VIPA System 300V

CP | 343-2AH10 | Manual

HB130E_CP | RE_343-2AH10 | Rev. 09/46

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VIPA art of automation

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Note

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CE Conformity

Hereby, VIPA GmbH declares that the products and systems are in compliance with the essential requirements and other relevant provisions of the following directives:

- 2004/108/EC Electromagnetic Compatibility Directive
- 2006/95/EC Low Voltage Directive

Conformity is indicated by the CE marking affixed to the product.

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Contents

About this manual

This manual describes the VIPA CP 343-2P ASI AS-i master from the System 300V. Here you may find every information for commissioning and operation.

Outline

Chapter 1: Basics

This basics contain hints for the usage of the System 300V modules. Besides the general information like dimensions and environment conditions, also basics about AS-i may be found here.

Chapter 2: Assembly and installation guidelines

In this chapter you will find all information, required for the installation and the cabling of a PLC system with the components of the System 300 and the CP 343-2P ASI.

Chapter 3: Hardware description

Here the hardware components of the CP 343-2P ASI are described.
The technical data are at the end of the chapter.

Chapter 4: Deployment CP 343-2P ASI

Here the deployment of the CP 343-2P ASI in the System 300 is described. The chapter starts with information about hardware configuration, button configuration and how to upload and deal with the AS-i configuration in the PG. In the following there is a description of the embedding in the your PLC system and the possibilities for diagnostics and troubleshooting are shown.

With information about the firmware update the chapter ends.

Chapter 5: Deployment command interface

This chapter contains the information, which is required to access the command interface of the VIPA CP 343-2P ASI. Via the command interface the response of the AS-i master may completely be controlled within your user program.

Objective and contents

The manual describes the CP 343-2P ASI from VIPA. It contains a description of the construction, project implementation and usage.

This manual is part of the documentation package with order number HB130E_CP and relevant for:

Product	Order number	as of state:	
		CP HW	CP FW
CP 343-2P ASI	VIPA 343-2AH10	01	V104

Target audience

The manual is targeted at users who have a background in automation technology.

Structure of the manual

The manual consists of chapters. Every chapter provides a self-contained description of a specific topic.

Guide to the document

The following guides are available in the manual:

- an overall table of contents at the beginning of the manual
- an overview of the topics for every chapter
- an index at the end of the manual.

Availability

The manual is available in:

- printed form, on paper
- in electronic form as PDF-file (Adobe Acrobat Reader)

Icons Headings

Important passages in the text are highlighted by following icons and headings:

Danger!
Immediate or likely danger.
Personal injury is possible.

Attention!
Damages to property is likely if these warnings are not heeded.

Note!
Supplementary information and useful tips.

Safety information

Applications conforming with specifications

The CP 343-2P ASI is constructed and produced for:

- all VIPA System 300 components
- communication and process control
- general control and automation applications
- industrial applications
- operation within the environmental conditions specified in the technical data
- installation into a cubicle

Danger!

This device is not certified for applications in

- in explosive environments (EX-zone)

Documentation

The manual must be available to all personnel in the

- project design department
- installation department
- commissioning
- operation

The following conditions must be met before using or commissioning the components described in this manual:

- Modification to the process control system should only be carried out when the system has been disconnected from power!
- Installation and modifications only by properly trained personnel
- The national rules and regulations of the respective country must be satisfied (installation, safety, EMC ...)

Disposal

National rules and regulations apply to the disposal of the unit!

Chapter 1 Basics

Overview

This basics contain hints for the usage of the System 300V modules. Besides the general information like dimensions and environment conditions, also basics about AS-i may be found here.

Content

Safety Information for Users

Handling of electrostatic sensitive modules

VIPA modules make use of highly integrated components in MOS-Technology. These components are extremely sensitive to over-voltages that can occur during electrostatic discharges.

The following symbol is attached to modules that can be destroyed by electrostatic discharges.

The Symbol is located on the module, the module rack or on packing material and it indicates the presence of electrostatic sensitive equipment.

It is possible that electrostatic sensitive equipment is destroyed by energies and voltages that are far less than the human threshold of perception. These voltages can occur where persons do not discharge themselves before handling electrostatic sensitive modules and they can damage components thereby, causing the module to become inoperable or unusable.

Modules that have been damaged by electrostatic discharges can fail after a temperature change, mechanical shock or changes in the electrical load.

Only the consequent implementation of protection devices and meticulous attention to the applicable rules and regulations for handling the respective equipment can prevent failures of electrostatic sensitive modules.

Shipping of modules

Modules must be shipped in the original packing material.

Measurements and alterations on electrostatic sensitive modules

When you are conducting measurements on electrostatic sensitive modules you should take the following precautions:

- Floating instruments must be discharged before use.
- Instruments must be grounded.

Modifying electrostatic sensitive modules you should only use soldering irons with grounded tips.

Attention!

Personnel and instruments should be grounded when working on electrostatic sensitive modules.

General description of the System 300V

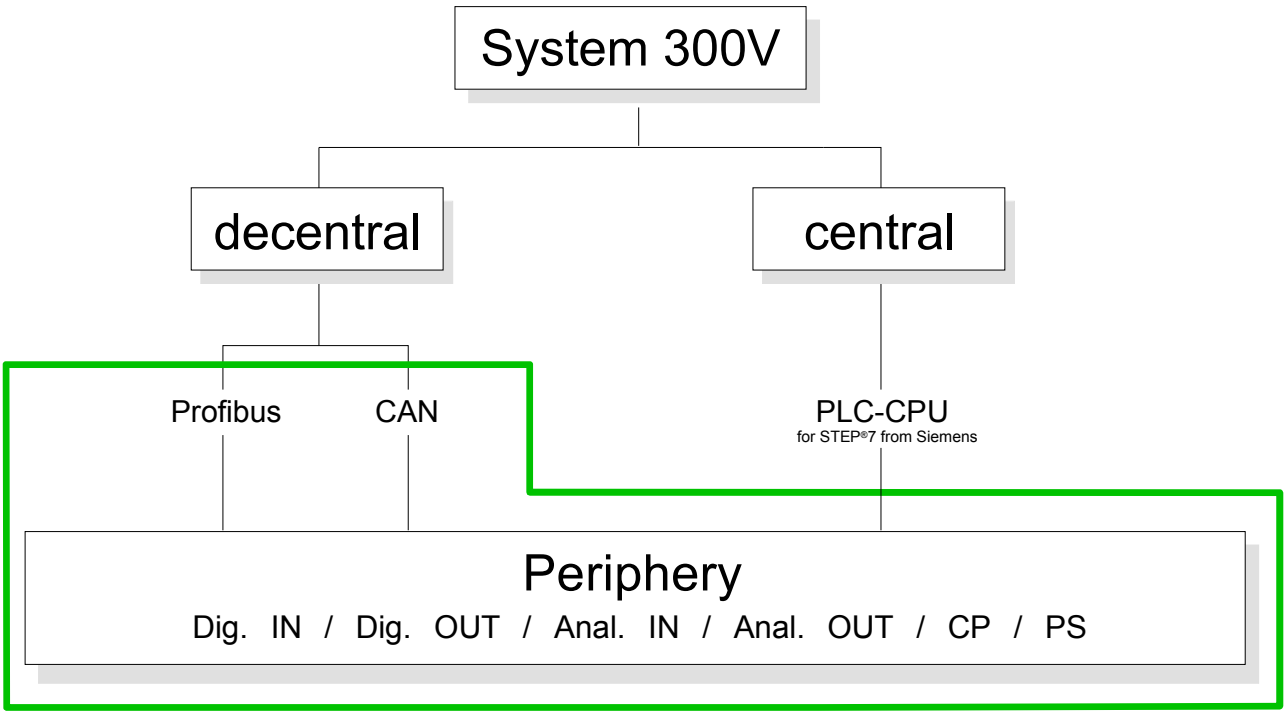
The System 300V

The System 300V is a modular automation system for middle and high performance needs, that you can use either distributed or non-distributed. The single modules are directly clipped to a 530 mm backplane and are connected together with the help of bus clips at the backside.

The single modules of the VIPA System 300V are design compatible to Siemens. Due to the compatible backplane bus it is no problem to mix the modules from VIPA and Siemens.

The CPUs of the System 300V are instruction set compatible to S7-300 from Siemens. The CPUs are programmed via the VIPA programming software WinPLC7 or the SIMATIC manager from Siemens or other available programming tools.

The following picture illustrates the performance range of the System 300V:



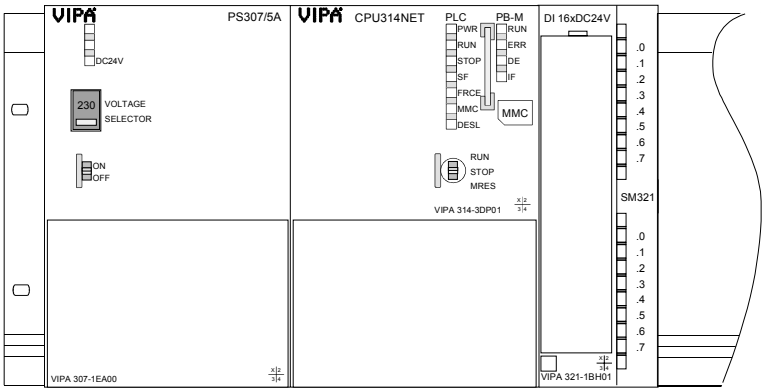
Components

Dimensions/ Weight

- Profile rail 530mm
- Peripheral modules with recessed labeling
- Dimensions of the basic enclosure:
  1tier width: (WxHxD) in mm: 40x125x120

Installation

Please regard that the power supply and header modules like CPUs and couplers may only plugged-in at the left side.



Reliability

- Wiring by means of spring pressure connections (CageClamps) at the front connector
- Core cross-section 0.08...2.5mm^2 or 1.5 mm^2
- Total isolation of the wiring at module change
- Potential separation of all modules to the backplane bus
- Burst/ESD acc. IEC 61000-4-2/IEC 61000-4-4 (up to level 3)
- Shock resistance acc. IEC 60068-2-6 / IEC 60068-2-27 (1G/12G)

Environmental conditions

- Operating temperature: 0 ... +60°C
- Storage temperature: -25 ... +70°C
- Relative humidity: 5...95% without condensation
- Ventilation by means of a fan is not required

Compatibility

The digital in-/output modules of the System 300V from VIPA are pin and function compatible to Siemens.
The project engineering happens in the SIMATIC manager from Siemens.

Basics AS-i

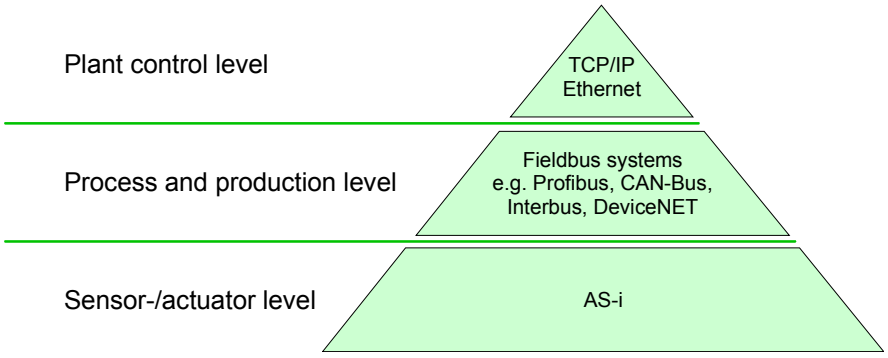
What is AS-i ?

AS-Interface (AS-i=**A**ktor-**S**ensor-**i**nterface) may be deployed at the field area as a communication system. It serves for the connection of sensors and actuators at the lowest control level with the goal to compensate the parallel wiring.

Data and energy (max. 8A) are transferred by the same line at AS interface. Here non-shielded 2-wire lines are used.

AS-Interface is a single master system. Data were cyclically (max. 10ms) exchanged between AS-i master and each configured AS-i slave by means of a serial protocol.

Here one telegram has 4bit user data. Up to 62 AS-i slaves may be connected to one AS-i master according to the specification 2.1



AS-i address

Within an AS-i net each AS-i slave has an individual address, which is not volatile programmed. The address 0 may not be used, since every AS-i slave has the address 0 on delivery and the address 0 is used at the AS-i master for the function *automatic address programming*.

AS-i slave profile

Each AS-i slave has a slave profile. The profile consists of 2 digits divided by a dot. The I/O configuration is represented by the 1. digit, the ID code (identification code) is represented by the 2. digit.

The direction of the data bits is described by the I/O configuration.

I: input, O: output, B: bidirectional

Slave profiles with the same I/O configuration where more near described by the ID code.

Connection to AS-i cable

An AS-i slave is connected to the two-wire-cable by means of the piercing technique. Here the insulating material is penetrated by two piercing connectors to get contact to the cable. Since the flat cable is mechanically coded, there is a protection against reverse polarity. The replacement of just mounted AS-i slaves is possible at any time. Here cables with self-healing effect are available.

Due to the arbitrary network topology e.g. bus, star or tree each AS-i slave may be mounted at any position within the network. Due to the small frequency a termination at the end of the lines is not necessary. The line length is limited to max. 100m. The line length may be increased up to 300m by means of a repeater.

Chapter 2 Assembly and installation guidelines

Overview

In this chapter you will find all information, required for the installation and the cabling of a PLC system with the components of the System 300 and the CP 343-2ASI.

Content

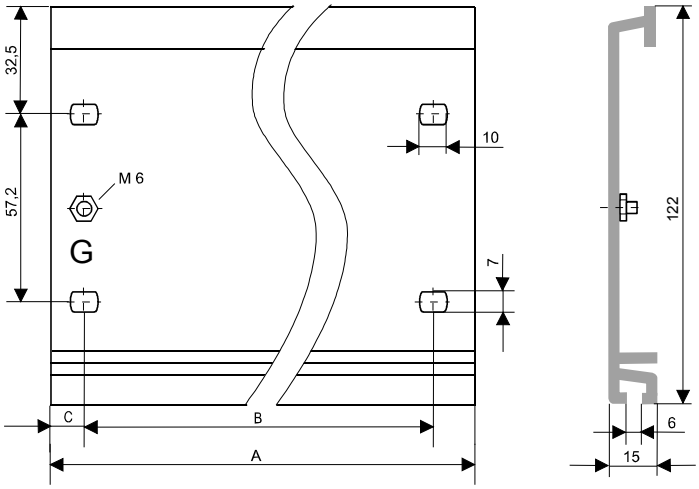
Overview

General

The single modules are directly installed on a profile rail and connected via the backplane bus coupler. Before installing the modules you have to clip the backplane bus coupler to the module from the backside.

The backplane bus couplers are included in the delivery of the peripheral modules.

Profile rail

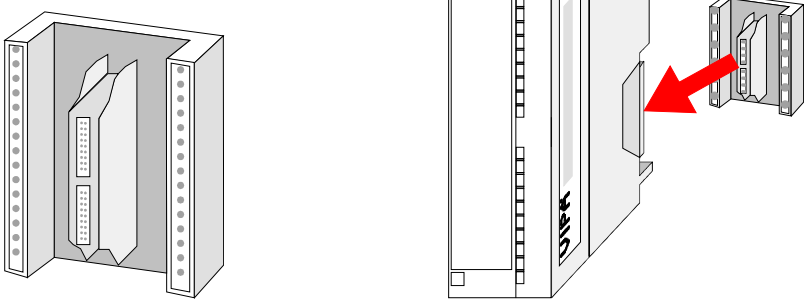


Order number	A	B	C
VIPA 390-1AB60	160mm	140mm	10mm
VIPA 390-1AE80	482mm	466mm	8.3mm
VIPA 390-1AF30	530mm	500mm	15mm
VIPA 390-1AJ30	830mm	800mm	15mm
VIPA 390-9BC00*	2000mm	-	15mm

* Unit pack: 10 pieces

Bus connector

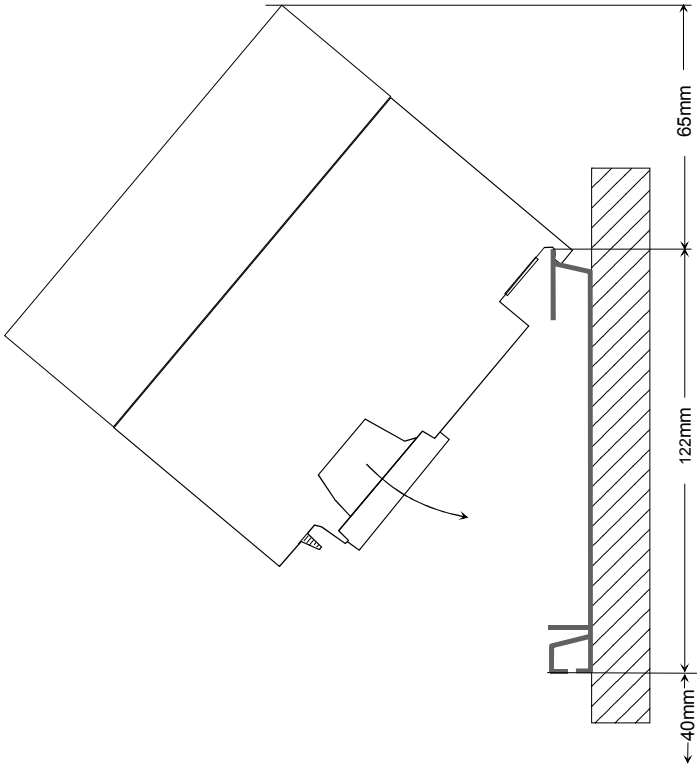
For the communication between the modules the System 300V uses a backplane bus connector. The backplane bus connectors are included in the delivering of the peripheral modules and are clipped at the module from behind before installing it to the profile rail.



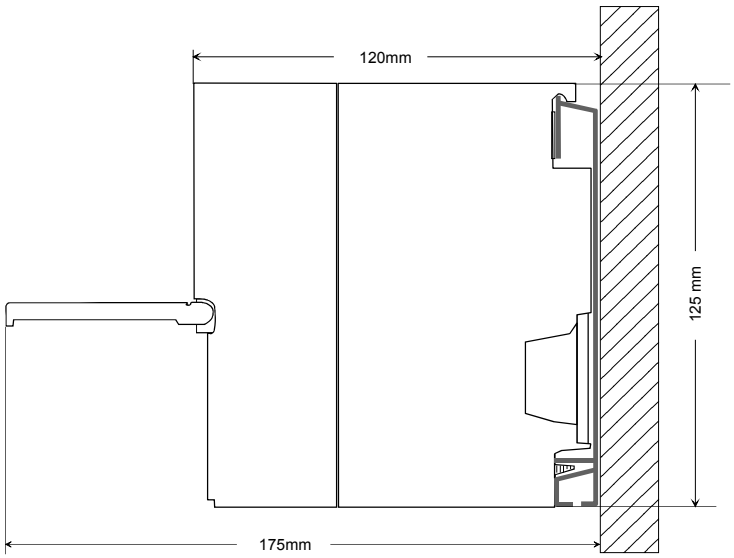
Installation dimensions

Dimensions Basic enclosure 1tier width (WxHxD) in mm: 40 x 125 x 120

Dimensions



Installation dimensions



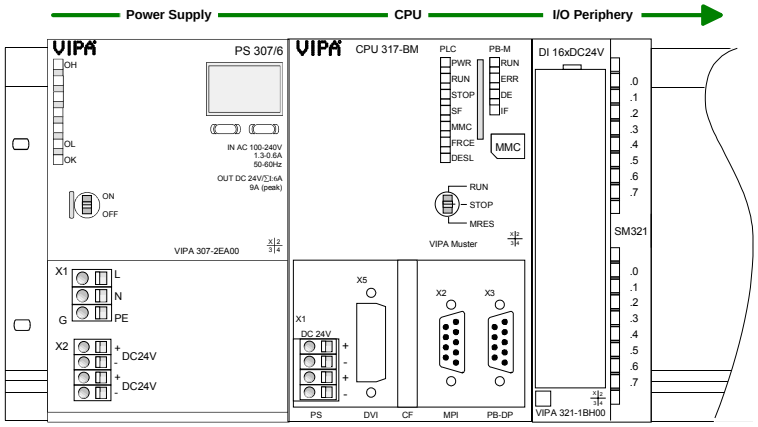
Installation at the profile rail

Structure:

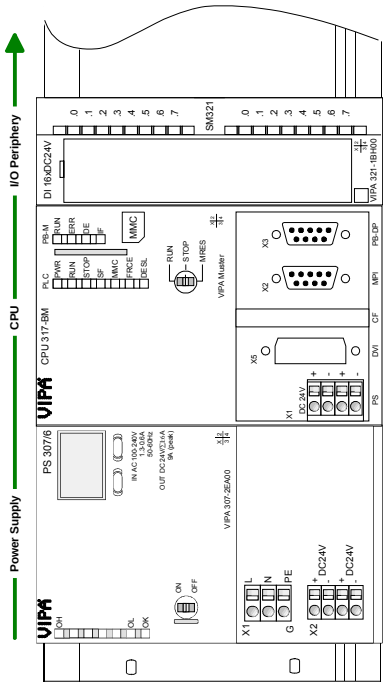
You may install the System 300V as well horizontal as vertical. Please regard the allowed environment temperatures:

- horizontal structure: from 0 to 60°
- vertical structure: from 0 to 40°

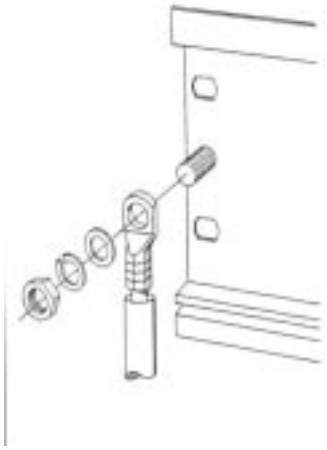
The horizontal structure always starts at the left side with the power supply and the CPU, then you plug-in the peripheral modules beside to the right.
You may plug-in maximum 32 peripheral modules to the CPU.



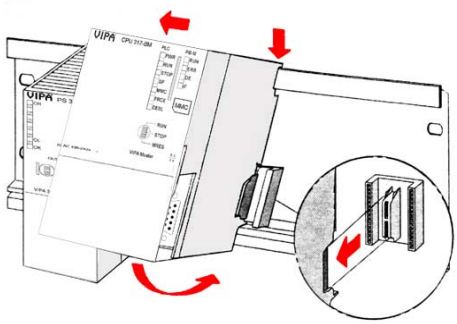
The vertical structure is turned for 90° against the clockwise direction.



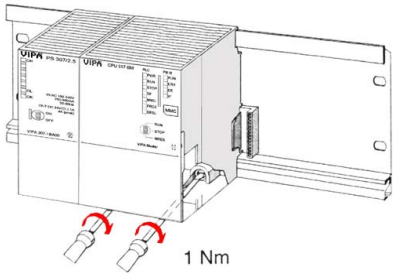
Approach



- Bolt the profile rail with the background (screw size: M6), so that you still have minimum 65mm space above and 40mm below the profile rail.
- If the background is a grounded metal or device plate, please look for a low-impedance connection between profile rail and background.
- Connect the profile rail with the protected earth conductor. For this purpose there is a bolt with M6-thread.
- The minimum cross-section of the cable to the protected earth conductor has to be 10mm^2.



- Stick the power supply to the profile rail and pull it to the left side to the grounding bolt of the profile rail.
- Fix the power supply by screwing.
- Take a bus coupler and click it at the CPU from behind like shown in the picture.
- Stick the CPU to the profile rail right from the power supply and pull it to the power supply.



- Click the CPU downwards and bolt it like shown.
- Repeat this procedure with the peripheral modules, by clicking a backplane bus coupler, stick the module right from the modules you've already fixed, click it downwards and connect it with the backplane bus coupler of the last module and bolt it.

Danger!

- Before installing or overhauling the System 300V, the power supplies must be disconnected from voltage (pull the plug or remove the fuse)!
- Installation and modifications only by properly trained personnel!

Cabling

Overview

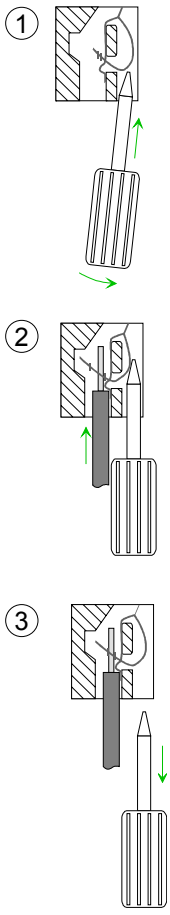
The power supplies and CPUs are exclusively delivered with CageClamp contacts. For the signal modules the front connectors are available from VIPA with screw contacts. In the following all connecting types of the power supplies, CPUs and input/output modules are described.

Danger!

- Before installation or overhauling, the power supplies must be disconnected from voltage (pull the plug or remove the fuse)!
- Installation and modifications only by properly trained personnel!

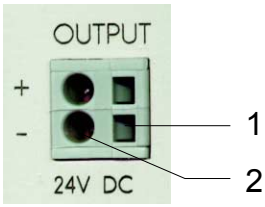
CageClamp technology (gray)

For the cabling of power supplies, bus couplers and parts of the CPU, gray connectors with CageClamp technology are used.



You may connect wires with a cross-section of 0.08mm^2 to 2.5mm^2. You can use flexible wires without end case as well as stiff wires.

You fix the conductors to the CageClamps like this:



[1] Rectangular opening for screwdriver

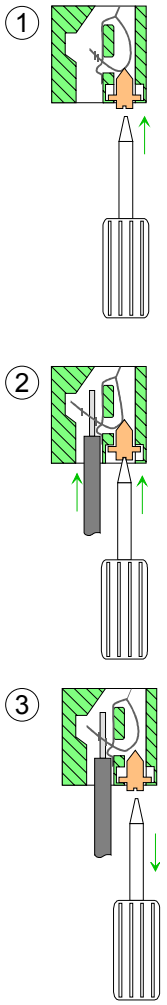
[2] Round opening for wires

The picture on the left side shows the cabling step by step from top view.

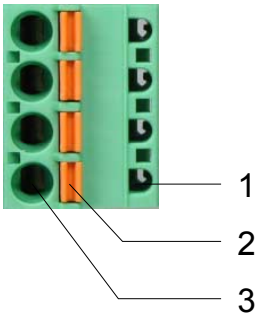
- To conduct a wire you plug a fitting screwdriver obliquely into the rectangular opening like shown in the picture.
- To open the contact spring you have to push the screwdriver in the opposite direction and hold it.
- Insert the de-isolated wire into the round opening. You may use wires with a cross-section from 0.08 mm^2 to 2.5 mm^2.
- By removing the screwdriver the wire is connected safely with the plug connector via a spring.

CageClamp technology (green)

For the cabling of e.g. the power supply of a CPU, green plugs with CageClamp technology are deployed.



Here also you may connect wires with a cross-section of 0.08mm^2 to 2.5 mm^2. You can use flexible wires without end case as well as stiff wires.



[1] Test point for 2mm test tip
[2] Locking (orange) for screwdriver
[3] Round opening for wires

The picture on the left side shows the cabling step by step from top view.

- For cabling you push the locking vertical to the inside with a suiting screwdriver and hold the screwdriver in this position.
- Insert the de-isolated wire into the round opening. You may use wires with a cross-section from 0.08mm^2 to 2.5mm^2.
- By removing the screwdriver the wire is connected safely with the plug connector via a spring.

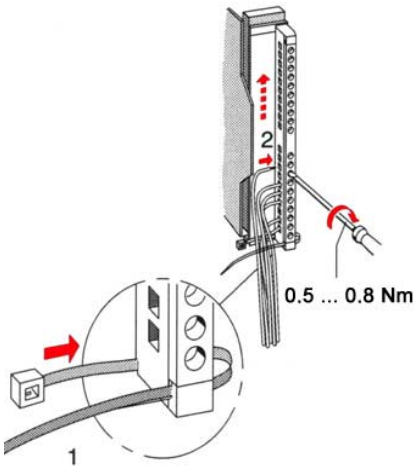
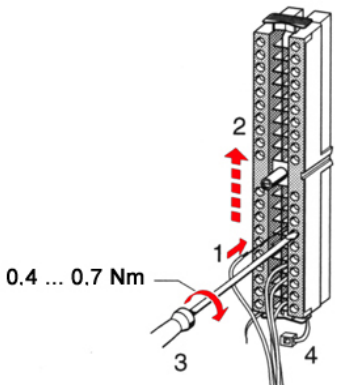
Note!

In opposite to the gray connection clamp from above, the green connection clamp is realized as plug that can be clipped off carefully even if it is still cabled.

Front connectors of the in-/output modules

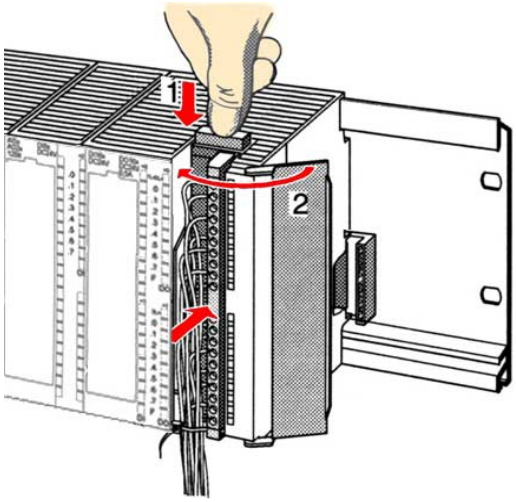
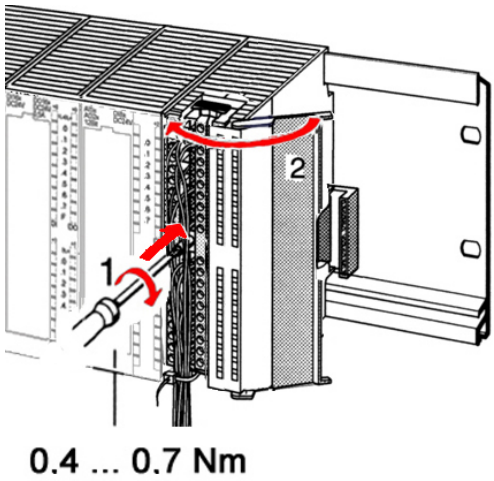
In the following the cabling of the three variants of the front-facing connector is shown:

For the I/O modules the following plugs are available at VIPA:

<table>
<tr><th>20pole screw connection
VIPA 392-1AJ00</th><th>40pole screw connection
VIPA 392-1AM00</th></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">Open the front flap of your I/O module.</td></tr>
<tr><td colspan="2">Bring the front connector in cabling position.
For this you plug the front connector on the module until it locks. In this position the front connector juts out of the module and has no contact yet.</td></tr>
<tr><td colspan="2">De-isolate your wires. If needed, use core end cases.</td></tr>
<tr><td>Thread the included cable binder into the front connector.</td><td></td></tr>
<tr><td colspan="2">If you want to lead out your cables from the bottom of the module, start with the cabling from bottom to top, res. from top to bottom, if the cables should be led out at the top.</td></tr>
<tr><td colspan="2">Bolt also the connection screws of not cabled screw clamps.</td></tr>
<tr><td> 
</td><td>Put the included cable binder around the cable bundle and the front connector.
 
</td></tr>
<tr><td colspan="2">Fix the cable binder for the cable bundle.</td></tr>
</table>

continued ...

... continue

<table>
<tr><th>20pole screw connection</th><th>40pole screw connection</th></tr>
<tr><td>Push the release key at the front connector on the upper side of the module and at the same time push the front connector into the module until it locks.
 
</td><td>Bolt the fixing screw of the front connector.
 
</td></tr>
<tr><td colspan="2">Now the front connector is electrically connected with your module.</td></tr>
<tr><td colspan="2">Close the front flap.</td></tr>
<tr><td colspan="2">Fill out the labeling strip to mark the single channels and push the strip into the front flap.</td></tr>
</table>

Installation Guidelines

General

The installation guidelines contain information about the interference free deployment of System 300V systems. There is the description of the ways, interference may occur in your control, how you can make sure the electromagnetic digestibility (EMC), and how you manage the isolation.

What means EMC?

Electromagnetic digestibility (EMC) means the ability of an electrical device, to function error free in an electromagnetic environment without being interferenced res. without interferencing the environment.

All System 300V components are developed for the deployment in hard industrial environments and fulfill high demands on the EMC. Nevertheless you should project an EMC planning before installing the components and take conceivable interference causes into account.

Possible interference causes

Electromagnetic interferences may interfere your control via different ways:

- Fields
- I/O signal conductors
- Bus system
- Current supply
- Protected earth conductor

Depending on the spreading medium (lead bound or lead free) and the distance to the interference cause, interferences to your control occur by means of different coupling mechanisms.

One differs:

- galvanic coupling
- capacitive coupling
- inductive coupling
- radiant coupling

Basic rules for EMC

In the most times it is enough to take care of some elementary rules to guarantee the EMC. Please regard the following basic rules when installing your PLC.

- Take care of a correct area-wide grounding of the inactive metal parts when installing your components.
  - Install a central connection between the ground and the protected earth conductor system.
  - Connect all inactive metal extensive and impedance-low.
  - Please try not to use aluminum parts. Aluminum is easily oxidizing and is therefore less suitable for grounding.
- When cabling, take care of the correct line routing.
  - Organize your cabling in line groups (high voltage, current supply, signal and data lines).
  - Always lay your high voltage lines and signal res. data lines in separate channels or bundles.
  - Route the signal and data lines as near as possible beside ground areas (e.g. suspension bars, metal rails, tin cabinet).
- Proof the correct fixing of the lead isolation.
  - Data lines must be laid isolated.
  - Analog lines must be laid isolated. When transmitting signals with small amplitudes the one sided lying of the isolation may be favorable.
  - Lay the line isolation extensively on an isolation/protected earth conductor rail directly after the cabinet entry and fix the isolation with cable clamps.
  - Make sure that the isolation/protected earth conductor rail is connected impedance-low with the cabinet.
  - Use metallic or metalized plug cases for isolated data lines.
- In special use cases you should appoint special EMC actions.
  - Wire all inductivities with erase links that are not addressed by the System 300V modules.
  - For lightening cabinets you should prefer incandescent lamps and avoid luminescent lamps.
- Create a homogeneous reference potential and ground all electrical operating supplies when possible.
  - Please take care for the targeted employment of the grounding actions. The grounding of the PLC is a protection and functionality activity.
  - Connect installation parts and cabinets with the System 300V in star topology with the isolation/protected earth conductor system. So you avoid ground loops.
  - If potential differences between installation parts and cabinets occur, lay sufficiently dimensioned potential compensation lines.

Isolation of conductors

Electrical, magnetic and electromagnetic interference fields are weakened by means of an isolation, one talks of absorption.

Via the isolation rail, that is connected conductive with the rack, interference currents are shunt via cable isolation to the ground. Hereby you have to make sure, that the connection to the protected earth conductor is impedance-low, because otherwise the interference currents may appear as interference cause.

When isolating cables you have to regard the following:

- If possible, use only cables with isolation tangle.
- The hiding power of the isolation should be higher than 80%.
- Normally you should always lay the isolation of cables on both sides. Only by means of the both-sided connection of the isolation you achieve a high quality interference suppression in the higher frequency area.

  Only as exception you may also lay the isolation one-sided. Then you only achieve the absorption of the lower frequencies. A one-sided isolation connection may be convenient, if:
  - the conduction of a potential compensating line is not possible
  - analog signals (some mV res. µA) are transferred
  - foil isolations (static isolations) are used.
- With data lines always use metallic or metalized plugs for serial couplings. Fix the isolation of the data line at the plug rack. Do not lay the isolation on the PIN 1 of the plug bar!
- At stationary operation it is convenient to de-isolate the isolated cable interruption free and lay it on the isolation/protected earth conductor line.
- To fix the isolation tangles use cable clamps out of metal. The clamps must clasp the isolation extensively and have well contact.
- Lay the isolation on an isolation rail directly after the entry of the cable in the cabinet. Lead the isolation further on to the System 300V module and **don't** lay it on there again!

Please regard at installation!

At potential differences between the grounding points, there may be a compensation current via the isolation connected at both sides.

Remedy: Potential compensation line

Chapter 3 Hardware description

Overview

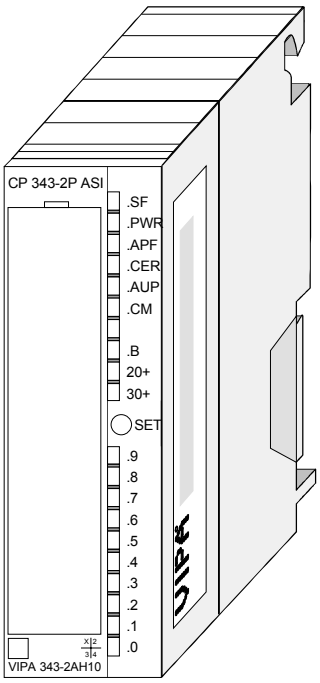
Here the hardware components of the CP 343-2ASI are described.
The technical data are at the end of the chapter.

Content

Properties

CP 343-2P ASI
343-2AH10

- up to 62 slaves are connectable
- corresponds to AS-i specification 3.0 (master profile M3)
- Analog slaves concerning the profile 7.3 respectively 7.4 are supported
- direct access to digital periphery via peripheral address
- automatic address programming by means of address 0 possible
- Button configuration of current configuration into non-volatile memory
- current configuration may be uploaded to the PG
- compatibility to Siemens FC "ASI_3422"
- Diagnostic functions are supported
- Cycle time 10.5ms
- Cyclical slave status display by LEDs on the front side
- Firmware update by SPEED7 CPU possible

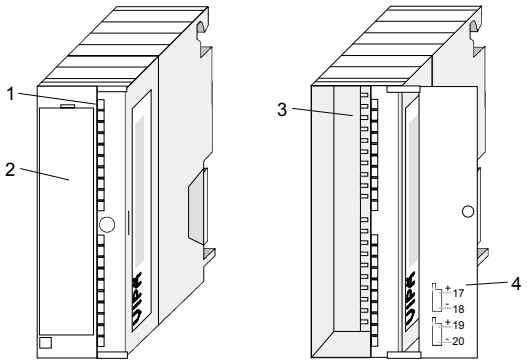


Order data

Type	Order number	Description
CP 343-2P ASI	VIPA 343-2AH10	CP 343 AS-i master

Structure

CP 343-2P ASI
343-2AH10



[1] LEDs

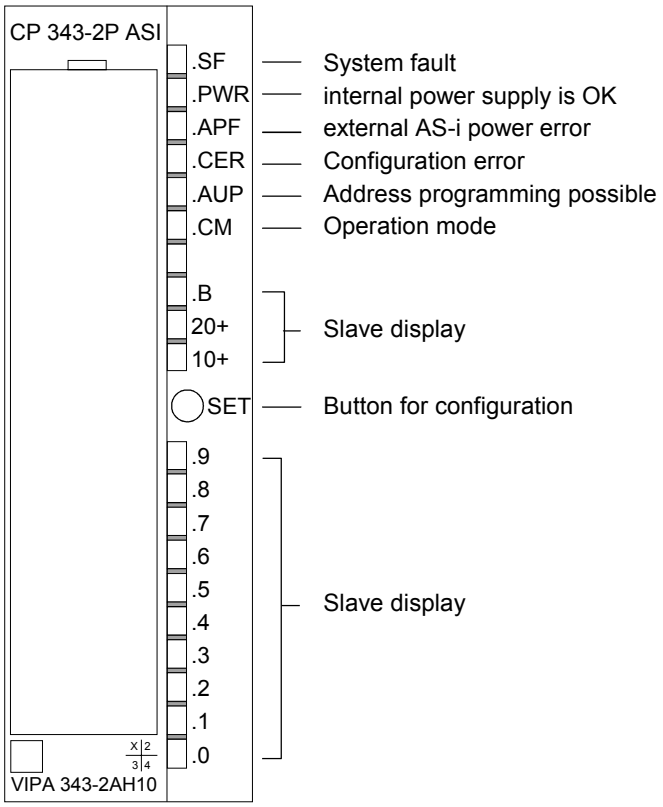
[2] flap with labeling strip

[3] contact bar

[4] flap opened with inner label

Pin assignment
Circuit diagram

Pin	Assignment	Circuit diagram
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17	AS-i + (brown)	+ 17
18	AS-i - (blue)	- 18
19	AS-i + (brown)	+ 19
20	AS-i - (blue)	- 20



Description

"SET" button

The "SET" button is required for configuring the CP in standard operation. The button is only activated when the CPU is in the STOP mode.

If the CP is in the *configuration mode*, the CP is configured automatically when the button is pressed. Configuration involves the following steps:

- The CP stores the existing slave configuration, which is indicated by the slave display, as desired configuration in the Flash-ROM.
- The CP then changes to the *protected mode*.

If the CP is in the *protected mode*, pressing the button "SET" the CP switches to the *configuration mode*.

LEDs of the CP

LED	Color	Meaning
SF	red	System fault The LED is lit, when: • the CP is in the *protected mode* and an AS-i configuration error has occurred (for example slave failed) • the CP detects an internal fault (e.g. Flash-ROM defective) • the CP cannot change to the mode requested with the "SET" button (for example a slave exists with address 0).
RUN	green	Indicates that the CP has started up correctly.
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 there is a complete power fail.
CER	yellow	Configuration error This LED indicates whether the slave configuration detected on the AS-i cable matches the configuration configured on the CP (LPS). If they do not match, the CER LED is lit.
AUP	green	Autoprog available In the *protected mode* of the CP, this indicated that automatic address programming of a slave is possible. Automatic address programming makes it easier to replace a defective slave on the AS-i cable.
CM	yellow	Configuration Mode This LED indicates the mode: on: *configuration mode* off: *protected mode*
B	green	Slave display: Slave of the B address area
20+	green	Slave display: group of 20
10+	green	Slave display: group of 10
0...9	green	Slave display: Slave address of the corresponding group

Display of the detected and activated AS-i slaves

The detected and activated slaves are indicated by the LEDs .0 to .9 and the LEDs 10+, 20+, B. The activated slaves are displayed in groups of ten. The switchover is time-controlled. The LEDs labeled 10+, 20+ indicate which group of 10 is currently displayed by LEDs .0 to .9. If the B LED is lit, this indicates that the detected and activated slaves are slaves from the extended address area B.

Characteristics of the Slave display:

- If the CP is in the *configuration mode*, all detected AS-i slaves are displayed.
- If the CP is in the *protected mode*, all activated AS-i slaves are indicated by the LED being permanently lit. Failed or existing but not configured AS-i slave are indicated by corresponding LED flashing.

Examples for the Slave Display

Example 1 Slaves with the Addresses 1, 2, and 6 detected res. activated	Example 2 Slaves with the Addresses 21, 22, and 26 detected res. activated	Example 3 Slaves with the Addresses 11B, 12B and 16B detected res. activated	Example 4 Slave with the Addresses 31B, 32B and 36B detected res. activated
○ .B	○ .B	● .B	● .B
○ 20+	● 20+	○ 20+	● 20+
○ 10+	○ 10+	● 10+	● 10+
○ .9	○ .9	○ .9	○ .9
○ .8	○ .8	○ .8	○ .8
○ .7	○ .7	○ .7	○ .7
● .6	● .6	● .6	● .6
○ .5	○ .5	○ .5	○ .5
○ .4	○ .4	○ .4	○ .4
○ .3	○ .3	○ .3	○ .3
● .2	● .2	● .2	● .2
● .1	● .1	● .1	● .1
○ .0	○ .0	○ .0	○ .0

on: ● off: ○

Technical Data

CP 343-2P ASI

Module name	343-2AH10
Dimensions and weight	
Dimensions W x H x D	40 x 125 x 120mm
Weight	200g
Voltages, Currents, Potentials	
Current consumption from backplane bus	max. 200mA
Power supply from backplane bus	DC 5V
Current consumption from the AS-i cable	max. 100mA
Power supply from the AS-i cable	According to the AS-i specification
Power dissipation of the module	2.5W
Data for Specific Module	
Bus cycle time	5ms with 31 Slaves 10ms for 62 Slaves with extended addressing mode
Configuration	using a button on the front or FC "ASI_3422"
Supported AS-i master profiles	AS-i specification 3.0 (master profile M3)
Connection of the AS-i cable	via front connector with screw contacts (20pin) Current load between contact 17 and 19 res. between 18 and 20 max. 4A
Address area	16 I bytes and 16 Q byte in the analog area
Environment conditions	
Operating temperature Transportation and storage temperature Relative humidity	0...60°C -40°C to +70°C max. 95% at +25°C

Chapter 4 Deployment CP 343-2P ASI

Overview

Here the deployment of the CP 343-2P ASI in the System 300 is described. The chapter starts with information about hardware configuration, button configuration and how to upload and deal with the AS-i configuration in the PG. In the following there is a description of the embedding in the your PLC system and the possibilities for diagnostics and troubleshooting are shown.

With information about the firmware update the chapter ends.

Content

Fast introduction

Hardware configuration

- Configure a profile rail
- Configure the CPU with modules
- Configure as VIPA CP 343-2P ASI the Siemens CP with order number 6GK7 343-2AH10-0XA0.
- Save and translate you project and transfer it to the CPU.

Button configuration

The actual configuration of the connected AS-i slaves is stored in the internal Flash-ROM of the CP by means of the button configuration.

Please regard that there is no slave with address "0" connected.

- Supply your system with power
- Switch the CPU to "STOP"
- Push the "SET" button

Upload the current configuration to the PG for changes if necessary

The transfer of the current configuration from the CP to your project happens by means of the register "AS-i Slave Options" at the properties dialog of the CP. The configuration is transferred to the project by the button "Upload to PG". This configuration may be accessed by the register "Slave Configuration". Here the configuration may be changed or further configurations may be configured based on this configuration.

Access by the user program

Depending on the slave type there are the following possibilities for access with the user program:

Access to ...	Type A/B (standard)	Type A	Type B
Binary data			
Peripheral load and transfer instructions	X	X	
SFC 58/59 (write/read: record set 150)	X	-	X
Analog data			
SFC 58/59 (write/read: record set 140...147)	X	-	-

Note!

Please regard a configuration produced respectively modified by the Siemens SIMATIC manager always has priority in relation to a button configuration! At start-up of the CPU the CP gets its AS-i configuration from the CPU. Here a possibly existing button configuration is overwritten.

Hardware configuration

Overview

The description here refers to modules that are at the same bus together with the CPU. In order to address the installed peripheral modules individually, specific addresses in the CPU have to be assigned to them.

The allocation of addresses and the configuration of the installed modules is a function of the Siemens SIMATIC manager.

Here navigate within the hardware catalog to the according CP and place it at the S7-300 station.

After the CP is inserted, there is still no AS-i slave configured. Here there is the possibility for "button configuration". The current configuration may be stored by the "button configuration"

Note!

Please regard a configuration produced respectively modified by the Siemens SIMATIC manager always has priority in relation to a button configuration! At start-up of the CPU the CP gets its AS-i configuration from the CPU. Here a possibly existing button configuration is overwritten.

Project engineering

- Start the Siemens SIMATIC Manager.
- Swap to the hardware configurator.
- Place a profile rail via drag&drop from the hardware catalog to the project window.
- Project the CPU and the corresponding modules. Place the corresponding modules via drag&drop from the hardware catalog to the corresponding slot of the profile rail.
- To project the VIPA CP 343 the Siemens CP 343-2P (6GK7 343-2AH10-0XA0) at the according slot is to be used.
- Save and translate your project and transfer it to the CPU.
- Execute a button configuration (see "Button configuration")
- Upload the current configuration into the PG (see "Upload current configuration to PG").
- The current configuration may be checked respectively modified by the properties of the CP 343-2P. More information about the configuration of an AS-i slave may be found at the same named part in this chapter.

CP 343-2P ASI Properties

The properties of the CP may be accessed by a double click at the CP within your project in the hardware configurator. The parameters of the VIPA CP 343-2P ASI may be modified by the registers in the following described.

General

Short Description

The short description with the information below is identical to the shown Information in the "hardware catalog" window.

Order No.

Here the order number of the Siemens CP 343-2P is displayed. For project engineering of the VIPA CP 343-2P ASI the Siemens CP with order number 6GK7 343-2AH10-0XA0 is to be used.

Name

This displays the designation of the CP, which may be changed. If the designation is changed, the new designation appears in your project in the configuration table.

Comment

In this part the purpose of the module may be entered.

Addresses

Inputs / Outputs

By presetting a start address for the input respectively output area the beginning of the address area of the CPU may be determined, which is mapped by the CP. Here the CP occupies for input and output 16byte each.

1 byte of the 16byte I/O address area is used by 2 A/B (standard) respectively A slaves for binary-coded data.

Process image

With the process image a consistent image of the process signal may be accessed during the program cycle.

If the field *process image* shows the entry "---" then the set address area is outside the process image. The entry "OB1-PA" indicates that the set address area is within the process image.

Operating Parameters

Diagnostic Interrupt

By activation of this checkbox the diagnostic interrupt for the CP is enabled. If enabled the following events may release a diagnostic interrupt:

- Change of AS-i slave configuration in *protected mode*
- Loss of AS-i power supply
- Error at Flash-ROM

The reaction on the variety of errors may be programmed in the OB 82.

Automatic Address Programming

When enabled and the AS-i master is in *protected mode,* a failed AS-i slave may simply be replaced with a AS-i slave with address 0.

In this case, the AS-i master will automatically assign the address of the replaced AS-i slave to the new AS-i slave.

Slave Configuration

This register shows the configuration of the AS-i bus. If you have already uploaded a configuration made by "button configuration" into your project, this may be checked respectively modified here.

Via double click to a line of the table a dialog window is opened. There the corresponding AS-i slave may be configured. More may be found at "Configuration AS-i slave".

AS-i slave options

The configuration, stored in the Flash-ROM of the CP, may be uploaded to your project by clicking to the button [Upload to PG]. More may be found at "Uploading the current configuration to PG".

Button configuration

Overview

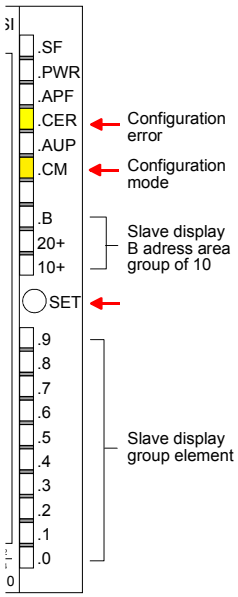
The current configuration of AS-i slaves may be recorded by the *button configuration.* After fulfillment of certain conditions the current configuration may be stored in the Flash-ROM of the CP by pushing the "SET" button of the CP. Here the CP changes its mode from *protected mode* to *configuration mode* and back again, this is shown by the "CM" LED.

By uploading to the PG, the current configuration may be modified in the Siemens SIMATIC manager.

Precondition

- Your system is mounted at least consisting of CPU and AS-i master CP.
- The CPU must be switched to STOP.
- The AS-i master CP and every AS-i slave is to be connected to the AS interface and supplied by an AS-i power supply.
- The AS-i slaves must have unique addresses other than "0". To change an address the command 0Fh (see description of the AS-i slave commands) may be used. Depending on the manufacturer an appropriate software tool may be enclosed to your AS-i slave for the address change.

Proceeding



- Check whether the CP is in *configuration mode.* The "CM"-LED is on in *configuration mode.* If not, press the "SET" button → the CP jumps to the *configuration mode.* This is shown by the "CM" LED.
- Check whether all the slaves connected to the AS interface exist and are displayed. Here the LEDs of the slave display serve for. The detected and activated slaves are indicated by the LEDs 0...9 and the LEDs 10+, 20+, B. The display is time-controlled in groups of 10. More of the functionality of the LEDs may be found at the hardware description.
- By pressing the "SET" button once more, the current configuration is stored in the non-volatile Flash-ROM of the CP an the CP is switched to the *protected mode.* The "CM"-LED and "CER"-LED go off since the stored configuration matches to the current configuration, now.

Note!

Changing from the *configuration mode* to the *protected mode* is only possible when there is no AS-i slave with address 0 connected to the AS-interface. Otherwise the "SF"-LED lights up when the SET button is pressed.

If the AS-i power supply is missing ("APF"-LED is on) respectively no AS-i slave is connected, all the internal lists are set to their default values (all the AS-i parameters = Fh, AutoAddress_enable = 1).

Uploading the current configuration to PG

Overview

In the Siemens SIMATIC manager there is the possibility to transfer the current configuration stored in the Flash-ROM of the CP to your project. Here the register "AS-i slave options" of the "properties" of the CP may be used. The configuration is transferred to your project by the button [Upload to PG].

Here this configuration may be changed or used for further configurations. In addition the configuration may be checked without confirmation by leaving the dialog with [cancel] button after checking it up.

Precondition

- Create a basic configuration. Here insert the CP 343-2P without AS-i slaves to the hardware configuration.
- Save and translate your project and transfer it to the CPU.
- Execute a button configuration (see same named chapter). The current configuration is now stored in the Flash-ROM of the CP.

Procedure

- Open the properties of the CP 343-2P in the Siemens hardware configurator.
- Select the register "AS-i slave options".
- Click to the button [Upload to PG]. Since during this procedure a configuration in your project is overwritten, an appropriate warning is to be confirmed before.
- Go to the register "Slave configuration". Here the current configuration may be checked and handled.

Note!

To use the function for information despite an existing configuration, the current configuration may be uploaded and then after checking it, the dialog is to be closed with the [Chancel] button. So the current project is not influenced.

Configuration AS-i slave

Overview

The adjustments set at the hardware configuration described above, are sufficient for access to your AS-i salves from your user program.

More information to change respectively to extend the AS-i slave configuration may be found here.

Note!

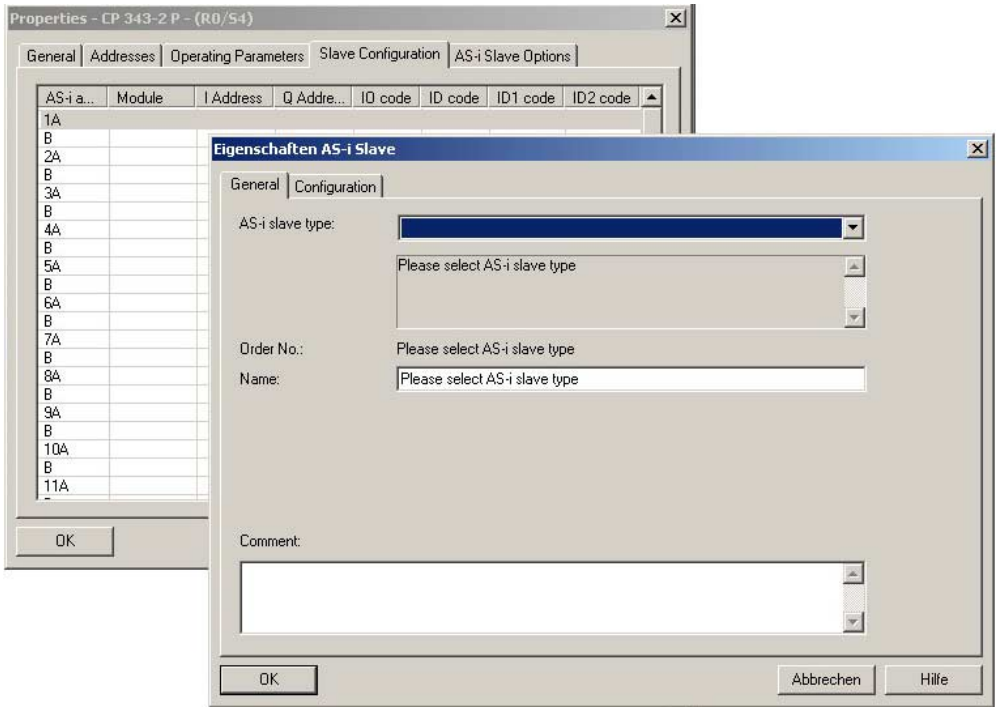
A configuration produced respectively modified by the Siemens SIMATIC manager has priority to a button configuration.

During the start-up of the CPU the AS-i configuration is transferred to the CP. Here a possibly existing button project is overwritten.

Configure an AS-i slave

To configure a special slave configuration the register "Slave configuration" is to be chosen in the properties dialog of the CP 343-2P.

Double-click at that line of the shown table, in which you would like to register respectively change a slave with the according address. This opens the following properties window:



Here the structure and the properties of the AS-i slave may be defined. The dialog window contains the following elements:

General

AS-i slave type

Select the type of AS-i slave you are using. There are the following types:

- AS-i standard slave
- AS-i A/B slave

AS-i standard slave

Basically the AS-i standard slave may only be placed at the A area of an AS-i address. If this slave type is used, no further AS-i slave of the type A/B may be used at the B area of the same AS-i address. Please use the AS-i standard slave type likewise for the analog slaves. The properties of the analog interface may be preset by the register "Configuration". The corresponding parameters may be found at the documentation of your AS-i slave.

AS-i A/B slave

An AS-i A/B slave may be placed at the A area or at the B area of an AS-i address. The B area may only be used if no AS-i standard slave is placed in the A area.

Order No.

Here an internal designation is shown, which is assigned to the corresponding AS-i slave type.

Name

The short designation of the AS-i slave may be entered here. If the designation is changed, the new designation is shown in the project in the configuration table.

Comment

Here the targeted application of the module may be entered.

Configuration

Information of the parameters to be set here may be found at the documentation of your AS-i salve.

I/O configuration IDx code

Here the I/O configuration respectively the ID code of your AS-i slave may be set.

With AS-i standard slaves set the ID1/2 code as default value to Fh an.

Parameter

Enable the available bits according to the AS-i slave documentation. Here e.g. an AS-i slave may be adjusted to the connected sensors.

For the standard AS-i slave the bits 0...3 may be used. The bits 0...2 may be used with an A/B slave. Bit 3 is reserved for address switch.

Data transfer with the user program

Overview

Depending on the slave type there are the following possibilities for access from the user program:

Access to ...	Type A/B (standard)	Type A	Type B
binary data			
Peripheral load and transfer instructions	X	X	
SFC 58/59 (read/write: Record set 150)	X	-	X
analog data			
SFC 58/59 (read/write: Record set 140...147)	X	-	-

Access to binary data at A/B-(Standard) / A slave

Each AS-i A/B-(standard) or A slave is assigned four bits "nibble" by the AS-i master. This nibble may be accessed by the user program by means of peripheral load and transfer instructions as e.g.:

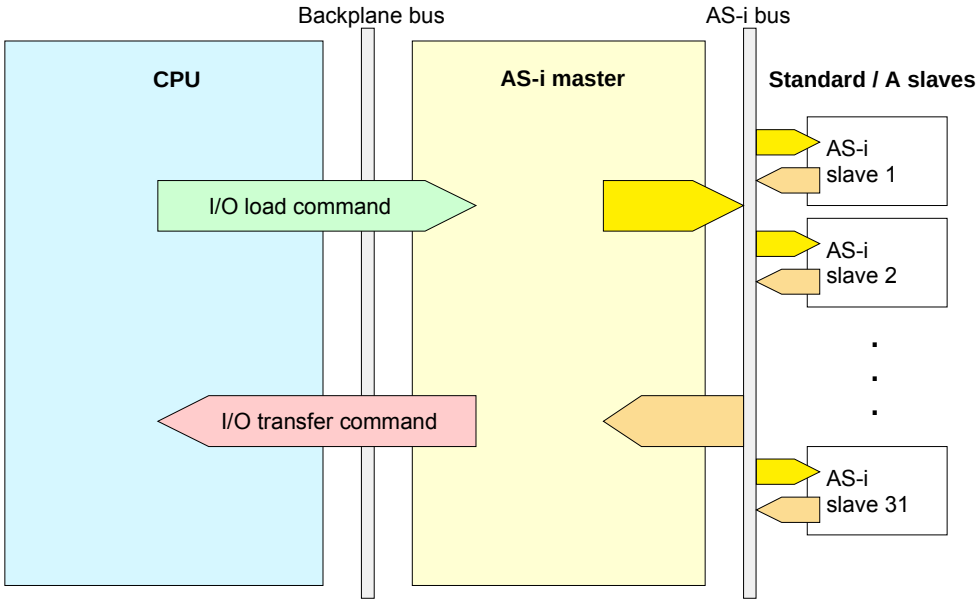
L PIW x (Access to slave input data)
L PID x
T PQW x (Access to slave output data)
T PQD x

with x byte address in AS-i master CP

Please regard that the input nibbles of the AS-i analog slaves are set to "0" in the process image of the CP. The CP ignores the output nibbles.

Note!

For system internal reasons the access to even byte addresses is only allowed in words or double words. Byte transfer operations are not allowed.



Nibble allocation

The following table shows the nibble allocation in the CP corresponding to the address area of the CPU.

Byte in CPU	Bit 7...4				Bit 3...0			
	Bit3	Bit2	Bit1	Bit0	Bit3	Bit2	Bit1	Bit0
n*	reserved				A/B / A slave 1			
n+1	A/B / A slave 2				A/B / A slave 3			
n+2	A/B / A slave 4				A/B / A slave 5			
n+3	A/B / A slave 6				A/B / A slave 7			
n+4	A/B / A slave 8				A/B / A slave 9			
n+5	A/B / A slave 10				A/B / A slave 11			
n+6	A/B / A slave 12				A/B / A slave 13			
n+7	A/B / A slave 14				A/B / A slave 15			
n+8	A/B / A slave 16				A/B / A slave 17			
n+9	A/B / A slave 18				A/B / A slave 19			
n+10	A/B / A slave 20				A/B / A slave 21			
n+11	A/B / A slave 22				A/B / A slave 23			
n+12	A/B / A slave 24				A/B / A slave 25			
n+13	A/B / A slave 26				A/B / A slave 27			
n+14	A/B / A slave 28				A/B / A slave 29			
n+15	A/B / A slave 30				A/B / A slave 31			

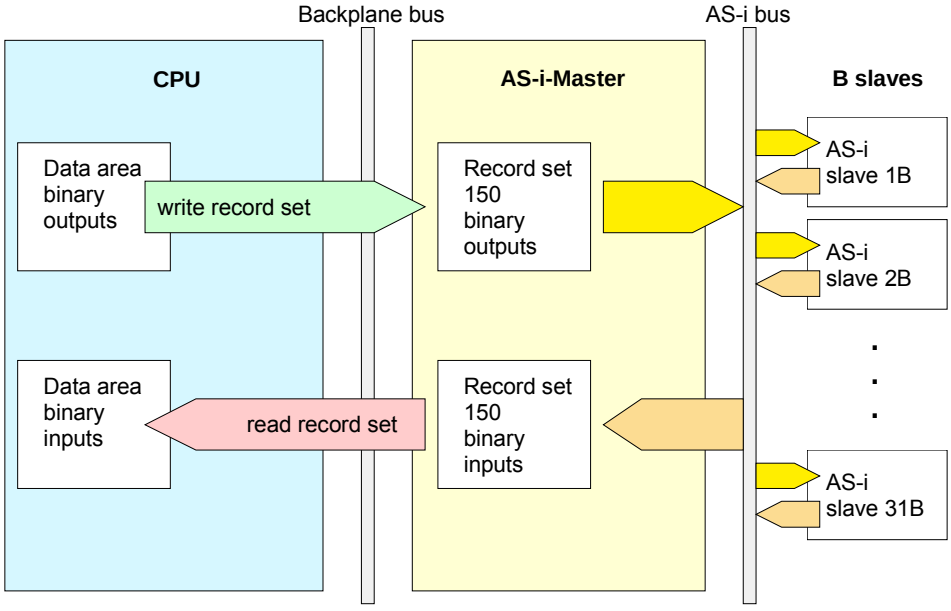
*) Configured I/O address of the CP in the CPU

Access to binary data at B slave

Binary coded data of a B slave are handled in two 16byte large areas for input and output by the CP.

The structure of these areas corresponds to the structure of binary data for A/B-(standard) respectively A slaves.

You access these areas by means of the system function blocks SFC 58/59 (read/write). For this the record set 150 is to be used.



Address allocation

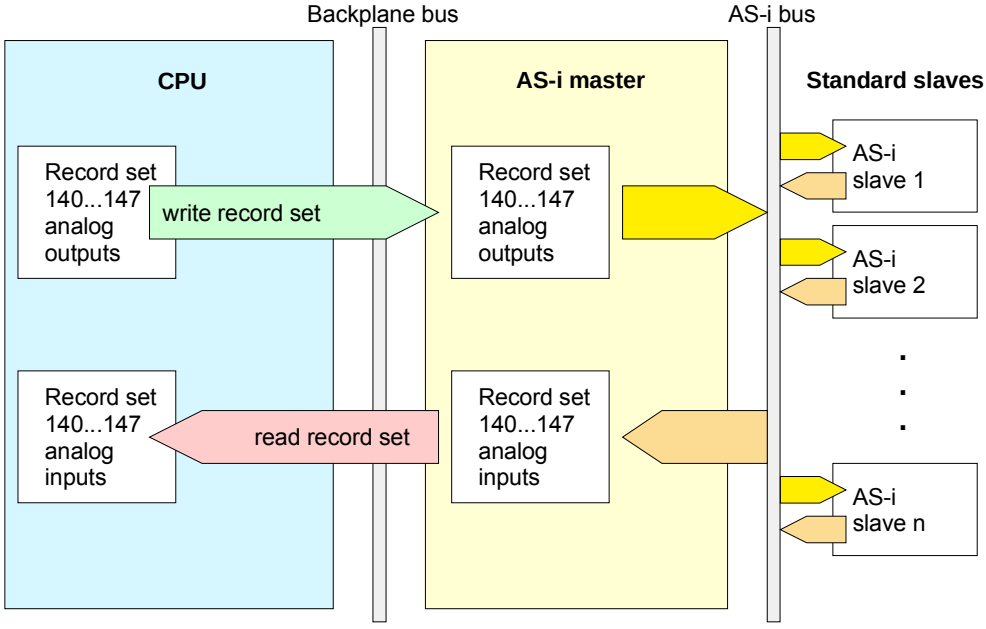
The following table shows the address allocation in the CP corresponding to the byte number in record set 150.

I/O byte no.	Bit 7...4				Bit 3...0			
	Bit3	Bit2	Bit1	Bit0	Bit3	Bit2	Bit1	Bit0
0	reserved				B slave 1B			
1	B slave 2B				B slave 3B			
2	B slave 4B				B slave 5B			
3	B slave 6B				B slave 7B			
4	B slave 8B				B slave 9B			
5	B slave 10B				B slave 11B			
6	B slave 12B				B slave 13B			
7	B slave 14B				B slave 15B			
8	B slave 16B				B slave 17B			
9	B slave 18B				B slave 19B			
10	B slave 20B				B slave 21B			
11	B slave 22B				B slave 23B			
12	B slave 24B				B slave 25B			
13	B slave 26B				B slave 27B			
14	B slave 28B				B slave 29B			
15	B slave 30B				B slave 31B			

Access to analog data A/B-(Standard) slave

With the analog value transmission you have access at up to 31 AS-i slaves with max. 4 analog input respectively output data, each.

You access these areas by means of the system function blocks SFC 58/59 (read/write). For this the record sets 140...147 are to be used.



Mapping of the analog values in the record sets

An 8byte area is used for each slave address to address 4 analog channels. You access these areas by means of the record sets DS 140...147. Here the data length 2...128byte are to be used.

The allocation between record set and slave number is shown in the following table:

Address AS-i slave	DS 140	DS 141	DS 142	DS 143	DS 144	DS 145	DS 146	DS 147
1	0-7							
2	8-15							
3	16-23							
4	24-31							
5	32-39	0-7						
6	40-47	8-15						
7	48-55	16-23						
8	56-63	24-31						
9	64-71	32-39	0-7					
10	72-79	40-47	8-15					
11	80-87	48-55	16-23					
12	88-95	56-63	24-31					
13	96-103	64-71	32-39	0-7				
14	104-111	72-79	40-47	8-15				
15	112-119	80-87	48-55	16-23				
16	120-127	88-95	56-63	24-31				
17		96-103	64-71	32-39	0-7			
18		104-111	72-79	40-47	8-15			
19		112-119	80-87	48-55	16-23			
20		120-127	88-95	56-63	24-31			
21			96-103	64-71	32-39	0-7		
22			104-111	72-79	40-47	8-15		
23			112-119	80-87	48-55	16-23		
24			120-127	88-95	56-63	24-31		
25				96-103	64-71	32-39	0-7	
26				104-111	72-79	40-47	8-15	
27				112-119	80-87	48-55	16-23	
28				120-127	88-95	56-63	24-31	
29					96-103	64-71	32-39	0-7
30					104-111	72-79	40-47	8-15
31					112-119	80-87	48-55	16-23

Possibilities to access e.g. slave 15:
DS 140: 120byte, DS 141: 88byte, DS 142: 56byte, DS 143: 24byte

Structure of the analog values in the record set.

The analog values are interpreted as 16bit values in two's complement. For further information regarding the range of values, the measurement range and the accuracy please refer to the relevant documentation of the analog salves.

The structure of the analog values of the corresponding analog slaves may be found in the following table:

Byte no.	Cannel / analog value
+0	Cannel 1 / high byte
+1	Cannel 1 / low byte
+2	Cannel 2 / high byte
+3	Cannel 2 / low byte
+4	Cannel 3 / high byte
+5	Cannel 3 / low byte
+6	Cannel 4 / high byte
+7	Cannel 4 / low byte

Diagnostic functions

Overview

There is the possibility to enable a diagnostic interrupt for the CP by means of the CP properties with the register "Operating parameters".

A diagnostic interrupt may only be released in the *protected mode;* this is not possible in *configuration mode.*

With a diagnostic requirement the CPU branches to the OB 82. To this diagnostic it may be reacted by an appropriate program.

Error events

The following error events may release a diagnostic interrupt:

- Changes to the AS-i slave configuration
- AS-i power fail
- Flash-ROM error of the CP

Sequence of diagnostic interrupt processing

On error if diagnostic is enabled the CP releases a diagnostic request to the CPU both with incoming and going event.

After that the CPU interrupts the cyclic user program and jumps to the OB 82. Here you can react accordingly to an error event.

More information about the error events may be accessed by the local bytes of the OB 82.

If OB 82 is not programmed, the CPU changes to STOP.

Interrupt behavior and operating modes

The CP produces diagnostic interrupts exclusive in the *protected mode.*

If the CPU changes to STOP respectively the CP changes to the *configuration mode,* the interrupt history is reset; in other words, every error bit of DS 0 is reset.

If the CP changes from the *configuration mode* to the *protected mode* and if there is a configuration error at this point in time, this is signaled with a diagnostic interrupt.

read diagnostic data with SFC 59

Via OB 82 you have access to detailed error information by means of the SFC 59 RD_REC (read record set). The diagnostic data are consistent until leaving the OB 82. The diagnostic interrupt is acknowledged by leaving the OB 82.

The diagnostic data are in record set 0 (DS 0) and record set 1 (DS 1). DS 0 consists of 4byte, which describe the current state of the CP.

Local data OB 82 record set 0

In the following there is an extract (local byte 8...11) from the record set 0 of the OB 82.

Local byte	Bit	Variable	Data type	Description
8	0	OB82_MDL_DEFECT	BOOL	Group error bit 0: Interrupt going 1: Interrupt incoming
	1	OB82_INT_FAULT	BOOL	Internal error e.g. Flash-ROM defective
	2	OB82_EXT_FAULT	BOOL	External error e.g. slave failed or APF
	3	OB82_PNT_INFO	BOOL	At least one slave differs from the expected configuration
	4	OB82_EXT_VOLTAGE	BOOL	Voltage on the AS-interface to low (APF)
	5	OB82_FLD_CONNCTR	BOOL	with the CP always 0
	6	OB82_NO_CONFIG	BOOL	with the CP always 0
	7	OB82_CONFIG_ERR	BOOL	with the CP always 0
9		OB82_MDL_TYPE	BYTE	Module class: for CP: 1Ch
10	0	OB82_SUB_MDL_ERR	BOOL	At least 1 slave differs from the expected configuration
	1	OB82_COMM_FAULT	BOOL	with the CP always 0
	2	OB82_MDL_STOP	BOOL	Operating mode 0: CP is in normal state 1: CP is offline
	3	OB82_WTCH_DOG_FLT	BOOL	Hardware error of the CP (internal watchdog)
	4	OB82_INT_PS_FLT	BOOL	with the CP always 0
	5	OB82_PRIM_BATT_FLT	BOOL	with the CP always 0
	6	OB82_BCKUP_BATT_FLT	BOOL	with the CP always 0
	7	OB82_RESERVED_2	BOOL	with the CP always 0
11	0	OB82_RACK_FLT	BOOL	with the CP always 0
	1	OB82_PROC_FLT	BOOL	with the CP always 0
	2	OB82_EPROM_FLT	BOOL	Flash-ROM defective
	3	OB82_RAM_FLT	BOOL	with the CP always 0
	4	OB82_ADU_FLT	BOOL	with the CP always 0
	5	OB82_FUSE_FLT	BOOL	with the CP always 0
	6	OB82_RESERVED_3	BOOL	with the CP always 0

Local data OB 82 record set 1

During operation the CP updates a *delta list* internally. The *delta list* is a part of record set 1 (DS 1).

Here every deviation to the AS-i slave configuration is listed like e.g. missing, wrong or not configured but present slaves.

Starting with local byte 7 one bit is assigned to each slave in the delta list. Bit 0 is assigned to slave 0, Bit 1 to slave 1 and so on.

There are the following states represented by the bits: 0 = no error
1 = error

With the VIPA CP 343-2P ASI the record set 1 always has the length of 16byte and has the following structure:

Local byte	Description
0...3	Contents of the local byte 8...11 from record set 0

Local byte	Value	Description
4	60h	60h fix
5	00h	00h fix
6	40h	40h fix

Local byte	Bit	Description
7	0...7	0: no error 1: error at AS-i slave 0...7
8	0...7	0: no error 1: error at AS-i slave 8...15
9	0...7	0: no error 1: error at AS-i slave 16...23
10	0...7	0: no error 1: error at AS-i slave 24...31
11	0...7	0: no error 1: error at AS-i slave 0B...7B
12	0...7	0: no error 1: error at AS-i slave 8B...15B
13	0...7	0: no error 1: error at AS-i slave 16B...23B
14	0...7	0: no error 1: error at AS-i slave 24B...31B
15		reserved

Troubleshooting and error behavior

Overview

Using the *automatic address programming* function, failed respectively defective AS-i slaves may be exchanged.

Please regard that *automatic address programming* is only possible when the CP is in the *protected mode* and only one AS-i slave has failed.

In the following there is explained how to replace failed AS-i slaves using the *automatic address programming* function.

Detect defective AS-i slave

If the "AUP"-LED is lit, this indicates exactly one AS-i slave is failed and may be changed by means of the automatic address programming.

You can recognize the failed AS-i slave on the slave display. The assigned LED flashes on the front panel.

Replace defective AS-i slave

Replace the defective AS-i slave with an identical AS-i slave with address 0 (default address).

After replacement the AS-i-Slave is programmed with the address of the original station that had failed. The "AUP"-LED goes off and the new slave is indicated by the slave display.

Error display at analog value transfer

At the following conditions the CP supplies the value 7FFFh in the input direction (read record set):

- The AS-i slave does not exist, has failed or is not an analog slave complying with profile 7.3 respectively 7.4.
- The channel number is not supported by the analog salve.
- The analog slave signals "value invalid".

At the following conditions the CP supplies the value 0h in the input direction (read record set) when the analog slave delivers transparent data complying with profile 7.3 (ext. ID2 code, Bit 2=1):

- The analog slave has failed.
- The analog salve signals "value invalid".

In the output direction (write record set) the CP behaves as follows:

In the STOP Mode of the CPU the CP interrupts the transfer of the analog output values. Here the reaction of the analog slave depends on the particular device.

When the CP starts-up, all analog output values have the value 7FFFh. This value is, however, only sent by the CP after the first data record transfer for the relevant analog slaves.

Help for trouble shooting

Possible error causes

In the following table may be found the possible causes of errors during operation of the VIPA CP 343-2P ASI and how to remedy the problem.

Error	Possible cause	Remedy
"APF" LED lit	Power requirement of the AS-i slave is too high. 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 external voltage.
	Power requirements of the AS-i slave too high.	Check the power requirements of the AS-i slaves. If necessary, supply the slaves with power externally.
"PWR" LED not lit	The CP connection to the backplane bus is faulty.	Check whether the module is plugged correctly.
"SF" LED lights up without pressing the button.	The CP is in the *protected mode* and an AS-i configuration error has occurred (for example slave failure).	Eliminate the configuration error.
	The CP is defective. Contact the VIPA service.	Replace the CP.
"SF" LED is lit when the SET button is pressed.	A slave with address 0 exists when there is a change to the *protected mode.*	Remove the slave with address 0 from the AS-i cable.
"CER" LED is permanently lit	The CP has not yet been configured.	Configure the CP using the SET button on the front panel.
	A configured AS-i slave has failed (evaluate the slave display).	Replace the defective AS-i slave or reconfigure the CP if the AS-i slave is not required.
	A not configured slave was connected to the AS-i cable.	Remove the AS-i slave or reconfigure the CP.
	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 CP.
	Short circuit on the AS-i cable.	Check the AS-i cable and the connected AS-i slaves.
"CER" LED flickers, in other words a configured AS-i 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 CP and check the AS-i cable. Check that the shield of the AS-i power supply unit is connected correctly.

continued ...

... continue

The CP does not switch from the *configuration mode* to the *protected mode.*	The CPU is in the "RUN" mode.	Switch the CPU to "STOP".
	The "SET" button was not pressed long enough.	Press the "SET" button for at least 0.5 seconds.
	An AS-i slave with address 0 is connected to the AS-i cable. The CP cannot change to the *protected mode* as long as this slave exists.	Remove the AS-i slave with address 0.
The CP does not switch from the *configuration mode* to the *protected mode.*	The CPU is in the "RUN" mode.	Switch the CPU to "STOP".
	The SET button was not press long enough.	Press the SET button for at least 0.5 seconds.
After failure of an AS-i slave, the "AUP" LED remains off.	The CP is in the *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 CP.
	More then one 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 slave using the addressing unit.
	The CP has not detected configured AS-i slaves.	Remove the not configured AS-i slaves from the AS-i cable.
	"AUTO_ADRESS_ENABLE" is not set.	Set the Bit with the appropriate FC calls.
Automatic address programming is unsuccessful although the "AUP" LED is 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 CP (with SET button).
	The replaced AS-i slave does not have the address "0".	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.
"CER" LED and the LEDs of active AS-i slaves flicker irregularly.	An extender is installed in the AS interface with "Line 1" und "Line 2" and the connections are reversed.	Correct the connections on the extender.

Firmware update

Overview

By means of a MMC and exclusive with a SPEED7-CPU 31xS from VIPA there is the opportunity to execute a firmware update at the CP. For this an accordingly prepared MMC must be in the CPU during the start-up. As soon as the firmware is more current than in the CP, the CP gets the new firmware.

So a firmware files may be recognized and assigned with start-up, a pkg file name is reserved for each updatable component and hardware release, which begins with "px" and differs in a number with six digits. With the CP 343-2P ASI the name of the pgk file may be found at lable on the backside of the module. Information about the CP firmware may also be found at the web page of the SPEED7 CPU. Here among others each updateable component at the standard bus is listed. More may be found at the manual of the SPEED7 CPU at "Access to the internal web page".

Note!

Please regard for a CP firmware update a SPEED7 CPU firmware version starting with V340 is necessary!

Latest Firmware at www.vipa.de

The latest 2 firmware versions may be found in the service area at www.vipa.de.

For example the following file is necessary for the firmware update of the CP 343-2P ASI with hardware release 1: Px000084_Vxxx.zip

Attention!

When installing a new firmware you have to be extremely careful. Under certain circumstances you may destroy the CPU respectively the CP, for example if the voltage supply is interrupted during transfer or if the firmware file is defective.

In this case, please call the VIPA-Hotline!

Please regard that the version of the update firmware has to be different from the existing firmware otherwise no update is executed.

Execute firmware update

More information to the proceeding with a firmware update may be found at the manual of the SPEED7 CPU at "Firmware update".

Chapter 5 Deployment Command interface

Overview

This chapter contains the information, which is required to access the command interface of the VIPA CP 343-2ASI. Via the command interface the response of the AS-i master may completely be controlled within your user program.

Content

Command interface FC "ASI_3422"

Overview

The VIPA CP 343-2P ASI is suitable for the deployment of the FC "ASI_3422" from Siemens starting with version V2.0 or higher. With the FC "ASI_3422" a convenient command interface is available. This FC may be received by Siemens. 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. In the following the FC "ASI_3422" and every commands are described.

Parameter

Parameter	Declaration	Data type	Memory area	Description
ACT	INPUT	BOOL	I,Q,M,D,L, constant	As long as ACT=1, command processing is started provided no other call is being processed.
STARTUP	INPUT	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	INPUT	WORD	I,Q,M,D,L, constant	Base address of the CP in the S7 address space. The module base address is specified during configuration.
SEND	INPUT	ANY	I,Q,M,D,L	Send buffer The parameter references a memory area in which the command must be specified by the user as e.g.: P#DB20.DBX 20.0 Byte 10
RECV	INPUT	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 length of the response data is evaluated by the FC as e.g.: P#DB30.DBX 20.0 Byte 1
DONE	OUTPUT	BOOL	Q,M,D,L	DONE=1 signals "job completed without error".
ERROR	OUTPUT	BOOL	Q,M,D,L	ERROR=1 signals "job terminated with error".
STATUS	INPUT/ OUTPUT	DWORD	M,D	1.Word: Job status / error code For "job terminated with error" an error code is generated that describes the error in greater detail. 2.Word: for internal purposes, must not be modified. **Note!** For FC calls to different CP modules, different double words must be used for the STATUS parameter.

Structure 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. For status information, the response buffer is not required for 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.

Note!

- 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).
- If the CP used in the ET 200M, only a limited number of read_data_record and write_data_record jobs can be activate at the same time on the CPU. The maximum number of jobs is triggered; they are terminated with the error 80C3h (temporary lack of resources). The rejected job must then be repeated.

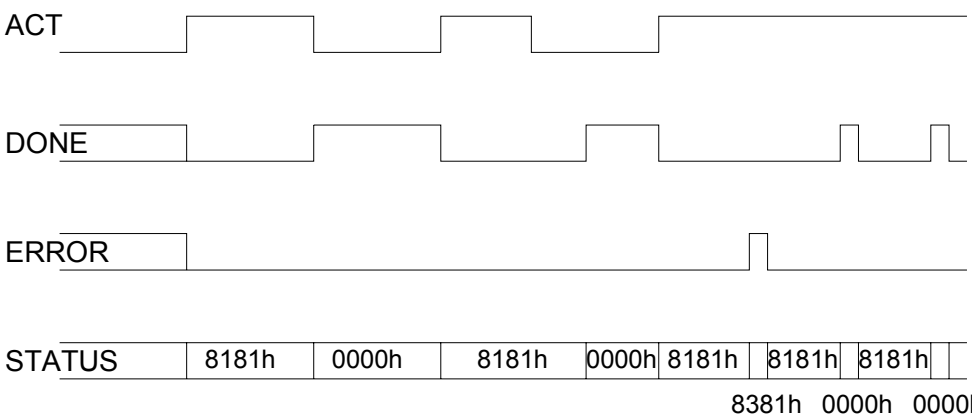
Signal Sequence of ACT, DONE, ERROR and STATUS

A command call is started by ACT=1. During the processing of the job, the first word of STATUS has the value 8181h. 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 CP, these are available in the receive buffer specified for RECV. In this case, 0000h 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 CP 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, ERORR and STATUS parameters remain unchanged until the next job is processed.



Error Coding

DONE	ERROR	STATUS	Meaning
1	0	0000h	**Job is complete without error**
0	1	8090h	Address in LADDR invalid
0	1	8092h	A type other than BYTE is specified in the ANY reference
0	1	8093h	This SFC is not permitted fort he modules selected with LADDR and IOID.
0	1	80A0h	Negative acknowledgment when reading from AS-i master
0	1	80A1h	Negative acknowledgment when writing to AS-i master
0	1	80A2h	DP protocol error at layer 2
0	1	80A3h	DP protocol error at user interface/user
0	1	80A4h	Communication problems on bus
0	1	80B0h	AS-i master does not recognize the data record
0	1	80B1h	Specified data record length incorrect
0	1	80B2h	The configured slot is not use.
0	1	80B3h	Actual module type does not match the expected module type in SDB1
0	1	80C0h	Data record cannot be read
0	1	80C1h	The specified data record is currently being processed
0	1	80C2h	There is a job pileup.
0	1	80C3h	Resource (memory) in use
0	1	80C4h	Communication error
0	1	80C5h	Distributed I/Os not available
0	1	80C6h	Data record transfer aborted due to priority class abort (warm restart or background) of the distributed I/Os.
0	1	8181h	**Job active (no error)**
0	1	8182h	**ID from block execution with STARTUP=TRUE (not an error)**
0	1	8184h	Data type of the RECV formal parameter illegal
0	1	8381h	The AS-i slave address is incorrect.
0	1	8382h	The AS-i slave is not activated (not in LAS).
0	1	8383h	Error on the AS interface.
0	1	8384h	Command not permitted in the current status of the AS-i master.
0	1	8385h	An AS-i slave with address 0 exists.
0	1	8386h	The AS-i slave has illegal Configuration data (I/O or ID-Codes).
0	1	83A1h	The addressed AS-i slave was not found on the AS interface.
0	1	83A2h	An AS-i slave with address 0 exists.
0	1	83A3h	An AS-i slave with the new address already exists on the AS-Interface.
0	1	83A4h	The AS-i slave address cannot be deleted.
0	1	83A5h	The AS-i slave address cannot be set.
0	1	83A6h	The AS-i slave address cannot be stored permanently.
0	1	83A7h	Error reading the extended ID1 code
0	1	83A8h	The target address is not plausible (for example a B slave address was used for a standard slave).

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DONE	ERROR	STATUS	Meaning
0	1	83B1h	A length error has occurred transferring a string according to profile 7.4.
0	1	83B2h	A protocol error has occurred transferring a string according to profile 7.4.
0	1	83F8h	The job number or the job parameter is unknown.
0	1	83F9h	The AS-i master has detected a Flash-ROM error.
0	1	8F22h 8F23h	Area length error reading a parameter Area length error writing a parameter This error code indicates that a parameter is entirely or partly outside the address area or that length of a bit array of an ANY parameter cannot be divided by 8.
0	1	8F24h 8F25h	Area error reading a parameter Area error writing a parameter This error codes indicates that a parameter is located in an area that is illegal for system function.
0	1	8F28h 8F29h	Alignment error reading a parameter Alignment error writing a parameter This error codes indicates that the reference to a parameter is a bit address other than 0.
0	1	8F30h 8F31h	The parameter is in the write-protected global DB 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	8F32h	The DB number in the parameter is too high
0	1	8F3Ah	The parameter contains the number of a DB that is not loaded.
0	1	8F42h 8F43h	An access error has occurred while the system attempted to read out a parameter from the peripheral area of the inputs. An access error occurred while the system was attempting to write a parameter to the peripheral area of the outputs.
0	1	8F44h	This parameter code indicates that read access to a parameter was denied.
0	1	8F45h	This parameter code indicates that write access to a parameter was denied.
0	1	8F7Fh	Internal error

Deployment of the command interface

Overview

This section describes the command calls that may be sent by the user program to the CP. With these command calls, the CP provides the complete functionality. How to use the job is explained in the descriptions of the individual jobs.

Name	Parameter	Return	Coding
Set_Permanent_Parameter	Slave address, parameter		00h
Get_Permanent_Parameter	Slave address	Parameter	01h
Write_Parameter	Slave address, parameter	Parameter echo (optional)	02h
Read_Parameter	Slave address	Parameter value	03h
Store_Actual_Parameters			04h
Set_Extended_Permanent_Configuration	Slave address		25h
Get_Extended_Permanent_Configuration	Slave address, configuration	Specified configuration	26h
Store_Actual_Configuration			07h
Get_Extended_Actual_Configuration	Slave address	Actual configuration	28h
Set_LPS	LPS		29h
Set_Offline_Mode	Mode		0Ah
Select_Autoprogramming	Mode		0Bh
Set_operation_mode	Mode		0Ch
Change_AS-i-Slave_Address	Address1, Address2		0Dh
Get_AS-i_Slave_Status	Slave address	Error record of the AS-i slaves	0Fh
Get_LPS, Get_LAS, Get_LDS, Get_Flags	none	LDS, LAS, LPS, flags	30h
Get_Extended_Total_Configuration		Actual configuration current parameters, LAS, flags	39h
Store_Extended_Total_Configuration	Total configuration		2Ah
Write_Extended_Parameter_List	Parameter list		3Ch
Read_Extended_Parameter_Echo_List		Parameter echo list	33h
Read_Version_ID		Version string	14h
Read_AS-i_Slave_ID	Slave address	ID code	17h

continued ...

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Name	Parameter	Return	Coding
Read_AS-i_Slave_Extended-ID1	Slave address	Extended ID1 code	37h
Write_AS-i_Slave_Extended-ID1	Extended ID1 code		3Fh
Read_AS-i_Slave_Extended-ID2	Slave address	Extended ID2 code	38h
Read_AS-i_Slave_I/O	Slave address	I/O configuration	18h
Get_LPF		LPF	3Eh
Write_AS-i_Slave_Parameter-String	Slave address, parameter string		40h
Read_AS-i_Slave_Parameter-String	Slave address	Parameter string	41h
Read_AS-i_Slave_ID-String	Slave address	ID string	42h
Read_AS-i_Slave_Diagnostic-String	Slave address	Diagnostic string	43h

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 with green background.

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

q=base 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 with green background.

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

n= base 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.

Set_Permanent_Parameter

Description

With this call a parameter value for the specified AS-i slave is configured on the CP. The value is stored permanently in the Flash-ROM of the CP.

The configured parameter is **not** transferred immediately by the CP 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 CP.

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 Fh.

Attention!

If you configure the AS-i slaves with a hardware configuration, using the call described here is generally unnecessary.

If you use the call, you will overwrite the corresponding configuration data originating from the button configuration or the configuration set with hardware configuration.

Structure of the Job Data in the Send buffer

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

Get_Permanent_Parameter

Description

With this call, a slave-specific parameter value stored on the Flash-ROM of the CP is read.

Structure of the Job Data in the Send buffer

Byte	Meaning
0	Command number: 01h
1	Slave address

Structure of the Job Data in the Receive buffer

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

Write_Parameter

Description

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 CP only **volatile** and is not entered as a configured parameter in the Flash-ROM.

The AS-i slave transfers its current parameter value in the response (parameter echo). This could deviate from the value that has just been written according to the AS-i master specification. 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: 02h			
1	Slave address			
2	irrelevant		Parameter	

Structure of the Job Data in the Receive buffer

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

Read_Parameter

Description

This call returns the current parameter value (actual parameter) of an AS-i slave sent by the CP.

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: 03h
1	Slave address

Structure of the Job Data in the Receive buffer

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

Store_Actual_Parameters

Description

With this call the configured parameters stored on the Flash-ROM 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 Fh.

Structure of the Job Data in the Send buffer

Byte	Meaning
0	Command number: 04h

Set_Extended_Permanent_Configuration

Description

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

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

The configuration data are stored permanently on the Flash-ROM of the CP and are used as the expected configuration by AS-i master in the *protected mode*. The configuration data are specified by the manufacturer of the AS-i slave. If the addressed AS-i slave does not support an extended ID code 1/2, the value Fh 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 start on the AS-i master).

This call is not made in *protected mode*.

Attention!

If you configure the AS-i slaves with a hardware configuration, using the call described here is generally unnecessary.
If you use the call, you will overwrite the corresponding configuration data originating from the button configuration or the configuration set with hardware configuration.

Structure of the Job Data in the Send buffer

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

Get_Extended_Permanent_Configuration

Description

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

Structure of the Job Data in the Send buffer

Byte	Meaning
0	Command number: 26h
1	Slave address

Structure of the Job Data in the Receive buffer

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

Store_Actual_Configuration

Description

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 Flash-ROM 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*.

Attention!

If you configure the AS-i slaves with a hardware configuration, using the call described here is generally unnecessary.

If you use the call, you will overwrite the corresponding configuration data originating from the button configuration or the configuration set with hardware configuration.

Structure of the Job Data in the Send buffer

Byte	Meaning
0	Command number: 07h

Read_Extended_Actual_Configuration

Description

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.

Structure of the Job Data in the Send buffer

Byte	Meaning
0	Command number: 28h
1	Slave address

Structure of the Job Data in the Receive buffer

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

Set_LPS

Description

With this call the list of configured AS-i slaves is transferred for permanent storage in the Flash-ROM 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 start on the AS-i master). The call is not executed in the *protected mode.*

Attention!

If you configure the AS-i slaves with hardware configuration, using the call described here is generally unnecessary. If you use the call, you will overwrite the corresponding configuration data originating from the button configuration or the configuration set with hardware configuration.

Structure of the Job Data in the Send buffer

Byte	Meaning							
	7	6	5	4	3	2	1	0
0	Command number: 29h							
1	irrelevant							
2	irrelevant	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	irrelevant	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 24B	slave 25B	slave 26B	slave 27B	slave 28B	slave 29B	slave 30B	slave 31B

Set_Offline_Mode

Description

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 slave 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 CP 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 warm/hot restart, the CP 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: 0Ah	
1	00h 01h	Mode 0=online 1=offline

Select Autoprogramming

Description

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

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

Structure of the Job Data in the Send buffer

Byte	Meaning	
	Bit 7 Bit 1	Bit 0
0	Command number: 0Bh	
1	00h 01h	Value for AUTO_ADDR_ENABLE 1=Automatic address programming enabled 0=Automatic address programming disabled

Set_Operation_Mode

Description

This call changes the mode 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).

Attention!
If an AS-i slave with address 0 is entered in the LDS, the CP 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: 0Ch		
1	00h 01h		Operating mode: 0=*Protected mode* 1=*Configuration mode*

Change_AS-i_Slave_Address

Description

With this call, the AS-i address of an AS-i slave may 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 may only be made when the following conditions are fulfilled:

- An AS-i slave with "AS-i slave address old" exists.
- 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.
- The "AS-i slave address new" must have a valid value.
- An AS-i slave with "AS-i slave address new" must not exist.

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

Structure of the Job Data in the Send buffer

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

Get_AS-i_Slave_Status

Description

With this call the status register of the addressed AS-i slave may be read out. Depending on the type of AS-i slave, the flag 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
S0	**Address volatile** This flag is set when • the internal slave touting for permanent storage of the AS-i slave address is active. This could 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.	**Address / ID code volatile**
S1	**Parity error detected** 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	**I/O error detected** An AS-i slave can set this flag when it has detected and error (for example wire break) in the attached I/Os.
S2	**End bit error detected** This flag is set when the AS-i slave has recognize an end bit error in a frame since the last "read and delete status" job.	reserved
S3	**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: 0Fh
1	Slave address

Structure of the Job Data in the Receive buffer

Byte	Meaning					
	Bit 7	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0		S3	S2	S1	S0

Get_LPS, Get_LAS, Get_LDS, Get_Flags

Description With this call the following entries are read out of the CP:

- 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 slaves specification

Structure of the Job Data in the Send buffer

Byte	Meaning
0	Command number: 30h

Structure of the Job Data in the Receive buffer

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	reserved	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	reserved	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	reserved	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
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	reserved	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	reserved	LPS slave 1	LPS slave 2	LPS slave 3	LPS slave 4	LPS slave 5	LPS slave 6	LPS slave 7

continued ...

... continue

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
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	reserved	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 1							
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	Meaning
0	OFFLINE_READY
1	APF
2	NORMAL_MODE
3	CONFIG_MODE
4	AUTO_ADDR_AVAIL
5	AUTO_ADDR_ASSIGN
6	LDS_0
7	CONFIG_OK

Flag 2

Bit	Meaning
0	OFFLINE
1	INTERNAL
2	Flash-ROM_OK
3	AUTO_ADDR_ENABLE
4	PERIPHERY_FAULT
5	reserved
6	reserved
7	MPO startup

Meaning of the Flags

Flag	Meaning
OFFLINE_READY	The flag is set when the online phase is active.
APF	The flag is set when the voltage on the AS-i cable is too low.
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	The flag is set when automatic address programming is possible (in other words, exactly one AS-i slave is currently out of operation).
AUTO_ADDR_ASSIGN	The 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	The flag is set when an AS-i slave exists with address 0.
CONFIG_OK	The flag is set when desired (configured) and actual configuration match.
OFFLINE	The flag is set when the mode is changed to OFFLINE or this mode has already been adopted.
EPROM_OK	The flag is set when the test of the internal Flash-ROM did not detect any errors.
AUTO_ADDR_ENABLE	The flag indicates whether the automatic address programming is enabled (BIT=0) or disabled (BIT=1) by the user.
INTERNAL	The flag is always set.
PERIPHERY_FAULT	The flag is set when at least one AS-i slave is signaling a peripheral fault.
MPO startup	The flag "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.

Get_Extended_Total_Configuration

Description

With this command, the following data are read from the CP:

- 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 und ID code)
- The current parameters of the AS-i slaves (actual parameters)
- The current flags

This command for example may be used to find out the configuration of the stations connected to the AS-i cable after installation. The configuration data read in may be modified if necessary and saved on the CP as the expected configuration using the "Configure Total System".

Structure of the Job Data in the Send buffer

Byte	Meaning
0	Command number: 39h

Structure of the Job Data in the Receive buffer

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	00h							
1	00h							
2	reserved	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	reserved	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
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

continued ...

... continue

Byte	Meaning	
	Bit 7 ... Bit 4	Bit 3 ... Bit 0
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

continued ...

... continue

Byte	Meaning	
	Bit 7 ... Bit 4	Bit 3 ... Bit 0
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

continued ...

... continue

Byte	Meaning	
	Bit 7 ... Bit 4	Bit 3 ... Bit 0
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	Parameter slave 1
139	Parameter slave 2	Parameter slave 3
140	Parameter slave 4	Parameter slave 5
141	Parameter slave 6	Parameter slave 7
142	Parameter slave 8	Parameter slave 9
143	Parameter slave 10	Parameter slave 11
144	Parameter slave 12	Parameter slave 13
145	Parameter slave 14	Parameter slave 15
146	Parameter slave 16	Parameter slave 17
147	Parameter slave 18	Parameter slave 19
148	Parameter slave 20	Parameter slave 21
149	Parameter slave 22	Parameter slave 23
150	Parameter slave 24	Parameter slave 25
151	Parameter slave 26	Parameter slave 27
152	Parameter slave 28	Parameter slave 29
153	Parameter slave 30	Parameter slave 31
154	reserved	Parameter slave 1B
155	Parameter slave 2B	Parameter slave 3B
156	Parameter slave 4B	Parameter slave 5B
157	Parameter slave 6B	Parameter slave 7B
158	Parameter slave 8B	Parameter slave 9B
159	Parameter slave 10B	Parameter slave 11B
160	Parameter slave 12B	Parameter slave 13B
161	Parameter slave 14B	Parameter slave 15B
162	Parameter slave 16B	Parameter slave 17B
163	Parameter slave 18B	Parameter slave 19B
164	Parameter slave 20B	Parameter slave 21B
165	Parameter slave 22B	Parameter slave 23B
166	Parameter slave 24B	Parameter slave 25B
167	Parameter slave 26B	Parameter slave 27B
168	Parameter slave 28B	Parameter slave 29B
169	Parameter slave 30B	Parameter slave 31B
170	Flag1	
171	Flag2	
172 ... 218	reserved	

Flag 1

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

Flag 2

Bit	Meaning
0	OFFLINE
1	INTERNAL
2	Flash-ROM_OK
3	AUTO_ADDR_ENABLE
4	PERIPHERY_FAULT
5	reserved
6	reserved
7	MPO start up

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

Store_Extended_Total_Configuration

Description

With this call the required total configuration of the AS interface is transferred to the AS-i master and stored permanently in the Flash-ROM as the expected configuration. This configures the CP:

- 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 determinate the operating status of the AS-i master following start up.

This call is not made in the *protected mode*.

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.

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	reserved	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

continued ...

... continue

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
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
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			

continued ...

... continue

Byte	Meaning	
	Bit 7 ... Bit 4	Bit 3 ... Bit 0
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

continued ...

... continue

Byte	Meaning	
	Bit 7 ... Bit 4	Bit 3 ... Bit 0
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	Parameter slave 1
139	Parameter slave 2	Parameter slave 3
140	Parameter slave 4	Parameter slave 5
141	Parameter slave 6	Parameter slave 7
142	Parameter slave 8	Parameter slave 9
143	Parameter slave 10	Parameter slave 11
144	Parameter slave 12	Parameter slave 13
145	Parameter slave 14	Parameter slave 15
146	Parameter slave 16	Parameter slave 17
147	Parameter slave 18	Parameter slave 19
148	Parameter slave 20	Parameter slave 21
149	Parameter slave 22	Parameter slave 23
150	Parameter slave 24	Parameter slave 25
151	Parameter slave 26	Parameter slave 27
152	Parameter slave 28	Parameter slave 29
153	Parameter slave 30	Parameter slave 31
154	reserved	Parameter slave 1B
155	Parameter slave 2B	Parameter slave 3B
156	Parameter slave 4B	Parameter slave 5B
157	Parameter slave 6B	Parameter slave 7B
158	Parameter slave 8B	Parameter slave 9B
159	Parameter slave 10B	Parameter slave 11B
160	Parameter slave 12B	Parameter slave 13B
161	Parameter slave 14B	Parameter slave 15B
162	Parameter slave 16B	Parameter slave 17B
163	Parameter slave 18B	Parameter slave 19B
164	Parameter slave 20B	Parameter slave 21B
165	Parameter slave 22B	Parameter slave 23B

continued ...

... continue

Byte	Meaning	
	Bit 7 ... Bit 4	Bit 3 ... Bit 0
166	Parameter slave 24B	Parameter slave 25B
167	Parameter slave 26B	Parameter slave 27B
168	Parameter slave 28B	Parameter slave 29B
169	Parameter slave 30B	Parameter slave 31B
170	Flag1	
171	Flag2	
172	reserved	
...	...	
218	reserved	

Flag 1

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

Flag 2

Bit	Meaning
0	OFFLINE
1	INTERNAL
2	Flash-ROM_OK
3	AUTO_ADDR_ENABLE
4	PERIPHERY_FAULT
5	reserved
6	reserved
7	MPO startup

Flags whose values modify the AS-i master mode are shown in green. 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.

	Meaning
CONFIG_MODE	The entry "0" means that the AS-i master changes to the *protected mode* after executing the command. The entry "1" means that the *configuration mode* is retained. 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: Automatic address programming disable. 1: Address programming enable

Write_Extended_Parameter_List

Description

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 4	Bit 3 ... Bit 0
0	Command number: 3Ch	
1	00h	
2	irrelevant	Parameter slave 1
3	Parameter slave 2	Parameter slave 3
4	Parameter slave 4	Parameter slave 5
5	Parameter slave 6	Parameter slave 7
6	Parameter slave 8	Parameter slave 9
7	Parameter slave 10	Parameter slave 11
8	Parameter slave 12	Parameter slave 13
9	Parameter slave 14	Parameter slave 15
10	Parameter slave 16	Parameter slave 17
11	Parameter slave 18	Parameter slave 19
12	Parameter slave 20	Parameter slave 21
13	Parameter slave 22	Parameter slave 23
14	Parameter slave 24	Parameter slave 25
15	Parameter slave 26	Parameter slave 27
16	Parameter slave 28	Parameter slave 29
17	Parameter slave 30	Parameter slave 31
18	irrelevant	Parameter slave 1B
19	Parameter slave 2B	Parameter slave 3B
20	Parameter slave 4B	Parameter slave 5B
21	Parameter slave 6B	Parameter slave 7B
22	Parameter slave 8B	Parameter slave 9B
23	Parameter slave 10B	Parameter slave 11B
24	Parameter slave 12B	Parameter slave 13B
25	Parameter slave 14B	Parameter slave 15B
26	Parameter slave 16B	Parameter slave 17B
27	Parameter slave 18B	Parameter slave 19B
28	Parameter slave 20B	Parameter slave 21B
29	Parameter slave 22B	Parameter slave 23B
30	Parameter slave 24B	Parameter slave 25B
31	Parameter slave 26B	Parameter slave 27B
32	Parameter slave 28B	Parameter slave 29B
33	Parameter slave 30B	Parameter slave 31B

Read_Extended_Parameter_Echo_List

Description

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 Job Data in the Receive buffer

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

Read_Version_ID

Description

This call reads out the version ID of the firmware of the AS-i master.

Structure of the Job Data in the Send buffer

Byte	Meaning
0	Command number: 14h

The response of the AS-i master contains the name and the firmware version number.

Structure of the Job Data in the Receive buffer

Byte	Meaning
0 ... 31	Version string

Read_AS-i-Slave_ID

Description

With this call the ID code of an AS-i slave may be read out directly over the AS-i cable. The call is intended for diagnostic purpose and is not required in the normal master mode.

Structure of the Job Data in the Send buffer

Byte	Meaning
0	Command number: 17h
1	Slave address

The response of the AS-i master contains the name and the firmware version number.

Structure of the Job Data in the Receive buffer

Byte	Meaning			
	Bit 7	Bit 4	Bit 3	Bit 0
0	reserved		ID code	

Read_AS-i_Slave_Extended_ID1

Description

With this call the extended ID 1 code of an AS-i slave may be read out directly via 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: 37h
1	Slave address

The response of the AS-i master contains the name and the firmware version number.

Structure of the Job Data in the Receive buffer

Byte	Meaning	
	Bit 7 Bit 4	Bit 3 Bit 0
0	reserved	Extended ID1 code

Write_AS-i_Slave_Extended_ID1

Description

With this call the extended ID1 code of an AS-i slave with address "0" may be written directly via the AS-i cable. The call is intended for diagnostic purposes and nor required in the normal master code.

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: 3Fh	
1	irrelevant	Extended ID1 code

Read_AS-i_Slave_Extended_ID2

Description

With this call the extended ID2 code of an AS-i slave may be read out directly via the AS-i cable. The call is intended for diagnostic purposes and is nor required in the normal master mode.

Structure of the Job Data in the Send buffer

Byte	Meaning
0	Command number: 38h
1	Slave address

The response of the AS-i master contains the name and the firmware version number.

Structure of the Job Data in the Receive buffer

Byte	Meaning	
	Bit 7 Bit 4	Bit 3 Bit 0
0	reserved	Extended ID2 code

Read_AS-i_Slave_I/O

Description

With this call the I/O configuration of an AS-i slave may be read out directly via the AS-i cable. The call is intended for diagnostic purpose and is not required in the normal master mode.

Structure of the Job Data in the Send buffer

Byte	Meaning
0	Command number: 18h
1	Slave address

The response of the AS-i master contains the name and the firmware version number.

Structure of the Job Data in the Receive buffer

Byte	Meaning	
	Bit 7 Bit 4	Bit 3 Bit 0
0	reserved	I/O configuration

Get_LPF

Description

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 update cyclically be the AS-i master. Whether and when as AS-i slave signals faults of the attached peripherals (for example wire break) may be found in the description of the AS-i slave.

Structure of the Job Data in the Send buffer

Byte	Meaning
0	Command number: 3Eh

Structure of the Job Data in the Receive buffer

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	reserved	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	reserved	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 24B	slave 25B	slave 26B	slave 27B	slave 28B	slave 29B	slave 30B	slave 31B
8	reserved							
...	reserved							
13	reserved							

Bit=0: Slave signals no peripheral fault; Bit=1: Slave signals peripheral fault.

Write_AS-i_Slave_Parameter_String

Description

With this call a parameter string complying with AS-i slave profile 7.4 may 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 223bytes 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 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: 40h
1	Slave address
2	Number of the parameter bytes
3	String byte (1)
4	String byte (2)
...	...
	String byte (n-1)
...	String byte (n)

Maximum value for n=220

Read_AS-i-Slave_Parameter_String

Description

With this call a parameter string complying with AS-i slave profile 7.4 may 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 221bytes 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 220bytes, 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: 41h
1	Slave address

Structure of the Job Data in the Receive buffer

Byte	Meaning
0	Number of the parameter bytes
1	String byte (1)
2	String byte (2)
...	...
	String byte (n-1)
...	String byte (n)

Maximum value for n=220

Read_AS-i_Slave_ID_String

Description

With this call an identification string complying with the AS-i slave profile 7.4 may 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 221bytes of response data. The number of the receive buffer (number of ID bytes).

If the AS-i slave sends a string longer than 220bytes, 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.

Structure of the Job Data in the Send buffer

Byte	Meaning
0	Command number: 42h
1	Slave address

Structure of the Job 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

Read_AS-i_Slave_Diagnostic_String

Description

With this call a diagnostic string complying with AS-i slave profile 7.4 may 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 221bytes of response data. The number of diagnostic bytes actually sent 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 linger than 220bytes, 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: 43h
1	Slave address

Structure of the Job 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

Appendix - AS-Interface Protocol Implementation Conformance Statement (PICS)

PICS for the
CP 343-2P ASI

Vendor:	VIPA GmbH
Product Name:	CP 343-2P ASI
Order No.:	VIPA 343-2AH10
Release:	1
Master Profile:	M3
Date:	08.10.2008

List of available
Master Functions

No.	Part A Function or call at host interface	M3	Remark / implemented by
1	Image, Status = Read_IDI ()	X	By the CPU accessing the I/O data of the CP 343-2P ASI or with data record DS150 for B slaves, see chapter 4
2	Status = Write_ODI (Image)	X	
3	Status = Set_Permanent_Parameter (Addr, Param)	X	see chapter 5
4	Param, Status = Get_Permanent_Parameter (Addr)	X	see chapter 5
5	Status, Param = Write_Parameter (Addr, Param)	X	see chapter 5
6	Status, Param = Read_Parameter (Addr)	X	see chapter 5
7	Status = Store_Actual_Parameters ()	X	see chapter 5
8	Status = Set_Permanent_Configuration (Addr, Config)	X	see chapter 5
9	Status, Config = Get_Permanent_Configuration (Addr)	X	see chapter 5
10	Status = Store_Actual_Configuration ()	X	By pressing the SET button; also using a command, see chap. 5
11	Status, Config = Read_Actual_Configuration (Addr)	X	see chapter 5
12	Status = Set_LPS (List)	X	see chapter 5
13	Status, List = Get_LPS ()	X	see chapter 5
14	Status, List = Get_LAS ()	X	see chapter 5
15	Status, List = Get_LDS ()	X	see chapter 5
16.0	Status, Flags = Get_Flags ()	X	see chapter 5
16.1	Status, Flag = Get_Flag_Config_OK ()	X	see chapter 5
16.2	Status, Flag = Get_Flag_LDS.0 ()	X	see chapter 5
16.3	Status, Flag = Get_Flag_Auto_Address_Assign ()	X	see chapter 5
16.4	Status, Flag = Get_Flag_Auto_Prog_Available()	X	see chapter 5
16.5	Status, Flag = Get_Flag_Configuration_Active ()	X	see chapter 5
16.6	Status, Flag = Get_Flag_Normal_Operation_Active ()	X	see chapter 5
16.7	Status, Flag = Get_Flag_APF ()	X	CP error bit, LEDs, see chapter 5
16.8	Status, Flag = Get_Flag_Offline_Ready ()	X	see chapter 5
16.9	Status, Flag = Get_Flag_Periphery_OK ()	X	see chapter 5

continued ...

... continue part A

No.	Part A Function or call at host interface	M3	Remark / implemented by
17	Status = Set_Operation_Mode (Mode)	X	By pressing the SET button; also using a command, see chap. 5
18	Status = Set_Offline_Mode (Mode)	X	see chapter 5
19	Status = Activate_Data_Exchange (Mode)	-	not implemented
20	Status = Change_Slave_Address (Addr1, Addr2)	X	see chapter 5
21.1	Status = Set_Auto_Address_Enable (Mode)	X	see chapter 5
21.2	Mode = Get_Auto_Address_Enable ()	X	see chapter 5
22.1	Status, Resp = Cmd_Reset_AS-i_Slave (Addr, RESET)	X	see chapter 5
22.2	Status, Resp = Cmd_Read_IO_Configuration (Addr, CONF)	X	see chapter 5
22.3	Status, Resp = Cmd_Read_Identification_Code (Addr, IDCOD)	X	see chapter 5
22.4	Status, Resp = Cmd_Read_Status (Addr, STAT)	X	see chapter 5
22.5	Status, Resp = Cmd_Read_Reset_Status (Addr, STATRES)	-	not implemented
22.6	Status; Resp = Cmd_Read_Ext_ID-Code_1 (Addr, IDCOD1)	X	see chapter 5
22.7	Status; Resp = Cmd_Read_Ext_ID-Code_2 (Addr, IDCOD2)	X	see chapter 5
23	Status, List = Get_LPF()	X	see chapter 5
24	Status = Write_Extendet_ID-Code_1 (S_Ext_ID-Code_1)	X	see chapter 5
25	AImage, Status = Read_AIDI ()	X	access by DS 140...147, see chap. 4
26	Status = Write_AODI (AImage)	X	
27	String, Status = Read_ParamStr (Addr)	X	see chapter 5
28	Status = Write_ParamStr (Addr, String)	X	see chapter 5
29	String, Status = Read_DiagStr (Addr)	X	see chapter 5
30	String, Status = Read_IdentStr (Addr)	X	see chapter 5
No.	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	
4	Support of Combined transaction type 2 integrated	-	
5	Support of Combined transaction type 3 integrated	-	
6	Support of Combined transaction type 4 integrated	-	
7	Support of Combined transaction type 5 integrated	-	

Key to the symbols in column 3 (M3):

Sign	Meaning
X	Function implemented
-	Function not implemented

Dependence of AS-i cycle time of number of connected slaves

The AS-i cycle time may be calculated with the following formula:

T_{zykl} = (1 + number_activated_AS-i_slaves) x 158µs

Note!

When a pair of A and B slaves on the same address is activated they are counted in this formula like one single slave. Pairs of A- and B-slaves are accessed in every second AS-interface-cycle.

Appendix B - Index