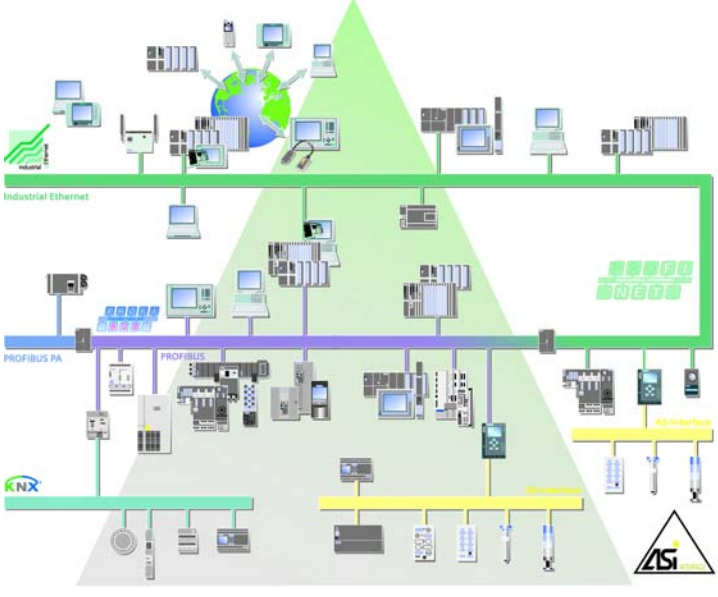
SIEMENS

SIMATIC NET

CP 343–2 / CP 343–2 P AS–Interface Master

Manual





Release 08/2008
C79000–G8976–C149–04

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Edition 08/2010

1 Technical description
1.10 AS-Interface operation with 24 V voltage (AS-i Power24V)

5 Using the command interface
5.1 Description of FC "ASI_3422" (supplements
5.2 Description of the AS-i-slave commands (supplements)

7 Dealing with problems / error displays
7.1 Replacing a defective AS-i slave/automatic address programming
7.2 Error displays/remedying errors (incompatibilities)

Edition 01/2023

8 Approvals
8.1 Ex Certificates

Classification of Safety-Related Notices

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



Danger

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



Warning

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



Caution

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

Caution

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

Notice

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

Note

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

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Safety Instructions Regarding your Product:

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

Qualified Personnel

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

Correct Usage of Hardware Products

Note the following:



Warning

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

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

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

EU Directive: Do not start up until you have established that the machine on which you intend to run this component complies with the directive 98/37/EG.

Correct Usage of Software Products

Note the following:



Warning

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

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

Prior to Startup

Prior to startup, note the following:

Caution

Prior to startup, note the information and follow the instructions in the latest documentation. You will find the ordering data for this documentation in the relevant catalogs or contact your local Siemens office.

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Disclaimer of Liability

We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

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Industry Automation
Industrial Communication
Postfach 4848, D-90327 Nuernberg

Technical data subject to change.

Preface

Purpose of the Manual

This manual supports you when using the following modules:

- CP 343-2
- CP 343-2 P

It contains information about how the PLC can address AS-i actuators and AS-i sensors via this module.

What's new?

The CP 343-2 (6GK7 343-2AH01-0XA0) and the CP 343-2 P (6GK7 343-2AH11-0XA0) as of firmware version V3.0 support all combined transaction type slaves (CTT slaves) according to AS-i Specification V3.

For these CPs as of firmware version V3.0, configuration of the CTT slaves is supported as of STEP 7 version 5.4 SP4. The command interface has been expanded to allow the transfer of CTT2 strings.

The following AS-i CPs do not support CTT slaves complying with AS-i specification V3:

- 6GK7 343-2AH00-0XA0
- 6GK7 343-2AH10-0XA0

As of STEP 7 version 5.3 SP3, the selection of Siemens slaves is supported in the slave project engineering.

This issue of the manual also includes several corrections.

The notes on installation have been integrated in the manual. The product information bulletin no longer ships with the product.

We recommend the following procedure when...

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

– First read ‘AS-Interface – Introduction and Basic Information’ (on the accompanying product CD). This contains general information about the **AS-Interface**, abbreviated to **AS-i** in the following chapters.

... You want to set up an AS-i system and include the CP 343-2 module in it:

– You will find the relevant information about connecting and operating the CP 343-2 in Chapter 1, 2 and 3.

... You want to know how to operate the CP 343-2 from the PLC:

– Read Chapter 4.

– Chapter 5 explains the command interface.

Requirements

To understand this manual, you require the following:

- Basic knowledge of SIMATIC S7, STEP 7
- Familiarity with the manual ‘AS-Interface – Introduction and Basic Information’ (on the accompanying product CD).

CD with sample program

The accompanying CD contains a sample program for operating the CP 343-2.

FAQs

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

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

❑

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1 Technical Description

This chapter describes the features of the module and familiarizes you with the basic functions of the AS-i master module CP 343-2.

You will learn the following:

- The PLC systems on which the AS-Interface can be operated with the CP 343-2 / CP 343-2 P.
- Which displays and operator controls are available on the CP 343-2 / CP 343-2 P.
- Which modes are supported by the CP 343-2 / CP 343-2 P.
- Which options are available with the button configuration
- How addressing is handled on the CPU

Notice

The two device types CP 343-2 and CP 343-2 P are largely identical in terms of functionality. The CP 343-2 P however has additional options for configuration and parameter assignment during startup (see Section 2.1).

The CP 343-2 P module is **not** therefore intended as a replacement for the CP 343-2 that can still be ordered!

Note

In the description below a distinction between the types CP 343-2 and CP 343-2 P is made only where their performance characteristics differ.

Otherwise, unless specifically indicated, the name CP 343-2 (or CP) stands for both device types CP 343-2 and CP 343-2 P

1.1 General Notes on Operation − Safety Warnings

Using the CP

You can use the CP 343-2 in the following automation systems:

- S7-300 – central configuration
- S7-300 – distributed configuration via ET 200M (IM153)

You can also connect the CP to an S7-400H via a redundant ET 200M.

Caution

To ensure protection from electrostatic discharge, the module may only be operated when the front panel is closed.

When operating the module, implement the measures for preventing build up of electrostatic charges. For information on this topic, refer to the S7-300 device manual /4/.

You will find further information on conditions for use in Chapter 2.



Warning

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



Warning

When used under hazardous conditions:

- If the cable or conduit entry point exceeds 70 °C or the branching point of conductors exceeds 80 °C, special precautions must be taken: If the equipment is operated in an air ambient of 50 °C ... 60 °C, only use cables with admitted maximum operating temperature of at least 80 °C.
- Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40%. This criterion is fulfilled, if supplies are derived from SELV (Safety Extra Low Voltage) only.

Restrictions

Access to AS-i analog values using data records 140 to 147 and to the binary values of the B slaves using data record 150 is not possible with the CPU 318 with a firmware version V1.1.3 or earlier.

1.2 Overview of the Module

1.2.1 Uses of the Module

The CP 343-2 module can be operated in the automation systems (AS or PLC) of the S7-300 series and in the ET 200M system. It allows the connection of an AS-i chain to the programmable controllers listed above.

Using the CP 343-2, you can access the inputs and outputs on the AS-i slaves from the PLC. Depending on the slave type, you can access binary values or analog values.

All AS-i slaves complying with AS-i specification V3.0 can be operated except for slaves complying with slave profile 7.1 and 7.2.

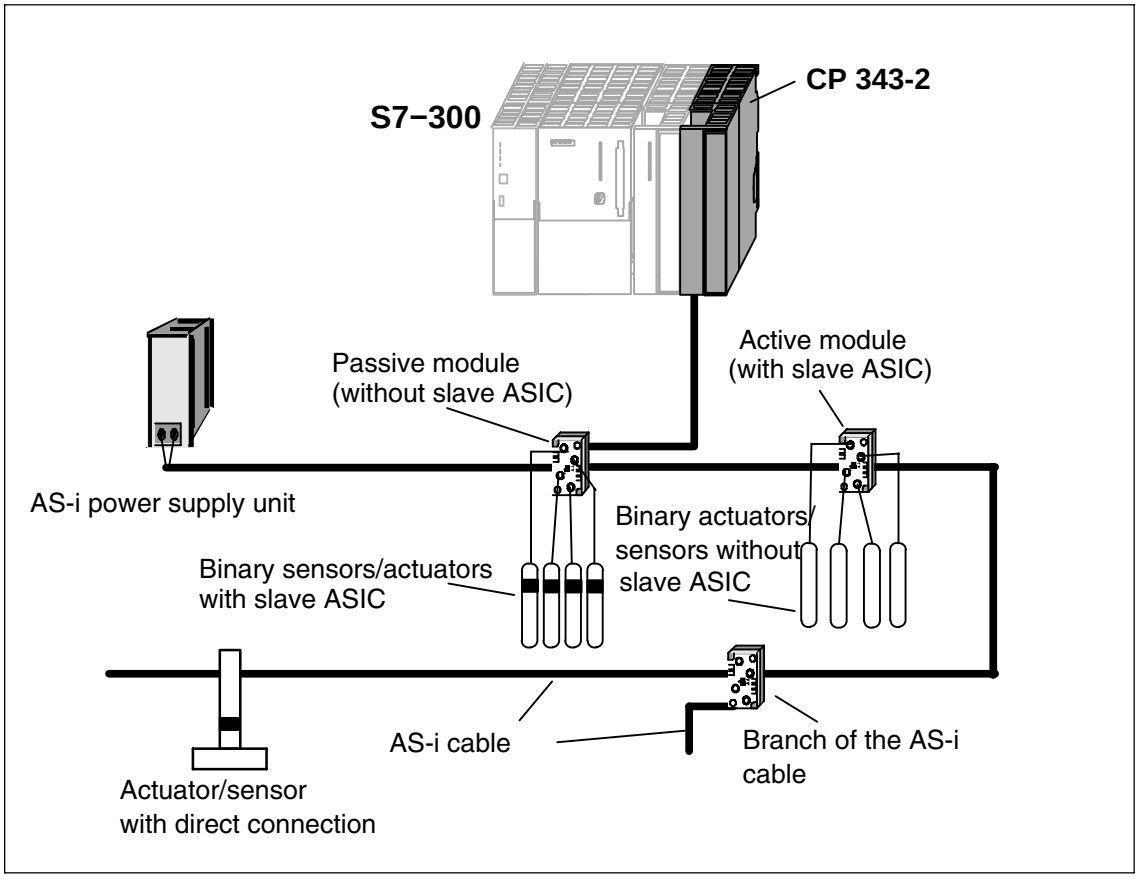


Figure 1-1 Using the CP 343-2 Master Module in the S7-300

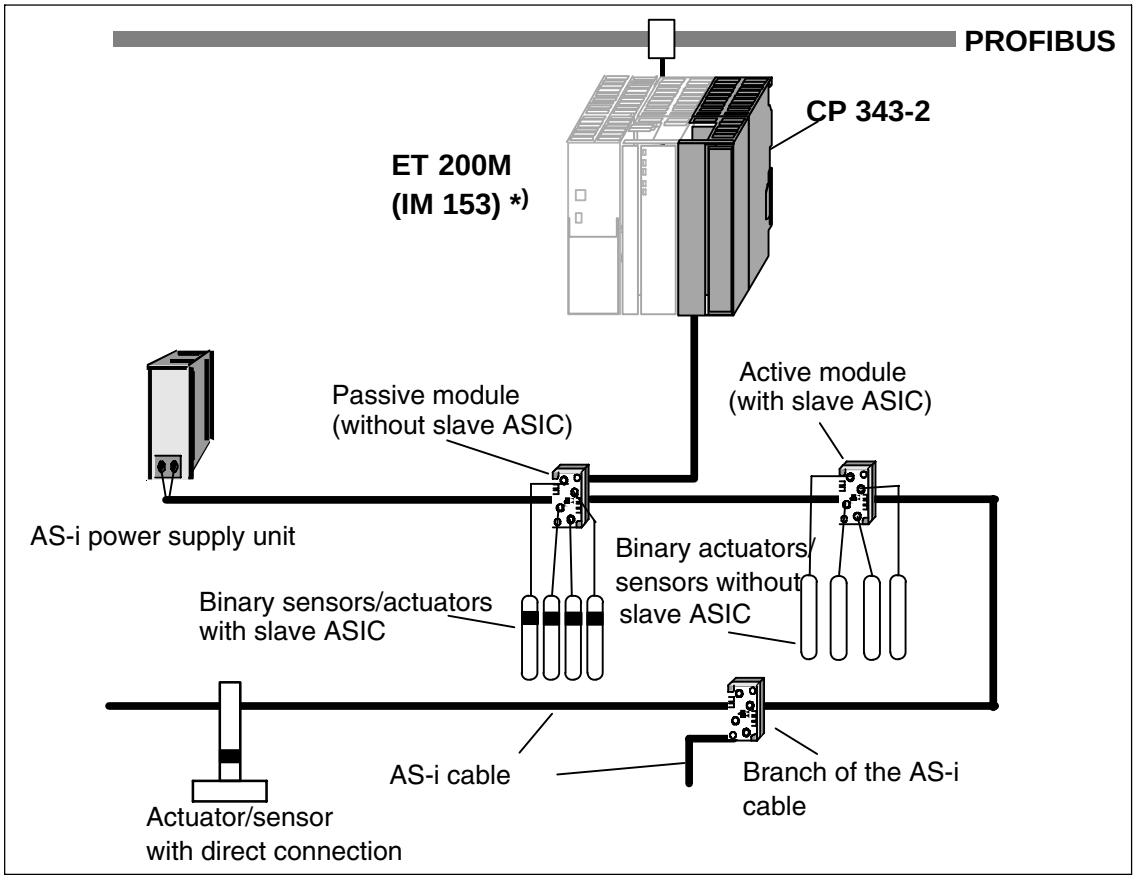


Figure 1-2 Distributed Use of the Master Module CP 343-2 in the ET 200M

*) The CP 343-2 / CP 343-2 P is not released for operation in the IM 153-3.

1.2.2 The Product

The product consists of the following:

1. One of the modules of the following type:
   - CP 343-2 Order number 6GK7 343-2AH01-0XA0
   - CP 343-2 P Order number 6GK7 343-2AH11-0XA0
2. Backplane bus connector
3. Labeling strips
4. CD with sample programs and documentation

   The STEP 7 block FC “ASI_3422” (version 2.0) required for extended operation of the CP 343-2 is included on this CD.

Note

The 20-pin front connector for attaching to the AS-i cable is not supplied with the CP 343-2. You will find the order number of the front connector in the Catalog IK PI.

1.3 Technical Specifications of the Module

The CP 343-2 / CP 343-2 P module has the following characteristics:

Table 1-1 Technical Specifications

Feature	Explanation/Values
Bus cycle time	5 ms with 31 slaves 10 ms for 62 slaves with the extended addressing mode Depending on the slave profile, analog values have longer update times.
Configuration	Using buttons on the front panel or with STEP 7 (download of the configuration with FC “ASI_3422”, see section 5.1)
Supported AS-i master profiles	M4
Connection of the AS-i cable	Via S7-300 front connector with screw contacts (20-pin) Current load between contact 17 and 19 and between 18 and 20 maximum 4 A
Address area	16 I bytes and 16 Q bytes in the analog area of the S7-300
Current consumption from SIMATIC backplane bus Power supply SIMATIC backplane bus Current consumption from the AS-i cable Power supply from the AS-i cable	max. 200 mA 5 V DC max. 100 mA DC 29.5 to 31.6 V, according to the AS–i specification
Ambient conditions • Operating temperature • Transportation and storage temperature • Relative humidity	 • 0..60°C (horizontal installation of the S7 standard rail) • 0..40°C (vertical installation of the S7 standard rail) –40°C to +70°C max. 95% at +25°C
Construction • Module format • Dimensions (W x H x D) in mm • Weight	 Compact module S7-300, single width 40 x 125 x 115 approx. 200 g

1.4 Approvals

Table 1-2 Description of the Approvals

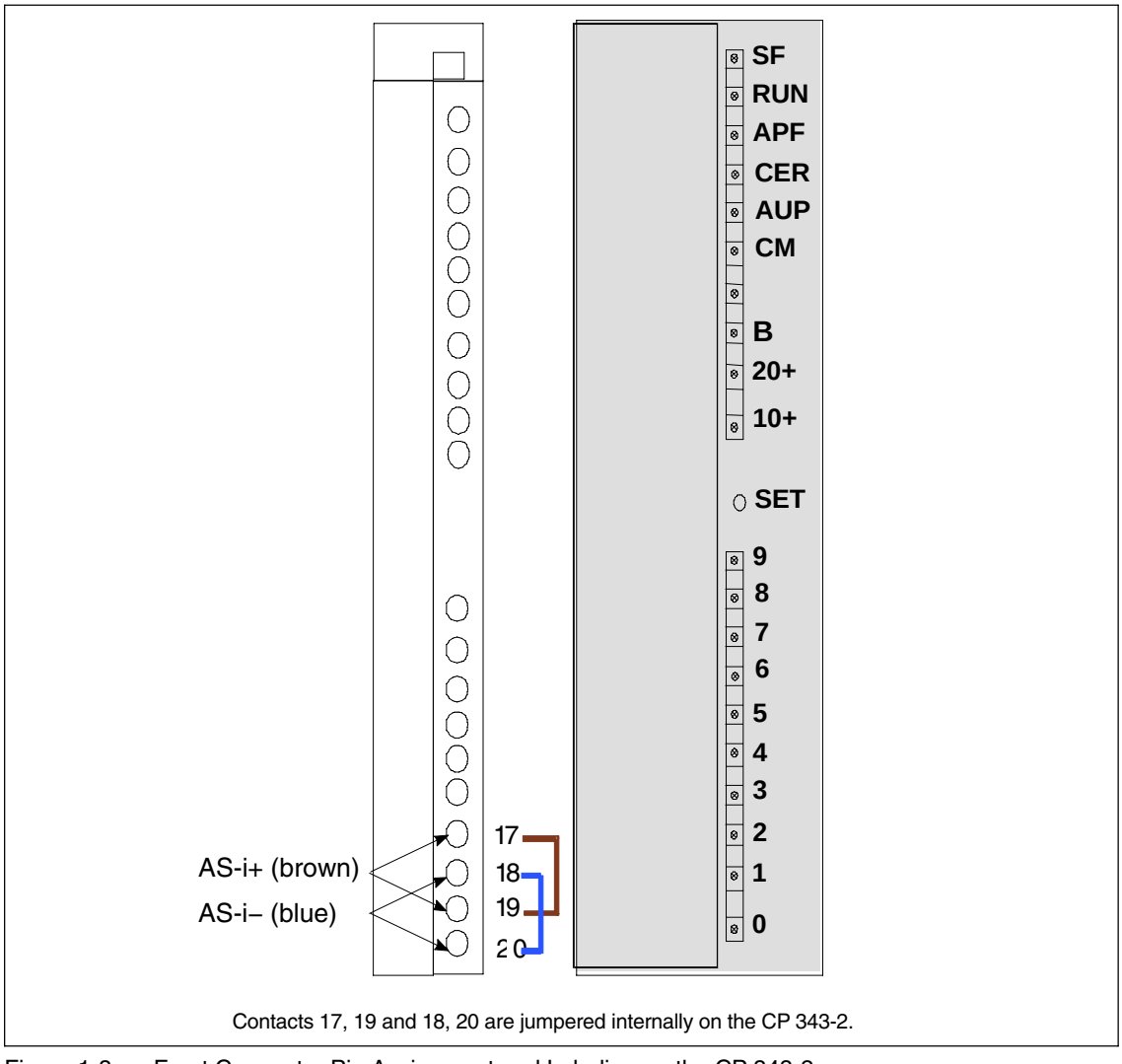
c–UL–us	UL 508
	CSA C22.2 No. 142
c–UL–us for hazardous locations	ANSI / ISA 12.12.01, CSA C22.2 No. 213–M1987 CL. 1, Div. 2 GP.A.B.C.D T4 CL. 1, Zone 2, GP.IIC, T4 CL. 1, Zone 2, AEx nC IIC T4
FM	FM 3611 CL. 1, Div. 2 GP.A.B.C.D T4 CL. 1, Zone 2, GP.IIC. T4 Ta: 0...+60°C
C–TICK	AS/NZS 2064 (Class A)
CE UKCA	EN IEC 60079-0:2018 EN IEC 60079-7/A1:2018 EN IEC 63000:2018 EN IEC 60079-15:2019 EN62026-2/A1:2019
ATEX UKEX IECEx	See Chapter Approvals

Note

The current approvals are printed on the module.

1.5 Displays and Operator Controls of the CP 343-2

The following diagram shows the front panel of the CP 343-2 with its indicators and operator controls. The front connector for connecting the AS-i cable is below the cover on the front of the CP 343-2.



Contacts 17, 19 and 18, 20 are jumpered internally on the CP 343-2.

Figure 1-3 Front Connector Pin Assignment and Labeling on the CP 343-2

The CP 343-2 has internal contacts for two AS-i cables that are jumpered internally on the CP. This allows the CP 343-2 to be “looped” into the AS-i cable.

Notice

The load capacity of the contacts is a maximum of 4 A. If this value is exceeded on the AS-i cable, the CP 343-2 must not be “looped into” the AS-i cable but must be connected by a separate cable (only one pair of contacts used on the CP 343-2).

For further information on connecting the AS-i cable, refer to Section 2.2.

Meaning of the Indicators and Operator Controls:

LED	Meaning
SF	System fault. The LED is lit when: • The CP 343-2 is in the protected mode and an AS-i configuration error has occurred (for example slave failed) • The CP detects an internal fault (for example EEPROM defective) • In response to a button command, the CP cannot execute the required mode change at the present time (for example, because there is a slave with address 0).
RUN	Indicates that the CP has started up correctly.
APF	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 outage.
CER	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. The CER LED is lit in the following situations: • When a configured AS-i slave does not exist on the AS-i cable (for example failure of the slave). • When a slave exists on the AS-i cable but it has not been configured • When an attached slave has different configuration data (I/O configuration, ID code) from the slave configured on the CP. • When the CP is in the offline phase.
AUP	Autoprog available. In the protected mode of the CP, this indicates 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 (for more detailed information, see Chapter 5.2.12).
CM	Configuration Mode. This LED indicates the mode. Indicator on: configuration mode Indicator on: protected mode

LED	Meaning
	• Configuration Mode The configuration mode is used during AS-i installation and commissioning. In the configuration mode, the CP 343-2 can exchange data with every AS-i slave connected to the AS-i cable (except for the AS-i slave with address ‘0’). Any AS-i slaves that are added later are detected immediately by the master and activated and included in the cyclic data exchange. When installation and startup is completed, the CP 343-2 can be switched to the protected mode using the SET button. Any AS-i slaves active at this point are therefore configured. The following data of the AS-i slaves is stored in non-volatile memory on the CP 343-2: – the PLC addresses – the ID codes – the I/O configuration • Protected Mode In the protected mode, the CP 343-2 exchanges data only with the configured AS-i slaves. In this sense, “configured” means that the slave addresses and the configuration data stored on the CP 343-2 match the values of existing AS-i slaves.

SET Button

The SET button is required for configuring the CP 343-2 in standard operation. The button is only activated when the PLC is in the STOP mode.

If the CP 343-2 is in the configuration mode (CM LED lit), the CP 343-2 is configured automatically when the button is pressed. Configuration involves the following steps:

1. The CP 343-2 saves the existing slave configuration as indicated by the LEDs of the active slaves as the expected configuration.
2. The CP 343-2 then changes to the protected mode.

If the CP 343-2 is in the protected mode (“CM” LED is not lit), pressing the button on the CP switches to the configuration mode.

For information on the method, refer to Section 1.6.

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 343-2 is in the **configuration mode**, all **detected** AS-i slaves are displayed.
- If the CP 343-2 is in the **protected mode**, all **activated** AS-i slaves are indicated by the LED being permanently lit. Failed or existing but unconfigured AS-i slaves are indicated by the corresponding LED flashing.

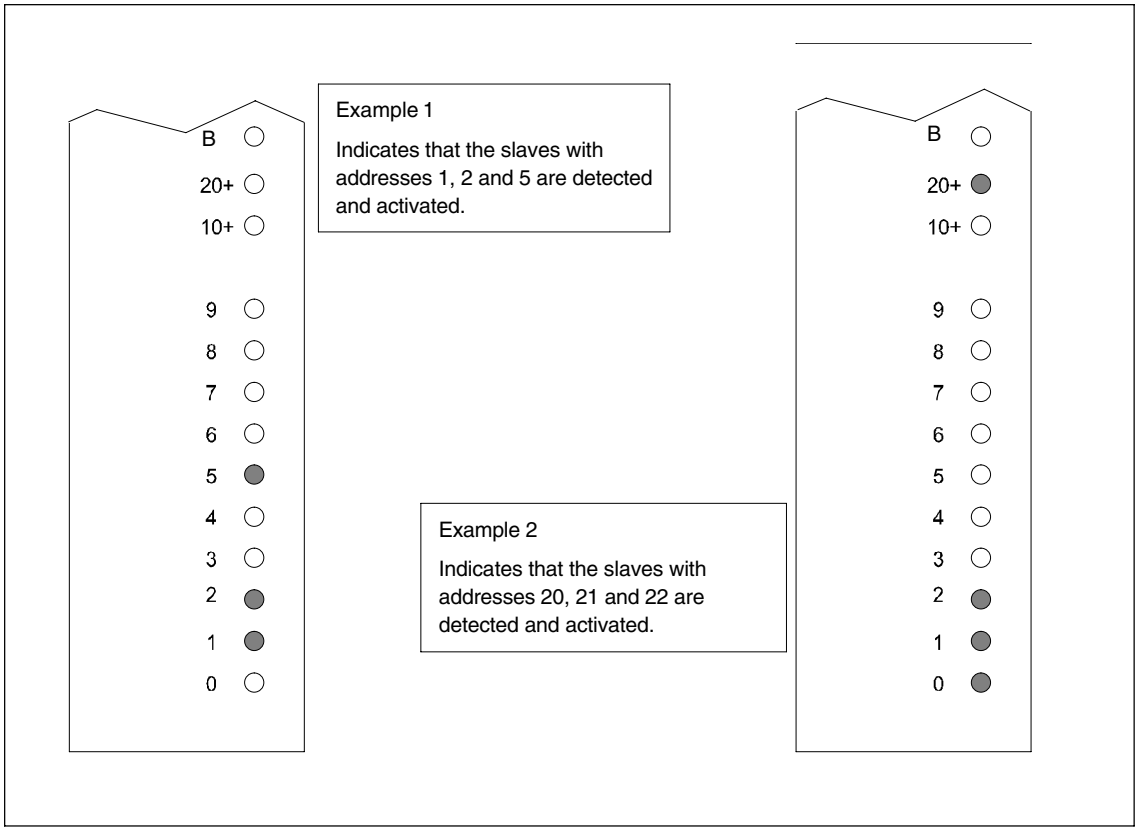


Figure 1-4 Examples of the Display of Detected and Activated AS-i Slaves on the Front Panel of the CP 343-2

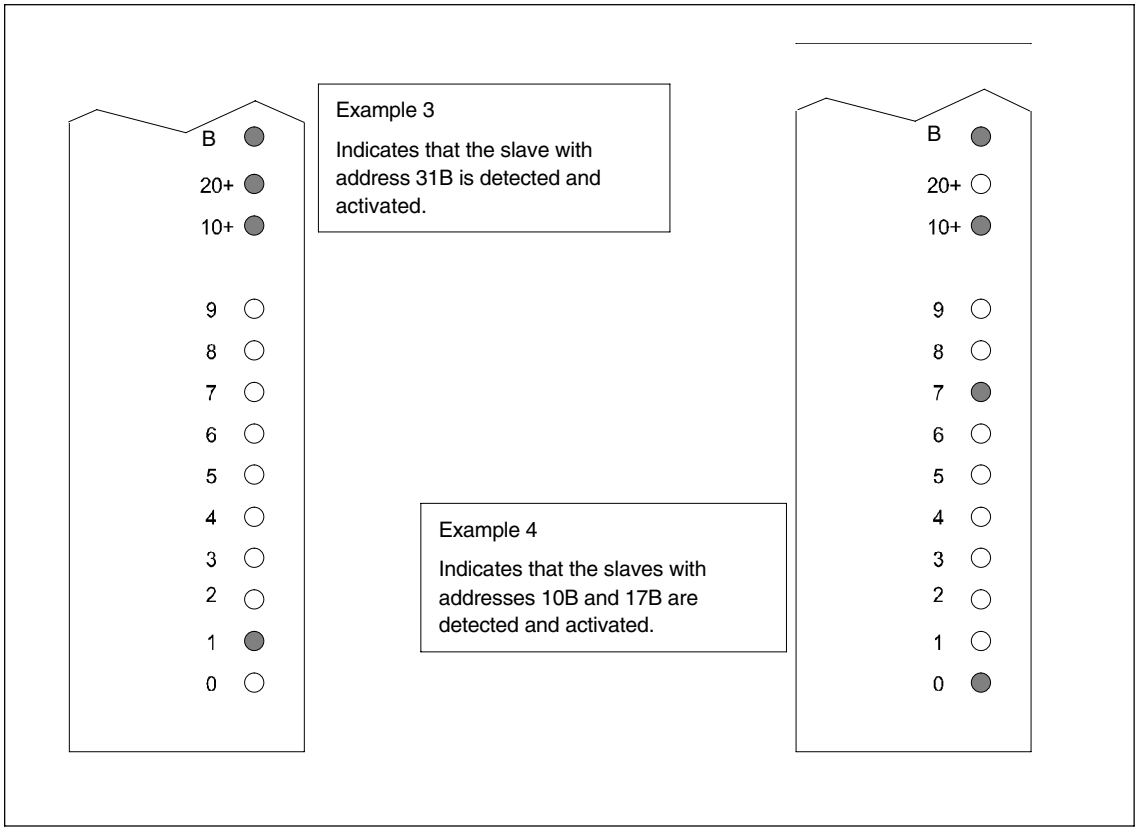


Figure 1-5 Examples of the Display of Detected and Activated AS-i Slaves on the Front Panel of the CP 343-2

1.6 Configuring using Buttons

Preparation for Button Configuration

Make sure that the following situation applies:

- The PLC CPU must be switched to STOP.
- The CP 343-2 and all AS-i slaves must be connected to the AS-interface and supplied with power.
- The AS-i slaves must have unique addresses other than “0”.

Setting the Configuration with Buttons

1. Check whether the CP 343-2 is in “configuration mode” (”CM” LED is lit).

   If the ”CM” LED is not lit, change the CP 343-2 to the configuration mode with the “SET” button.

2. Check whether all the slaves connected to the AS-interface exist and are displayed.
3. Press the SET button. This configures the CP 343-2; in other words, the detected actual configuration is stored as the default in the non-volatile EEPROM. At the same time, the CP 343-2 is changed to the protected mode; the “CM” LED goes off. (See Section 1.5 > SET button)

   The “CER” LED also goes off since following configuration, the “expected configuration” stored on the CP 343-2 matches the “actual configuration” on the AS-Interface.

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. If a slave 0 is connected, the “SF” LED lights up when the SET button is pressed.

If you run a button configuration when there is no AS-i power supply (APF state) or when no AS-i slaves are connected, all the internal lists are set to their default values. In particular, all the AS-i parameters are set to = F_{Hex} and the AutoAddress_Enable bit is set to = 1.

Notice

The following applies to the CP 343-2 P: A configuration of the AS-i slaves set by STEP 7 and downloaded to the S7 station is transferred to the CP 343-2 P by the CPU during startup. Any configuration set with the buttons is then overwritten.

1.7 Modes

The CP recognizes two modes:

- Configuration mode
- Protected mode

Configuration mode

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

You can change the CP module from protected mode (productive operation) to configuration mode with the ”SET” button. (“CM” LED is lit, see Section 1.6).

In Configuration mode, the CP can exchange data with every AS-i slave connected to the AS-i cable. Any AS-i slaves that are added later are detected immediately by the master, activated and included in the cyclic data exchange.

Protected mode

In protected mode, the CP exchanges data only with the configured AS-i slaves.

After configuring with the “SET” button, activate protected mode by pressing the ”SET” button again, the “CM” LED goes off.

1.8 Permitted Slots for the CP 343-2 in the SIMATIC S7-300 and in the ET 200M

In principle, the CP can be installed in all the slots for I/O modules in the S7-300 and ET 200M.

There may, however, be restrictions depending on the CPU or power supply unit being used in terms of the following:

- The expandability with several racks (multi-tier expansion of the PLC only with the CPU 314 and higher),
- The electrical configuration, in other words the total current consumption from the S7 backplane bus.

For more detailed information, refer to the relevant SIMATIC system manuals /4/.

1.9 Addressing the CP 343-2 in the S7 Automation System

The CP 343-2 can be addressed by the PLC like an analog module with 16 input bytes and 16 output bytes. The CP occupies 16 input bytes and 16 output bytes in the I/O address space of the S7 automation system (analog area on the AS).

Of the 16 bytes I/O address area of the CP 343-2, 31 x 4 bits are used for the binary data of the AS-i standard slaves or A slaves. The remaining four bits are reserved for later applications.

The base address n of this address area is fixed as follows by the slot of the CP 343-2.

Rack 0

Module	PS	CPU	IM	CP	CP	CP	CP	CP	CP	CP	CP
Slot number	1	2	3	4	5	6	7	8	9	10	11
Base address	1	2	3	256	272	288	304	320	336	352	368

Rack 1

Module			IM	CP	CP	CP	CP	CP	CP	CP	CP
Slot number			3	4	5	6	7	8	9	10	11
Base address				384	400	416	432	448	464	480	496

Rack 2

Module			IM	CP	CP	CP	CP	CP	CP	CP	CP
Slot number			3	4	5	6	7	8	9	10	11
Base address				512	528	544	560	576	592	608	624

Rack 3

Module			IM	CP	CP	CP	CP	CP	CP	CP	CP
Slot number			3	4	5	6	7	8	9	10	11
Base address				640	656	672	688	704	720	736	752

Note

In most CPUs (for example, the CPU 315-2DP, 318), the slot-oriented addressing can be modified with STEP 7 configuration (HW Config).

In particular, with the freely configurable CPUs, it is possible to address the standard AS-i slaves or the A/B slaves with A addresses from the extended address area via the process image of the inputs and outputs.

2 Installation and Commissioning

This chapter explains how to install and commission the module.

2.1 Safety Warnings

Warning

When used under hazardous conditions (zone 2), the devices must be installed in an enclosure.

To comply with Directive 2014/34/EU on Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres and UK-Regulations 2016 (S.I. 2016 No. 1107), and related amendments, this enclosure must meet the requirements of at least IP54 in compliance with EN 60529.

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

Warning

- ”WARNING” – Explosion Hazard – Do not disconnect while circuit is live unless area is known to be non-hazardous.
- ”WARNING” – Explosion Hazard – Substitution of components may impair suitability for Class I, Division 2 or Zone 2.
- ”This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D; Class I, Zone 2, Group IIC or non-hazardous locations.

Warning

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

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

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

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

Caution

Please keep to the ESD guidelines when installing and operating the CP.

Connect the CP only when the power supply is turned off.

Ground/Chassis Ground Concept

Notice

To achieve the noise immunity of the CP 343-2 / CP 343-2 P the AS and AS-i power supply unit must be correctly grounded.

Please note the instructions regarding the grounding and chassis ground concept in the SIMATIC S7 installation guidelines; see “SIMATIC S7 Automation System S7-300 – Installation: installation manual” /4/.

2.2 Installing and Commissioning the CP

Installation

The CP can be installed in a SIMATIC S7-300 or an ET 200M.

Notice

The CP 343-2 / CP 343-2 P is not released for operation in the IM 153-3.

Step	Explanation / Meaning
Note Only wire up the S7-300 with the power switched off! Follow the steps as described in detail in /4/ when wiring between the power supply and the CPU.	
1. Install the CP on the S7 standard rail.	Slots 4 to 11 are permitted for the CP in racks 0 to 3 (connected by IM 360/361). Proceed as in the sections dealing with setup and wiring, described in detail in /1/.
2. Establish the connection via the enclosed bus connector to the backplane bus.	
3. Then secure the CP by the screws in its casing.	
4. Connect the AS-i cable to the terminals on the front connector of the CP.	Contact is made at terminal pairs 17 and 19 or 18 and 20 of the front connector. Terminals 17 and 19 and terminals 18 and 20 are electrically connected within the CP. The assignment of the terminal pair and the polarity are indicated on the front panel of the CP. The second terminal pair (18/20) is intended for connecting the AS-i power supply unit or a branch of the AS-i cable. This allows the CP to be “looped” into the AS-i cable. The AS-i power supply unit can, however, be connected to any point on the AS-i cable.

Caution

The load capacity of the AS-i contacts is a maximum of 4 A. If this value is exceeded on the AS-i cable, the CP must not be “looped into” the AS-i cable but must be connected by a separate cable(only one pair of CP terminals used).

Step	Explanation / Meaning
5. Turn on the power supply for the SIMATIC station and the AS-i system.	
6. The remaining steps in commissioning involve downloading the configuration data.	For details on configuration, refer to Section 1.6 and 3.

❑

3 Configuration with STEP 7



This chapter explains how to configure the CP with STEP 7 as of V5.2.

You will learn the following:

- What basic configuration will need to create for the CP 343–2 and CP 343–2 P
- What other configuration options the CP 343–2 P provides

3.1 General Information on Configuring the CP 343-2 with STEP 7

Significance of the Configuration in STEP 7

Configuration in STEP 7 is necessary for the use of the CP 343-2 in an S7-300. Here, a distinction must be made between the obligatory basic configuration and the optional slave configuration for the CP 343–2 P.

The following applies to the CP 343–2 P:
While configuration with the buttons as described in Section 1.6 simply allows querying of the current actual configuration, by configuring in STEP 7, you can create a defined configuration regardless of the actual configuration and download it to the CP.

Note

The information on the basic configuration in Section 3.2 applies both to the CP 343-2 and to the CP 343-2 P.

The information in Section 3.3 relates only to the CP 343-2 P!

3.2 STEP 7 Basic Configuration

Entering the AS-i Master into the S7-300 Station in HW Config

The CP 343-2 / CP 343-2 P is taken from the hardware catalog in STEP 7 HW Config just like any other module and placed in the required slot in the rack of the S7-300 station.

After you have inserted the CP 343-2 / CP 343-2 P, there are still no AS-i slaves configured. In this default setting, the rules of “**button configuration**” apply initially (see Section 1.6).

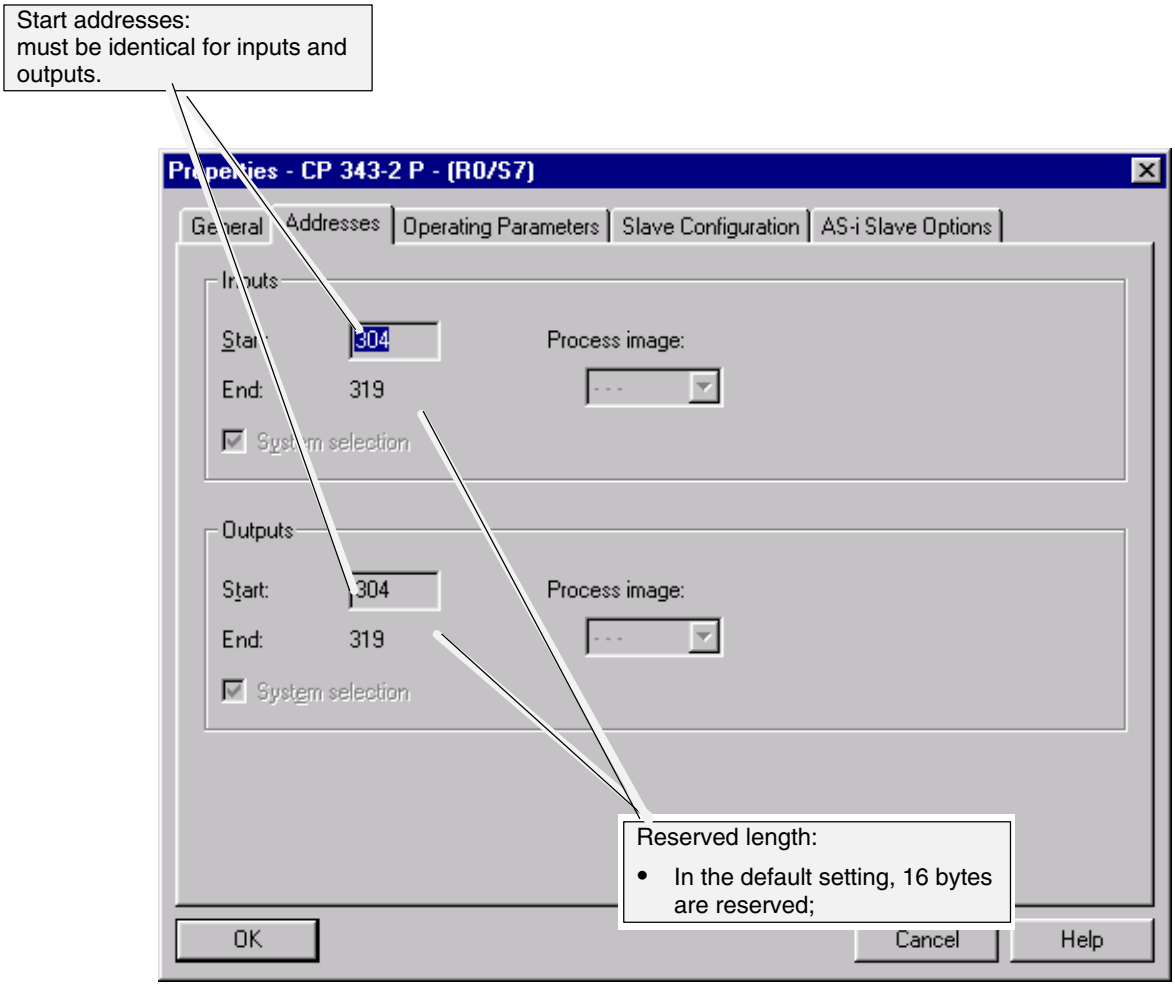
Configuring Properties of the CP 343-2 / CP 343-2 P

To view general information, addresses, and operating parameters and to configure or modify them, change to the Properties dialog of the CP 343-2 / CP 343-2 P.

- “General” Tab

  Here, you can change the name of the CP.

- “Addresses” Tab



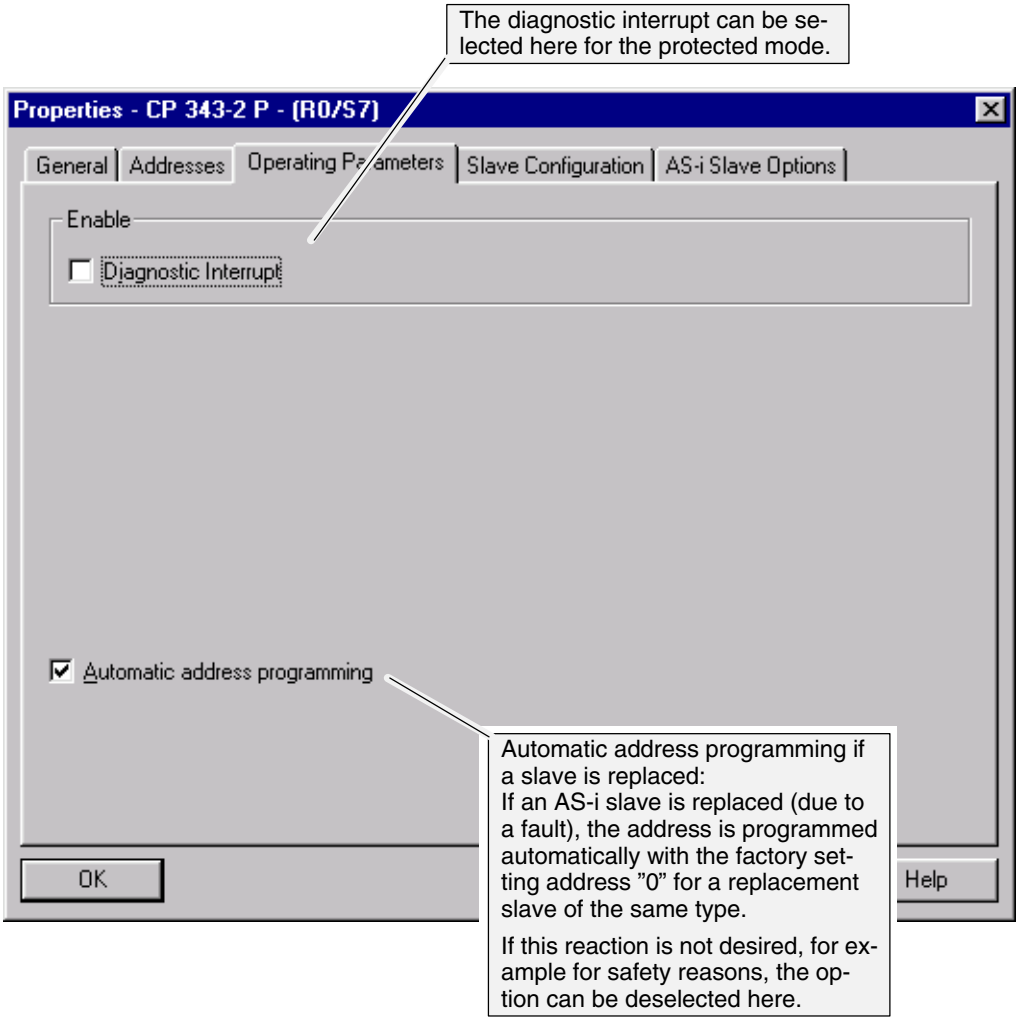
3.3 Extra Configuration of the CP 343-2 P

Note

The information in Section 3.3 relates only to the CP 343-2 P!

3.3.1 Configuring in STEP 7 − Operating Parameters

- ”Operating Parameters” tab



The settings you have made up to now in the Properties dialog are adequate to be able to access the AS-i slaves from the user program. If you want to set a more detailed AS-i configuration with STEP 7, follow the steps below.

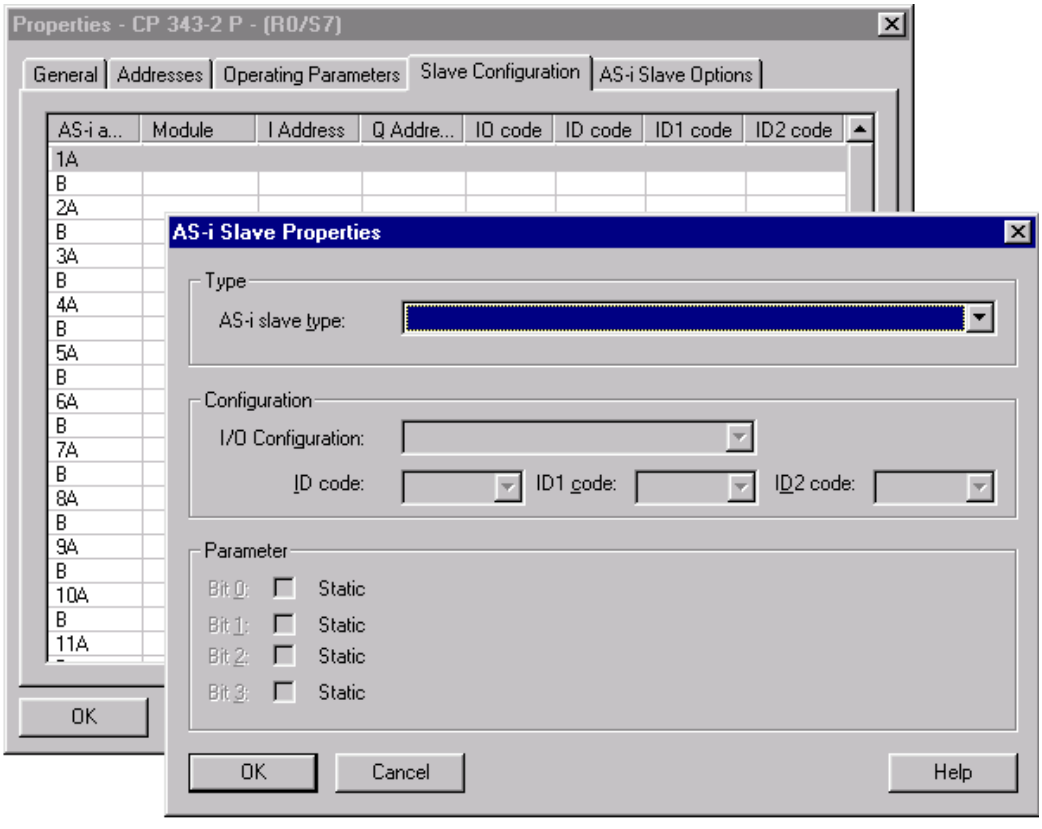
3.3.2 Configuring AS-i Slaves

Notice

A configuration of the AS-i slaves set by STEP 7 and downloaded to the S7 station is transferred from the CPU to the CP 343-2 P when the S7 station starts up. Any configuration set with the buttons is then overwritten.

To configure a specific slave configuration, select the “Slave Configuration” tab.

Double-click on the row in the displayed table in which you want to enter an AS-i slave with the corresponding address; this opens the Properties dialog for AS-i slaves.



Take the AS-i slaves from the drop-down list. Three basic types of AS-i slave are available:

- AS-i A/B Slave Universal

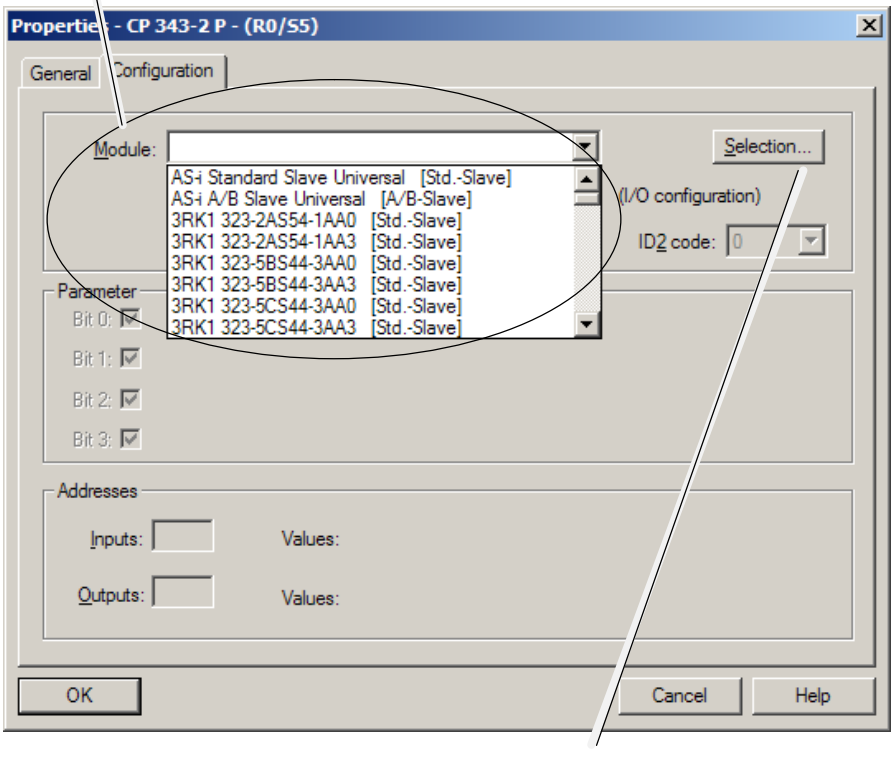
  AS-i slave with extended addressing mode

- AS-i Standard Slave Universal or AS-i Analog Slave

  AS-i slave for the standard address area; if you use this slave type, you cannot place an AS-i A/B slave at the same address in the B address area.

- Siemens Slaves

  As of STEP 7 version 5.3.3, you have the option of simple configuration of slaves from Siemens AG, by selecting the relevant order number from the drop-down list.



  As an alternative, you can open the slave selection dialog with the “Selection” button. Here, you will find the Siemens slaves with order numbers arranged according to groups.

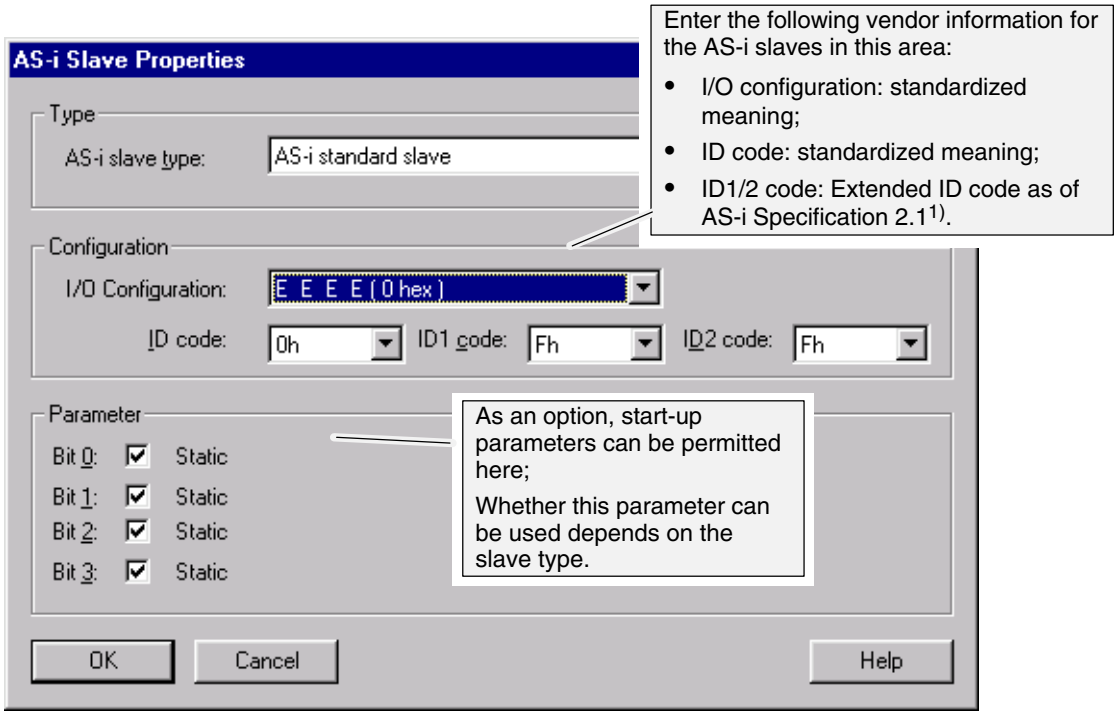
Configuring the Properties of an AS-i Slave

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

- Enter configuration data of the AS-i slaves
- Specify the I/O configuration
- Set the AS-i parameters

Standard AS-i Slave

The AS-i standard slave can only be placed at an AS-i address in the A area. This address is then no longer available in the B area.



1) For AS–i slaves that do not support the ID1/ID2 codes, the values F (hexadecimal) must be entered.

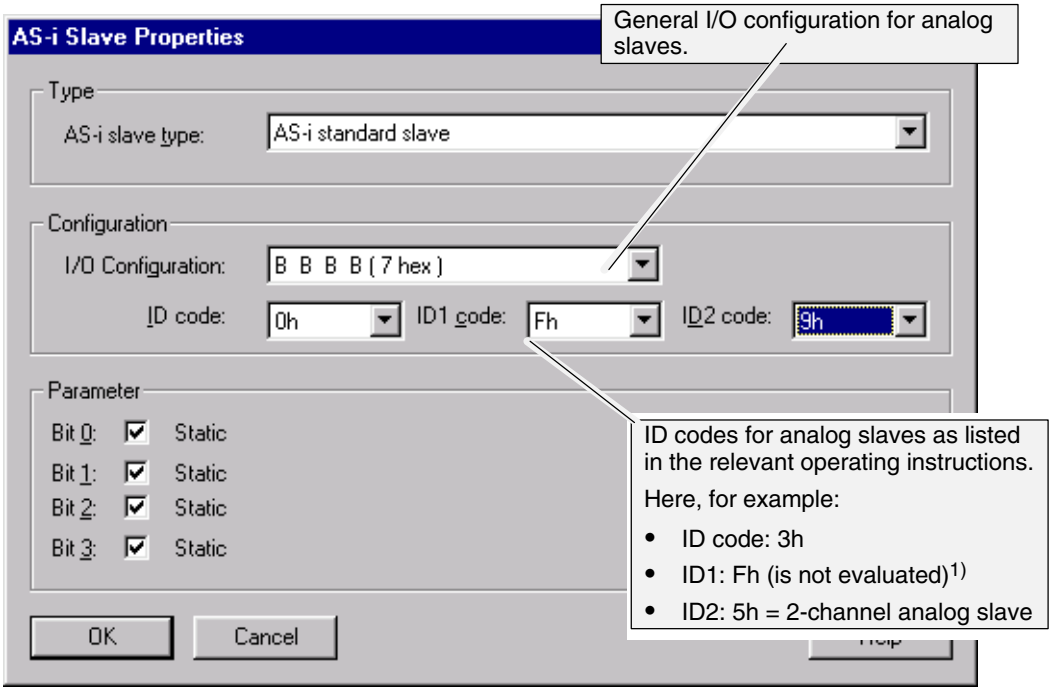
Configuring Analog Slaves as Standard Slaves

If you want to configure an analog slave with more than two channels, use the AS-i standard slave.

You then set the properties of the analog interface using the combination of the I/O configuration and the three ID codes. Please refer to the operating instructions of the AS-i slave you are using for information on the parameter settings.

These parameters are set in accordance with the DP standard V1.

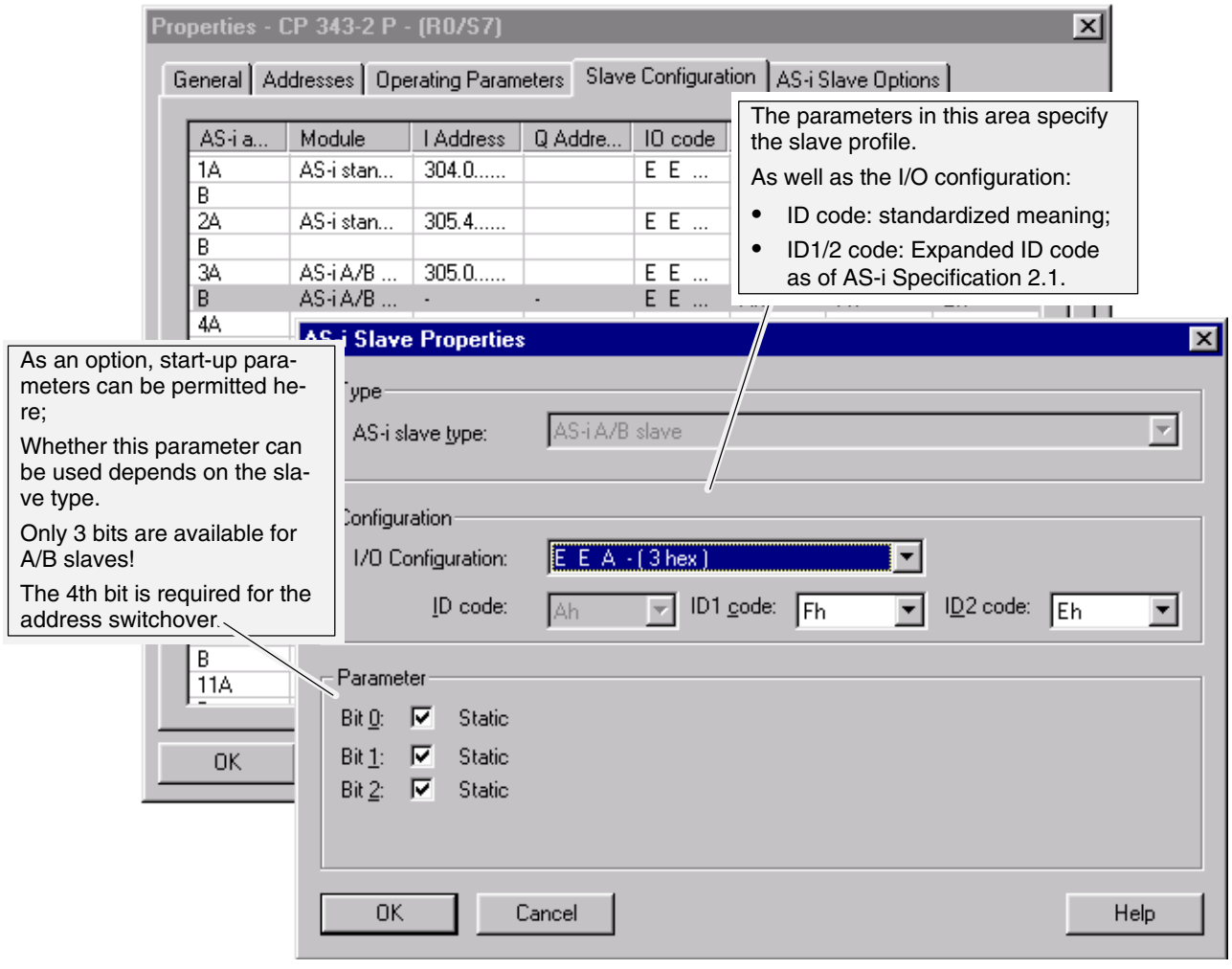
Example:



1) For AS-i slaves that do not support the ID1/ID2 codes, the values F_H must be entered.

AS-i A/B Slave

The AS-i A/B slave can either be placed at an AS-i address in the A or B area. The B area can be used only when no AS-i standard slave is placed in the A area.



AS−i analog slaves with expanded address area

If you use an analog slave with only 2 channels, you can configure this as an AS-i A/B slave in the expanded address area. Configuration is as described above in the section “AS-i A/B slave”.

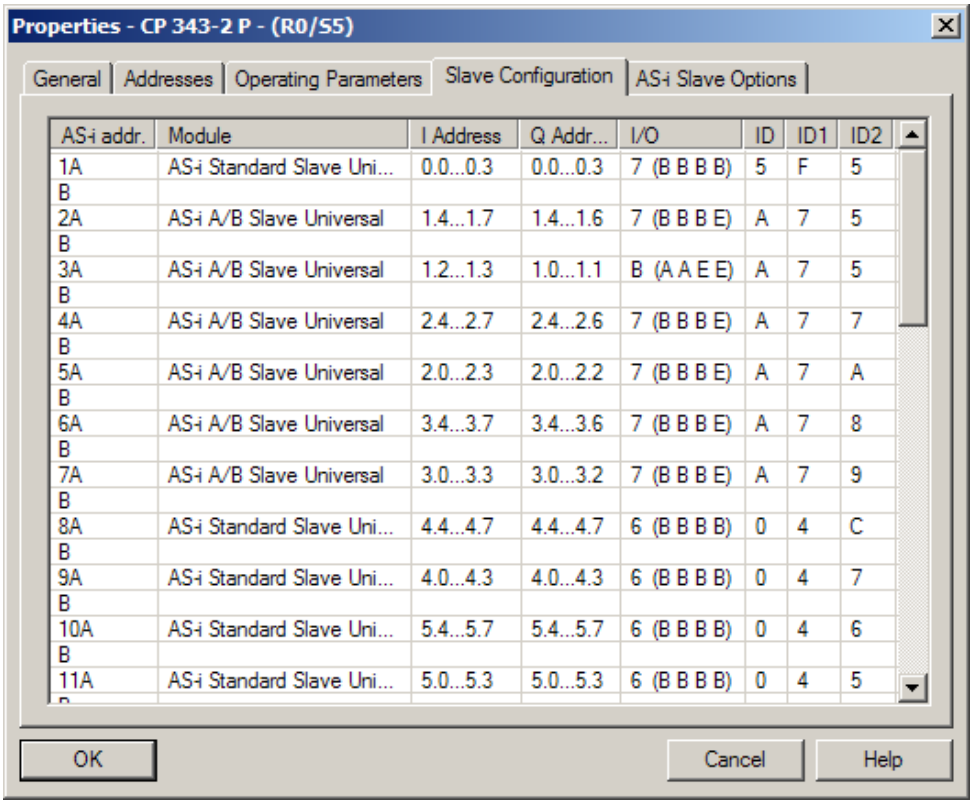
Slaves Complying with AS-i Specification V3

AS-i slaves complying with AS-i Specification V3 (combined transaction type (CTT) 2–5) are supported by the CP as of firmware version V3.0. You can access the analog values of these slaves using data records 140 to 147.

Notice

In the corresponding digital values, STEP 7 does not indicate the correct number of bits. Access to the user data by the user program is nevertheless always possible.

The following screenshot shows an example of the “Slave Configuration” tab in the Properties dialog of a module with configured CTT slaves:



AS-i addr.	Module	I Address	Q Addr...	I/O	ID	ID1	ID2
1A	AS-i Standard Slave Uni...	0.0...0.3	0.0...0.3	7 (B B B B)	5	F	5
B							
2A	AS-i A/B Slave Universal	1.4...1.7	1.4...1.6	7 (B B B E)	A	7	5
B							
3A	AS-i A/B Slave Universal	1.2...1.3	1.0...1.1	B (A A E E)	A	7	5
B							
4A	AS-i A/B Slave Universal	2.4...2.7	2.4...2.6	7 (B B B E)	A	7	7
B							
5A	AS-i A/B Slave Universal	2.0...2.3	2.0...2.2	7 (B B B E)	A	7	A
B							
6A	AS-i A/B Slave Universal	3.4...3.7	3.4...3.6	7 (B B B E)	A	7	8
B							
7A	AS-i A/B Slave Universal	3.0...3.3	3.0...3.2	7 (B B B E)	A	7	9
B							
8A	AS-i Standard Slave Uni...	4.4...4.7	4.4...4.7	6 (B B B B)	0	4	C
B							
9A	AS-i Standard Slave Uni...	4.0...4.3	4.0...4.3	6 (B B B B)	0	4	7
B							
10A	AS-i Standard Slave Uni...	5.4...5.7	5.4...5.7	6 (B B B B)	0	4	6
B							
11A	AS-i Standard Slave Uni...	5.0...5.3	5.0...5.3	6 (B B B B)	0	4	5

“Slave Configuration” tab in the Properties dialog of a CP 343–2 P (example): Not all bits of the I/O addresses of the CTT slaves are relevant!

Table 3-1 shows the relevant bits of the CTT slaves.

Table 3-1

Slave in the example (see figure)	Type, IO.ID.ID2	Relevant bits	Non-relevant bits
Slave 1A	CTT2, S–7.5.5	I0.0...I0.1 Q0.2...Q0.3	I0.2...I0.3 Q0.0...Q0.1
Slave 2A	CTT2, S–7.A.5	I1.4...I1.5 Q1.6	I1.6...I1.7 Q1.4...Q1.5
Slave 3A	CTT2, S–B.A.5	–	All bits irrelevant. Data access using data record 140...147
Slave 4A	CTT3, S–7.A.7	I2.4...I2.7 Q2.4...Q2.7 *)	– –
Slave 5A	CTT3, S–7.A.A	–	All bits irrelevant. Data access using data record 140...147
Slave 6A	CTT4, S–7.A.8	 Q3.6	I3.4...I3.7 Q3.4, Q3.5
Slave 7A	CTT4, S–7.A.9	–	All bits irrelevant. Data access using data record 140...147
Slave 8A, 9A, 10A, 11A	CTT5, S–6.0.x	–	All bits irrelevant. Data access using data record 140...147

*) Bit Q2.7 is not shown but can be used.

Note

Slaves with IO code 6 and ID code 0 occupy several AS-i addresses. The IO and ID code specified by the vendor must be configured for each occupied AS-i address.

3.4 Uploading the Actual Configuration to the PG (CP 343-2 P only)

Aims

You can upload the current actual configuration over the CP 343–2 P to the open STEP 7 project.

This allows you to

- read in a complex configuration and use it as a basis for a further configuration in STEP 7
- check a current configuration.

Note

The uploaded configuration is always the current actual configuration. This can deviate from the configuration set with the buttons and stored on the AS-i master, for example when an AS-i slave is added or removed using the button configuration function.

When you download the configuration defined in the STEP 7 project to the CP 343-2, the configuration detected by the button configuration function is overwritten.

Follow the steps below

Preparation: Create the basic configuration and download to the station:

1. Create a basic configuration by inserting the CP 343-2 P in an S7-300 station without AS-i slaves in HW Config.
2. Download this basic configuration to the S7-300 station using HW Config.

Uploading:

3. Select the “AS-i Slave Options” tab in the Properties dialog of the CP.
4. Click the “Download to PG” button and, if a warning is displayed, simply confirm it.

An existing configuration in the STEP 7 project is overwritten. Before the new configuration is adopted, you must first confirm the warning.

5. Change to the “Slave Configuration” tab to view the actual configuration and edit it if necessary.

Tip:

To use the function for information despite an existing configuration in STEP 7, you can upload the actual configuration and then after checking it, quit the dialog with the “Cancel” button.

❑

4 Data Exchange between User Program and AS−i Slaves

This chapter provides you with the information you require to access the data of the AS-i slaves from the PLC user program via the CP 343-2. The chapter explains the transfer of the following:

- Binary values of the standard or A slaves via the PLC I/Os
- Binary values of the B slaves by reading or writing data record 150
- Analog values of the AS-i analog slaves complying with profile 7.3/7.4 by reading or writing data records 140–147

For information on using the data record numbers with the CPU 318, refer to “Restrictions” in Section 1.1.

4.1 Exchanging AS−i Binary Values with Standard or A Slaves

Interface between PLC CPU and CP 343-2

You can access the binary values of AS-i standard slaves or A slaves in the user program using suitable STEP 7 I/O commands.

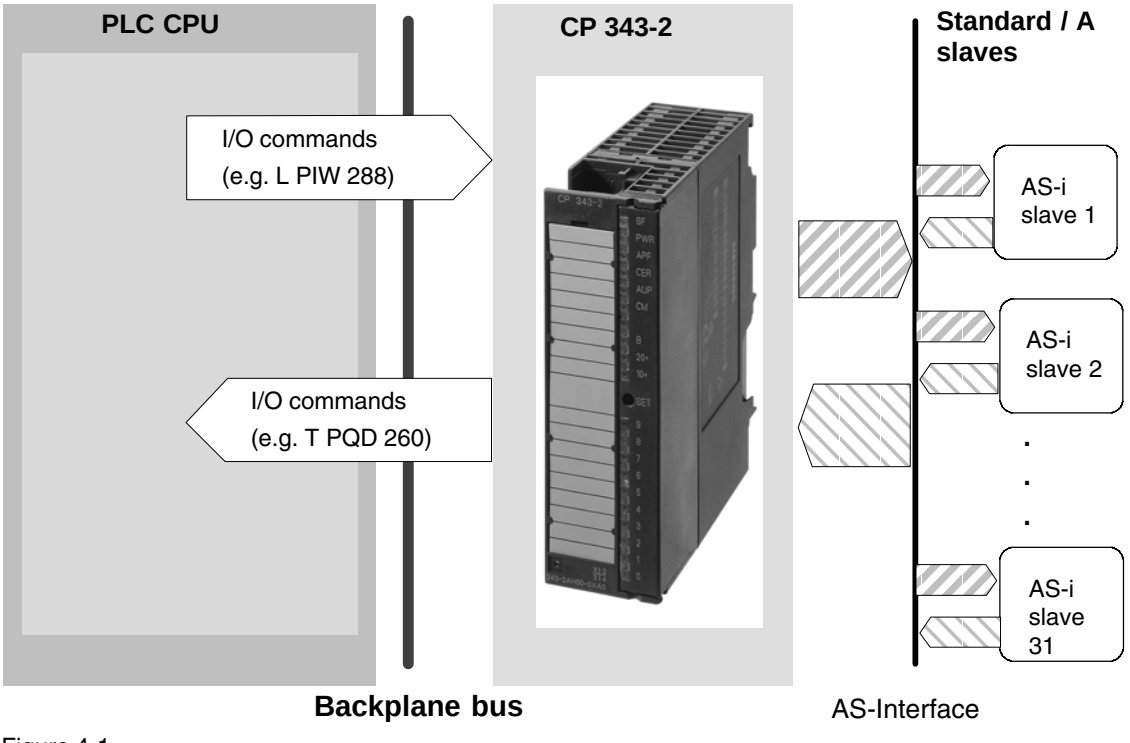


Figure 4-1

4.1.1 Addressing the Standard or A Slaves with the PLC

Each standard or A slave on the AS-i cable is assigned four bits (a nibble) by the CP 343-2. The PLC can write (slave output data) and read (slave input data) this nibble. This allows bi-directional slaves to be accessed.

The first four input bits (first nibble) are reserved for using FC “ASI_3422”. If you do not use an FC, the first four input bits alternate between the values 8H and EH approximately every 2.5 seconds. The first four output bits (first nibble) have no significance for the CP 343-2.

Assignment:

I/O byte number	Bit 7−4	Bit 3−0
n+0	reserved	Slave 1 or 1A Bit 3 I Bit 2 I Bit 1 I Bit 0
n+1	Slave 2 or 2A	Slave 3 or 3A
n+2	Slave 4 or 4A	Slave 5 or 5A
n+3	Slave 6 or 6A	Slave 7 or 7A
n+4	Slave 8 or 8A	Slave 9 or 9A
n+5	Slave 10 or 10A	Slave 11 or 11A
n+6	Slave 12 or 12A	Slave 13 or 13A
n+7	Slave 14 or 14A	Slave 15 or 15A
n+8	Slave 16 or 16A	Slave 17 or 17A
n+9	Slave 18 or 18A	Slave 19 or 19A
n+10	Slave 20 or 20A	Slave 21 or 21A
n+11	Slave 22 or 22A	Slave 23 or 23A
n+12	Slave 24 or 24A	Slave 25 or 25A
n+13	Slave 26 or 26A	Slave 27 or 27A
n+14	Slave 28 or 28A	Slave 29 or 29A
n+15	Slave 30 or 30A Bit 3 I Bit 2 I Bit 1 I Bit 0	Slave 31 or 31A Bit 3 I Bit 2 I Bit 1 I Bit 0

n = base address

The table shows the assignment of the CP 343-2 interface for standard and A slaves (where n is the base address of the I/O address area occupied by the CP 343-2). The assignment of the slave I/O bits to the I/O byte of the PLC can also be seen in the table.

Special Feature of AS-i Analog Slaves

If you use AS-i analog slaves complying with profile 7.3 /7.4, the following applies:

- The input nibbles of these AS-i slaves are set to the value “0” by the CP 343-2;
- The output nibbles of these AS-i slaves are ignored by the CP 343-2;

Example of a Configuration

Figure 4–2 shows an example of the PLC CPU addressing 4 standard or A slaves. The base addresses m = 256 for the I/O data are configured in STEP 7.

The bits relevant for the user program are shown on a gray background. The bits shown on a white background are irrelevant for the user program since no AS-i slave bits are assigned here.

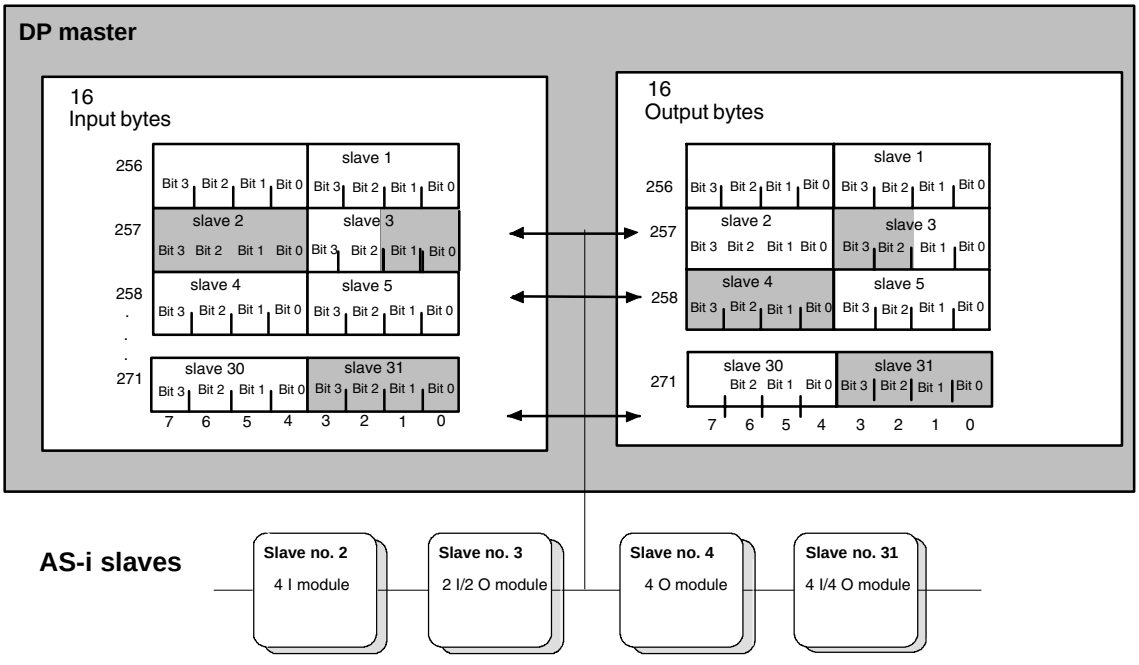
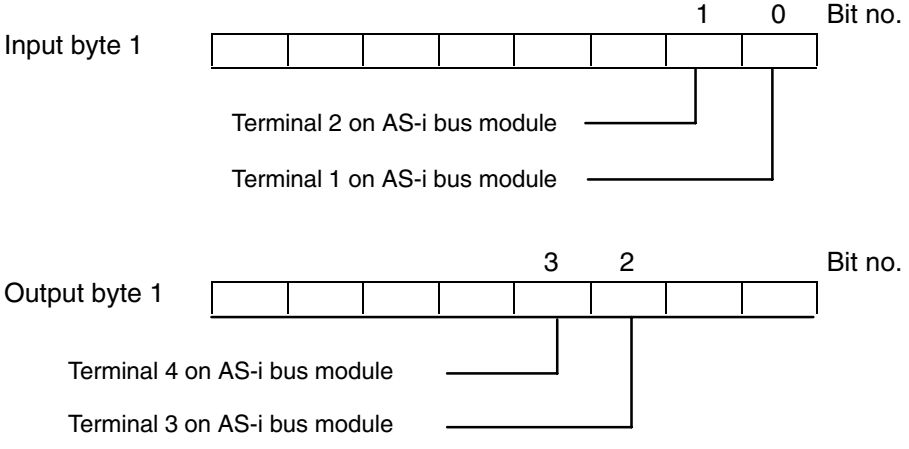


Figure 4-2

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

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



4.1.2 Accessing Binary Data of Standard or A Slaves

The bits of the AS-i slaves are accessed using S7 load and transfer commands, such as:

L PIW X
L PID X
T PQW X
T PQD X

X stands for the byte address on the CP 342-2.

Note

The internal system allows access only to even byte addresses in words or double words. The byte transfer commands L PIB X and T PQB X are not permitted in conjunction with the CP 342-2.

Example:

Correct: `L PIW 260`
Wrong: `T PQB 260`
Wrong: `L PIW 257`

If you require bit access to slave data, you can, for example, use the strategy shown in the following program example of a CP with base address 256:

Table 4-1

STL	Explanation
//Read in binary input data of standard/A slaves	
L PID 256	
T DB20.DBD 0	
L PID 260	
T DB20.DBD 4	
L PID 264	
T DB20.DBD 8	
L PID 268	
T DB20.DBD 12	
Examples: binary access to standard / A slaves	
A DB20.DBX 0.1	//Slave 1, terminal 2
A DB20.DBX 3.0	//Slave 7, terminal 1
= DB20.DBX 47.3	//Slave 31, terminal 4
//Output binary output data of standard/A slaves	
L DB20.DBD 32	
T PQD 256	
L DB20.DBD 36	
T PQD 260	
L DB20.DBD 40	
T PQD 264	
L DB20.DBD 44	
T PQD 268	

Note

If you use a PLC CPU with configurable I/O addresses (for example, 315-2DP), you can also access the 16 bytes of I/O data directly via the process image using single commands.

4.2 Exchanging AS-i Binary Values with B Slaves

Interface between PLC CPU and CP 343-2

You access the binary values of B slaves in the user program using the system function blocks SFC 58 / SFC 59 (”write_data_record” / “read_data_record”). For this function, you always use data record number 150.

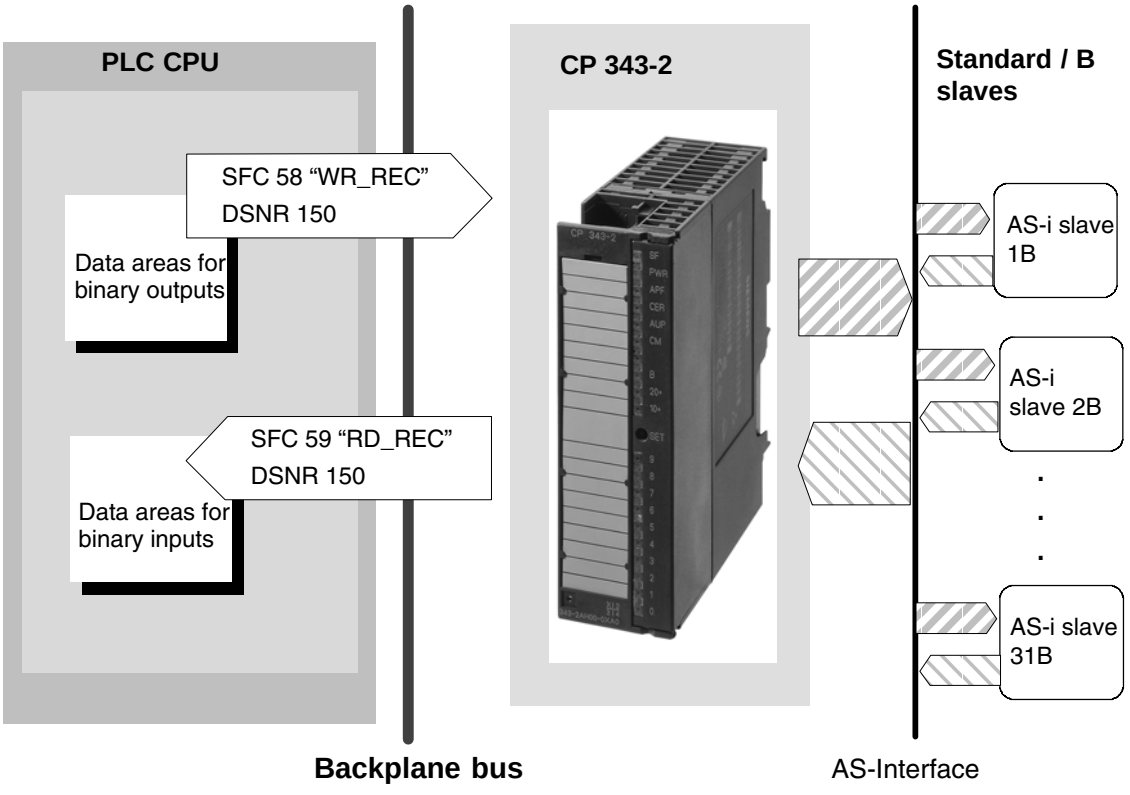


Figure 4-3

4.2.1 How the PLC Addresses the Slaves

The CP 343-2 manages the binary data of the B slaves in two 16-byte long areas (one area for the input data and one area for the output data). The structure of these areas corresponds to the structure of the binary data for the standard or A slaves.

Assignment:

I/O byte number	Bit 7−4	Bit 3−0
n+0	reserved	Slave 1B Bit 3 I Bit 2 I Bit 1 I Bit 0
n+1	Slave 2B	Slave 3B
n+2	Slave 4B	Slave 5B
n+3	Slave 6B	Slave 7B
n+4	Slave 8B	Slave 9B
n+5	Slave 10B	Slave 11B
n+6	Slave 12B	Slave 13B
n+7	Slave 14B	Slave 15B
n+8	Slave 16B	Slave 17B
n+9	Slave 18B	Slave 19B
n+10	Slave 20B	Slave 21B
n+11	Slave 22B	Slave 23B
n+12	Slave 24B	Slave 25B
n+13	Slave 26B	Slave 27B
n+14	Slave 28B	Slave 29B
n+15	Slave 30B Bit 3 I Bit 2 I Bit 1 I Bit 0	Slave 31B Bit 3 I Bit 2 I Bit 1 I Bit 0

n = base address

4.2.2 Accessing Binary Data of B Slaves

The following sample program illustrates access to the binary data of B slaves.

Table 4-2

```
STL                                                 Explanation
//Read in binary input data of the B slaves:
       CALL SFC 59                                  //RD_REC
       REQ     :=TRUE                               //Permanent trigger
       IOID    :=B#16#54                            //Fixed value
       LADDR   :=W#16#100                           //CP address (here 256 dec.)
       RECNUM  :=B#16#96                            //DSNR=150 (binary data B slaves)
       RET_VAL :=MW10
       BUSY    :=M9.0
       RECORD  :=P#DB20.DBX16.0 Byte 16             //Dest. area binary data

//Examples: Binary access to B slaves:
       A       DBX 17.4                             //Slave 2B, terminal 1
       S       DBX 49.6                             //Slave 2B, terminal 3
       A       DBX 17.0                             //Slave 3B, terminal 1
       R       DBX 49.6                             //Slave 3B, terminal 3

//Output binary output data of the B slaves:
       CALL SFC 58                                  //WR_REC
       REQ     :=TRUE                               //Permanent trigger
       IOID    :=B#16#54                            //Fixed value
       LADDR   :=W#16#100                           //CP address (here 256 dec.)
       RECNUM  :=B#16#96                            //DSNR=150 (binary data B slaves)
       RECORD  :=P#DB20.DBX48.0 Byte 16             //Source area binary data
       RET_VAL :=MW12
       BUSY    :=M9.1
```

4.3 Points to Note about Binary Data of Analog Slaves

4.3.1 Point to Note About Analog Slaves

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

The following applies to these protocol bits:

- In the input direction, the CP sets the value “0”.
- In the output direction, the CP ignores the bits;

How to access AS-i analog slaves is described in Section 4.4.

4.3.2 Points to Note About AS-i Safety Slaves

The CP sets the input bits

- 0 and 1 = 0 if the contact at F–IN1 is open;
- 0 and 1 = 1 if the contact at F–IN1 is closed;
- 2 and 3 = 0 if the contact at F–IN2 is open;
- 2 and 3 = 1 if the contact at F–IN2 is closed;

4.4 Transferring AS-i Analog Values

Notice

The following descriptions apply only to AS–i slaves whose data is stored in the analog area. Analog value transfer in compliance with AS-i slave profile 7.1/7.2 is not supported by the CP 343-2. In this case, analog value transfer must be implemented in your software.

Analog Interface between the PLC CPU and CP 343-2

You can operate up to 31 AS-i slaves each with up to 4 analog input or 4 analog output values.

You can operate up to 62 analog slaves in the A/B area each with up to 2 analog input or analog output values.

You access the analog values of AS-i analog slaves in the user program using the system function blocks SFC 58 / SFC 59 (“write_data_record” / “read_data_record”). For this function, you use data record numbers 140–147.

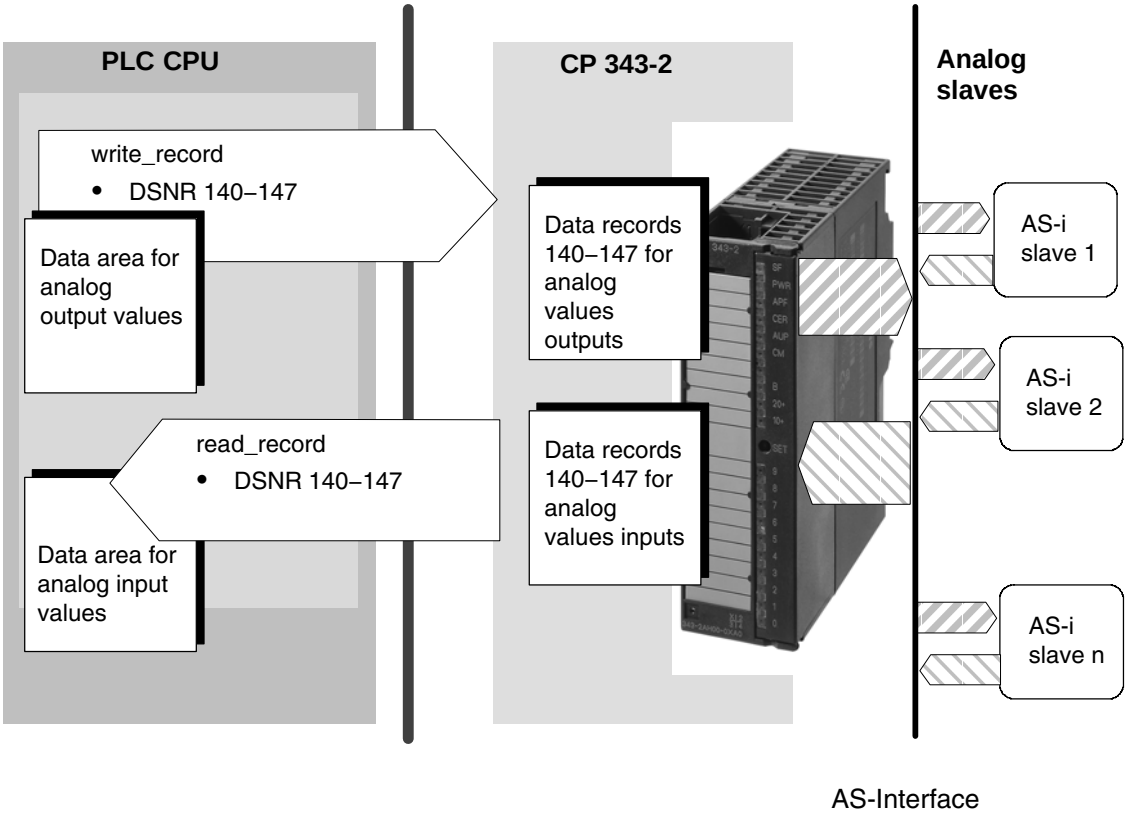


Figure 4-4

4.4.1 Addressing Analog Values of AS-i Slaves

Mapping the Analog Values in the Data Records

For each data record number, you can use data record lengths between 2 bytes and max. 128 bytes.

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

Table 4-3 below shows which data record is used to transfer the analog values of which AS-i slave. The way in which the analog values of the analog slave are arranged is shown in Table 4-4.

The tables can be used both for the analog **inputs** and for the analog **outputs**.

Table 4-3 Accessing Analog Values using Data Records

	Byte addresses occupied by analog values in the data record							
AS-i slave address	**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

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

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

Analog A/B slaves with 2 channels occupy only half the address area. The A slaves, in this case, occupy bytes 0–3 and the B slaves bytes 4–7.

Examples / notes on reading Table 4-3:

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

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

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

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

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

   You use data record 140 and specify 128 as the data record length. This covers analog slaves 1–16.

   For the other analog slaves 17–31, you use data record 144 in a second job and specify 120 as the data record length.

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

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

Representation of the analog values

The analog values are interpreted according to slave profile 7.3 or 7.4 as 16-bit values in two's compliment.

The transparent values are interpreted as two independent bytes.

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

Special cases when transferring analog values in the output direction

- The following applies in the output direction:
- With firmware version V2.x, the AS−i master interrupts the transfer of the analog output values when the CPU is in STOP. How the analog slave reacts depends on the particular device.
- As of firmware V3.0, the AS−i master sends the substitute value ”0” to all slaves when the CPU is in STOP.

Special cases when transferring analog values in the input direction

- In the input direction the AS−i returns the substitute value 7FFFh when
  - The AS−i slave has failed or does not exist
  - The channel number is not supported by the analog slave
  - The analog slave signals “Value Invalid”

  According to AS−i Specification 3.0, these are slaves with the following profiles:
  6.0.A to 6.0.C
  7.3.4 to 7.3.7
  7.3.B to 7.3.F
  7.4.1 to 7.4.F
  7.A.9
  7.A.8 (ID1 = 6)
  7.A.8 (ID1 = 7)
  7.A.5 and 7.5.5 and B.A.5
- Transparent data:

  In the input direction, the AS−i master returns the substitute value 0h when the analog slave supplies transparent data and when
  - This analog slave has failed
  - This analog slave signals “Value Invalid”

  According to the AS−i Specification 3.0, these are slaves with the following profiles:
  6.0.2 to 6.0.4
  7.3.0 to 7.3.3
  7.3.8 to 7.3.A
  7.A.A
  7.A.8 (ID1 = 3,4,5)

Note

If the CP 343-2 is used in the ET 200M, only a limited number of read_data_record and write_data_record jobs can be active at the same time on the S7 CPU. The maximum number of jobs depends on the S7 CPU.

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

4.4.2 Programming Examples

Table 4-5

```
STL                                          Explanation
//Read in analog input data for slave 5:
       Call SFC 59                           //RD_REC
       REQ     :=TRUE                        //Permanent trigger
       IOID    :=B#16#54                     //Fixed value
       LADDR   :=W#16#100                    //CP address (here 256 dec.)
       RECNUM  :=B#16#8D                     //DSNR=141 (analog data slave 5...)
       RET_VAL :=MW14
       BUSY    :=M9.2
       RECORD  :=P#DB20.DBX64.0 BYTE 8       //Dest. area analog input data

//Examples: processing analog values:
       L       DB20DBW 64                    //Slave 5, input channel 1
       +       400
       T       DB20.DBW 88                   //Slave 6, output channel 1
       T       DB20.DBW 106                  //Slave 8, output channel 2

//Output analog output data for slave 5..8:
       CALL SFC 58                           //WR_REC
       REQ     :=TRUE                        //Permanent trigger
       IOID    :=B#16#54                     //Fixed value
       LADDR   :=W#16#100                    //CP address (here 256 dec.)
       RECNUM  :=B#16#8D                     //DSNR=141 (analog data slave 5...)
       RECORD  :=P#DB20.DBX80.0 Byte 32      //Source area analog output data
       RET_VAL::=MW16
       BUSY    :=M9.3
```

❑

5 Using the Command Interface

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

This chapter contains the information you require to access the command interface of the CP 343-2.

5.1 Description of FC “ASI_3422”

Meaning

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

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

Points to Note

- You will find FC ASI_3422 at the following locations:
  - In the STEP 7 block library “SIMATIC_NET_CP” (as of STEP 7 V5.4 SP4)
  - On the accompanying product CD
- You must use version 2.0 or higher of the FC ASI_3422
- FC ASI_3422 must be interrupted during execution! 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 343-2 is used in the ET 200M, only a limited number of read_data_record and write_data_record jobs can be active at the same time on the S7 CPU. The maximum number of jobs depends on the S7 CPU.
  If more than the maximum number of jobs are triggered, they are terminated with the error 80C3h (temporary lack of resources). The rejected job must then be repeated.

Call Interface

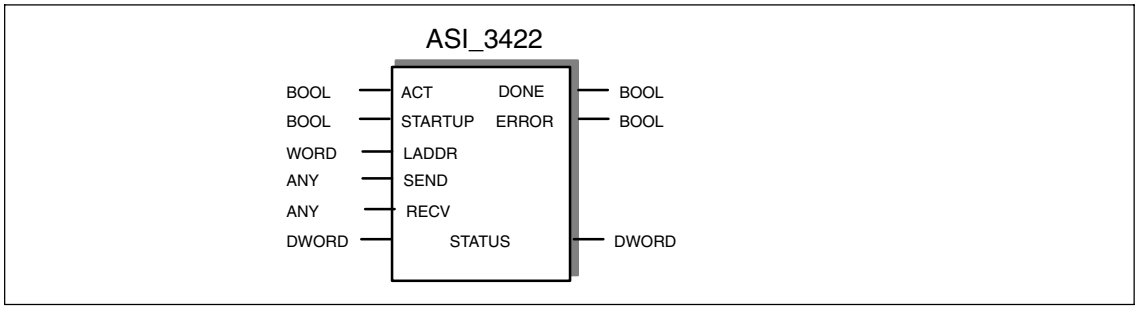


Table 5-1 Formal Parameters

Name	Para Type	Data Type	Memory Area	Remarks
ACT	I	BOOL	I,Q,M,D,L,constant	As long as ACT = 1, command processing is started provided no other call is being processed.
STARTUP	I	BOOL	I,Q,M,D,L,constant	A CPU startup is indicated to the FC by STARTUP = 1. After the function is run through the first time, STARTUP must be reset by the user.
LADDR	I	WORD	I,Q,M,D,L,constant	Base address of the CP 343-2 in the S7 address space. The module base address is specified during STEP 7 configuration.
SEND	I	ANY	I,Q,M,D,L	Send buffer The parameter references a memory area in which the command must be specified by the user. for example: P#DB20.DBX 20.0 byte 10
RECV	I	ANY	I,Q,M,D,L	Receive buffer This buffer is only relevant for commands that supply response data. The parameter references a memory area in which the command response is stored. The length information in the ANY pointer specified here is irrelevant. The FC itself obtains the length of the response data. for example: P#DB30.DBX 20.0 byte 1
DONE	Q	BOOL	Q,M,D,L	DONE = 1 signals 'job completed without error'.
ERROR	Q	BOOL	Q,M,D,L	ERROR = 1 signals 'job terminated with error'.

Table 5-1 Formal Parameters, continued

Name	Para Type	Data Type	Memory Area	Remarks
STATUS	I/Q	DWORD	M,D	1st word: Job status / error code (see Table 5-2); For 'job terminated with error', an error code is generated that describes the error in greater detail. 2nd word: Required by the FC for internal purposes and must **not** be modified. Note: For FC calls to different logical addresses (LADDR), different double words must be used for the STATUS parameter.

Commands in the User Program

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

1. In the warm restart branch of your S7 user program, call FC ASI_3422 once with the parameter value STARTUP = TRUE.
2. Specify the command call in a send buffer in the user program. You transfer this send buffer with the SEND call parameter.
3. Depending on the command type you will also require a response buffer. You transfer this response buffer with the RECV call parameter. 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.

The CD that ships with the CP contains sample programs.

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

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

If no error occurred, DONE is set. In jobs involving response data from the CP 343-2, these are available in the receive buffer specified for RECV. In this case, 0000_H is entered in the first word of STATUS.

If an error occurred, ERROR is set. In this case, no receive data are available from the CP 343-2 for jobs with response data. To identify the error in greater detail, an error code is entered in the first word of STATUS.

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

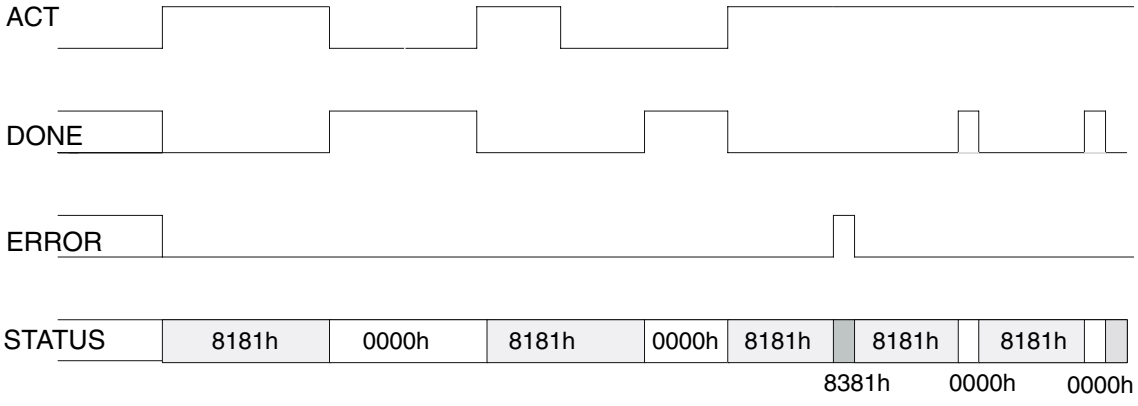


Figure 5-1

Table 5-2 Error Coding

DONE	ERROR	STATUS	Meaning
1	0	0000H	**Job completed 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 for the module selected with LADDR and IOID. (S7-300 modules are permitted for S7-300, S7-400 modules for S7-400, S7-DP modules for S7-300 and S7-400.)
0	1	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 involving user interface/user
0	1	80A4H	Communication problems on K 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 in 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

Table 5-2 Error Coding, continued

DONE	ERROR	STATUS	Meaning
0	1	80C6H	Data record transfer aborted due to priority class abort (warm restart or background) of the distributed I/Os.
0	0	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	8185H	Communications errors with the AS–i master
0	1	8381_H	The AS-i slave address is incorrect
0	1	8382_H	The AS-i slave is not activated (not in LAS).
0	1	8383_H	Error on the AS-Interface
0	1	8384_H	Command not permitted in the current status of the AS-i master.
0	1	8385_H	An AS-i slave with address 0 exists.
		8386_H	The AS-i slave has illegal configuration data (I/O or ID codes).
0	1	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).
0	1	83B1H	A length error occurred transferring a string.
0	1	83B2H	A protocol error occurred transferring a string.
0	1	83F8H	The job number or the job parameter is unknown.
0	1	83F9H	The AS-i master has detected an EEPROM error.
0	1	8F22H	Area length area reading a parameter
		8F23H	Area length error writing a parameter This error code indicates that a parameter is entirely or partly outside the address area or that the length of a bit array of an ANY parameter cannot be divided by 8.
0	1	8F24H	Area error reading a parameter
		8F25H	Area error writing a parameter This error codes indicates that a parameter is located in an area that is illegal for a system function.
0	1	8F28H	Alignment error reading a parameter

Table 5-2 Error Coding, continued

DONE	ERROR	STATUS	Meaning
		8F29H	Alignment error writing a parameter This error code indicates that the reference to a parameter is a bit address other than 0.
0	1	8F30H	The parameter is in the write-protected global DB
		8F31H	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	An access error has occurred while the system attempted to read out a parameter from the peripheral area of the inputs.
0	1	8F43H	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 error code indicates that write access to a parameter was denied
0	1	8F7FH	Internal error

5.2 Description of the AS-i Slave Commands

Overview

This section describes the command calls that can be sent by the user program to the CP 343-2. With these command calls, the CP 343-2 provides the complete functionality of the master profile M4 of the AS-i master specification. How to use the jobs is explained in the descriptions of the individual jobs, the PICS appendix and the explanations in /1/ and /2/.

Table 5-3 AS-i Slave Commands

Name	Parameter	Return	Coding
Set_Permanent_Parameter –> described in section 5.2.1	Slave address, parameter		0 0 $_H$
Get_Permanent_Parameter –> described in Section 5.2.2	Slave address	Parameter	0 1 $_H$
Write_Parameter –> described in section 5.2.3	Slave address, parameter	Parameter echo (optional)	0 2 $_H$
Read_Parameter –> described in section 5.2.4	Slave address	Parameter value	0 3 $_H$
Store_Actual_Parameters –> described in section 5.2.5			0 4 $_H$
Set_Extended_Permanent_Configuration –> described in section 5.2.6	Slave address Configuration data to be created		2 5 $_H$
Get_Extended_Permanent_Configuration –> described in section 5.2.7	Slave address	Specified configuration	2 6 $_H$
Store_Actual_Configuration –> described in Section 5.2.8			0 7 $_H$
Get_Extended_Actual_Configuration –> described in Section 5.2.9	Slave address	Actual configuration	2 8 $_H$
Set_LPS –> described in section 5.2.10	LPS		2 9 $_H$
Set_Offline_Mode –> described in section 5.2.11	Mode		0 A $_H$
Select_Autoprogramming –> described in section 5.2.12	Mode		0 B $_H$
Set_operation_mode –> described in section 5.2.13	Mode		0 C $_H$
Change_AS-i_Slave_Address –> described in Section 5.2.14	Address 1, Address 2		0 D $_H$
Get_AS-i_Slave_Status –> described in Section 5.2.15	Slave address	Error record of the AS-i slave	0 F $_H$

Table 5-3 AS-i Slave Commands, continued

Name	Parameter	Return	Coding
Get_LPS, Get_LAS, Get_LDS, Get_Flags –> described in section 5.2.16		LDS, LAS, LPS, flags	3 0 H
Get_Extended_Total_Configuration –> described in section 5.2.17		Actual configuration, current parameters, LAS, flags	3 9 H
Store_Extended_Total_Configuration –> described in section 5.2.18	Total configuration		3 A H
Write_Extended_Parameter_List –> described in Section 5.2.19	Parameter list		3 C H
Read_Extended_Parameter_Echo_List –> described in section 5.2.20		Parameter echo list	3 3 H
Read_write_CTT2_request –> Description see Section 5.2.21	Slave address CTT2 string	CTT2 string	4 4 H
Read_Version_ID –> described in section 5.2.22		Version string	1 4 H
Read_AS-i_Slave_ID –> described in section 5.2.23	Slave address	ID code	1 7 H
Read_AS-i_Slave_Extended_ID1 –> described in section 5.2.24	Slave address	Extended ID1 code	3 7 H
Write_AS-i_Slave_Extended_ID1 –> described in section 5.2.25	Extended ID1 code		3 F H
Read_AS-i_Slave_Extended_ID2 –> described in section 5.2.26	Slave address	Extended ID2 code	3 8 H
Read_AS-i_Slave_I/O –> described in section 5.2.27	Slave address	I/O configuration	1 8 H
Get_LPF –> described in section 5.2.28		LPF	3 E H
Write_AS-i_Slave_Parameter_String –> described in section 5.2.29	Slave address, parameter string		4 0 H
Read_AS-i_Slave_Parameter_String –> described in section 5.2.30	Slave address	Parameter string	4 1 H
Read_AS-i_Slave_ID_String –> described in section 5.2.31	Slave address	ID string	4 2 H
Read_AS-i_Slave_Diagnostic_String –> described in section 5.2.32	Slave address	Diagnostic string	4 3 H

General Structure of the Send Buffer

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

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

q = 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 on a gray 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

5.2.1 Set_Permanent_Parameter

Meaning

With this call, a parameter value for the specified AS-i slave is configured on the CP 343-2. The value is stored permanently in the EEPROM of the CP 343-2.

The configured parameter is **not** transferred immediately by the CP 343-2 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 343-2.

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

Notice

If you configure the AS-i slaves with HW Config, using the call described here is generally unnecessary

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

Structure of the Job Data in the Send Buffer

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

5.2.2 Get_Permanent_Parameter

Meaning

With this call, a slave-specific parameter value stored on the EEPROM of the CP 343-2 is read.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 01_H
1	Slave address

Structure of the Response Data in the Receive Buffer

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

5.2.3 Write_Parameter

Purpose of the Command

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

The parameter is stored on the CP 343-2 only **temporarily** and is not entered as a configured parameter in the EEPROM!

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

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

Structure of the Job Data in the Send Buffer

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

Structure of the Response Data in the Receive Buffer

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

5.2.4 Read_Parameter

Meaning

This call returns the current parameter value (actual parameter) of an AS-i slave sent by the CP 343-2.

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

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 03_H
1	Slave address

Structure of the Response Data in the Receive Buffer

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

5.2.5 Store_Actual_Parameters

Meaning

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

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 04_H

5.2.6 Set_Extended_Permanent_Configuration

Meaning

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

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

The configuration data are stored permanently on the EEPROM of the CP 343-2 and are used as the expected configuration by the AS-i master in the protected mode. The configuration data are specified by the manufacturer of the AS-i slave. The meaning of the configuration data is described in /2/.

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

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

This call is not made in the protected mode.

Notice

If you configure the AS-i slaves with HW Config, using the call described here is generally unnecessary

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

Structure of the Job Data in the Send Buffer

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

5.2.7 Get_Extended_Permanent_Configuration

Meaning

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

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

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

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number 26_H
1	Slave address

Structure of the Response Data in the Receive Buffer

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

5.2.8 Store_Actual_Configuration

Purpose of the Command

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

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

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

Notice

If you configure the AS-i slaves with HW Config, using the call described here is generally unnecessary

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

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 07_H

5.2.9 Read_Extended_Actual_Configuration

Purpose of the Command

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

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

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

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number 28_H
1	Slave address

Structure of the Response Data in the Receive Buffer

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

5.2.10 Set_LPS

Purpose of the Command

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

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

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

Notice

If you configure the AS-i slaves with HW Config, using the call described here is generally unnecessary

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

Structure of the Job Data in the Send Buffer

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

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

5.2.11 Set_Offline_Mode

Meaning

This call switches between the online and offline mode.

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

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

In the **offline mode**, the CP 343-2 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 343-2 is once again in the online mode.

Structure of the Job Data in the Send Buffer

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

5.2.12 Select Autoprogramming

Meaning

This call can enable or disable the “automatic address programming” function (see also Section 7.1).

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

Structure of the Job Data in the Send Buffer

Byte	Meaning		
	Bit 7	Bit 1	Bit 0
0	Command number: $0B_H$		
1	0		Value for AUTO_ADDR_ENABLE 1= Automatic address programming enabled 0= Automatic address programming disabled

5.2.13 Set_Operation_Mode

Purpose of the Command

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

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

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

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

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

Notice

If an AS-i slave with address 0 is entered in the LDS, the CP 343-2 module cannot change from the configuration mode to the protected mode.

Structure of the Job Data in the Send Buffer

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

5.2.14 Change_AS-I_Slave_Address

Purpose of the Command

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

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

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

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

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

Structure of the Job Data in the Send Buffer

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

5.2.15 Get_AS-i_Slave_Status

Meaning

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

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

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

Structure of the Job Data in the Send Buffer

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

Structure of the Response Data in the Receive Buffer

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

5.2.16 Get_LPS, Get_LAS, Get_LDS, Get_Flags

Meaning

With this call, the following entries are read out of the CP 343-2:

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

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 30_H

Structure of the Response Data in the Receive Buffer

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	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	LDS slave 0	LDS slave 1	LDS slave 2	LDS slave 3	LDS slave 4	LDS slave 5	LDS slave 6	LDS slave 7
9	LDS slave 8	LDS slave 9	LDS slave 10	LDS slave 11	LDS slave 12	LDS slave 13	LDS slave 14	LDS slave 15
10	LDS slave 16	LDS slave 17	LDS slave 18	LDS slave 19	LDS slave 20	LDS slave 21	LDS slave 22	LDS slave 23

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
11	LDS slave 24	LDS slave 25	LDS slave 26	LDS slave 27	LDS slave 28	LDS slave 29	LDS slave 30	LDS slave 31
12	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
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 2							
26	reserved							
27	reserved							
28	reserved							
29	reserved							
30	reserved							
31	reserved							

Meaning of the Bits in Bytes 0 to 23

- Bit = 0 :
  The AS-i slave is **not** activated, detected, or configured
- Bit = 1 :
  The AS-i slave **is** activated, detected, or configured

Flag 1

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

Flag 2

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

Meaning of the Flags

Flag	Meaning
OFFLINE_READY	The flag is set when the offline phase is active.
APF	This flag is set when the voltage on the AS-i cable is too low.
NORMAL_MODE	This flag is set when the CP 343-2 is in the normal mode. (The flag is set when the CP is in the normal mode.)
CONFIG_MODE	The flag is set in the configuration mode and reset in the protected mode.
AUTO_ADDR_AVAIL	This flag is set when the automatic address programming can be executed (in other words, exactly **one** AS-i slave is currently out of operation).
AUTO_ADDR_ASSIGN	This flag is set when the automatic address programming is possible (in other words, AUTO_ADDR_ENABLE = 1 **and** there is no “incorrect” slave connected to the AS-i Interface).
LDS_0	This flag is set when an AS-i slave exists with address 0.
CONFIG_OK	This flag is set when the desired (configured) and actual configuration match.
OFFLINE	This flag is set when the mode is to changed to OFFLINE or this mode has already been adopted.
EEPROM_OK	This flag is set when the test of the internal EEPROM did not detect any errors.
AUTO_ADDR_ENABLE	This flag indicates whether the automatic address programming is enabled (BIT = 1) or disabled (BIT = 0) by the user.
INTERNAL	This flag is always set.
PERIPHERY_FAULT	This flag is set when at least one AS-i slave is signaling a peripheral fault.
MPO startup	The “master_power_on_startup” flag is set after the power supply of the AS-i slave master has been turned on. If the master is later changed to OFFLINE, the bit is reset.

5.2.17 Get_Extended_Total_Configuration

Meaning

With this command, the following data are read from the CP 343-2:

- The list of active AS-i slaves (LAS) This indicates which of the connected AS-i slaves are activated.
- The current configuration data of the connected AS-i slaves (I/O configuration and ID code).
- The current parameters of the AS-i slaves (actual parameters)
- The current flags.

This command can, for example, be used to find out the configuration of the stations connected to the AS-i cable after installation. The configuration data read in can, if necessary, be modified and saved on the CP 343-2 as the expected configuration using the command ‘Configure Total System’ (see Section 5.2.18).

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 39_H

Structure of the Response Data in the Receive Buffer

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

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

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

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

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

Flag 1

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

Flag 2

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

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

5.2.18 Store_Extended_Total_Configuration

Meaning

With this call, the required total configuration of the AS interface is transferred to the AS-i master and stored permanently in the EEPROM as the expected configuration. This configures the CP 343-2.
The following data are transferred:

- The list of configured AS-i slaves specifying the AS-i slaves that can be activated by the AS-i master in the protected mode.
- The list of configuration data specifying the ID codes and I/O configurations the AS-i slaves must have.
- The list of AS-i slave parameters configured on the AS-i master and stored in non-volatile memory. These parameters are transferred to the AS-i slaves when the AS-i master starts up.
- The flags that determine the operating status of the AS-i master following start up.

Up to firmware version V2.x, this call is not executed in protected mode.

As of firmware version V3.0, the call is permitted both in protected and in configuration 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
7	LPS slave 8B	LPS slave 9B	LPS slave 10B	LPS slave 11B	LPS slave 12B	LPS slave 13B	LPS slave 14B	LPS slave 15B

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

54	ID_CODE slave 22	I/O configuration slave 22
55	Ext ID1 slave 22	Ext ID2 slave 22
56	ID_CODE slave 23	I/O configuration slave 23
57	Ext ID1 slave 23	Ext ID2 slave 23
58	ID_CODE slave 24	I/O configuration slave 24
59	Ext ID1 slave 24	Ext ID2 slave 24
60	ID_CODE slave 25	I/O configuration slave 25
61	Ext ID1 slave 25	Ext ID2 slave 25
62	ID_CODE slave 26	I/O configuration slave 26
63	Ext ID1 slave 26	Ext ID2 slave 26
64	ID_CODE slave 27	I/O configuration slave 27
65	Ext ID1 slave 27	Ext ID2 slave 27
66	ID_CODE slave 28	I/O configuration slave 28
67	Ext ID1 slave 28	Ext ID2 slave 28
68	ID_CODE slave 29	I/O configuration slave 29
69	Ext ID1 slave 29	Ext ID2 slave 29
70	ID_CODE slave 30	I/O configuration slave 30
71	Ext ID1 slave 30	Ext ID2 slave 30
72	ID_CODE slave 31	I/O configuration slave 31
73	Ext ID1 slave 31	Ext ID2 slave 31
74	0	0
75	0	0
76	ID_CODE slave 1B	I/O configuration slave 1B
77	Ext ID1 slave 1B	Ext ID2 slave 1B
78	ID_CODE slave 2B	I/O configuration slave 2B
79	Ext ID1 slave 2B	Ext ID2 slave 2B
80	ID_CODE slave 3B	I/O configuration slave 3B
81	Ext ID1 slave 3B	Ext ID2 slave 3B
82	ID_CODE slave 4B	I/O configuration slave 4B
83	Ext ID1 slave 4B	Ext ID2 slave 4B
84	ID_CODE slave 5B	I/O configuration slave 5B
85	Ext ID1 slave 5B	Ext ID2 slave 5B
86	ID_CODE slave 6B	I/O configuration slave 6B
87	Ext ID1 slave 6B	Ext ID2 slave 6B
88	ID_CODE slave 7B	I/O configuration slave 7B
89	Ext ID1 slave 7B	Ext ID2 slave 7B
90	ID_CODE slave 8B	I/O configuration slave 8B
91	Ext ID1 slave 8B	Ext ID2 slave 8B
92	ID_CODE slave 9B	I/O configuration slave 9B
93	Ext ID1 slave 9B	Ext ID2 slave 9B
94	ID_CODE slave 10B	I/O configuration slave 10B
95	Ext ID1 slave 10B	Ext ID2 slave 10B
96	ID_CODE slave 11B	I/O configuration slave 11B
97	Ext ID1 slave 11B	Ext ID2 slave 11B
98	ID_CODE slave 12B	I/O configuration slave 12B
99	Ext ID1 slave 12B	Ext ID2 slave 12B
100	ID_CODE slave 13B	I/O configuration slave 13B
101	Ext ID1 slave 13B	Ext ID2 slave 13B
102	ID_CODE slave 14B	I/O configuration slave 14B
103	Ext ID1 slave 14B	Ext ID2 slave 14B

104	ID_CODE slave 15B	I/O configuration slave 15B
105	Ext ID1 slave 15B	Ext ID2 slave 15B
106	ID_CODE slave 16B	I/O configuration slave 16B
107	Ext ID1 slave 16B	Ext ID2 slave 16B
108	ID_CODE slave 17B	I/O configuration slave 17B
109	Ext ID1 slave 17B	Ext ID2 slave 17B
110	ID_CODE slave 18B	I/O configuration slave 18B
111	Ext ID1 slave 18B	Ext ID2 slave 18B
112	ID_CODE slave 19B	I/O configuration slave 19B
113	Ext ID1 slave 19B	Ext ID2 slave 19B
114	ID_CODE slave 20B	I/O configuration slave 20B
115	Ext ID1 slave 20B	Ext ID2 slave 20B
116	ID_CODE slave 21B	I/O configuration slave 21B
117	Ext ID1 slave 21B	Ext ID2 slave 21B
118	ID_CODE slave 22B	I/O configuration slave 22B
119	Ext ID1 slave 22B	Ext ID2 slave 22B
120	ID_CODE slave 23B	I/O configuration slave 23B
121	Ext ID1 slave 23B	Ext ID2 slave 23B
122	ID_CODE slave 24B	I/O configuration slave 24B
123	Ext ID1 slave 24B	Ext ID2 slave 24B
124	ID_CODE slave 25B	I/O configuration slave 25B
125	Ext ID1 slave 25B	Ext ID2 slave 25B
126	ID_CODE slave 26B	I/O configuration slave 26B
127	Ext ID1 slave 26B	Ext ID2 slave 26B
128	ID_CODE slave 27B	I/O configuration slave 27B
129	Ext ID1 slave 27B	Ext ID2 slave 27B
130	ID_CODE slave 28B	I/O configuration slave 28B
131	Ext ID1 slave 28B	Ext ID2 slave 28B
132	ID_CODE slave 29B	I/O configuration slave 29B
133	Ext ID1 slave 29B	Ext ID2 slave 29B
134	ID_CODE slave 30B	I/O configuration slave 30B
135	Ext ID1 slave 30B	Ext ID2 slave 30B
136	ID_CODE slave 31B	I/O configuration slave 31B
137	Ext ID1 slave 31B	Ext ID2 slave 31B
138	0	Parameters slave 1
139	Parameters slave 2	Parameters slave 3
140	Parameters slave 4	Parameters slave 5
141	Parameters slave 6	Parameters slave 7
142	Parameters slave 8	Parameters slave 9
143	Parameters slave 10	Parameters slave 11
144	Parameters slave 12	Parameters slave 13
145	Parameters slave 14	Parameters slave 15
146	Parameters slave 16	Parameters slave 17
147	Parameters slave 18	Parameters slave 19
148	Parameters slave 20	Parameters slave 21
149	Parameters slave 22	Parameters slave 23
150	Parameters slave 24	Parameters slave 25
151	Parameters slave 26	Parameters slave 27
152	Parameters slave 28	Parameters slave 29
153	Parameters slave 30	Parameters slave 31

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

Flag 1

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

Flag 2

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

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

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

5.2.19 Write_Extended_Parameter_List

Meaning

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

Structure of the Job Data in the Send Buffer

Byte	Meaning							
	Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Command number: $3C_H$							
1	00H							
2	irrelevant				Parameters slave 1			
3	Parameters slave 2				Parameters slave 3			
4	Parameters slave 4				Parameters slave 5			
5	Parameters slave 6				Parameters slave 7			
6	Parameters slave 8				Parameters slave 9			
7	Parameters slave 10				Parameters slave 11			
8	Parameters slave 12				Parameters slave 13			
9	Parameters slave 14				Parameters slave 15			
10	Parameters slave 16				Parameters slave 17			
11	Parameters slave 18				Parameters slave 19			
12	Parameters slave 20				Parameters slave 21			
13	Parameters slave 22				Parameters slave 23			
14	Parameters slave 24				Parameters slave 25			
15	Parameters slave 26				Parameters slave 27			
16	Parameters slave 28				Parameters slave 29			
17	Parameters slave 30				Parameters slave 31			
18	irrelevant				Parameters slave 1B			
19	Parameters slave 2B				Parameters slave 3B			
20	Parameters slave 4B				Parameters slave 5B			
21	Parameters slave 6B				Parameters slave 7B			
22	Parameters slave 8B				Parameters slave 9B			
23	Parameters slave 10B				Parameters slave 11B			
24	Parameters slave 12B				Parameters slave 13B			
25	Parameters slave 14B				Parameters slave 15B			
26	Parameters slave 16B				Parameters slave 17B			
27	Parameters slave 18B				Parameters slave 19B			
28	Parameters slave 20B				Parameters slave 21B			
29	Parameters slave 22B				Parameters slave 23B			
30	Parameters slave 24B				Parameters slave 25B			
31	Parameters slave 26B				Parameters slave 27B			
32	Parameters slave 28B				Parameters slave 29B			
33	Parameters slave 30B				Parameters slave 31B			

5.2.20 Read_Extended_Parameter_Echo_List

Meaning

The read parameter echo list call outputs the echo values of all AS-i slaves. The echo values of an AS-i slave originate from the last parameter call sent to this AS-i slave.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 33h
1	00h

Structure of the Response Data in the Receive Buffer

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

5.2.21 Read_Write_CTT2_request

Meaning

Using this call, a CTT2 request according to AS-i slave profile “CombinedTranslationType2” can be sent to the AS-i master as a byte string. This forwards the string bytes to the AS-i slave address specified in the send buffer.

With this call, a send buffer with a maximum of 223 bytes is transferred to the AS-i master. The actual number of string bytes to be sent to the AS-i slave is calculated by the AS-i master from byte 2 of the send buffer (number of string bytes).

The CTT2 request is replied to by the addressed AS-i slave with a CTT2 response. The AS-i master transfers this response as a byte string in the response buffer. The strings are transferred by the AS–i master with the response.

The structure of the CTT2 request or CTT2 response (code, index, ...) always begins with string byte 1. For more detailed information, refer to the relevant AS-i slave description.

As long as strings are being transferred on AS-i, there is no cyclic data transfer with the addresses AS-i slave.
Due to the type of protocol, the transfer of approximately 200 bytes can take up to half a minute.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 44_H
1	Slave address
2	Number of string bytes
3	String byte 1
4	String byte 2
...	**...**
...	String byte (n–1)
...	(String byte n)

Structure of the Response Data in the Receive Buffer

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

5.2.22 Read_Version_ID

Meaning

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: 14_H

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

Structure of the Response Data in the Receive Buffer

Byte	Meaning
0...31	Version string

5.2.23 Read_AS-i_Slave_ID

Meaning

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

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 17_H
1	Slave address

Structure of the Response Data in the Receive Buffer

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

5.2.24 Read_AS-i_Slave_Extended_ID1

Meaning

With this call, the extended ID1 code of an AS-i slave can be read out directly over the AS-i cable. The call is intended for diagnostic purposes and is not required in the normal master mode.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 37_H
1	Slave address

Structure of the Response Data in the Receive Buffer

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

5.2.25 Write_AS-i_Slave_Extended_ID1

Meaning

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

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

Structure of the Job Data in the Send Buffer

Byte	Meaning	
0	Command number: $3F_H$	
1	irrelevant	Extended ID1 code

5.2.26 Read_AS-i_Slave_Extended_ID2

Meaning

With this call, the extended ID2 code of an AS-i slave can be read out directly over the AS-i cable. The call is intended for diagnostic purposes and is not required in the normal master mode.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 38_H
1	Slave address

Structure of the Response Data in the Receive Buffer

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

5.2.27 Read_AS-i_Slave_I/O

Meaning

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

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 18
1	Slave address

Structure of the Response Data in the Receive Buffer

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

5.2.28 Get_LPF

Meaning

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

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number $3E_H$

Structure of the Replies in the Receive Buffer

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

For the LPF data, the bit values have the following meaning:

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

5.2.29 Write_AS-i_Slave_Parameter_String

Meaning

With this call, a parameter string complying with AS-i slave profile 7.4 can be sent to the AS-i master that passes on the string to the AS-i slave address specified in the send buffer.

With this call, a send buffer with a maximum of 223 bytes is transferred to the AS-i master. The actual number of parameter bytes to be sent to the AS-i slave is calculated by the AS-i master from byte 2 of the send buffer (number of parameter bytes).

The remaining information in the string is not evaluated by the AS-i master and is passed on to the AS-i slave transparently. As long as the string transfer is active, there is no user/analog data exchange with the addressed AS-i slave.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 40_H
1	Slave address
2	Number of parameter bytes
3	String byte (1)
4	String byte (2)
...	.....
	String byte (n-1)
...	String byte (n)

Maximum value for n=220

5.2.30 Read_AS-i_Slave_Parameter_String

Meaning

With this call, a parameter string complying with AS-i slave profile 7.4 can be read from the AS-i slave with the AS-i slave address specified in the send buffer.

The AS-i master supplies up to 221 bytes of response data. The number of parameter bytes actually sent by the AS-i slave is signaled by the AS-I master in byte 0 of the receive buffer (number of parameter bytes).

If the AS-i slave sends a string longer than 220 bytes, the AS-i master aborts the string transfer and terminates the job with an error. The received data are then not made available to the user program.

As long as the string transfer is active, there is no user/analog data exchange with the addressed AS-i slave.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number 41_H
1	Slave address

Structure of the Response Data in the Receive Buffer

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

Maximum value for n=220

5.2.31 Read_AS-i_Slave_ID_String

Meaning

With this call, an identification string complying with the AS-i slave profile 7.4 can be read from the AS-i slave with the AS-i slave address specified in the send buffer. The AS-i master supplies up to 221 bytes of response data. The number of ID bytes actually sent by the AS-i slave is signaled by the AS-i master in byte 0 of the receive buffer (number of ID bytes).

If the AS-i slave sends a string longer than 220 bytes, the AS-i master aborts the string transfer and terminates the job with an error. The received data are then not made available to the user program.

As long as the string transfer is active, there is no user/analog data exchange with the addressed AS-i slave.

Note

As an exception, with this call, the bytes contained in the bits “Follows” and “Valid” are also transferred (see AS-i slave profile 7.4).

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number 42_H
1	Slave address

Structure of the Response Data in the Receive Buffer

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

Maximum value for n=220

5.2.32 Read_AS-i_Slave_Diagnostic_String

Meaning

With this call, a diagnostic string complying with AS-i slave profile 7.4 can be read from the AS-i slave with the AS-i slave address specified in the send buffer. The AS-i master supplies up to 221 bytes of response data. The number of diagnostic bytes actually sent by the AS-i slave is signaled by the AS-i master in byte 0 of the receive buffer (number of diagnostic bytes).

If the AS-i slave sends a string longer than 220 bytes, the AS-i master aborts the string transfer and terminates the job with an error. The received data are then not made available to the user program.

As long as the string transfer is active, there is no user/analog data exchange with the addressed AS-i slave.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number 43_H
1	Slave address

Structure of the Response Data in the Receive Buffer

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

Maximum value for n=220

❑

6 Diagnostics and Interrrupts of the CP 343-2

In the protected mode, the CP 343-2 signals a diagnostic interrupt whenever the configuration on the AS-Interface is changed. Changes in the configuration might be that voltage on the AS-Interface is too low (AS-i Power Fail) or that configuration errors have been detected (missing, incorrect or existing but unconfigured AS-i slaves).

6.1 Overview

If the CP 343-2 detects an external or internal fault/error (AS-i slave failures, EEPROM error on the CP, ...) during operation, it signals this by triggering a diagnostic interrupt on the S7 I/O bus.
The S7 CPU then interrupts the cyclic user program (OB1), enters the event as “module fault” in the system diagnostic buffer and behaves as follows:

- If the user has not programmed a suitable interrupt OB (OB82), the PLC CPU changes to the STOP mode!
- If the user has programmed OB 82, this is started by the PLC operating system. The local data of OB 82 already provides the user with a certain amount of diagnostic information. (Which module triggered the interrupt. What type of error has occurred ...). The user program can obtain more detailed information (which slave has failed? ...) by reading the diagnostic data record DS 1 using the system functions SFC 51 (”RDSYSST”) or SFC 59 (”RD_REC”). When OB82 has been executed, the PLC continues the cyclic program (OB1) at the point at which it was interrupted.

Note

OB82 cannot be programmed on the CPU 312; in other words, if a diagnostic interrupt occurs, the CPU changes to the STOP mode.

6.2 Interrupt Events

The CP 343-2 distinguishes between interrupt events entering and leaving the state. If the occurrence of an interrupt event leads to an error-free status, a diagnostic interrupt leaving state is triggered (in OB 82: Bit OB82_MDL_DEFECT = 0). All other interrupt events result in a diagnostic interrupt entering state (Bit OB82_MDL_DEFECT = 1).

The following events can lead to a diagnostic interrupt being triggered by the CP 343-2:

CP-external interrupt events:

- All changes to the AS-i slave configuration in the protected mode
- AS-i Power Fail in the protected mode

CP-internal interrupt events:

- EEPROM Error

Note

CP-internal interrupt events are always events entering the state. After a CP-internal interrupt event occurs, the group error bit remains = TRUE. This is only reset again after a restart on the S7-300.

6.3 Sequence of Diagnostic Interrupt Processing

If the CP 343-2 detects an interrupt event, it triggers a diagnostic interrupt. The PLC CPU finds the source of the interrupt and reads data record 0 from the CP. It then interrupts the cyclic user program and behaves as follows:

- If OB82 is not programmed, the PLC CPU changes to STOP as the default reaction.
- If organization block OB82 his programmed, this is started. DS 0 is available in the local data bytes 8 to 11 in the local data area of OB82. It is possible (but not necessary) to read DS 1 that contains the delta list in OB82 using an SFC call (SFC 51 “RDSYSST” or SFC 59 ”RD_REC”). When OB has been executed, the PLC CPU acknowledges the diagnostic interrupt on the CP 342-2.

If interrupt events occur in a status in which they cannot be signaled by triggering a diagnostic interrupt (for example, when the PLC is in the STOP mode or when an older diagnostic interrupt is not yet been acknowledged), the CP 343-2 behaves as follows:

- As soon as it becomes possible to trigger a diagnostic interrupt again, and if the total CP configuration (in other words, AS-i slave configuration and CP-internal, interrupt-relevant state) at this point in time is not the same as the configuration signaled earlier with the diagnostic interrupt, a diagnostic interrupt with the current configuration information is triggered.
- When it becomes possible again to trigger a diagnostic interrupt and if the total CP configuration is the same as signaled earlier with the diagnostic interrupt, no diagnostic interrupt is triggered. This means that brief slave failures (for example, a bad contact) can go unnoticed.

6.4 Response to Interrupts in Different CP Operating States

The CP 343-2 generates diagnostic interrupts triggered by external interrupt events only in the protected mode and not in the configuration mode.

If the PLC CPU changes to STOP, the internal interrupt history is reset; in other words, the bit OB82_MDL_DEFECT and all other error bits in DS 0 are reset.

If there is a change from the protected mode to the configuration mode, the external interrupt history is reset. If the CP 343-2 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. If it is temporarily not possible to issue a diagnostic interrupt (for example, because the PLC is in the STOP mode), a diagnostic interrupt is generated at the next possible time only if the problem still exists.

6.5 Local Data of the Diagnostic Organization Block (OB82)

The following table shows the DS 0 available in the local data of OB82 (local byte 8 to local byte 11). For the meaning of the other OB82 local data, please refer to the STEP 7 descriptions.

Byte	Bit	Variable Name	Data Type	Meaning
8	2^0	OB82_MDL_DEFECT	BOOL	Group error bit (0: interrupt leaving state, 1: interrupt entering state)
8	2^1	OB82_INT_FAULT	BOOL	Internal CP error (for example EEPROM defective).
8	2^2	OB82_EXT_FAULT	BOOL	External CP error (for example slave failed or APF).
8	2^3	OB82_PNT_INFO	BOOL	At least one slave differs from the expected configuration.
8	2^4	OB82_EXT_VOLTAGE	BOOL	Voltage on the AS-Interface too low (APF).
8	2^5	OB82_FLD_CONNCTR	BOOL	with the CP 343-2 always 0
8	2^6	OB82_NO_CONFIG	BOOL	with the CP 343-2 always 0
8	2^7	OB82_CONFIG_ERR	BOOL	with the CP 343-2 always 0
9	2^0... 2^3	OB82_MDL_TYPE	–	Module class, for CP 343–2: C_{hex}
9	2^4	OB82_MDL_TYPE	BOOL	with the CP 343-2 always 1
9	2^5	OB82_MDL_TYPE	BOOL	reserved

Byte	Bit	Variable Name	Data Type	Meaning
9	2^6	OB82_MDL_TYPE	BOOL	• with the CP with firmware V2.x: always “0” • with the CP as of firmware V3.0: at least 1 AS–i slave is signaling an IO error.
9	2^7	OB82_MDL_TYPE	BOOL	reserved
10	2^0	OB82_SUB_NDL_ERR	BOOL	At least one slave differs from the expected configuration.
10	2^1	OB82_COMM_FAULT	BOOL	with the CP 343-2 always 0
10	2^2	OB82_MDL_STOP	BOOL	0: CP 343-2 is in the normal state, 1: CP 343-2 is in the offline state
10	2^3	OB82_WTCH_DOG_FLT	BOOL	Hardware error on the CP (internal watchdog)
10	2^4	OB82_INT_PS_FLT	BOOL	with the CP 343-2 always 0
10	2^5	OB82_PRIM_BATT_FLT	BOOL	with the CP 343-2 always 0
10	2^6	OB82_BCKUP_BATT_FLT	BOOL	with the CP 343-2 always 0
10	2^7	OB82_RESERVED_2	BOOL	with the CP 343-2 always 0
11	2^0	OB82_RACK_FLT	BOOL	with the CP 343-2 always 0
11	2^1	OB82_PROC_FLT	BOOL	with the CP 343-2 always 0
11	2^2	OB82_EPROM_FLT	BOOL	EEPROM of the CP 343-2 defective
11	2^3	OB82_RAM_FLT	BOOL	with the CP 343-2 always 0
11	2^4	OB82_ADU_FLT	BOOL	with the CP 343-2 always 0
11	2^5	OB82_FUSE_FLT	BOOL	with the CP 343-2 always 0
11	2^6	OB82_RESERVED_3	BOOL	with the CP 343-2 always 0

6.6 Reading the Diagnostic Data Record DS 1

The CP 343-2 continuously updates a delta list containing all the slaves that exist but that differ from the configuration; in other words, they are missing, incorrect, or not configured (each slave is assigned a bit in the delta list: 0 = no error; 1 = error). This delta list is part of the diagnostic data record DS1 that can be read out by calling the operating system functions SFC 51 “RDSYSST” or SFC 59 ”RD_REC”.

To optimize the time at which DS1 is read, it is advisable to use SFC 51.

On the CP 343-2, DS 1 always has a length of 16 bytes and is structured as follows:

Byte		Value/meaning
0–3		These four bytes contain DS 0 and correspond to the local data bytes 8 to 11 in OB82.

Byte	Value	Purpose
4	60H	Fixed value
5	00H	Fixed value
6	40H	Fixed value

Byte	Bit *)	Value/meaning *)
7	0..7	1: error in AS-i slave 0.. 7
8	0..7	1: error in AS-i slave 8..15
9	0..7	1: error in AS-i slave 16..23
10	0..7	1: error in AS-i slave 24..31
11	0..7	1: error in AS-i slave 0B.. 7B
12	0..7	1: error in AS-i slave 8B..15B
13	0..7	1: error in AS-i slave 16B..23B
14	0..7	1: error in AS-i slave 24B..31B
15		reserved

*) Bit 0 belongs to slave 0, bit 1 belongs to slave 1 etc.

After the programming example, Section 6.7 contains an example of evaluating the delta list.

6.7 Programming Example

The following example illustrates how you can react to a diagnostic interrupt of the CP 343-2 in OB82 by reading the data record (DS1).

Table 6-1

```
STL                                                 Explanation
OB82 local data:


       20.0    temp    t_header  Struct          //No relevance for the CP 343-2
       +0.0    temp    len       WORD
       +2.0    temp    nr        WORD
       =4.0    temp              END_STRUCT


OB82 Code:


       L 256                                      //Address of the CP 343-2
       L #OB82_MDL_ADDR                           //Interrupt from the CP 343-2
       <>I
       BEC
       CALL "RDSYSST"
       REQ     :=TRUE
       SZL_ID  :=W#16#B3                          //DS1 via logical base address
       INDEX   :=W#16#100                         //CP address (256 dec.)
       RET_VAL :=MW18
       BUSY    :=M9.4
       SZL_HEADER :=#t_header                     //Structure of the local data
       DR      :=P#M 100.0 Byte 16                //Destination for DS1


//Example of an error reaction

       0       M107.1                             //Error: slave 1
       0       M107.7                             //Error: slave 7
       0       M111.3                             //Error: slave 3B
       =       M9.5                               //Error bit
```

6.8 Diagnostic Interrupts: Some Examples

It is assumed that slaves 1 and 12 were configured using the buttons on the CP 343-2 and that the CP 343-2 is in the protected mode.

If slave 7 fails, the CP 343-2 generates a diagnostic interrupt. The PLC operating system then enters the “module fault” message in the system diagnostic buffer and starts OB82 (refer to the programming example in Section 6.7). When OB82 has been executed, the delta list contains the following information:

MD 107 $80\ 00\ 00\ 00_H$
MD 111 $00\ 00\ 00\ 00_H$

If the unconfigured slave 15 is then connected to the AS-interface, the CP 343-2 generates another diagnostic interrupt. The “module fault” message appears in the system diagnostic buffer again.The delta list then changes to the following value:

MD 107 $80\ 80\ 00\ 00_H$
MD 111 $00\ 00\ 00\ 00_H$

After reconnecting slave 7 to the AS-interface, there is still an error (slave 15). The “module fault” message appears in the system diagnostic buffer and the delta list has the following value:

MD 107 $00\ 80\ 00\ 00_H$
MD 111 $00\ 00\ 00\ 00_H$

After disconnecting slave 15, no error exists any longer. The CP 343-2 signals this in the diagnostic interrupt. The “module OK” appears in the system diagnostic buffer and the Delta list is empty:

MD 107 $00\ 00\ 00\ 00_H$
MD 111 $00\ 00\ 00\ 00_H$

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7 Dealing with Problems / Error Displays

This chapter contains information about special operating states of the CP 343-2. It is intended to help you to deal with problems.

7.1 Replacing a Defective AS-i Slave/Automatic Address Programming

Simple Replacement of AS-i Slaves

Using the automatic address programming function, you can replace failed AS-i slaves extremely simply.

Note

Remember that “automatic address programming” is only possible when the CP 343-2 is in the protected mode and only one AS-i slave has failed.

Slaves with profile CTT5 (multiaddress slaves) do not support automatic address programming.

The sections below explain how to replace failed AS-i slaves using the automatic address programming function.

Detecting a Defective AS-i Slave

If the AUP LED is lit (only in the protected mode) this indicates the following:

- Exactly **one** slave has failed.
- Automatic address programming by the CP 343-2 is possible.

You can recognize the failed AS-i slave simply because the LED assigned to the slave flashes on the front panel.

Replacing a Defective AS-i Slave

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

The CP 343-2 then programs this slave with the address of the original station that had failed.

The “AUP” display goes off. The LED in the slave display of the CP 343-2 module indicates that the slave has been included.

7.2 Error Displays/Remedying Errors

The following table lists the possible causes of errors that can occur when operating the CP 343-2 and how to remedy the problem.

Table 7-1

Error	Possible Cause	Remedy
APF LED lit	Power requirements of the AS-i slaves are 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 an 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 in correctly.
SF lights up without pressing the button.	The CP 342–2 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. Internal EEPROM error –> see signaling S7–300 system diagnostic buffer.	Replace the CP.
SF 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 343-2 module has not yet been configured.	Configure the CP 343-2 module 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 343-2 module if the AS-i slave is not required.
	An unconfigured slave was connected to the AS-i cable.	Remove the AS-i slave or reconfigure the CP 343-2 module.
	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 343-2.
	Short circuit on the AS-i cable	Check the AS-i cable and the connected AS-i slaves.

Table 7-1 continued

Error	Possible Cause	Remedy
The CER display flickers, in other words a configured slave is lost sporadically.	Bad contact	Check the electrical connections of the AS-i slaves.
	Interference on the AS-i cable.	Check the correct grounding of the CP 343-2 module and check the AS-i cable. Check that the shield of the AS-i power supply unit is connected correctly.
The CP 343-2 does not switch from the configuration mode to the protected mode.	The PLC is in the “RUN” mode.	Switch the PLC 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 343-2 cannot change to the protected mode as long as this slave exists.	Remove the AS-i slave with address 0.
The CP 343-2 does not switch from the protected mode to the configuration mode.	The PLC is in the “RUN” mode.	Switch the PLC to “STOP”.
	The SET button was not pressed long enough.	Press the SET button for at least 0.5 seconds.
After failure of an AS-i slave, the “AUP” display remains off.	The CP 343-2 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 343-2.
	More than one AS-i slave has failed.	Check the AS-i cable. If “APF” is displayed at the same time, check the power supply on the AS-i cable. If more than one slave is defective, program the address on the replaced slaves using the addressing unit.
	The CP 343-2 has not detected configured AS-i slaves.	Remove the unconfigured AS-i slaves from the AS-i cable.
	The AUTO_ADDRESS_ENABLE flag is not set.	Set the bit with the appropriate FC calls
Automatic address programming is unsuccessful although the “AUP” display 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 343-2 module (with the SET button).
	The replaced AS-i slave does not have the address “ZERO”.	Set the address of the replaced slave with the addressing unit.

Table 7-1 continued

Error	Possible Cause	Remedy
	The replaced AS-i slave is not correctly connected or is defective.	Check the connections of the slave and if necessary replace the slave.
The “CER” LED and the LEDs of active AS-i slaves flicker irregularly.	An extender is installed in the AS-interface with “Line1” and “Line2” and the connections are reversed.	Correct the connections on the extender.

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A AS-Interface Protocol Implementation Conformance Statement (PICS)

PICS for the CP 343−2

Table A-1

Vendor	SIEMENS AG
Product Name	CP 343-2
Order Number	6GK7 343−2AH11−0XA0
Version	V3.0
Master Profile	M4
Date	03.03.2008

List of Available Master Functions

Symbols in column 3 (M4)

Symbol	Meaning
X	Function exists
–	Function does not exist

Table A-2 PICS

No.	Function or Call on the Host Interface (symbolic representation)	M4	Comment / Function implemented by
1	Image, Status = Read_IDI()	X	By the PLC accessing the I/O data of the CP 343−2 or with data record DS 150 for B slaves
2	Status = Write_ODI(Image)	X	By the PLC accessing the I/O data of the CP 342−2 or with data record DS 150 for B slaves
3	Status = Set_Permanent_Parameter(Addr, Param)	X	see Section 5.2
4	Param, Status = Get_Permanent_Parameter(Addr)	X	see Section 5.2
5	Status, Param = Write_Parameter(Addr, Param)	X	see Section 5.2
6	Status, Param = Read_Parameter(Addr)	X	see Section 5.2

Table A-2 PICS, (continued)

No.	Function or Call on the Host Interface (symbolic representation)	M4	Comment / Function implemented by
7	Status = Store_Actual_Parameters()	X	see Section 5.2
8	Status = Set_Permanent_Configuration(Addr, Config)	X	see Section 5.2
9	Status, Config = Get_Permanent_Configuration(Addr)	X	see Section 5.2
10	Status = Store_Actual_Configuration()	X	By pressing the SET button; also using a command (see Section 5.2)
11	Status, Config = Read_Actual_Configuration(Addr)	X	see Section 5.2
12	Status = Set_LPS(List31)	X	see Section 5.2
13	Status, List31 = Get_LPS()	X	see Section 5.2
14	Status, List31 = Get_LAS()	X	see Section 5.2
15	Status, List32 = Get_LDS()	X	see Section 5.2
16.0	Status = Get_Flags()	X	see Section 5.2
16.1	Status, Flag = Get_Flag_Config_OK()	X	see Section 5.2
16.2	Status, Flag = Get_Flag_LDS.0()	X	see Section 5.2
16.3	Status, Flag = Get_Flag_Auto_Address_Assign()	X	see Section 5.2
16.4	Status, Flag = Get_Flag_Auto_Prog_Available()	X	see Section 5.2
16.5	Status, Flag = Get_Flag_Configuration_Active()	X	see Section 5.2
16.6	Status, Flag = Get_Flag_Normal_Operation_Active()	X	see Section 5.2
16.7	Status, Flag = Get_Flag_APF()	X	CPerror bit, LED display; (see Section 5.2)
16.8	Status, Flag = Get_Flag_Offline_Ready()	X	see Section 5.2
16.9	Status, Flag = Get_Flag_Periphery_OK()	X	see Section 5.2
17	Status = Set_Operation_Mode(Mode)	X	By pressing the SET button; also using a command (see Section 5.2)
18	Status = Set_Offline_Mode(Mode)	X	see Section 5.2
19	Status = Activate_Data_Exchange(Mode)	–	optional command
20	Status = Change_Slave_Address(Addr1, Addr2)	X	see Section 5.2
21.1	Status = Set_Auto_Address_Enable	X	see Section 5.2
21.2	Status = Get_Auto_Address_Enable	X	see Section 5.2

Table A-2 PICS, (continued)

No.	Function or Call on the Host Interface (symbolic representation)	M4	Comment / Function implemented by
22.1	Status, Resp = Cmd_Reset_ASI_Slave(Addr, RESET)	–	optional command
22.2	Status, Resp = Cmd_Read_IO_Configuration(Addr, CONF)	X	see Section 5.2
22.3	Status, Resp = Cmd_Read_Identification_Code(Addr, IDCOD)	X	see Section 5.2
22.4	Status, Resp = Cmd_Read_Status(Addr, STAT)	X	see Section 5.2
22.5	Status, Resp = Cmd_Read_Reset_Status(Addr, STATRES)	–	optional command
22.6	Status, Resp = Cmd_Read_Ext_ID-Code_1(Addr, IDCOD1)	X	see Section 5.2
22.7	Status, Resp = Cmd_Read_Ext_ID-Code_2(Addr, IDCOD2)	X	see Section 5.2
23	Status, S_List = Get_LPF()	X	see Section 5.2
24	Status = Write_Extended_ID-Code_11(S_Ext_ID-Code_1)	X	see Section 5.2
25	AImage, Status = Read_AIDI()	X	not implemented
26	Status = Write_AODI(AImage)	X	not implemented
27	String, Status = Read_ParamStr(S_Addr)	X	not implemented
28	Status = Write_ParamStr(S_Addr, String)	X	not implemented
29	String, Status = Read_DiagStr(S_Addr)	X	not implemented
30	String, Status = Read_IdentStr(S_Addr)	X	not implemented
Part B	**Supported Slave Profiles**		
1	Support of extended address mode	X	
2	Support of Combined transaction type 1 integrated (S-7.3 only)	X	
3	Full support of Combined transaction type 1 integrated	X	Only profiles 7.3/7.4 are supported.
4	Support of Combined transaction type 2 integrated	X	
5	Support of Combined transaction type 3 integrated	X	

Table A-2 PICS, (continued)

No.	Function or Call on the Host Interface (symbolic representation)	M4	Comment / Function implemented by
6	Support of Combined transaction type 4 integrated	X	
7	Support of Combined transaction type 5 integrated	X	

How the AS-i cycle time depends on the number of connected slaves

The AS-i cycle time can be calculated using the following formula:

If 5 or more AS-i slaves are activated:

t_{cycl} = (1 + number of activated AS-i slaves) x 154 µs

If less than 5 AS-i slaves are activated:

t_{cycl} = (1 + number of activated AS-i slaves) x 654 µs

Note

If two 2 AS-i slaves with extended addressing mode occupy the same address (for example, address 5A and address 5B), this slave pair is calculated as one 1 AS-i slave in the above formula. The reason for this is that slave pairs with the same address are addressed only in every second cycle. The cycle time in the formula above is therefore doubled for such slaves.

❑

B References and Literature

/1/ AS–Interface. Das Aktuator–Sensor–Interface für die Automation
ISBN 978–3446210646
AS–Interface. The Actuator–Sensor–Interface for Automation
ISBN 978–3446210653
Werner Kriesel, O.W. Madelung, Carl Hanser Verlag München Wien 1999

/2/ AS–Interface Complete Specification

can be ordered from the AS-i Association
Address:

AS–International Association
Zum Taubengarten 52
D–63571 Gelnhausen
Germany

Tel.: +49 – 6051 – 473212
Fax.: +49 – 6051 – 473282
E–Mail: info@as–interface.net

(The AS-i technology is promoted by the AS-Interface Association)

Internet address of the AS-International Association:

http:/www.as-interface.net

/3/ SIMATIC NET Industrielle Kommunikation für Automation and Drives

Catalog IK PI

The catalog can be ordered from your local SIEMENS branch office or distributor.

/4/ SIMATIC S7
S7–300 Automation System
– CPU 31xC and 31x Installation: Operating Instructions (ID: 13008499)
– Module Data: Reference Manual (ID: 8859629)
Siemens AG

/5/ SIMATIC
– Distributed I/O Device ET 200M
Operating Instructions (ID: 1142798)
and
– ET 200M Signal Modules for Process Automation
Configuration Manual (ID: 7215812)
Siemens AG

Order numbers

The order numbers of the SIEMENS documentation listed above can be found in the catalogs “SIMATIC NET Industrial Communication and Field Devices, Catalog IK PI” and “SIMATIC Programmable Controllers SIMATIC S7 / M7 / C7 – Components for Integrated Automation, Catalog ST70”.

You can order these catalogs and obtain additional information from your local SIEMENS branch or distributor.

You will find many of the Siemens AG manuals on the Internet pages of Siemens Customer Support for automation:

http://support.automation.siemens.com

Enter the ID of the manual in the search box. The ID is shown in parentheses in the literature references.

You can locate manuals included in the online documentation of the STEP 7 installation on your PG/PC from the Start menu (Start > SIMATIC > Documentation).

You will find an overview of the SIMATIC documentation at:

http://www.automation.siemens.com/simatic/portal/html_76/techdoku.htm

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C Notes on the CE Mark

Product name:

CP 343–2 Order no.: 6GK7 343–2AH01–0XA0

CP 343–2 P Order no.: 6GK7 343–2AH11–0XA0

EC Directive EMC 2014/30/EU

The product listed above meets the requirements of the EC Directive 2014/30/EU “Electromagnetic Compatibility”.

The EC Declaration of Conformity is available for the responsible authorities according to the above mentioned EU Directive at the following address:

Siemens AG
Werner-von-Siemens-Str. 48
92224 Amberg
Germany

For more information see:
https://support.industry.siemens.com/cs/ww/en/view/81138384

Area of Application

The product meets the following requirements:

Area of application	Requirements	
	Emission	Immunity
Industrial area	EN 61000–6–4 : 2007	EN 61000–6–2 : 2005

If the product is used in a domestic area, it may interfere with other devices.

Installation Instructions

The product meets the requirements if you adhere to the installation instructions in Chapter 2 and in /4/ and /5/ during installation and operation.

Notes for the Manufacturers of Machines

The product is not a machine in the sense of the EU Machinery Directive. There is therefore no declaration of conformity relating to the EU Machinery Directive 2006/42/EC for this product.

If the product is integrated as part of the equipment of a machine, it must be included in the conformity application of the manufacturer.

D Glossary

APF

AS-i Power Fail Flag or LED display that indicates that the power supply on the AS-i cable is too low or has failed (for example failure of the AS-i power supply unit).

AS

Automation system

AS-i (AS-Interface)

Actuator-sensor interface. A network system for the lowest field area of the automation range. It is suitable for networking sensors and actuators with the controllers (previously known as: SINEC S1).

AS-i A/B slave

AS-i A/B slaves use the extended addressing mode. Pairs of A/B slaves can be assigned to one address on the AS-Interface; by organizing addresses in this way, up to 62 AS-i A/B slaves can be attached to the AS-Interface.

AS-i analog slave

AS-i analog slaves are special AS-i standard slaves that exchange analog values with the AS-i master.

AS-i master

The AS-i master is used to monitor and control the simplest binary actuators and sensors via AS-i modules or AS-i slaves.
A distinction is made between a standard AS-i master and the extended AS-i master.

AS-i module

For the AS-Interface, a module concept has been defined that allows the block-like linking of AS-i slaves – sensors and actuators – via AS-i modules.

The following types of module exist:

The **active** AS-i module with an integrated AS-i chip; using this, up to four conventional sensors and actuators can be connected.

The **passive** AS-i module; this functions as a distributor and provides a connection for up to four sensors and actuators with an integrated AS-i chip.

In keeping with the concept of the standard AS-i master and the extended AS-i master, either AS-i chips with standard functions or with extended functions are used in the AS-i slaves.

AS-i slave

All the nodes that can be addressed by an AS-i master are known as AS-i slaves.

AS-i slaves are distinguished by their design (AS-i modules and sensors or actuators with an integrated AS-i attachment) and their address range (AS-i standard slaves and AS-i A/B slaves with the extended addressing mode).

AS-i standard slave

An AS-i standard slave always occupies one address on the AS-Interface; with this address organization, up to 31 AS-i standard slaves can be attached to the AS-Interface.

APF

AS-i Power Fail Flag or LED display that indicates that the power supply on the AS-i cable is too low or has failed (for example failure of the AS-i power supply unit).

Extended AS-i master

An extended AS-i master supports 31 addresses that can be used for standard AS-i slaves or AS-i slaves with the extended addressing mode. This increases the number of addressable AS-i slaves to a maximum of 62.

The extended AS-i masters of SIMATIC NET support the integrated transfer of AS-Interface analog slaves that operate in compliance with Profile 7.3/7.4 of the AS-Interface Specification.

Protected mode

In protected mode, the AS–i master exchanges data only with the configured AS–i slaves. ”Configured” means that the slave addresses stored on the AS–i master and the configuration data match the values of the existing AS-i slaves.

LAS

List of activated slaves

LDS

List of detected slaves.

LPS

List of permanent slaves.

Nibble

A nibble is a unit of information consisting of four bits.

Standard AS-i master

Up to 31 standard slaves or slaves with the extended addressing mode (A slaves only) can be attached to a standard AS-i master.

❑

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AS-Interface

Supplement to manual AS-Interface Master CP 343-2 / CP 343-2 P for SIMATIC S7

Operating Manual

08/2010
A5E03006584020A-01

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Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

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

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION

without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE

indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation for the specific task, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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Technical description

1

1.10 AS-Interface operation with 24 V voltage (AS-i Power24V)

Description

The AS-Interface cable transports communication signals as well as supply voltage for the modules and sensors / actuators (depending on module type). The nominal supply voltage is normally 30 V DC and is supplied by an AS-Interface power supply unit. This power supply unit also contains the data decoupling circuit required to operate the system.

Following enhancement of the AS-Interface specification in 2010, it is now possible to use a nominal supply voltage of 24 V DC, which means that standard power supply units can be employed. In this case, the following requirements must be fulfilled:

- An external data decoupling module is connected between the power supply unit and other bus components (master and slaves).
- All components are approved for a 24 V DC supply voltage.

In order to limit the voltage drop on the AS-Interface cable, the maximum permissible cable length specified for a 24 V DC supply voltage is 50 m. The extension plug cannot be used to extend the cable length.

The AS-Interface method of communication is identical for both 30 V and 24 V supply voltages. The possible number of addresses and slaves on the AS-Interface network is therefore unaffected by the supply voltage used. Communication signals must be decoupled from the power supply. The data decoupling circuit required is integrated in standard AS-Interface power supply units (30 V DC).

CAUTION
Using a standard 24 V DC or 30 V DC power supply unit • The AS-Interface system is designed to comply with protection class III (PELV) in accordance with IEC 61140. For this reason, the standard 24 V DC or 30 V DC power supply unit must also comply with these requirements! • When you use a standard 24 V DC or 30 V DC power supply unit, you must install a data decoupling module between the power supply unit and AS-Interface network!

Modules

- CP 343−2 (6GK7 343-2AH01-0XA0) and
- CP 343−2 P (6GK7 343-2AH11-0XA0)

with product version 02 or higher have been approved for operation with 24 V DC and 30 V DC.

NOTICE
Voltage lower than 22.5 V on the AS-Interface If the voltage on the AS-Interface is less than 22.5 V (+/-1 V), • the CP 343−2 / CP 343−2 P generates the message "AS-i POWER FAIL" (APF) when voltage monitoring is activated (setting in delivery state) and • halts operation of the AS-Interface network. The slaves connected to the AS-Interface network shut down automatically in response to undervoltage. In order to ensure fault-free operation under these conditions, voltage monitoring must be deactivated!

Voltage monitoring is activated in the delivery state and the
CP 343-2 / CP 343-2 P module is thus preset for operation on a 30 V supply voltage.

Checking the setting of voltage monitoring (only on 6GK7 343-2AH01-0XA0 and 6GK7 343-2AH11-0XA0, product version 02):

Step	Meaning
1: Install the CP as described in Section 2.2.	
2: Switch the power supply to the SIMATIC station off and then on again.	The CP performs a self-test when it powers up. All the LEDs on the CP light up while it is powering up. Then the LEDs go out.
3: Check the status of the voltage monitoring by reading the LED display.	There are two different cases: • Voltage monitoring is activated (setting in delivery state): The LEDs immediately indicate the operating state described in Section 1.5 • Voltage monitoring is deactivated (for AS-i Power24V operation): The two LEDs "APF" and "0" flash for about 2 s, the LEDs then display the operating state described in Section 1.5.

Checking the setting for voltage monitoring

Deactivating the voltage monitoring (only on 6GK7 343-2AH01-0XA0 and 6GK7 343-2AH11-0XA0, product version 02):

Step	Meaning
1: Install the CP as described in Section 2.2.	
2: Switch the power supply to the SIMATIC station off and then on again.	The CP performs a self-test when it powers up. All the LEDs on the CP light up while it is powering up. Then the LEDs go out.
3: Check the status of the voltage monitoring by reading the LED display.	There are two different cases: • Voltage monitoring is activated (setting in delivery state): The LEDs immediately indicate the operating state described in Section 1.5 • Voltage monitoring is deactivated (for AS-i Power24V operation): The two LEDs "APF" and "0" flash for about 2 s, the LEDs then display the operating state described in Section 1.5.
4: Press and hold down the "SET" button (for at least 5 s) until the LED "APF" flashes. **Note**: This action is only possible within 30 s of switching on the SIMATIC station.	Pushbutton actuation detected. The device is in setting mode.
5: Release the "SET" button.	The LED "APF" flashes. Voltage monitoring status display: • LED "1" lights up: Voltage monitoring is activated (setting in delivery state) • LED "0" lights up: Voltage monitoring is deactivated (AS-i Power24V operation).
6: Press the "SET" button briefly (several times if necessary).	The LED "APF" flashes. Voltage monitoring switchover: • LED "1" lights up: Voltage monitoring is activated • LED "0" lights up: Voltage monitoring is deactivated.
7: Press and hold down the "SET" button (for at least 5 s) until the LED "APF" goes out. Observe the information in the safety notices underneath this table.	The setting of the voltage monitoring has been stored in non-volatile memory in the CP.
8: Transition to normal operation	Meaning of the displays and operator controls: Analogous to Section 1.5.

Deactivating the voltage monitoring

NOTICE
Note on step 2: Termination of power-up by pressing the "SET" button: While the CP is powering up, do **not** press the "SET" button, if you press the "SET" button the CP will switch to a special internal state: An LED running light display is activated (LED "SF" - "PWR" - "APF" - "CER" - "AUP" - "CM"). The CP cannot operate normally in this special state. To cancel this special state, the power supply to the SIMATIC station must be switched off.

NOTICE
Note on step 7 (storing the setting): If you want to cancel the setting of the voltage monitoring without saving it, you must switch off the power supply to the SIMATIC station instead of performing step 7.

The CP will be ready to run (normal operation) immediately after powering up.

NOTICE
Note on steps 4 to 8: Perform steps 4 to 8 only if you want to change the current setting of the voltage monitoring.

Using the command interface 5

5.1 Description of FC "ASI_3422" (supplements)

CAUTION
If the receive buffer of the FC ASI_3422 is too short, any bordering memory areas are overwritten. The length specification in the ANY pointer of the parameter RECV when calling the FC ASI_3422 is irrelevant. The required length of the receive buffer can be found in the description of the command. The supplements listed below must be observed.

5.2 Description of the AS-i-slave commands (supplements)

5.2.17 Read_extended_total_configuration (command number: 39_H)

Supplement:

The receive buffer must have a length of 221 bytes (byte 0 to 220).

The highest bytes 172 to 220 are reserved and may be overwritten by the AS-i master with zero values.

5.2.21 Read_write_CTT2_request (command number: 44_H)

Supplement:

The receive buffer must have a length of 221 bytes (byte 0 to 220).

The number of bytes actually transferred by the AS-i slave depends on the CTT2 response. The additional bytes contained in the receive buffer may be overwritten by the AS-i master with zero values.

5.2.30 Read_AS−i−slave_parameter_string (command number: 41_H)

Supplement:

The receive buffer must have a length of 221 bytes (byte 0 to 220).

The number of bytes actually transferred by the AS-i slave depends on the slave. The additional bytes contained in the receive buffer may be overwritten by the AS-i master with zero values.

5.2.31 Read_AS−i−slave_ID−string (command number: 42_H)

Supplement:

The receive buffer must have a length of 221 bytes (byte 0 to 220).

The number of bytes actually transferred by the AS-i slave depends on the slave. The additional bytes contained in the receive buffer may be overwritten by the AS-i master with zero values.

5.2.32 Read_AS−i−slave_diagnostic_string (command number: 43_H)

Supplement:

The receive buffer must have a length of 221 bytes (byte 0 to 220).

The number of bytes actually transferred by the AS-i slave depends on the slave. The additional bytes contained in the receive buffer may be overwritten by the AS-i master with zero values.

Dealing with problems / error displays 7

7.1 Replacing a defective AS-i slave / automatic address programming

7.1.1 Automatic address programming after failure of one or more AS-i slaves (CP with firmware version V3.1 or higher)

AS-i slave replacement with CP 343-2 (6GK7 343-2AH01-0XA0) and CP 343-2 P (6GK7 343-2AH11-0XA0), product version 02/firmware version V3.1 or higher

The "Automatic address programming" function makes it particularly easy for you to replace defective AS-i slaves.

Note

Automatic address programming:

You can use the automatic address programming function only if the CP is operating in "protected mode" and **one or more** AS-i slaves have failed.

If several AS-i slaves have failed, the defective slaves must be uniquely identified in the configuration by their slave profile (I/O configuration, ID code, ID2 code) and ID1 code. The automatic address programming function does not work if two identical slaves have failed.

The automatic address programming function also supports slaves with the "CTT5" profile (multi-address slaves) and AS-i devices which contain multiple internal slave addresses. A precondition for support is that each internal slave is uniquely identified (I/O configuration, ID code, ID2 code, ID1 code).

Examples of devices with multiple internal slave addresses which support automatic address programming:

- K60 module with 8DI/2DO (3RK2400-1HQ00-0AA3)
- M200D motor starter AS-i standard (3RK1325- ...).

If no address has yet been assigned to these devices (setting in delivery state), only **one** zero address is visible on the bus. The device automatically suppresses the other internal zero addresses.

Note

Exceptions

Automatic address programming does not work on the following devices as the internal slaves all have identical identifiers (I/O configuration, ID code, ID2 code, ID1 code).

- K60 module with 8 DI (3RK1200-0DQ00-0AA3, 3RK2200-0DQ00-0AA3, 3RK2200-1DQ00-1AA3)
- K45 safety-oriented module with 4 F-DI (3RK1205-0CQ00-0AA3).

Detection of a defective AS-i slave

An illuminated "AUP" LED signals the following (in "protected operation" only):

1. Slave failure:

- Exactly **one** slave has failed, **or**
- A device containing multiple different slaves has failed, **or**
- Multiple slaves or devices have failed, each of the failed slaves having a unique configuration (identifier)

2. Automatic address programming by the CP 343-2 is possible.

You can identify a failed AS-i slave by flashing of the LED assigned to the slave on the front plate.

The corresponding LEDs flash to indicate failure of a device with more than one internal slave address.

Replacement of a defective AS-i slave

- Replace the defective AS-i slave by an **identical** AS-i slave with address "zero" (setting in delivery state),**or**
- Replace the defective AS-I device (containing multiple internal slave addresses) by an identical AS-i device with address "zero" on all internal slaves (setting in delivery state).

Note

Replacement of a defective AS-i slave:

Only one address "zero" may be configured on the bus at any one time. If you want to replace several slaves or devices, you must replace them one after the other (with AS-i master switched on).

For the new slave or device, the CP 343-2 programs the address or addresses of the original node which has been replaced.

The LEDs "AUP" and "CER" go out once all slaves have been correctly replaced. The newly added slave is signaled by illumination of the relevant LED.

7.1.2 Automatic address programming after failure of an AS-i slave (CP with firmware version V3.0 or lower)

AS-i slave replacement with

- CP 343-2 (6GK7 343-2AH01-0XA0) and CP 343-2 P (6GK7 343-2AH11-0XA0), product version 01 / firmware version V3.0 or earlier, and
- CP 343-2 (6GK7 343-2AH00-0XA0) and CP 343-2 P (6GK7 343-2AH10-0XA0), all product versions or firmware version V2.x

Replacement

The "Automatic address programming" function makes it particularly easy for you to replace defective AS-i slaves.

Note

Automatic address programming:

You can use the automatic address programming function only if the CP 343-2 is operating in "protected mode" and **only one** AS-i slave has failed.

Slaves with the "CTT5" profile (multi-address slaves) do not support automatic address programming.

Detection of a defective AS-i slave

An illuminated "AUP" LED signals the following (in "protected operation" only):

- Exactly **one** slave has failed
- Automatic address programming by the CP 343-2 is possible.

You can identify a failed AS-i slave by flashing of the LED assigned to the slave on the front plate.

The corresponding LEDs flash to indicate failure of a device with more than one internal slave address.

Replacement of a defective AS-i slave

Replace the defective AS-i slave by an **identical** AS-i slave with address "zero" (setting in delivery state).

For this slave, the CP 343-2 programs the address of the original node which has been replaced.

The LEDs "AUP" and "CER" go out once the slave has been correctly replaced. The CP 343-2 signals the newly added slave by illumination of the relevant LED in the slave display.

7.2 Error displays/remedying errors

7.2.1 Error displays/remedying errors (incompatibilities)

Below are listed possible fault indicators, and potential remedial measures, when operating the CP 343−2 with incompatible slaves.

Error	Possible cause	Remedy
CER indicator flickers or lights up, and other LEDs may also flicker or light up (AUP, SF, LEDs 0-9)	A connected slave is not compatible with the AS-i master since the slave operates in accordance with a higher version of the AS-i specification. For examples, see below.	Connect only slaves that are compatible with the AS-i specification of the master, or replace the (older) master with a current AS-i master that is compatible with the connected slaves. A master can process slaves if the version of the slave specification is equal to or lower than the version of the master specification.

Examples of incompatible combinations of AS-i slaves and AS-i master (list not complete):

- Slave of type A/B
  including A/B slave with 4 inputs/3 outputs (e.g. 3RK2400-1FQ03-0AA3, in accordance with AS-i spec. V2.1)
  on
  master 6GK7342-2AH00-0XA0 (in accordance with AS-i spec. V2.0), especially if the highest output bit of the slave is set in the PLC (output D3 = "1").
- Slave of type A/B (spec. 3.0),
  including A/B slave with 4 inputs/4 outputs (e.g. 3RK2400-1DQ00-0AA3, in accordance with AS-i spec. V3.0)
  or A/B slave with 4 outputs (e.g. 3RK2100-1CT30-0AA3, in accordance with AS-i spec. V3.0)
  or A/B slave with analog profile 7.A.9 (e.g. 3RK2207-1BQ50-0AA3, in accordance with AS-i spec. V3.0)
  on
  master 6GK7343-2AH00-0XA0 (AS-i spec. V2.1) or
  master 6GK7343-2AH10-0XA0 (AS-i spec. V2.1)
- Slaves of the Combined Transaction Type 2-5 (CTT slaves in accordance with AS-i spec. 3.0),
  including A/B slave with profile 7.A.5 (e.g. 3RK1325-… SIRIUS motor starter M200D AS-i standard with 2 integral AS-i slaves)
  on
  master 6GK7343-2AH00-0XA0 (AS-i spec. V2.1) or
  master 6GK7343-2AH10-0XA0 (AS-i spec. V2.1)

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SIMATIC NET
CP 343-2 / CP 343-2 P
AS-Interface Master

Manual (Supplement)

01/2023
C79000-G8976-C149-04

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Warning notice system

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⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

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

NOTICE

indicates that property damage can result if proper precautions are not taken.

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Approvals

8

This chapter contains a selection of information about certificates and approvals.

You can find more information on the Internet at
(https://support.industry.siemens.com/cs/ww/en/ps/6GK7343-2AH11-0XA0)
or (https://support.industry.siemens.com/cs/ww/en/ps/6GK7343-2AH01-0XA0).

Select the entry type "Certificate".

8.1 Ex certificates

ATEX

DEKRA 20ATEX0042 X



II 3 G Ex ec IIC T4 Gc or
II 3 G Ex ec nC IIC T4 Gc

EN IEC 60079-0 : 2018 EN 60079-7 : 2015 + A1 : 2018 EN 60079-15 : 2019

Specific conditions of use

1. The equipment shall only be used in an area of not more than pollution degree 2, as defined in EN 60664-1.
2. The modules shall be installed in a suitable enclosure providing a degree of protection of at least IP54 according to EN 60079-7, taking into account the environmental conditions under which the equipment will be used.
3. Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 119 V.

For more information, see (https://support.industry.siemens.com/cs/ww/en/view/109783172)

UKEX

DEKRA 21UKEX0213 X



II 3 G Ex ec IIC T4 Gc or
II 3 G Ex ec nC IIC T4 Gc

EN IEC 60079-0 : 2018 EN 60079-7 : 2015 + A1 : 2018 EN 60079-15 : 2019

Specific conditions of use

1. The equipment shall only be used in an area of not more than pollution degree 2, as defined in EN 60664-1.
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3. Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 119 V.

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For more information, see (https://support.industry.siemens.com/cs/ww/en/view/109815522)

IECEx

IECEx DEK 20.0026X

IEC 60079-0 : 2017 (Ed.7) IEC 60079-7 : 2015 (Ed.5.1) IEC 60079-15 : 2017 (Ed. 5)

Specific conditions of use

1. The equipment shall only be used in an area of not more than pollution degree 2, as defined in IEC 60664-1.
2. The equipment shall be installed in a suitable enclosure providing a degree of protection of at least IP54 according to IEC 60079-7, taking into account the environmental conditions under which the equipment will be used.
3. Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 119 V.

For more information, see (https://support.industry.siemens.com/cs/ww/en/view/109783171)

CCC-Ex

The product has been tested and certified according to CNCA-C23-01 : 2019

China Compulsory Certification

Implementation Rules - Explosion-proof Electrical Products

For more information, see (https://support.industry.siemens.com/cs/us/en/view/109815161)

FM

For more information, see (https://support.industry.siemens.com/cs/us/en/view/109750842)