Industrial Controls

AS-Interface
AS-Interface PCS 7 Library

Getting Started
Legal information

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.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>🚨 DANGER 🚨</td>
<td>indicates that death or severe personal injury will result if proper precautions are not taken.</td>
</tr>
<tr>
<td>🚨 WARNING 🚨</td>
<td>indicates that death or severe personal injury may result if proper precautions are not taken.</td>
</tr>
<tr>
<td>🚪 CAUTION 🚪</td>
<td>indicates that minor personal injury can result if proper precautions are not taken.</td>
</tr>
<tr>
<td>🚪 NOTICE 🚪</td>
<td>indicates that property damage can result if proper precautions are not taken.</td>
</tr>
</tbody>
</table>

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, 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.

Proper use of Siemens products

Note the following:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>🚨 WARNING 🚨</td>
<td>Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.</td>
</tr>
</tbody>
</table>

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.
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Preface

Brief description

The Getting Started manual for the PCS 7 block library AS-Interface uses a simple example project to show you the basic procedures:

- Basic configuration steps
- Handling and monitoring different signal blocks
- Parameterization

This Getting Started manual is intended to be an introduction. Refer to the manual of the library to get more detailed information.

Requirements

Basic knowledge of creating a PCS 7 project is necessary. You will find information about this in the SIMATIC Process Control System PCS 7 Getting Started documentation on the Internet [https://support.industry.siemens.com/cs/document/109485954].

Conventions

This documentation contains designations of the software interface elements. If you have installed a multi-language package for the operating system, some of the designations will be displayed in the base language of the operating system after a language switch and will, therefore, differ from the designations used in this documentation.

Versions and documentation

Information about AS-Interface PCS7 Library, its versions and documentation are available on the internet [https://support.industry.siemens.com/cs/document/109759605].
Software required for the Getting Started of the PCS 7 block library AS-Interface

- You can execute the example project on any PC or programming device on which the following software is installed:
  - Windows operating system
  - Internet Explorer
  - Message Queuing service
  - SQL server

**Note**

The required versions depend on the version of PCS 7 installed.

- You can find further details in the following manuals:

- You create the PCS 7 project with SIMATIC Manager. To do so, follow the instructions in the Process Control System PCS 7; Getting Started documentation [https://support.industry.siemens.com/cs/document/109485954](https://support.industry.siemens.com/cs/document/109485954).

**Hardware used**

This PCS 7 example project was created with the following hardware for the automation station (AS):

<table>
<thead>
<tr>
<th>Order number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6ES7410-5HX08-0AB0</td>
<td>SIMATIC S7-400, CPU 410-5H with 1<em>DP and 2</em>PN interfaces</td>
</tr>
</tbody>
</table>

Hardware used in the various sample projects:

<table>
<thead>
<tr>
<th>Order number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6GK7 343-2AH01-0XA0</td>
<td>CP 343-2 on an ET200M connected via PROFIBUS with two digital AS-Interface Slaves (A and B slaves).</td>
</tr>
<tr>
<td>6GK7 343-2AH11-0XA0</td>
<td>CP 343-2P on an ET200M PN connected via PROFINET with two digital AS-Interface Slaves (A and B slaves).</td>
</tr>
<tr>
<td>6GK1 415-2BA10</td>
<td>Single master DP/AS-i LINK Advanced V2.0 connected via PROFIBUS with one digital AS-Interface Slave with Inputs and Outputs and two analog Slaves (AI and AO).</td>
</tr>
<tr>
<td>6GK1 411-2AB10</td>
<td>Single master IE/AS-i LINK PN IO V2.0 connected via PROFINET with one digital AS-Interface Slave with Inputs and Outputs and two analog Slaves (AI and AO).</td>
</tr>
<tr>
<td>3RK7 137-6SA00-0BC1</td>
<td>CM AS-i Master ST on an ET200SP PN HF connected via PROFINET with two digital AS-Interface Slaves (A and B slaves).</td>
</tr>
</tbody>
</table>
Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

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This library is designed to run under the PCS 7 environment. Therefore, it is recommended to follow the security principles for PCS 7 to support a secure operation, such as:

- User rights
- Password protection of
  - WinCC

For more information, click here
Introduction

4.1 General

This getting started document is valid for AS-Interface PCS 7 libraries compatible to PCS 7 versions V8, V9 and explains the basic principles of using the AS-Interface PCS7 Library. The AS-Interface Library is designed according to APL standards.

For reducing configuration time on site, a module driver generator is included with this library. By using this driver generator it is ensured that all necessary interconnections will be handled automatically by the system and the device is ready to operate in SIMATIC PCS 7 environment.

Custom configuration can be done by the user as well. User manual and online help will give detailed information about the blocks and their input and output connectors.

This document will guide you through the necessary steps for using the library and the module driver generator in a SIMATIC PCS 7 environment using a sample project. This project uses minimum hardware, single station, PN/DP PLC connected to various AS-i devices.
4.2 Prerequisites

User

SIMATIC PCS 7 knowledge:
- Project creation
- HW-Config
- CFC-Editor
- WinCC-Explorer
- WinCC


System

- Installed and compatible PCS 7 version with the latest APL
- Installed AS-Interface Library
- SIMATIC PCS 7 Multiproject (created by Project-Wizard)

Refer to the ReadMe for the library that you use for software details and steps to follow to change the existing project to migration.

Communication

Active communication network between Engineering Station (ES) / Operator Station (OS) and the PLC.
5.1 Installation

The Setup program will guide you through the required steps. Use "< Back" and "Next >" buttons to navigate through the screens during the installation process. The installation program supports German and English. Choose your language at the initial screen.

The AS-Interface library has two components:

- **AS** = Components for Automation System
- **OS** = Components for Operator Station

For example, this library has:

- AS-Interface PCS 7 Library **AS**
- AS-Interface PCS 7 Faceplates **OS**

Installation program will ask you to decide, which product you want to install. Below is the decision matrix:

<table>
<thead>
<tr>
<th></th>
<th>AS</th>
<th>OS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Station</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

"X" : required  
"-" : not required

<table>
<thead>
<tr>
<th></th>
<th>AS</th>
<th>OS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distributed System</td>
<td>Engineering Station</td>
<td>X</td>
</tr>
<tr>
<td>Operator Station</td>
<td>-</td>
<td>X</td>
</tr>
</tbody>
</table>
5.2 Before you start

You need to decide which AS-i Master will be used in your project. Refer to the table below.

1. Select an AS-i Master according to the AS-i slave types you want to use:

<table>
<thead>
<tr>
<th>AS-i master</th>
<th>Digital AS-i slave with standard addressing (1...31) or with extended A addressing (1A...31A)</th>
<th>Digital AS-i slave with extended B addressing (1B...31B)</th>
<th>Analog AS-i slave with standard or extended addressing (A or B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP 343-2</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>CP 343-2P</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>CM AS-i Master ST</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>DP/AS-i LINK Advanced (Single Master)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>DP/AS-i LINK Advanced (Double Master)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IE/AS-i LINK PN IO (Single Master)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IE/AS-i LINK PN IO (Double Master)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

"X" : Supported
"." : not supported by the library

Having identified the AS-i Master you are planning to use, you need to decide which Step 7 integration of the AS-i Master is suitable for your demands.

2. OM or GSD integration

Are you planning to use a single PLC or a redundant H-System with 2 PLCs and a Y-Link for PROFIBUS?

<table>
<thead>
<tr>
<th>Single PLC (PB/PN)</th>
<th>Redundant System (2 PLCs PB with Y-Link)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 7 integration</td>
<td>DP/AS-i LINK Advanced GSD</td>
</tr>
<tr>
<td>• OM/GSD for DP/AS-i LINK Advanced</td>
<td></td>
</tr>
<tr>
<td>• OM/GSD for IE/AS-i LINK PN IO</td>
<td></td>
</tr>
<tr>
<td>• OM for ET200M (PB/PN)</td>
<td></td>
</tr>
</tbody>
</table>
Following table lists all available Step7 integrations of the supported AS-Interface Masters.

<table>
<thead>
<tr>
<th>Article Number</th>
<th>OM Integration on Master System</th>
<th>GSD Integration on Master System</th>
<th>GSD Integration behind Y-Link</th>
<th>Behind Y-Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>DP/AS-i LINK Advanced</td>
<td>6GK1 415-2BA10 (V1.0, V2.0 and V2.2)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>6GK1 415-2BA20 (V1.0, V2.0 and V2.2)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IE/AS-i LINK PN IO</td>
<td>6GK1 411-2AB10 (V1.0 and V2.0)</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>6GK1 411-2AB10 (V2.2)</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>6GK1 411-2AB20 (V1.0 and V2.0)</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>6GK1 411-2AB20 (V2.2)</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CP 343-2 for ET 200M DP</td>
<td>6GK7 343-2AH00-0XA0</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>6GK7 343-2AH01-0XA0</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CP 343-2 for ET 200M PN</td>
<td>6GK7 343-2AH00-0XA0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>6GK7 343-2AH01-0XA0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CP 343-2P for ET 200M DP</td>
<td>6GK7 343-2AH10-0XA0</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>6GK7 343-2AH11-0XA0</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CP 343-2P for ET 200M PN</td>
<td>6GK7 343-2AH10-0XA0</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>6GK7 343-2AH11-0XA0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CM AS-i Master ST for ET 200SP PN HF</td>
<td>3RK7 137-6SA00-0BC1 (V1.0 and V1.1)</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

"X": Supported
"-": not supported by the library

¹ ET 200M PN: supported as with ET 200M IM 153-4 PN IO HF V4.0 or higher
5.3 Diagnostic screen

AS-Interface Library will be inserted into Maintenance Station (MS) and will be graphically represented by Diagnostic Screen. Therefore, you need to enable the creation of Diagnostic Screen.

AS-Interface Library doesn't provide block icons like SIMOCODE pro Library.

Before creating the Diagnostic Screen, you need to open the maintenance station in SIMATIC PDM.

1. Stop SIMATIC PDM. (This step may be skipped if you do not have PDM installed.)
   - Go to MS- Windows System Tray and right click on the SIMATIC PDM icon.
   - Select Open from context menu.

   - SIMATIC PDM Asset Service Manager opens.

   - If active, click on the Stop button to stop SIMATIC PDM.

   - Leave this dialog open and return to SIMATIC Manager.
2. In SIMATIC Manager, go to **Options > SIMATIC PDM > Settings**.
   - Select the **Maintenance Station** tab and click **Assign current Project**. Confirm the dialog with **OK**.

   - Information dialog will be shown which asks you to stop and restart **SIMATIC PDM**.
   - Confirm the dialog with **OK**.
   - Confirm the **SIMATIC PDM** Settings dialog with **OK**.
3. Return to **SIMATIC PDM Asset Service Manager** and click **Start**. (This step may be skipped if you do not have PDM installed).

- Close the dialog by clicking the **Close** button.
To enable the creation of Diagnostic Screen, follow the steps below.
1. In SIMATIC Manager, go to **View > Plant View**.
2. Right click the project node, e.g.: "GS_ASi_Prj". The context menu opens.
3. Select **Plant Hierarchy > Settings**.

The **Settings** dialog opens.
4. Enable the **Derive diagnostic screens from the plant hierarchy** checkbox and click **OK**.

The **Diagnostic Screen** will be now derived from your plant hierarchy.
A dialog for OS selection will appear during this process. Since this example uses just one Operator Station, confirm this dialog by clicking **OK**.

As a result, you will find the newly inserted **Diagnostics** node in your **Plant view**.

---

**Note**

Repeat the above steps for each OS in your project.
5.4 Hardware configuration

5.4.1 HW Config

Now you are ready to set up the HW-Config project with the appropriate HW-Integration. For selecting any AS-i device, please switch the hardware catalog profile to **Standard**:

![Profile: Standard dropdown menu]
5.4.2 Object Manager (OM)

5.4.2.1 CP 343-2

CP 343-2 supports "Configuring using Buttons" for AS-i Slaves only.

Refer to the manual of CP 343-2 [https://support.industry.siemens.com/cs/document/5581657/]: 1.6 Configuring using Buttons.

Digital slaves with standard address or A address

I/O addresses of AS-i Slaves are not displayed inside HW-Config for CP 343-2. Take a look to the manual of CP 343-2 [https://support.industry.siemens.com/cs/document/5581657/] for retrieving the I/O address of a AS-Interface Slave: 4.1.1 Addressing the Standard or A Slaves with the PLC.

**Note**

You will find the base address of a master module in the configuration table e.g.: ET 200M with CP 343-2(P) is displayed with input address range **512..527**.

In this example, the base address is: **512**.

Note down the address or insert it in symbol table of HW-Config (Options > Symbol Table or Ctrl+Alt+T) for later usage.

Digital slaves with B address

Note down the AS-i Slave addresses in use (e.g.: 2B, 3B, 5B, ...). CFC configuration is based on the AS-i Slave address in case of digital B-Slaves for CP 343-2.

**Note**

The AS-i masters CP 343-2 and CP 343-2P do not transmit I/O data from AS-i slaves with a B address via the cyclic process image (partition), but via data records. To prevent delays in the communication of driver blocks for B slaves, we recommend avoiding the use of AS-i slaves with B addresses for PCS 7 configurations with CP 343-2 or CP 343-2P.
5.4.2.2 CP 343-2P

Digital slaves with standard address or A address

Open HW-Config to retrieve the input / output address of the AS-Interface Slave.

Note

Note down the address or insert it in the symbol table of HW-Config (Options > Symbol Table or Ctrl+Alt+T) for later usage.
Digital slaves with B address

Note down the AS-i Slave addresses in use (e.g.: 2B, 3B, 5B,...). CFC configuration is based on the AS-i Slave address in case of digital B-Slaves for CP 343-2P.

---

**Note**

Enable the Diagnostic Interrupt checkbox under the Operating Parameters tab. Refer Appendix A for information on uploading slave configuration to PG.

---

**Note**

The AS-i masters CP 343-2 and CP 343-2P do not transmit I/O data from AS-i slaves with a B address via the cyclic process image (partition), but via data records. To prevent delays in the communication of driver blocks for B slaves, we recommended avoiding the use of AS-i slaves with B addresses for PCS 7 configurations with CP 343-2 or CP 343-2P.
DP/AS-i LINK Advanced

Open HW-Config to retrieve the input / output address of the AS-Interface Slave.

**Note**

Note down the address or insert it in symbol table of HW-Config (Options > Symbol Table or Ctrl+Alt+T) for later usage.
5.4.2.4 IE/AS-i LINK PN IO

Open HW-Config to retrieve the input / output address of the AS-Interface Slave. Refer to the manual of IE/AS-i LINK PN IO for retrieving the I/O address of a AS-Interface Slave: 7 Data Exchange between PROFINET IO Controller and AS-i Slave.

Note

Note down the address or insert it in symbol table of HW-Config (Options > Symbol Table or Ctrl+Alt+T) for later usage.
5.4.2.5 CM AS-i Master ST

Open HW-Config to retrieve the input / output address of the AS-Interface Slave.

**Note**

CM AS-i Master ST in the hardware catalog of STEP 7

If the CM AS-i Master ST module in the applicable firmware version is not listed in the hardware catalog of STEP 7, you will need a "Hardware Support Package". You can install this HSP from the Internet using the corresponding function in STEP 7.

Install HSP (Hardware Support Package) for CM AS-i Master [https://support.industry.siemens.com/cs/document/23183356].

ET 200SP configuration needs to be finalized with the "Server module" inside HW-Config.

![CM AS-i Master ST V1.1 inside HW Config](image)

**Figure 5-1 CM AS-i Master ST V1.1 inside HW Config**

**Note**

The screenshot applies for CM AS-i Master ST V1.1. For CM AS-i Master ST V1.0, the I/O addresses of AS-i Slaves are not displayed inside HW-Config. Refer to the manual of CM AS-i Master ST [https://support.industry.siemens.com/cs/document/71756485] for retrieving the I/O address of a AS-Interface Slave: **7.2.2 CM AS-i Master ST without configured AS-i slaves**.

Note down the address or insert it in symbol table of HW-Config (**Options > Symbol Table** or **Ctrl+Alt+T**) for later usage.
### 5.4.3 GSD

#### 5.4.3.1 DP/AS-i LINK Advanced

GSD Integration for DP/AS-i LINK Advanced works different than the Object Manager (OM) Integration. I/O addresses won't get automatically assigned by inserting the desired AS-Interface Slave. After connecting the GSD-Object to the PROFIBUS line, you need to insert the desired address space for the master module.

Address space modules for DP/AS-i LINK Advanced:

<table>
<thead>
<tr>
<th></th>
<th>ASi-1 (single master)</th>
<th>ASi-2 (double master)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital address space</td>
<td>32 Byte*</td>
<td>16 Byte* 8 Byte*</td>
</tr>
<tr>
<td>Analog address space IN</td>
<td>1 Word 2 Word 4 Word</td>
<td>1 Word 2 Word 4 Word</td>
</tr>
<tr>
<td>Analog address space OUT</td>
<td>1 Word 2 Word 4 Word</td>
<td>1 Word 2 Word 4 Word</td>
</tr>
<tr>
<td>Analog address space IN/OUT</td>
<td>1 Word 2 Word 4 Word</td>
<td>1 Word 2 Word 4 Word</td>
</tr>
</tbody>
</table>

*Support for digital B-Slaves is given by 32 Byte address space only.

Digital AS-Interface Slave

Refer to the manual of DP/AS-i LINK Advanced [https://support.industry.siemens.com/cs/document/22710305](https://support.industry.siemens.com/cs/document/22710305) for retrieving the I/O address of a AS-Interface Slave: **7.2.2 Addressing Table CLASSIC** *(default setting)*.

**Note**

You will find the base address of a master module in the configuration table, e.g.: DP/AS-i LINK Advanced is displayed with input address range 0..31.

In this example, the base address is: 0.

Note down the address or insert it in symbol table of HW-Config *(Options > Symbol Table or Ctrl+Alt+T)* for later usage.
Analog AS-Interface Slave

1. Insert the desired analog I/O or I/O address space which meets your requirements in the DP/AS-i LINK Advanced.
2. Double click the slot, the **Properties** dialog opens.
3. Select the **Parameter Assignment** tab. Click in the cell **AS-i Slave Address = 0 (fault!)** and select the AS-i Slave address from the dropdown menu.

I/O address of this slave is now visible in the **Configuration Table** of the DP/AS-i LINK Advanced.

**Note**

Note down the address or insert it in symbol table of HW-Config (**Options > Symbol Table** or **Ctrl+Alt+T**) for later usage.

**Note**

If an analog slave for line 1 or any other component of line 2 (ASi-2: Binary Array) has to be used with DP/AS-i LINK Advanced GSD, then it should be preceded by an ASi-1 Binary Array of any length (8/16/32) on the Configuration Table.
5.4.3.2 IE/AS-i LINK PN IO

GSD integration of IE/AS-i LINK PN IO comes preconfigured, which means that every slot is already occupied by 1 byte DI/DO, i.e. maximum configuration. Rearrange / replace the slots with address spaces, which meets your requirements (refer to the address space table below). Refer to the manual of IE/AS-i LINK PN IO [https://support.industry.siemens.com/cs/document/22712154](https://support.industry.siemens.com/cs/document/22712154) for retrieving the I/O address of an AS-Interface Slave: 7 Data Exchange between PROFINET IO Controller and AS-i Slave.

Each slot in the Configuration Table is assigned to one AS-Interface Slave address:

<table>
<thead>
<tr>
<th>Slot #</th>
<th>AS-Interface line</th>
<th>AS-Interface Slave address</th>
</tr>
</thead>
<tbody>
<tr>
<td>1..31</td>
<td>1</td>
<td>1..31 or 1A..31A</td>
</tr>
<tr>
<td>33..63</td>
<td>1</td>
<td>1B..31B</td>
</tr>
<tr>
<td>101..131</td>
<td>2</td>
<td>1..31 or 1A..31A</td>
</tr>
<tr>
<td>133..163</td>
<td>2</td>
<td>1B..31B</td>
</tr>
</tbody>
</table>

Following address spaces are available for IE/AS-i LINK PN IO GSD integration:

<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>O</th>
<th>I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital address space</td>
<td>1 byte DI</td>
<td>1 byte DO</td>
<td>1 byte DI/DO</td>
</tr>
<tr>
<td>Analog address space</td>
<td>1 byte Al</td>
<td>1 byte AO</td>
<td>1 byte Al/AO</td>
</tr>
<tr>
<td></td>
<td>1 word Al</td>
<td>1 word AO</td>
<td>1 word Al/AO</td>
</tr>
<tr>
<td></td>
<td>2 word Al</td>
<td>2 word AO</td>
<td>2 word Al/AO</td>
</tr>
<tr>
<td></td>
<td>4 word AI</td>
<td>4 word AO</td>
<td>4 word Al/AO</td>
</tr>
</tbody>
</table>
Insert the desired address space into the master module.

Note

Note down the I/O address or insert it in symbol table of HW-Config (Options > Symbol Table or Ctrl+Alt+T) for later usage.
5.5 CFC

5.5.1 Master data library

For using the library in a plant, it is recommended to store the blocks of the AS-Interface Library in the Master data library. For more information, refer to the Process Control System PCS 7 CFC for SIMATIC S7 Function manual.

Note

AS-Interface Library supports Advanced Process Library channel drivers Pcs7DiIn [FB1871] and Pcs7DiOu [FB1873]. Best practice is to add those blocks to Master data library, too.

5.5.2 CFC - Channel driver

1. Open CFC-Editor by double clicking on the desired CFC object.

2. Select the Libraries tab, located underneath the Catalog view. If the blocks of AS-Interface Library were placed in the Master data library, you will find them in the project library folder (Notation: "Project Name"+_Lib" e.g.: GS_ASi_Lib). Otherwise you will find the blocks in the AS-Interface Library (e.g.: AS-i PCS7 Library V8.1).
Refer to the following table to decide which channel driver block (AS-i Library or AP Library) is supported by the used AS-i Master Module.

<table>
<thead>
<tr>
<th>Master Module</th>
<th>Analog Slaves</th>
<th>Digital Standard Slave</th>
<th>Digital A-Slaves</th>
<th>Digital B-Slaves</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP 343-2(P)</td>
<td>-</td>
<td>AsiDiAlIn</td>
<td>AsiDiBlIn</td>
<td>AsiDiBOu</td>
</tr>
<tr>
<td>CM AS-i Master ST</td>
<td>-</td>
<td>AsiDiAlIn</td>
<td>AsiDiAOu</td>
<td></td>
</tr>
<tr>
<td>DP/AS-i LINK Advanced</td>
<td>Pcs7AnIn</td>
<td>AsiAnIn</td>
<td>Pcs7DiIn</td>
<td>AsiAnOu</td>
</tr>
<tr>
<td></td>
<td>Pcs7AnO</td>
<td>AsiAnIn</td>
<td></td>
<td>AsiAnOu</td>
</tr>
<tr>
<td>DP/AS-i LINK Advanced (GSD)</td>
<td>AsiAnIn</td>
<td>AsiAnOu</td>
<td></td>
<td>AsiAnOu</td>
</tr>
<tr>
<td>IE/AS-i LINK PN IO</td>
<td>Pcs7AnIn</td>
<td>AsiAnIn</td>
<td></td>
<td>AsiAnOu</td>
</tr>
<tr>
<td></td>
<td>Pcs7AnO</td>
<td>AsiAnIn</td>
<td></td>
<td>AsiAnOu</td>
</tr>
<tr>
<td>IE/AS-i LINK PN IO (GSD)</td>
<td>AsiAnIn</td>
<td>AsiAnOu</td>
<td></td>
<td>AsiAnOu</td>
</tr>
</tbody>
</table>

"-" : not supported by the library
5.5.2.1 CP 343-2 and CP 343-2P

1. Open CFC-Editor by double clicking on the desired CFC object.

2. Expand the Master data library node ("ProjName" + "_Lib": e.g.: GS_ASi_Lib).

3. Expand the Blocks node. Now you will see multiple nodes. Blocks for the AS-Interface Library are placed inside ASi, supported APL channel drivers are placed inside Channel.

4. Expand ASi.
According to the sample project, CP 343-2 and CP 343-2P is supported by AsiDiAIn, AsiDiAOu, AsiDiBIn and AsiDiBOu channel drivers. Drag and drop each channel driver in the CFC sheet.

Digital slaves with standard address or A address

Right click on the input / output connector and assign the I/O address manually or select it from the symbol table.

<table>
<thead>
<tr>
<th>Channel driver block</th>
<th>Input (to be wired manually)</th>
<th>Output (to be wired manually)</th>
</tr>
</thead>
</table>
| AsiDiAIn             | PV_In  
Mode = 16#8000FFFF         |                             |
| AsiDiAOu             | Mode = 16#8000FFFE           | PV_Out                      |
Digital slaves with B address

Right click on each input connector (listed in the table below) and enter the desired input in the **Value** field.
Wire the inputs of input / output channel drivers with their respective values. Refer the table below:

<table>
<thead>
<tr>
<th>Channel driver block</th>
<th>Input (to be wired manually)</th>
<th>Output (to be wired manually)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AsiDiBIn</td>
<td>LAddr</td>
<td>CP 343-2(P) base address, as seen in HW-Config</td>
</tr>
<tr>
<td></td>
<td>Slave_No</td>
<td>AS-i Slave address (e.g. 3)</td>
</tr>
<tr>
<td></td>
<td>BinAcSen*</td>
<td>No. of the actuator sensor of the parameterized AS-i slave</td>
</tr>
<tr>
<td></td>
<td>Mode = 16#8000FFFF</td>
<td>Fix value for input data</td>
</tr>
<tr>
<td>AsiDiBOu</td>
<td>LAddr</td>
<td>CP 343-2(P) base address, as seen in HW-Config</td>
</tr>
<tr>
<td></td>
<td>Slave_No</td>
<td>AS-i Slave address (e.g. 3)</td>
</tr>
<tr>
<td></td>
<td>BinAcSen*</td>
<td>No. of the actuator sensor of the parameterized AS-i slave</td>
</tr>
<tr>
<td></td>
<td>Mode = 16#8000FFFFE</td>
<td>Fix value for output data</td>
</tr>
</tbody>
</table>

*The sensor number (BinAcSen) is printed on the enclosure of the AS-i Slave next to the inputs / outputs. The result looks like this:
5.5.2.2 DP/AS-i LINK Advanced and IE/AS-i LINK PN IO

1. Expand the Master data library node ("ProjName" + "/Lib" e.g.: GS_ASi_Lib).

2. Expand the Blocks node. Now you will see multiple nodes. Blocks for the AS-Interface Library are placed inside ASi, supported APL channel drivers are placed inside Channel.

According to the sample project, DP/AS-i LINK Advanced and IE/AS-i LINK PN IO is supported by Pcs7DiIn, Pcs7DiOu, AsiAnIn and AsiAnOu channel drivers. Drag and drop each channel driver in the CFC sheet.
Set I/O

Right click on the input / output connector and assign the I/O address manually or select it from the symbol table.

Wire the inputs of input / output channel drivers with their respective I/O addresses, retrieved from HW-Config.

<table>
<thead>
<tr>
<th>Channel driver block</th>
<th>Input (to be wired manually)</th>
<th>Output (to be wired manually)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AsiAnIn</td>
<td>PV_In</td>
<td></td>
</tr>
<tr>
<td>Pcs7DlIn</td>
<td>PV_In</td>
<td></td>
</tr>
<tr>
<td>AsiAnOu</td>
<td></td>
<td>PV_Out</td>
</tr>
<tr>
<td>Pcs7DlOu</td>
<td></td>
<td>PV_Out</td>
</tr>
</tbody>
</table>

The result looks like this:

Note

One channel driver block represents one physical I/O port of the physical AS-i Slave.

One AS-i Slave may feed / read multiple channel driver.

Result: Basic block set up is now complete.
5.5.2.3 CM AS-i Master ST

1. Expand the Master data library node ("ProjName" + "_Lib" e.g.: GS_ASi_Lib).

2. Expand the Blocks node. Now you will see multiple nodes. Blocks for the AS-Interface Library are placed inside ASi, supported APL channel drivers are placed inside Channel.

3. Expand ASi.

According to the sample project, CM AS-i Master ST is supported by AsiDiAln and AsiDiAOU channel drivers, for both AS-Interface Standard / A-Slaves as well as AS-Interface B-Slaves. Drag and drop each channel driver block in the CFC sheet.
Set I/O

Right click on the input / output connector and assign the I/O address manually or select it from the symbol table.

Wire the inputs of input / output channel drivers with their respective I/O addresses, retrieved from HW-Config.

<table>
<thead>
<tr>
<th>Channel driver block</th>
<th>Input (to be wired manually)</th>
<th>Output (to be wired manually)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AsiDiAIn</td>
<td>PV_In</td>
<td></td>
</tr>
<tr>
<td>AsiDiAOu</td>
<td></td>
<td>PV_Out</td>
</tr>
</tbody>
</table>

The result looks like this:

Note

One channel driver block represents one physical I/O port of the physical AS-i Slave.
One AS-i Slave may feed / read multiple channel drivers.

Result: Basic block set up is now complete.
5.6 Create/update diagnostic screen

1. Go to View>Plant View.
2. Right click the project node: GS_ASi_Prj. The Context menu opens.

Note
Repeat Create/Update Diagnostic Screen procedure for every change in HW-Config regarding AS-Interface modules.
Generate module drivers

1. Go to **Chart > Compile > Chart as Program**... or hit **Ctrl+B** or click in the toolbar. The Compile dialog opens.

2. Ensure the **Generate module drivers** checkbox is selected.

![Compile dialog](image)

3. Confirm dialog with the **OK** Button.

After compilation has finished, the **Logs** dialog is displayed. Confirm this dialog by the **Close** button if no errors have occurred. If an error is shown by the **Logs** dialog, resolve it first, then proceed.

Hit **F5** in the chart view. The view will be updated and you will see all necessary block interconnections.
5.6 Create/update diagnostic screen

5.6.1 DP/AS-i LINK Advanced or IE/AS-i LINK PN IO
5.6.2 CP 343-2/CP 343-2P

5.6.3 CM AS-i Master ST
5.7 Operator Station

The **Maintenance Station** and the according **Diagnostic Screen** are inserted in the project while compiling the Operator Station (OS). Compile OS.

You can find the details on how to work with the Operator Station in the manual: SIMATIC Process Control System PCS 7 Operator Station [https://support.industry.siemens.com/cs/document/90682677](https://support.industry.siemens.com/cs/document/90682677).

The following pages will show the general displays inside WinCC Maintenance Station view. As an example device, DP/AS-i LINK Advanced is used as AS-i Master. The usage is similar for other AS-i Masters.

**Diagnostic Screen**

After starting the WinCC-Runtime with default configuration, you will see an empty **Process cell(1)** screen.

![Process cell(1) and Diagnostics area](image)

Next to the **Process cell(1)** area key, you will find the **Diagnostics** area key. After clicking on it, you will see the **Diagnostic Screen** of your current project.
Navigation

1. Click on the down arrow right next to the **Diagnostics** area key. A tree like navigation window opens.

2. Expand the node **Field devices**.
3. Click on **DP_master_system(1)**. The diagnostic view of the DP/AS-i LINK Advanced opens.

4. Click on **DP_AS-i_LINK_Advanced(1)**. The diagnostic group view of the AS-i Slaves connected to this AS-i master opens.
5.7 Operator Station
6.1 Upload to PG

Besides the manually configuration of each AS-i Slave inside HW-Config, it is also possible to upload all AS-i Slaves already connected to an OM-Master Object.

This feature is enabled for:
- CP 343-2P
- DP/AS-i LINK Advanced
- IE/AS-i LINK PN IO
- CM AS-i Master ST V1.1

This feature is **not** applicable for the GSD integration.

Inside the configuration table, double click the table row which hosts the AS-i Master object, e.g.:
- CP 343-2P
- DP/AS-i 1M or DP/AS-i 2M
- IE-ASi-Link-1M or IE-ASi-Link-2M
- CM AS-i Master ST V1.1
Properties dialog of the according AS-i Master opens.

Select tab **AS-i Slave Options** and hit **Upload to PG**. All connected AS-i Slaves will be uploaded and displayed in the configuration of the according AS-i Master.
6.2 Slave Selection Dialog

Using any AS-Interface OM-Master device, you may configure AS-i Slaves using the Slave Selection Dialog.

CP 343-2P and CM AS-i Master ST V1.1

1. Open HW-Config.
2. Double click the slot which hosts the CP 343-2P/CM AS-i Master ST V1.1 inside the configuration table of the ET200M/ET200SP PN HF station. Properties dialog of CP 343-2P/CM AS-i Master ST V1.1 opens.
4. Click Button Selection.
   The Slave Selection Dialog opens.

Use input field Find to search for the desired AS-i Slaves.
6.2 Slave Selection Dialog

Drag and drop a slave object (shipped with the according OM) in configuration table of the AS-i Master device. Double click on the AS-i Slave slot. Properties dialog opens. Click Button Selection.
The Slave Selection Dialog opens.
References

Additional information in the internet:

- SIMATIC PCS 7 Overview. [https://support.industry.siemens.com/cs/document/63481413]
- For PCS 7 V8.1: "Process Control System PCS 7 Getting Started Part 1 (V8.1)" [https://support.industry.siemens.com/cs/document/103141812]
- For PCS 7 V8.2: "Process Control System PCS 7 Getting Started Part 1 (V8.2)" [https://support.industry.siemens.com/cs/document/109485954]
- Process Control System PCS 7 CFC for SIMATIC S7 Function manual. [https://support.industry.siemens.com/cs/document/109736727]
- SIMATIC Process Control System PCS 7 Operator Station [https://support.industry.siemens.com/cs/document/109485970]
- SIMATIC Process Control System PCS 7 PC Configuration and Authorization (V8.0) on the Internet [https://support.industry.siemens.com/cs/document/68157327].
- SIMATIC Process Control System PCS 7 Released Modules (V8.0) on the Internet [https://support.industry.siemens.com/cs/document/61187475].
- WinCC, for more information, click here [https://support.industry.siemens.com/cs/document/60119725].
### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS</td>
<td>Automation station</td>
</tr>
<tr>
<td>AS-i</td>
<td>AS-Interface</td>
</tr>
<tr>
<td>CFC</td>
<td>Continuous function chart</td>
</tr>
<tr>
<td>CPU</td>
<td>Central processing unit</td>
</tr>
<tr>
<td>ES</td>
<td>Engineering station</td>
</tr>
<tr>
<td>GSD</td>
<td>General Station Description, Device Description File for PROFIBUS / PROFINET</td>
</tr>
<tr>
<td>HMI</td>
<td>Human machine interface</td>
</tr>
<tr>
<td>HW Config</td>
<td>&quot;Hardware configuration&quot; module in the SIMATIC Manager</td>
</tr>
<tr>
<td>OM</td>
<td>Object manager, Integrated Hardware Configuration Management in STEP 7</td>
</tr>
<tr>
<td>OS</td>
<td>Operator station</td>
</tr>
<tr>
<td>PCS 7</td>
<td>Process Control System 7</td>
</tr>
<tr>
<td>PLC</td>
<td>Programmable Logic Controller</td>
</tr>
</tbody>
</table>