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1 **Preface**

1.1 **About This Document**

This document describes how to configure and use the Anybus X-gateway PROFIBUS Slave Interface.

For additional documentation and software downloads, FAQs, troubleshooting guides and technical support, please visit [www.anybus.com/support](http://www.anybus.com/support).

1.2 **Document history**

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>2018-08-17</td>
<td>New document replacing HMSI-27-250</td>
</tr>
</tbody>
</table>
1.3 Document Conventions

Ordered lists are used for instructions that must be carried out in sequence:

1. First do this
2. Then do this

Unordered (bulleted) lists are used for:

- Itemized information
- Instructions that can be carried out in any order

...and for action-result type instructions:

- This action...
  → leads to this result

**Bold typeface** indicates interactive parts such as connectors and switches on the hardware, or menus and buttons in a graphical user interface.

Monospaced text is used to indicate program code and other kinds of data input/output such as configuration scripts.

This is a cross-reference within this document: *Document Conventions, p. 4*

This is an external link (URL): www.hms-networks.com

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1.4 Document-specific Conventions

The following conventions are used specifically in this document:

- Hexadecimal values are written as NNNNh (the suffix h indicates hexadecimal notation).
- 16 and 32 bit values are stored in Motorola (big endian) format unless otherwise stated.
2 Description

2.1 Overview

The Anybus X-gateway PROFIBUS Slave Interface has complete slave functionality according to the DP-V1 expansions of EN 50170, supporting standard DP functionality as well as acyclic Class 1 and Class 2 services.

The interface exchanges data via two memory buffers:

- **Input Buffer**: Contains data coming from the other network.
- **Output Buffer**: Contains data going to the other network.

![Diagram of data flow](image)

Fig. 1 Data flow

Data from the X-gateway can consist of cyclical (DP) and acyclical (DP-V1) I/O data. The interface can exchange up to 244 bytes of I/O data in each direction, although the total data size (input + output) cannot exceed 344 bytes. The actual byte sizes of input and output data and the amount of cyclical versus acyclical I/O data are set up in Anybus Configuration Manager to match the application.

See also *Configuration, p. 9* and *Data Exchange Examples, p. 10*. 

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**Anybus X-gateway™ PROFIBUS Slave Interface Network Guide**

Anybus® SCM-1202-103 1.0 en-US
3 Installation

3.1 Connectors and Switches

This product contains parts that can be damaged by electrostatic discharge (ESD). Use ESD prevention measures to avoid damage.

![Fig. 2 PROFIBUS slave adapter interface](image)

**PROFIBUS Connector (9-pin D-sub)**

The connector is labeled X1 if the interface is top-mounted and X2 if the interface is bottom-mounted in the X-gateway.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>(reserved)</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
<td>(reserved)</td>
</tr>
<tr>
<td>3</td>
<td>Line B</td>
<td>Positive RS-485 RxD/TxD</td>
</tr>
<tr>
<td>4</td>
<td>RTS</td>
<td>Request To Send</td>
</tr>
<tr>
<td>5</td>
<td>GND BUS</td>
<td>Isolated signal ground (RS-485)</td>
</tr>
<tr>
<td>6</td>
<td>+5V BUS</td>
<td>+5 V (RS-485)</td>
</tr>
<tr>
<td>7</td>
<td>-</td>
<td>(reserved)</td>
</tr>
<tr>
<td>8</td>
<td>Line A</td>
<td>Negative RS-485 RxD/TxD</td>
</tr>
<tr>
<td>9</td>
<td>-</td>
<td>(reserved)</td>
</tr>
</tbody>
</table>

Housing Shield Connected to PE

If the node is the last on a bus segment, use a PROFIBUS connector with built-in terminating resistors.

**Node Address Switches**

![Fig. 3 Node address switches](image)

The PROFIBUS node address is set with two rotary switches in combination.

In this example the station number is set to 42 (4 x 10 + 2 x 1).
### 3.2 LED Indicators

The GW Status LED indicates the status of the X-gateway. The other LEDs indicate network communication and interface status.

<table>
<thead>
<tr>
<th>LED</th>
<th>Indication</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>GW Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>No power</td>
</tr>
<tr>
<td></td>
<td>Green</td>
<td>Gateway running</td>
</tr>
<tr>
<td></td>
<td>Red</td>
<td>Communication error</td>
</tr>
<tr>
<td></td>
<td>Red, flashing</td>
<td>Network interface error</td>
</tr>
<tr>
<td>Acyclic</td>
<td>Off</td>
<td>No acyclic traffic</td>
</tr>
<tr>
<td></td>
<td>Green</td>
<td>Processing acyclic request</td>
</tr>
<tr>
<td>Online</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Not online</td>
</tr>
<tr>
<td></td>
<td>Red</td>
<td>Major internal fault</td>
</tr>
<tr>
<td></td>
<td>Green, flashing</td>
<td>Clear mode</td>
</tr>
<tr>
<td></td>
<td>Green</td>
<td>Online</td>
</tr>
<tr>
<td>Offline</td>
<td>Off</td>
<td>Not offline or no power</td>
</tr>
<tr>
<td></td>
<td>Red</td>
<td>Offline</td>
</tr>
<tr>
<td>Diagnostics</td>
<td>Off</td>
<td>No diagnostics present or no power</td>
</tr>
<tr>
<td></td>
<td>Red, 1 Hz</td>
<td>Configuration error</td>
</tr>
<tr>
<td></td>
<td>Red, 2 Hz</td>
<td>User parameter data error</td>
</tr>
<tr>
<td></td>
<td>Red, 4 Hz</td>
<td>PROFIBUS ASIC error</td>
</tr>
</tbody>
</table>

![Fig. 4 PROFIBUS slave interface LED indicators](image-url)
3.3 Installation Overview

Prerequisites
The following items are required for installation:

- USB cable
- PROFIBUS cable
- GSD file for the PROFIBUS slave interface

The GSD file can be downloaded from www.anybus.com/support.

Basic installation steps
1. Set the PROFIBUS node address using the rotary switches.
2. Connect the PROFIBUS slave interface to the network.
3. Connect a computer to the USB connector.
4. Power on the gateway.
5. Install the GSD file in the PROFIBUS network configuration tool and configure the PROFIBUS master to exchange data with the slave interface.
6. Configure the data exchange options for the PROFIBUS slave interface and the other network interface in Anybus Configuration Manager.
4 Configuration

4.1 Anybus Configuration Manager

The data exchange between the interfaces in the Anybus X-gateway is configured using the Windows-based configuration tool Anybus Configuration Manager, which can be downloaded from www.anybus.com/support.

![Anybus Configuration Manager](image)

**Input I/O data Size (bytes)**
- The amount of input I/O data to exchange on the PROFIBUS network.

**Output I/O data Size (bytes)**
- The amount of output I/O data to exchange on the PROFIBUS network.

**Input Parameter data Size (bytes)**
- The amount of input Parameter data to exchange on the PROFIBUS network.

**Output Parameter data Size (bytes)**
- The amount of output Parameter data to exchange on the PROFIBUS network.

**Offline option**
- The action to perform if the network goes offline. The gateway can either freeze (keep the current value) or clear (set to zero) the data from the offline network.

**Control word/Status word**
- Enables/disables representation of the Control/Status word.

4.2 Network Configuration

Each device in a PROFIBUS network is associated with a GSD (General Station Description) file. This file contains information about the device and is required by the PROFIBUS network configuration tool when adding the device to the network.

The GSD file for the Anybus X-gateway PROFIBUS Slave Interface as well as a free Windows-based PROFIBUS network configuration tool called Anybus NetTool are available for download at www.anybus.com/support, where you will also find additional documentation.
### 4.3 Data Exchange Examples

The direction of the data flow is described from the viewpoint of the interface.

**Input Data** is data coming from the X-gateway.

![Diagram A](image1)

**Example A**
- Input I/O Data size: 16 bytes
- Input Explicit Message size: 8 bytes
- Status Word: Enabled
- Live List: Enabled

![Diagram B](image2)

**Example B**
- Input I/O Data size: 10 bytes
- Input Explicit Message size: 14 bytes
- Status Word: Enabled
- Live List: Disabled

Depending on the actual gateway configuration, parts of the I/O data produced by the interface may be used for status information such as Status Word and Live List. The Live List is only available on master-slave configurations. See also the Anybus X-gateway User Manual.

**Output Data** is data going to the X-gateway.

![Diagram A](image3)

**Example A**
- Output I/O Data size: 16 bytes
- Output Explicit Message size: 8 bytes
- Control Word: Enabled

![Diagram B](image4)

**Example B**
- Output I/O Data size: 8 bytes
- Output Explicit Message size: 14 bytes
- Control Word: Disabled

Depending on the actual gateway configuration, the first 2 bytes of the I/O data consumed by the interface may be interpreted as control information (Control Word).
5 Technical Data

5.1 Technical Specifications

| PROFIBUS functionality                                      | • Complete PROFIBUS-DP/DPV1 Slave functionality according to extensions of EN 50170 |
|                                                             | • Supports Class 1 & Class 2 services                                               |
|                                                             | • Acyclic User Parameter data / Diagnostics length - up to 237 bytes               |
|                                                             | • Supports PROFIBUS features: Sync and Freeze and Watchdog                         |
| Maximum cyclic I/O data                                    | 244 bytes in each direction, 344 bytes total (input + output)                      |
| Supported baud rates                                       | Automatic baudrate detection up to 12 Mbit/s                                       |
| Configuration method                                       | On-board switches and GSD file                                                     |
| PROFIBUS connector                                         | 1 x D-sub 9-pin female connector                                                  |