X-gateway Interface Addendum

PROFIBUS Master

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Rev. 1.11

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About This Document

How To Use This Document

This document describes the various features of the PROFIBUS Master for the X-gateway, basic network installation procedures and other network specific details. General information and operating instructions for the gateway is available in the main User Manual.

The reader of this document is expected to be familiar with the PROFIBUS networking system, and communication systems in general.

For further information, documentation etc., please visit the HMS website, 'www.anybus.com'.

Important User Information

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There are many applications of this product. Those responsible for the use of this device must ensure that all the necessary steps have been taken to verify that the application meets all performance and safety requirements including any applicable laws, regulations, codes, and standards.

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The examples and illustrations in this document are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular implementation, HMS Industrial Networks cannot assume responsibility or liability for actual use based on these examples and illustrations.

Warning:	This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.
ESD Note:	This product contains ESD (Electrostatic Discharge) sensitive parts that may be damaged if ESD control procedures are not followed. Static control precautions are required when handling the product. Failure to observe this may cause damage to the product.

Related Documents

Document	Author
Anybus X-gateway User Manual	HMS
Anybus-M PROFIBUS DPV Fieldbus Appendix	
-	-

Document History

Summary of Recent Changes (1.10 ... 1.11)

Change	Page(s)
Removed Configuration Mode, that no longer is available	3-1
Added definition to Operation Mode-bits in Status Register, updated note	2-2

Revision List

Revision	Date	Author(s)	Chapter(s)	Description
0.50	2005-02-07	PeP	All	First preliminary
1.00	2005-02-14	PeP	All	First release
1.10	2007-08-16	PeP	All	Document rewritten to match main user manual
1.11	2010-01-29	KeL	2, 3	Minor updates

Conventions & Terminology

The following conventions are used throughout this manual:

- Numbered lists provide sequential steps
- Bulleted lists provide information, not procedural steps
- The term 'Master interface' refers to the PROFIBUS Master interface for the X-gateway
- The term 'Slave interface' or 'other network' refers to the other, 'non PROFBUS'-side of the gateway.
- The term 'user manual' is used when referring to the Anybus X-gateway User Manual.
- Hexadecimal values are written in the format NNNNh, where NNNN is the hexadecimal value.

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About the PROFIBUS Master

General Description

The PROFIBUS Master interface for the Anybus X-gateway allows up to 125 PROFIBUS slaves to exchange data with another network.

The interface features an on-board configuration interface, which is used to interface the master with the Anybus NetTool for PROFIBUS configuration software.

Like all X-gateway interfaces, the PROFIBUS Master exchanges data via two buffers as follows:

- **Input Buffer**

  This buffer holds data *from* the other network, i.e. data which will be sent *to* the slaves on the PROFIBUS network.

- **Output Buffer**

  This buffer holds data *from* the slaves on the PROFIBUS network, i.e. data which will be sent *to* the other network.

  Apart from network I/O, this can optionally also include general status information from the PROFIBUS network (Live List).
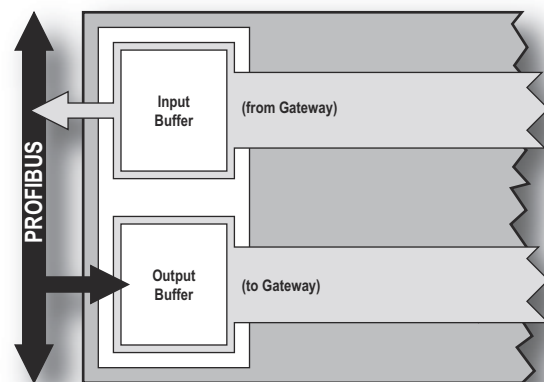

Features

- **Controls up to 125 slaves**

- **Supports all baudrates up to 12Mbit/s**

- **Up to 512 bytes of I/O in each direction**

- **Configuration via RS-232 or Ethernet (where applicable)**

- **Compatible with Anybus NetTool for PROFIBUS**

- **Galvanically isolated bus electronics**

Status LEDs

LED	State	Indication
MS	Off	Master is offline
	Red	Master is in STOP mode
	Green, flashing	Master is in CLEAR mode
	Green	Master is in OPERATE mode
DB	Off	No database
	Green	Database OK
	Green, flashing	Database download in progress
	Red	Database invalid
COM	Off	No data exchange
	Green	Data exchange with all slaves
	Green, flashing	Data exchange with at least one slave
	Red	Bus control error
TOK	Off	Another station holds the token
	Green	Master interface holds the token
Gateway Status	(Consult the main user manual for further details)	

Top mounted Master interface

MS
DB
COM
TOK
Gateway Status[1]

MS
DB
COM
TOK
Gateway Status[1]

Bottom mounted Master interface
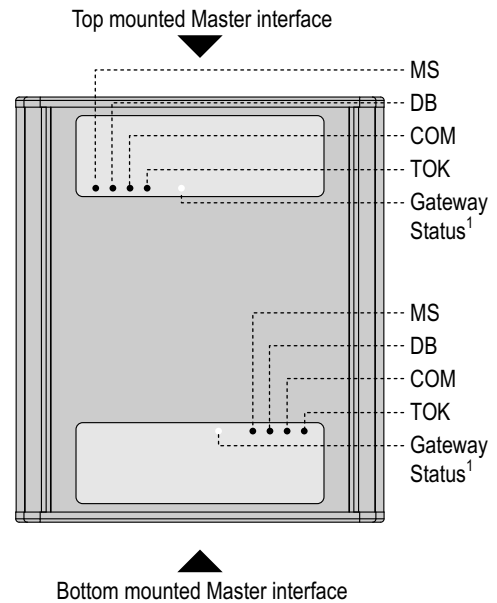
Connectors

#	Description
1	PROFIBUS connector (See A-1 "PROFIBUS Interface Pinout")
2	PROFIBUS Config connector (See A-1 "PROFIBUS Config Interface Pinout")
3	Gateway power connector (Consult the user manual for further details)
4	Gateway Config connector (Consult the user manual for further details)

(Top mounted Master Interface)

(Bottom mounted Master interface)
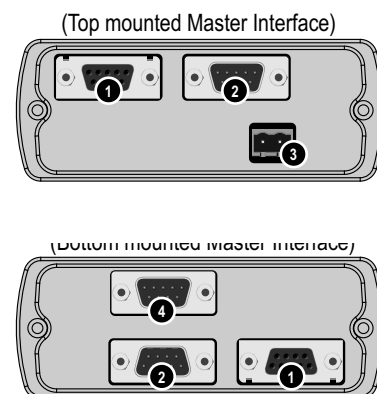
IMPORTANT: *Due to the mechanical design of the Master interface, the PROFIBUS Config Connector is blocked when using standard PROFIBUS connectors. This is generally not an issue when the master is up and running, however in order to be able to use the online features in Anybus NetTool for PROFIBUS, a reversed connector is required.*

Manufacturer	Direction	Part No.
Erni	Standard	134928
	Reversed	104577
Siemens	Standard	6GK1 500-0FC00
	Reversed	6ES7 972-0BA50-0XA0
		6ES7 972-0BB50-0XA0

Data Exchange

General Information

The Master interface exchanges data with up to 125 slaves. This data (from now on referred to as PROFIBUS Slave Data) is forwarded to the Slave Interface side of the gateway and vice versa according to the figure below.
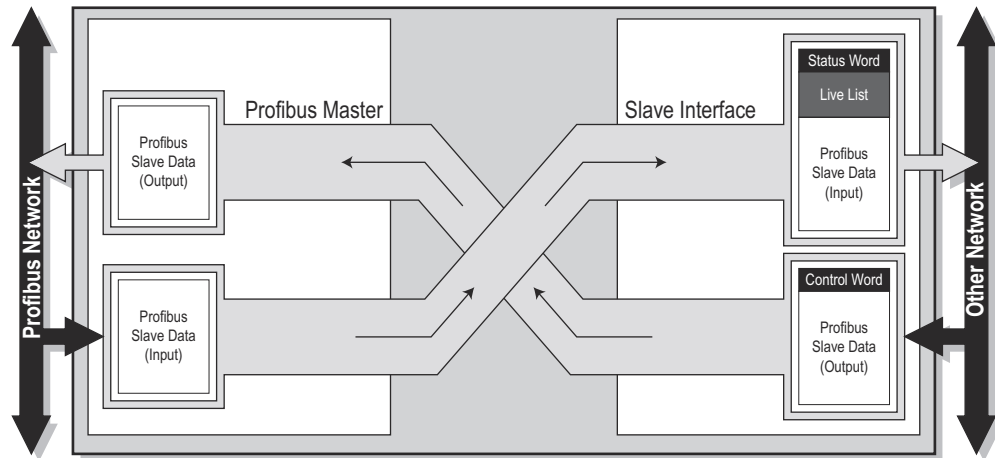
The structure of the PROFIBUS Slave Data is determined by the slave database created using the PROFIBUS configuration tool (in this case Anybus NetTool for PROFIBUS).

Note: The I/O sizes for the Master interface is determined by the size of the actual configuration created using the PROFIBUS configuration tool (in this case Anybus NetTool for PROFIBUS) and cannot be set via the Gateway Config interface.

See also...

- 3-1 "Gateway Config Interface"

Control & Status Word Implementation Details

Status Word

The Status Word holds general status information from the gateway.

(Consult the user manual for further information).

Control Word

The Control Word, if enabled, controls the communication towards the slaves on the PROFIBUS network.

Control Word Contents:

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
								Reset				Mode			

(MSB)   (LSB)

Mode	Meaning	Comments
00b	Stop	These settings are also available from the Gateway Config interface.
01b	Offline	See also...
10b	Clear	- 3-1 "Operation Modes"
11b	Operate	

Reset	Meaning	Comments
0b	Normal operation	-
1b	Reset gateway	Setting this bit causes the gateway to perform a self-reset.

IMPORTANT: *The Control- and Status Words can be disabled through the Gateway Configuration Interface. In such case, the master interface will enter 'Operate' mode automatically after having completed the start up initialisation sequence.*

Live List Implementation Details

The Live List holds bit coded status information for PROFIBUS slaves 0-63. A set bit indicates that the corresponding slave is in data transfer, a cleared bit indicates that the slave is not exchanging data. Please note that the master exchanges data with slaves 64... 125 even though these slaves are not represented in the Live List.

For more information regarding the Live List, consult the main user manual.

Gateway Config Interface

General Information

The Gateway Config Interface features certain settings specific to the PROFIBUS master interface.

(Consult the user manual for further information about the Gateway Config Interface).

Operation Modes

The main menu features an additional entry called 'Change operation mode', which affects the communication towards the slaves on the PROFIBUS network.

The master features the following Operation Modes:

Operation Mode	Description
Stop	-
Clear	-
Operate	-

Note: This setting is not available when the Control/Status words are enabled on the slave side of the gateway.

See also...

- 2-2 "Control & Status Word Implementation Details"

Configuration Settings

The master features the following PROFIBUS master specific configuration settings:

Setting	Description
Live List	This setting enables/disables the Live List.

Note: It is not possible to set the I/O sizes for the master in this menu since this information is determined automatically based on the actual slave database.
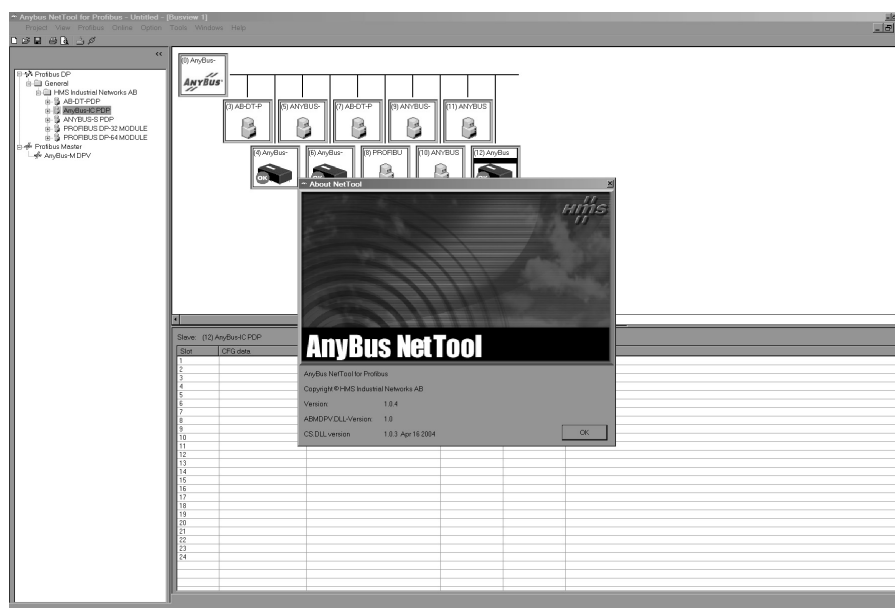
See also...

- 2-2 "Live List Implementation Details"
- 4-1 "PROFIBUS Config Interface"

PROFIBUS Config Interface

General Information

The PROFIBUS Config Interface can be used to interface the master with the Anybus NetTool for PROFIBUS configuration software. Anybus NetTool for PROFIBUS is user friendly PROFIBUS configuration tool suitable for the X-gateway. A fast learning curve and an intuitive visual user interface allows complete network configurations to be built without spending precious time learning a new program.

Anybus NetTool for PROFIBUS is ordered separately, however a free trial version (limited to 2 slaves) can be downloaded from the HMS website, www.anybus.com.

For more information, consult the Anybus-NetTool for PROFIBUS documentation (online help).

See also...

- 4-2 "Configuration Example".

HMS Transport Provider

Anybus NetTool for PROFIBUS supports the HMS Transport Provider, which allows it to control- and configure the PROFIBUS master interface via Ethernet on supported gateway configurations.

Gateway configurations which supports the HMS Transport Provider:

- PROFINET Slave to PROFIBUS Master
- Ethernet Slave to PROFIBUS Master

For more information regarding these products, consult their respective network interface addendums.

Configuration Example

In this example, a network consisting of 3 slaves and a master (in this case the Master interface) has been created using Anybus NetTool for PROFIBUS.

- **Node 0 (Master)**

  -

- **Node 3**

  Slot 1: 128 byte in, 128 byte out
  Slot 2: 32 bytes out

- **Node 4**

  Slot 1: 32 bytes out

- **Node 5**

  Slot 1: 32 bytes in
  Slot 2: 64 bytes out
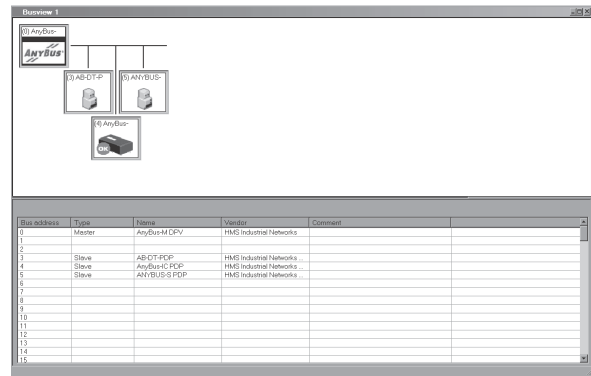
The resulting slave I/O map can be viewed under 'PROFIBUS\Slave I/O address overview'.

Node	Input Range	Output Range
3	0...127	0...127 128...159
4	-	160...191
5	128...159	192...255

The slave I/O map is also reflected in the Input- and Output data exchange buffers in the Master interface as follows:
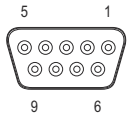
Slave Input Data Structure

128 bytes (node 3)

32 bytes (node 5)

(unused)
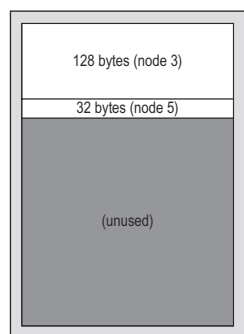
Slave Output Data Structure

128 bytes (node 3)

32 bytes (node 3)

32 bytes (node 4)

64 bytes (node 5)

(unused)
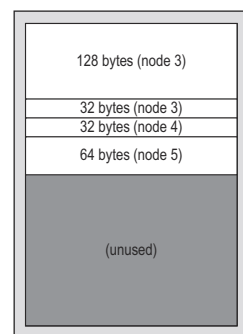
Technical Specification

PROFIBUS Interface Pinout

Pin	Signal
1	-
2	-
3	B-Line
4	RTS
5	GND_BUS
6	+5V BUS (output)
7	-
8	A-Line
9	-
Housing	Cable Shield

PROFIBUS Config Interface Pinout

Pin	Signal
1	-
2	RS232 Receive
3	RS232 Transmit
4	-
5	Ground
6	-
7	-
8	-
9	-
Housing	Protective Earth
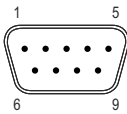
Note: The PROFIBUS Config Interface is a DTE device, i.e. a null modem (cross over) cable must be used when connecting it to another DTE device (e.g. a PC).