


Fieldbus Appendix

AnyBus-IC Profibus DP

Rev. 1.33

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Table of Contents

Preface	About This Manual
	How To Use This Manual..... P-1
	Important user information..... P-1
	Related Documentation..... P-1
	Revision List..... P-1
	Conventions used in this manual P-2
	Support..... P-2
Chapter 1	About the AnyBus-IC PDP
	Features 1-1
	Compatible Products 1-1
	GSD-File..... 1-1
Chapter 2	Connectors, Switches & Indicators
	Application Connector 2-1
	Profibus Connector..... 2-1
	<i>9-pin Sub-D</i> 2-1
	<i>Other connectors</i> 2-1
	Switches (Fieldbus Specific Input Register) 2-2
	Status Indicators (Fieldbus Specific Output Register) 2-2
Chapter 3	Design Considerations
	Shield and Protective Earth connection 3-1
	Fieldbus Termination..... 3-2
	Profibus Connection with Screw Connector 3-2
Chapter 4	Configuration
	Profibus Node Address 4-1
	Profibus Baud Rate 4-2
	Profibus ID - Number..... 4-2
Chapter 5	Profibus Functions
	User Parameter Data (Set_Prm)..... 5-1
	Extended Diagnostic Data (Slave_Diag) 5-1
	I/O Length Check (Chk_Cfg)..... 5-1
	Get_Cfg Telegram..... 5-2
	Global Control Telegrams..... 5-2
	Fieldbus fault action 5-2

Chapter 6 Initialisation

Fieldbus Specific Initialisation	6-1
Normal / Automatic Initialisation	6-2

Chapter 7 Fieldbus Specific Parameters

<i>FB Status (Parameter #100)</i>	7-2
<i>FB Init (Parameter #101)</i>	7-3
<i>FB Password (Parameter #102)</i>	7-3
<i>FB Node Address Config (Parameter #103)</i>	7-4
<i>FB Node Address SSC (Parameter #104)</i>	7-4
<i>FB Node Address Actual (Parameter #105)</i>	7-4
<i>Profibus Baud Rate Actual (Parameter #106)</i>	7-5
<i>Profibus ID Number Config (Parameter #107)</i>	7-5
<i>Profibus ID Number Actual (Parameter #108)</i>	7-6
<i>Default Config Data Length (Parameter #109)</i>	7-6
<i>Config Data Length (Parameter #110)</i>	7-6
<i>User Parameter Data Length (Parameter #111)</i>	7-7
<i>Extended Diagnostic Length (Parameter #112)</i>	7-7
<i>SSA Enable (Parameter #113)</i>	7-7
<i>SSA Node Address (Parameter #114)</i>	7-8
<i>Default Config Data (Parameter #115)</i>	7-8
<i>Config Data (Parameter #116)</i>	7-9
<i>User Parameter Data (Parameter #117)</i>	7-9
<i>Extended Diagnostics (Parameter #118)</i>	7-10

Appendix A Environmental Specification

Temperature	A-1
Relative Humidity	A-1
EMC compliance	A-1

Appendix B Electrical Characteristics

Power Supply	B-1
Current Consumption	B-1
Bus power	B-1
PE Grounding	B-1

About This Manual

How To Use This Manual

This document is intended to be used as a supplement to the AnyBus-IC Design Guide. The reader of this document is expected to have basic knowledge in the Profibus fieldbus system, and communication systems in general. Please consult the general AnyBus-IC Design Guide for general information about the AnyBus-IC platform.

Important user information

The data and illustrations found in this document are not binding. We, HMS Industrial Networks AB, reserve the right to modify our products in line with our policy of continuous product development. The information in this document is subject to change without notice and should not be considered as a commitment by HMS Industrial Networks AB. HMS Industrial Networks AB assumes no responsibility for any errors that may appear in this document.

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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Related Documentation

Document name	Author	Document ID	Revision
AnyBus-IC Design Guide	HMS	ABIC-DESIGN	-

Revision List

Revision	Date	Author	Chapter	Description
1.00 - 1.15	-	-	-	(See previous revisions)
1.20	2002-10-01	PeP	2 & 3	Moved "Design Considerations" to separate chapter. Updated PE / Termination spec.
1.25	2002-10-21	PeP	2 4	Renamed headings, added switch section Minor update
1.26	2002-11-07	PeP	3	Corrected bus termination
1.30	2003-01-22	PeP / DaR	6 4 7 All	Rewrote fieldbus specific initialisation section Corrected fieldbus baudrates Added modbus addresses to each parameter Updated parameters #100 and #101 Misc. minor corrections + cosmetic changes
1.31	2003-08-12	PeP	2	Corrected pinout
1.33	2003-10-15	ToT / PeP	4 6 7	Added information about Set_Slave_Address Minor adjustments Added parameters #113 and #114

Conventions used in this manual

The following conventions are used throughout this manual:

- Numbered lists provide sequential steps
- Bulleted lists provide information, not procedural steps
- The term ‘module’ is used when referring to the AnyBus-IC Profibus DP
- The term ‘application’ is used when referring to the hardware that is connected to the AnyBus Application Connector.
- Hexadecimal values are written in the format NNNNh or 0xNNNN, where NNNN is the hexadecimal value.

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About the AnyBus-IC PDP

The AnyBus-IC PDP is a communication module designed to communicate over the Profibus DP network. The module acts as a Profibus DP slave module, offering the all functionality required for a slave connected to Profibus DP.

Features

- **32 bytes input / 32 bytes output on the SCI Interface**
- **16 bytes input / 16 bytes output on the SSC Interface**
- **Supports all Profibus baudrates from 9,6kbps to 12Mbps**

- **Up to 237 bytes of User Parameter Data**

User Parameter Data is sent to the module from the Profibus master during initialisation. The User Parameter Data can always be found in the User Parameter Data field when the initialisation with the Profibus master is finished.

If the module is initialised in Fieldbus Specific Mode it is possible for the application to acknowledge the User Parameter Data during initialisation.

- **Up to 200 bytes of Extended Diagnostic Data**

The application can inform the Profibus master of important events via the Extended Diagnostic Data field. Static, Extended and Status diagnostic data can be sent to the Profibus master.

- **Galvanically isolated bus electronics**

The bus power is separated from other electronics via a DC/DC converter. The send and receive signals are isolated via opto couplers.

Compatible Products

This product is a member of the AnyBus concept of interchangeable fieldbus modules. Standardization of mechanical, electrical and software interfaces ensures that the different AnyBus-IC models are fully interchangeable with only little or no required software and/or hardware adjustments, depending on the application.

GSD-File

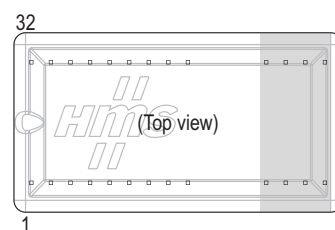
The GSD-file for the AnyBus-IC PDP can be downloaded from the HMS web site at ‘www.hms-networks.com’. If an AnyBus-IC PDP is used in a customer-specific implementation, the Profibus ID-number and the GSD-file must be changed to match the new implementation. The standard GSD-file can then be used as a template for the new GSD-file. See 4-2 “Profibus ID - Number” for more information.

Connectors, Switches & Indicators

Application Connector

Pin numbers 13-20 on the application connector are used for fieldbus specific signals, see pinout below.

Pin	Signal	Description
1-12	(See AnyBus-IC Design Guide)	-
13	FB1	A-Line
14	FB2	B-Line
15	FB3	RTS
16	Not Connected (FB4)	-
17	PE	PE
18	Not Connected (SHIELD)	-
19	FB5	GND BUS
20	FB6	+5V BUS
21-32	(See AnyBus-IC Design Guide)	-



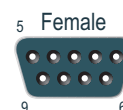
☐ Fieldbus Specific
☐ See general AnyBus-IC Design Guide

Profibus Connector

9-pin Sub-D

The recommended connector for Profibus is a 9-pin D-sub female connector, see pinout below.

Pin	Signal	Connect to
1	-	-
2	-	-
3	B-Line, Positive RS485 RxD/TxD	FB2 (pin 14)
4	RTS, Request To Send	FB3 (pin 15)
5	GND BUS	FB5 (pin 19)
6	+5V BUS	FB6 (pin 20)
7	-	-
8	A-Line, Negative RS485 RxD/TxD	FB1 (pin 13)
9	-	-
Housing	Bus Cable Shield	PE ^a



a. See 3-1 "Design Considerations" and 3-1 "Shield and Protective Earth connection"

If a 9-pin D-Sub is used, the A-Line, B-Line, +5V BUS, GND BUS and Shield are mandatory signals, and should be connected. If another fieldbus connector is used, only the A-Line and B-Line is mandatory. +5V BUS and GND BUS are normally used for the bus termination. Some devices, like optical transceivers (RS485 to fibre optics), may use these pins as power supply, in which case they may not consume more than 100mA. Observe that these power outputs are NOT short-circuit protected.

Other connectors

Other connectors which comply with the Profibus standard and has all mandatory signals present are also allowed.

Switches (Fieldbus Specific Input Register)

The node address can be set via switches connected to the Fieldbus Specific Input Register on the SSC interface. Both BCD-coded and binary-coded switches can be used

- **BCD Switch**

The node address for the AnyBus-IC PDP can be set from 0 to 99

- **Binary Switch**

The node address for the AnyBus-IC PDP can be set from 0 to 126

The type of switch used must be specified using parameter #9 (“Switch Coding”), see general AnyBus-IC Design Guide for more information. On the AnyBus-IC Profibus, the default value of this parameter is 00h (BCD Switches). However, the default value of this parameter is fieldbus dependant, i.e. there is no guarantee that the same type of switch is used by default on another version of the AnyBus-IC.

BCD Switch

When using BCD-type switches, two rotary switches are used to specify the node address, one for each decimal digit. Note that this type of switch limits the possible address range to 0 - 99.

Binary Switch

One 7 pole binary switch is used to specify the node address.

Bit 6 (MSB)	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0 (LSB)	Node Address
0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	1
0	0	0	0	0	1	0	2
...
1	1	1	1	1	0	0	124
1	1	1	1	1	0	1	125
1	1	1	1	1	1	0	126

Status Indicators (Fieldbus Specific Output Register)

The Fieldbus Specific Output Register on the SSC interface is used according to the following:

Bit	Colour	State	Description
1	Green	Off (Bit 1 = 0) Solid Green (Bit 1 = 1) Flash Green 1Hz (Bit 1 pulsing)	Node Off-Line or Power not supplied Node in Data Exchange Mode Node in Clear Mode
2	Red	Flash Red 1 Hz (Bit 2 pulsing) Solid Red (Bit 2 = 1) Off (Bit 2 = 0)	Error in configuration data and/or user parameter data Error in initialisation of Profibus ASIC No Error or Power not supplied
3 - 8	-	Not used	-

Note: The application can read the state of these leds using parameter #7 (“LED State”).

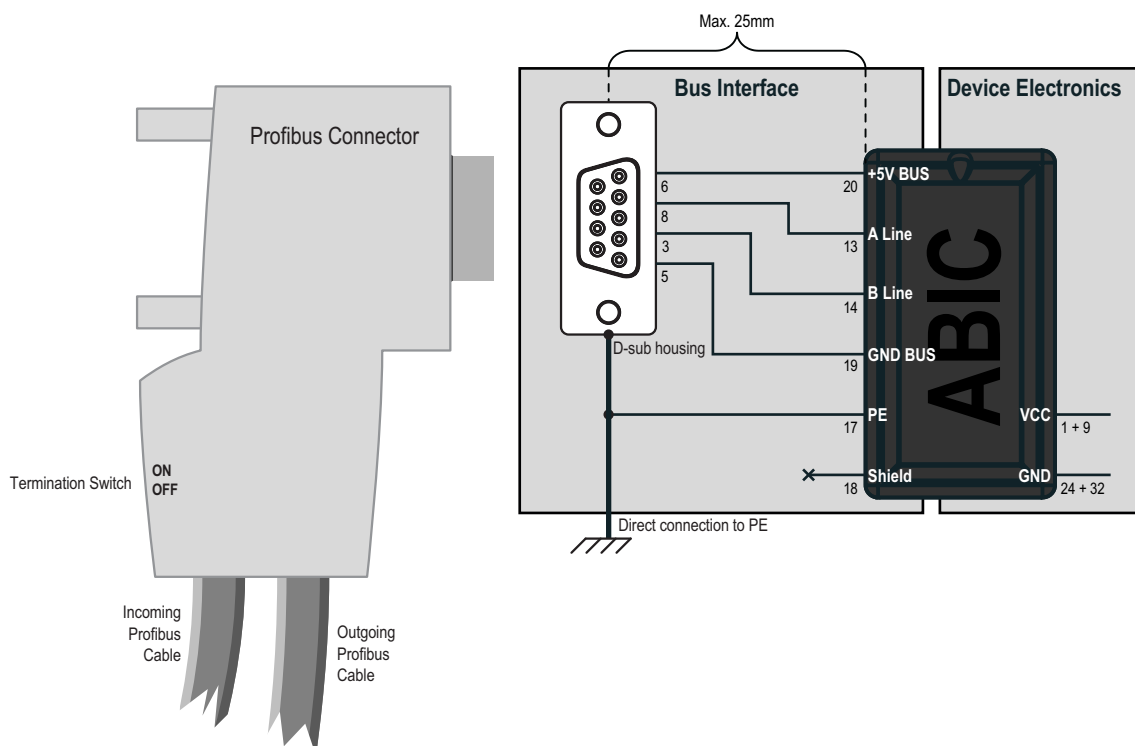
Design Considerations

When designing the carrier board for the AnyBus-IC, keep the length of the stub-lines on the carrier board (the length from the Profibus connector to the AnyBus-IC) as short as possible. If these stub-lines are too long, communication problems may arise when the AnyBus-IC is used at higher bus speeds (1,5Mbps to 12Mbps). At all times, these lines must be kept below 25mm, or HMS will not be able to guarantee proper functionality. (According to the Profibus Test Specification, the maximum allowed total length of all stub lines in one segment is 80cm@12Mbit/s. 80cm divided on a full segment (32 nodes) equals 25mm)

Shield and Protective Earth connection

The Profibus shielding concept differs from other fieldbus systems in that it requires a direct connection between the shield of the Profibus cable and PE, while most other systems uses a dedicated shield connection via a R/C circuit.

If the application should support other fieldbus systems, special care has to be taken when designing the motherboard in order to provide support for both types of PE connection. If the fieldbus systems in question uses different connector types this can easily be accounted for when routing the board. However, if two fieldbus types share the same connector, some sort of configuration jumpers for selecting PE connection type has to be included. (Consult the general AnyBus-IC Design Guide for more information.)



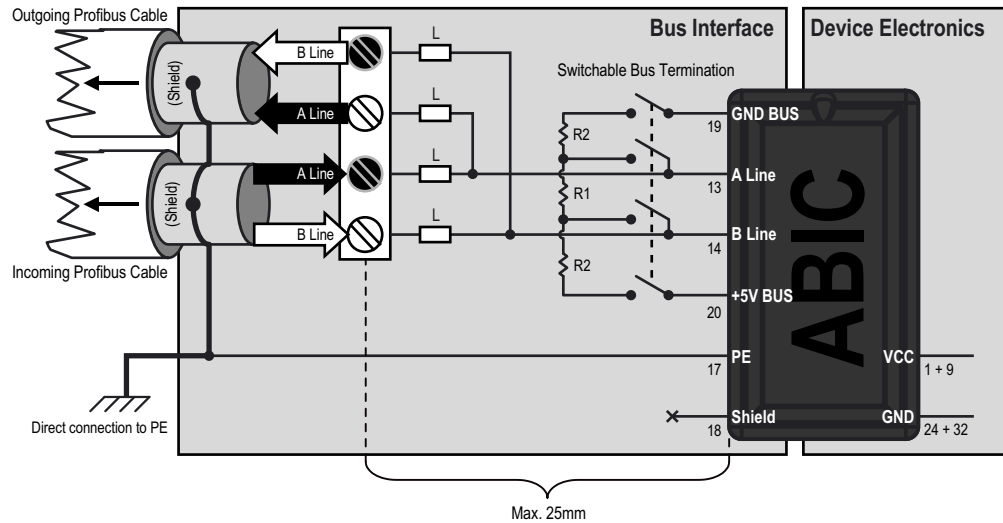
The figure above shows the most typical way to connect a Profibus 9-pin D-sub connector to the AnyBus-IC. Please note that the shield from the Profibus cable is connected to the D-sub housing inside of the Profibus connector.

To achieve proper EMC behaviour, the metal housing of the female D-sub connector on the carrier board should be directly connected to PE. This is most likely done via the housing of the device.

Fieldbus Termination

It is recommended to use Profibus connectors with built-in termination components and inductors according to the Profibus recommendation. If this is not possible, a screw connector shall be used according to the principle shown in the figure below.

Profibus Connection with Screw Connector



Ref.	Description
R1	$220\Omega \pm 5\%$
R2	$390\Omega \pm 5\%$
L	$110\text{nH} \pm 20\%$

Configuration

Profibus Node Address

There are a number of different ways to set the Profibus node address of the module:

- **Fieldbus specific Node Address Parameter**

The node address can be set using parameter #103 (“FB Node Address Config”).

- **SSC Node Address**

The node address can be set via the first input shift register of the SSC interface (Fieldbus Specific Input Register), see 2-2 “Switches (Fieldbus Specific Input Register)”.

Consult the general AnyBus IC Design Guide for more information.

Which one of these options that should be used is determined by the NA bit in parameter #8 (“Configuration Bits”). The resulting address is stored in parameter #105 (“FB Node Address Actual”).

Additionally, the node address can be set using the Profibus telegram Set_Slave_Address, see below.

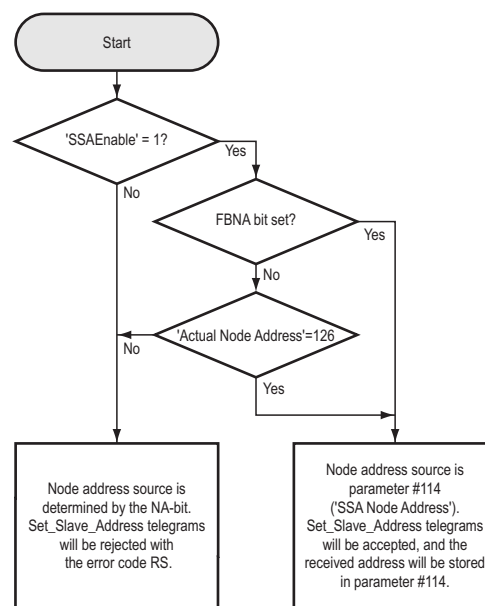
- **Set_Slave_Address telegram¹**

The node address can be set using the Profibus master/configuration tool using the Set_Slave_Address telegram.

This function is enabled only if the actual node address (reflected in parameter #105) equals 126, or if the FBNA bit in parameter #8 (“Configuration Bits”) is set.

The figure on the right illustrates how the node address is determined when using this feature.

The support for the Set_Slave_Address telegram can be completely disabled using parameter #113 (“SSAEnable”). (Note that in order to maintain fieldbus conformance, the .GSD file must be updated accordingly)



Note: The Profibus node address is read once during startup, i.e. any changes requires a reset in order to have effect.

1. This feature requires firmware revision 1.14 or higher.

Profibus Baud Rate

The module supports all standard baud rates from 9,6kbps to 12Mbps according to the Profibus specification, see below.

- 12 Mbps
- 6 Mbps
- 3 Mbps
- 1,5 Mbps
- 500 kbps
- 187,5 kbps
- 93,75 kbps
- 45,45 kbps
- 19,2 kbps
- 9,6 kbps

The AnyBus-IC PDP supports automatic baud rate detection, which means that the actual baud rate is only configured in the Profibus master.

When the module is on-line, the actual baud rate is displayed in parameter #106 (“Profibus baudrate Actual”).

Profibus ID - Number

The standard AnyBus-IC Profibus ID-number is 1810h. This ID-number is related to the standard .GSD-file. If the AnyBus IC PDP shall be customized with other functions or names, a new ID-number must be used (ordered from the Profibus organization).

The ID number can be changed using the password protected parameter #107(“Profibus ID Number Config”). Contact HMS for further information.

If the ID-number is changed, a new customized GSD-file must be generated for the application, and a new Profibus certification is required.

Profibus Functions

User Parameter Data (Set_Prm)

The AnyBus-IC PDP supports up to 237 bytes of User Parameter Data received from the Profibus master during initialisation.

The User Parameter Data can be used by the application for different purposes, for example configuring or setting of initial values of parameters for the application. The standard AnyBus-IC module with the standard GSD-file does not support User Parameter Data. If the User Parameter Data will be used, a new GSD-file must be generated. See 4-2 “Profibus ID - Number”.

The User Parameter is accessed via parameter #117 (“User Parameter Data”) and the received length can be read in parameter #111 (“User Parameter Data Length”). If the module is initialised in fieldbus specific mode, the User Parameter Data has to be acknowledged by the application. See 6-1 “Fieldbus Specific Initialisation”.

Extended Diagnostic Data (Slave_Diag)

Besides the 6 mandatory bytes of Diagnostic Data handled by the AnyBus-IC, extended diagnostic data can be sent to the master by the application after initialisation. The extended diagnostic can be sent for example when a fault has occurred in the application and the master should be notified.

There are three different types of extended diagnostic data in the Profibus specification, Device related, Identifier related and Channel related. The application is responsible for setting up the correct diagnostics before sending it to the master. For information about the different diagnostic settings, see the Profibus specification.

Parameter #118 (“Extended Diagnostics”) is used to set-up the diagnostics and parameter #112 (“Extended Diagnostic Length”) is used to indicate the length of the diagnostic data. The first word of parameter #118 is used as an “indication word” to the AnyBus-IC and is not included in the length specified in parameter #112. This word is used to indicate what kind of diagnostics that is to be sent.

The standard AnyBus-IC module with the standard GSD-file does not support Extended Diagnostic Data. If the Extended Diagnostic Data will be used, a new GSD-file must be generated. See 4-2 “Profibus ID - Number”.

Up to 200 bytes of extended diagnostic data can be used by the application.

I/O Length Check (Chk_Cfg)

When the module is initialised, and the fieldbus is connected, the module receives one set of input and output lengths from the Profibus master and one set of input and output lengths from the application (configured in the I/O length registers and/or read from the SSC interface).

If the I/O length configured from the Profibus master is larger than the actual size in configured from the application, a configuration error will be sent to the master, and the fieldbus will not go on-line.

If the I/O length configured from the Profibus master is less or equal to the actual size configured from the application, the fieldbus will go on-line with the lengths configured in the master.

The config data is accessed via parameter #110 (“Config Data Length”) and #116 (“Config Data”).

If the module is initialised in Fieldbus specific mode, the config data has to be acknowledged by the application. See 6-1 “Fieldbus Specific Initialisation”.

Get_Cfg Telegram

When the Profibus master sends a Get_Cfg telegram, the AnyBus-IC module answers with the configuration identifiers specified in parameter #115 (“Default Config Data”). The default configuration length is specified in parameter #109 (“Default Config Data Length”). If no default data is written by the application, the AnyBus-IC module will answer the Get_Cfg telegram with the identifiers calculated from the I/O lengths initialised.

These registers should be updated before the module is initialised. For information about the configuration identifiers, see the Profibus specification.

Note: If the AnyBus-IC is automatically initialised, it is only possible to change the default config data length via the monitor interface since the SCI interface is disabled. This function however is not very useful in this case, since the default config data is **not** stored in the NV RAM.

Global Control Telegrams

Clear

See 5-2 “Bus in Clear mode”

Sync/Freeze

The Sync and Freeze telegrams are supported by the AnyBus-IC PDP.

Fieldbus fault action

Bus off-line

When the fieldbus is off-line, the outputs can behave in different ways depending of the setting of parameter #10 (“Offline Action”). See the general AnyBus-IC Design Guide for more information about this parameter.

Bus in Clear mode

When the fieldbus master sends the Global control telegram “Clear”, the outputs can behave in different ways depending of the setting of parameter #11 (“Idle Action”). See the design guide for more information about this parameter.

The input data can be read by the Profibus master even if the module is in Clear mode.

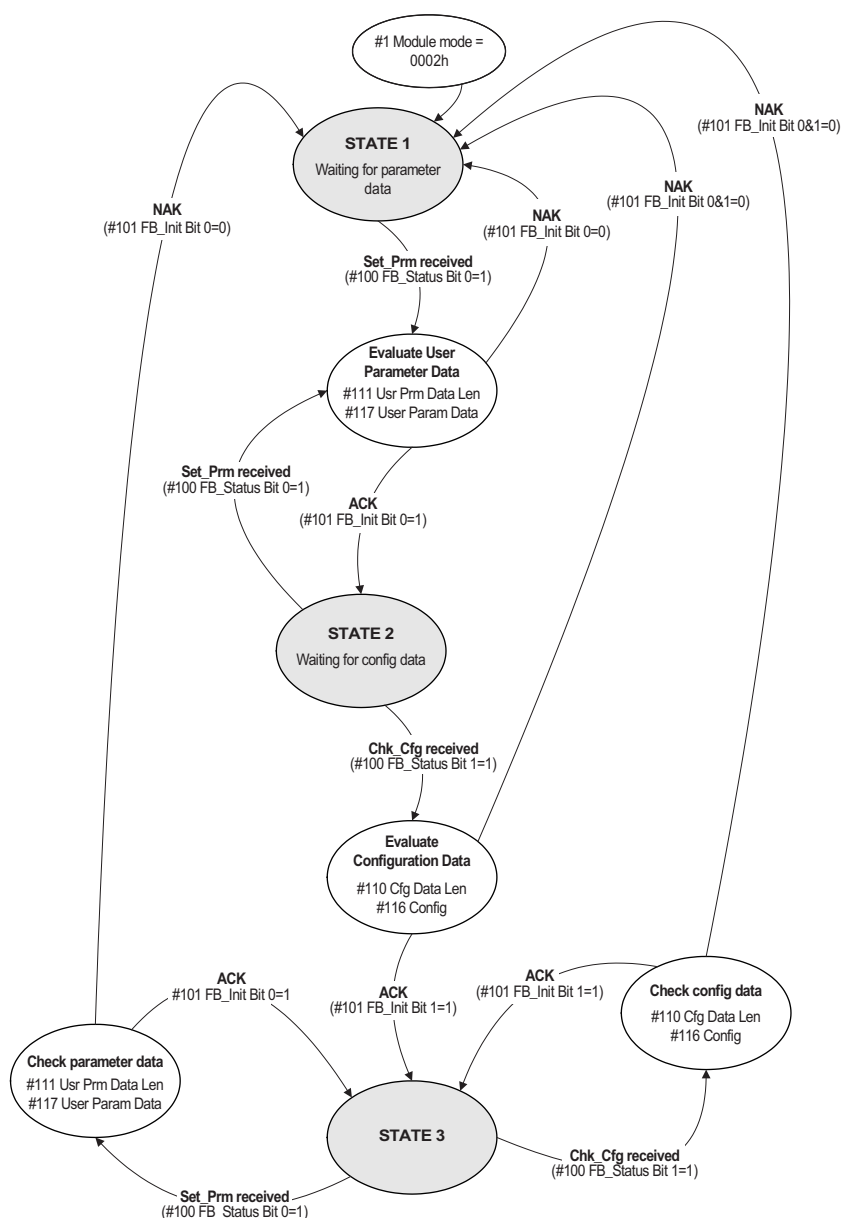
Initialisation

Fieldbus Specific Initialisation

Fieldbus Specific Initialisation is used when User Parameter Data and Configuration Data shall be acknowledged by the application during the handshaking with the Profibus master. To start the module in this mode, the Fieldbus Specific Initialisation option in parameter #1 ("Module Mode") is used. (Consult the general AnyBus-IC Design Guide for more information about this parameter)

The flow chart below illustrates the different states of the initialisation sequence. The Fieldbus Specific Initialisation is started by writing 0002h to parameter #1 ("Module Mode").

State 1 is the initial state for the application.



STATE 1 (Initial state)

The module waits for a SET_PRM telegram from the Profibus master. When it is received (indicated in bit 0 of parameter #100 (“Fieldbus Status”)), the application must evaluate the received User Parameter Data by checking parameters #111 (“Usr Prm Data Len”) and #117 (“User Param Data”).

- If the User Parameter Data is ok, the application shall accept the telegram by setting bit 0 of parameter #101 (“FB Init”). The application shall then enter STATE 2.
- If the User Parameter Data is not ok, the application shall reject the telegram by clearing bit 0 of parameter #101 (“FB Init”). The application shall then remain in STATE 1.

STATE 2

The module waits for a CHK_CFG telegram from the Profibus master. When it is received (indicated in bit 1 of parameter #100 (“Fieldbus Status”)), the application must evaluate the Configuration data by checking parameters #110 (“Cfg Data Len”) and #116 (“Config Data”).

- If the Configuration Data is ok, the application shall accept the telegram by setting bit 1 of parameter #101 (“FB Init”). The application shall then enter STATE 3.
- If the Configuration Data is not ok, the application shall reject the telegram by clearing bits 0 and 1 of parameter #101 (“FB Init”). The application shall then return to STATE 1 and expect a new initialisation sequence.

STATE 3

This state handles all telegrams received after the initialisation is finished and is also the ‘normal’ runtime state. The bus is online and exchanging I/O data in this state.

- If a SET_PRM telegram is received, the application must evaluate the User Parameter Data. If the User Parameter Data is ok, the application shall remain in STATE 3.
If the User Parameter Data is not ok, the application shall return to STATE 1 and expect a new initialisation sequence.
- If a CHK_CFG telegram is received, the application must evaluate the Configuration Data. If the Configuration Data is ok, the application shall remain in STATE 3.
If the Configuration Data is not ok, the application shall return to STATE 1 and expect a new initialisation sequence.

Note: If the fieldbus goes off line and then back to online (e.g. if the fieldbus connector is temporarily disconnected and then re-connected again), the initialisation sequence must restart from STATE 1 again.

Note: If both the SET_PRM and CHK_CFG telegram is received, and the application accepts both telegrams, it is possible to acknowledge both simultaneously by writing 03h to parameter #101 (“FB Init”). This is only allowed when both telegrams shall be acknowledged. If any of the telegrams shall be rejected, it must be made one at a time in the order described in the flowchart on the previous page.

Note: If the CHK_CFG telegram shall be rejected, both bits (0 and 1) of parameter #101 (“FB Init”) must be cleared.

Normal / Automatic Initialisation

When the module is initialised in Normal operation mode, the application does not need to acknowledge any telegrams from the Profibus master. The AnyBus-IC module automatically handles all the handshaking with the Profibus master during start-up. Consult the AnyBus-IC Design Guide for more information.

Fieldbus Specific Parameters

To be able to use the full functionality of every fieldbus, the Fieldbus Specific Parameters are used. These parameters are specific to the actual fieldbus used and must be configured accordingly.

The table below shows an overview of the parameters.

#	R/W	Name	Size	Default value	Modbus Address
100	R	FB Status	2 bytes	-	7000h
101	R/W	FB Init	1 byte	00h	7001h
102	W	FB Password	2 bytes	-	7002h
103	R/W	FB Node Address Config	1 byte	7Eh	7003h
104	R	FB Node Address SSC	1 byte	-	7004h
105	R	FB Node Address Actual	1 byte	-	7005h
106	R	Profibus baudrate Actual	1 byte	-	7006h
107	R/(W)	Profibus ID Number Config	2 bytes	1810h	7007h
108	R	Profibus ID Number Actual	2 bytes	-	7008h
109	R/W	Default Config Data Length	1 byte	-	7009h
110	R	Config Data Length	1 byte	-	700Ah
111	R	User Parameter Data Length	2 bytes	-	700Bh
112	R/W	Extended Diagnostic Length	1 byte	00h	700Ch
113	R/W	SSA Enable	1 byte	01h (enabled)	700Dh
114	R	SSA Node Address	1 byte	7Eh	700Eh
115	R/W	Default Config Data	24 bytes	00h	700Fh - 701Ah
116	R	Config Data	24 bytes	-	701Bh - 7026h
117	R	User Parameter Data	237 bytes	-	7027h - 709Dh
118	R/W	Extended Diagnostics	202 bytes	00h	709Eh - 7102h

Note: Byte sized parameter values are placed in the least significant byte of the word.

FB Status (Parameter #100)

This parameter holds information about the current fieldbus status.

Parameter Name	'FB Status'
Parameter Number	100
Modbus Address	7000h
Default Value	-
Range	0000h - FFFFh
Size	2 bytes
Stored in NV RAM	No
Access	R

Bit layout

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
-	-	-	-	-	-	IDLE	BUS	-	-	-	-	-	-	CFG	PRM

- **PRM¹**

This bit indicates if a Set_Prm telegram has been received from the Profibus master.

- 1: Set_Prm telegram has been received from the Profibus master. The application should check the received User Parameter Data in parameter #117 ("User Parameter Data") and respond by setting/clearing bit 0 of parameter #101 ("FB Init").
- 0: Set_Prm telegram has not been received from the Profibus master.

- **CFG¹**

This bit indicates if a Chk_cfg telegram has been received from the Profibus master.

- 1: Chk_Cfg telegram has been received from the Profibus master. The application should check the received Configuration Data in parameter #116 ("Config Data") and respond by setting/clearing bit 1 of parameter #101 ("FB Init").
- 0: Chk_Cfg telegram is not received from the Profibus master.

- **BUS**

- 1: Node is on line
- 0: Node is off line

- **IDLE**

- 1: Node is in Clear mode
- 0: Node is not in Clear mode

1. These bits are only valid when using the Fieldbus Specific Initialisation option. For more information, see 6-1 "Fieldbus Specific Initialisation".

FB Init (Parameter #101)

This parameter is used to acknowledge User Parameter Data and Configuration Data received from the Profibus master when using the Fieldbus Specific Initialisation option. For more information, see 6-1 “Fieldbus Specific Initialisation”.

Parameter Name	'FB Init'
Parameter Number	101
Modbus Address	7001h
Default Value	00h
Range	00h - FFh
Size	1 byte
Stored in NV RAM	No
Access	R/W

Bit layout

b7	b6	b5	b4	b3	b2	b1	b0
-	-	-	-	-	-	CFG	PRM

- **PRM¹**

This bit is used to accept / reject the User Configuration data found in parameter #117 (“User Parameter Data”) when the module has received a Set_Prm telegram from the Profibus master. The application should set this bit accordingly after checking the received parameter data.

- 1: Accept User Parameter Data
- 0: Reject User Parameter Data

- **CFG¹**

This bit is used to accept / reject the Configuration Data found in parameter #116 (“Config Data”) when the module has received a Chk_Cfg telegram from the Profibus master. The application should set this bit accordingly after checking the received configuration.

- 1: Accept Configuration Data
- 0: Reject Configuration Data

FB Password (Parameter #102)

This parameter is used to unlock parameter #107 (“Profibus ID Number Config”). The password can be obtained by contacting HMS.

Parameter Name	'FB Password'
Parameter Number	102
Modbus Address	7002h
Default Value	-
Range	0000h - FFFFh
Size	2 bytes
Stored in NV RAM	No
Access	W

1. These bits are only valid when using the Fieldbus Specific Initialisation option. For more information, see 6-1 “Fieldbus Specific Initialisation”.

FB Node Address Config (Parameter #103)

This parameter holds the manually configured Profibus node address. Note that in order for this value to be valid, bit 4 of parameter #8 (“Configuration Bits”) must be set. Valid node address settings range from 0 to 126.

Parameter Name	‘FB Address Cfg’
Parameter Number	103
Modbus Address	7003h
Default Value	7Eh
Range	00h - 7Eh
Size	1 byte
Stored in NV RAM	Yes
Access	R/W

FB Node Address SSC (Parameter #104)

This parameter holds the auto configured fieldbus node address from the SSC interface. Note that in order for this value to be valid, bit 4 of parameter #8 (“Configuration Bits”) must be cleared.

If the SSC node address is larger than allowed by the fieldbus, the default value of parameter #103 (“FB Node Address Config”) will be used as the actual node address.

Parameter Name	‘FB Address SSC’
Parameter Number	104
Modbus Address	7004h
Default Value	-
Range	00h - FFh
Size	1 byte
Stored in NV RAM	No
Access	R

FB Node Address Actual (Parameter #105)

After initialisation, this parameter holds the actual fieldbus node address. Prior to module initialisation, the value of this parameter is not defined.

Parameter Name	‘FB Address Act’
Parameter Number	105
Modbus Address	7005h
Default Value	-
Range	00h - 7Eh
Size	1 byte
Stored in NV RAM	No
Access	R

Profibus Baud Rate Actual (Parameter #106)

This parameter holds the actual fieldbus baud rate after the AnyBus-IC is on-line. Before the AnyBus-IC is on-line, the value of this parameter is not defined.

Parameter Name	'FB Baud Rate'
Parameter Number	106
Modbus Address	7006h
Default Value	-
Range	00h - 09h
Size	1 byte
Stored in NV RAM	No
Access	R

- Value**

00h: 12Mbps	05h: 187,5kbps
01h: 6Mbps	06h: 93,75kbps
02h: 3Mbps	07h: 45,45kbps
03h: 1,5Mbps	08h: 19,2kbps
04h: 500kbps	09h: 9,6kbps

Profibus ID Number Config (Parameter #107)

This parameter holds the configured Profibus ID number for the AnyBus-IC. This parameter is password protected with parameter #102 ("FB Password"). To change the value, a password must be written in parameter #102 before the value is changed.

The "set default" command in parameter #1 ("Module mode") does not affect this parameter if the password is not entered before the set default is executed. If the parameter is unlocked with the password, and the module is restarted, the parameter is locked again.

Parameter Name	'PDP ID Num Cfg'
Parameter Number	107
Modbus Address	7007h
Default Value	1810h
Range	0000h - FFFFh
Size	2 byte
Stored in NV RAM	Yes
Access	R(W)

Profibus ID Number Actual (Parameter #108)

This parameter holds the actual Profibus ID number after the AnyBus-IC has been initialised. Before the AnyBus-IC is initialised, the value of this parameter is not defined.

Parameter Name	'PDP ID Num Act'
Parameter Number	108
Modbus Address	7008h
Default Value	-
Range	0000h - FFFFh
Size	2 bytes
Stored in NV RAM	No
Access	R

Default Config Data Length (Parameter #109)

This parameter holds the length of the default configuration data sent to the master when a Get_Cfg telegram is received from the master. The default configuration is entered in parameter #115 ("Default Config Data").

Parameter Name	'Def Cfg Data Len'
Parameter Number	109
Modbus Address	7009h
Default Value	-
Range	00h - 18h
Size	1 byte
Stored in NV RAM	No
Access	R/W

Config Data Length (Parameter #110)

This parameter holds the configuration data length when the Chk_Cfg telegram is received from the Profibus master. The data is found in parameter #116 ("Config Data"). Before the Chk_Cfg telegram is received from the Profibus master, the length of the AnyBus-IC calculated configuration data are present here.

Parameter Name	'Cfg Data Len'
Parameter Number	110
Modbus Address	700Ah
Default Value	-
Range	00h - 18h
Size	1 bytes
Stored in NV RAM	No
Access	R

User Parameter Data Length (Parameter #111)

This parameter holds the user parameter data length when the Set_Prm telegram is received from the Profibus master. The data can be found in parameter #117 (“User Parameter Data”).

Parameter Name	‘Usr Prm Data Len’
Parameter Number	111
Modbus Address	700Bh
Default Value	-
Range	00h - EDh
Size	2 bytes
Stored in NV RAM	No
Access	R

Extended Diagnostic Length (Parameter #112)

This parameter holds the length (in bytes) of the extended diagnostics entered in parameter #118 (“Extended Diagnostics”). The indication word in parameter #118 is not included in the length.

Parameter Name	‘Ext Diag Len’
Parameter Number	112
Modbus Address	700Ch
Default Value	-
Range	00h - C8h
Size	1 byte
Stored in NV RAM	No
Access	R/W

SSA Enable (Parameter #113)

This parameter makes it possible to completely ignore the support for the Set_Slave_Address telegram (SSA). If enabled, the FBNA-bit in parameter #8 will be ignored.

Note: This functionality is only implemented in firmware revision 1.14 or higher.

Parameter Name	‘SSA Enable’
Parameter Number	113
Modbus Address	700Dh
Default Value	01h
Range	00h - 01h
Size	1 byte
Stored in NV RAM	Yes
Access	R/W

- **Value**

00h: Disable SSA support

(SSA telegrams will be rejected with the error code RS (No resource). The FBNA-bit in parameter #8 will be ignored.)

01h: Enable SSA support

(SSA telegrams will be accepted, and the node address will be stored in parameter #114)

SSA Node Address (Parameter #114)

This parameter holds the node address received with from the fieldbus via the Set_Slave_Address telegram. The FBNA bit in parameter #8 (Configuration Bits) determines if this value should be used or not. (Unless SSA support is disabled, see 7-7 “SSA Enable (Parameter #113)”)

Note: This functionality is only implemented in firmware revision 1.14 or higher.

Parameter Name	'SSA Node Address'
Parameter Number	114
Modbus Address	700Eh
Default Value	7Eh
Range	00h - 7Eh
Size	1 byte
Stored in NV RAM	Yes
Access	R

Default Config Data (Parameter #115)

This parameter holds the default configuration data sent to the master when a Get_Cfg telegram is received from the master. The length of the default configuration data is entered in parameter #109 (“Default Config Data Length”).

If no default data is written by the application, the AnyBus-IC module will answer the Get_Cfg telegram with the identifiers calculated from the I/O lengths initialised.

Parameter Name	'Default Config'
Parameter Number	115
Modbus Address	700Fh - 701Ah
Default Value	-
Range	00h - FFh
Size	24 bytes
Stored in NV RAM	No
Access	R/W

Config Data (Parameter #116)

This parameter holds the configuration data when the Chk_Cfg telegram is received from the Profibus master. The length is found in parameter #110 (“Config Data Length”). Before the Chk_Cfg telegram is received from the Profibus master, the AnyBus-IC calculated configuration data are present here.

Parameter Name	'Config'
Parameter Number	116
Modbus Address	701Bh - 7026h
Default Value	-
Range	00h - FFh
Size	24 bytes
Stored in NV RAM	No
Access	R

User Parameter Data (Parameter #117)

This parameter holds the user parameter data when the Set_Prm telegram is received from the Profibus master. The length can be found in parameter #111 (“User Parameter Data Length”). The first byte of the User Parameter Data is reserved for the Profibus ASIC and should always be left at 0 by the user.

Parameter Name	'User Param Data'
Parameter Number	117
Modbus Address	7027h - 709Dh
Default Value	-
Range	00h - FFh
Size	237 bytes
Stored in NV RAM	No
Access	R

Extended Diagnostics (Parameter #118)

The application can trigger user diagnostics to be sent to the Profibus master. See 5-1 “Extended Diagnostic Data (Slave_Diag)” for more information about the standard Profibus diagnostics. The length of the extended diagnostics is set in parameter #112 (“Extended Diagnostic Length”).

Parameter Name	'Ext Diagnostics'
Parameter Number	118
Modbus Address	709Eh - 7102h
Default Value	-
Range	00h - FFh
Size	200 bytes
Stored in NV RAM	No
Access	R/W

The first word in the extended diagnostic data field is used to indicate to the AnyBus-IC what kind of diagnostic is sent. The diagnostic is sent when this word is updated, which means that the diagnostic data must be updated before this word is sent.

Indication Word

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
-	-	-	-	-	-	-	-	-	-	-	-	-	OFL	STA	EXT

- **EXT**
 - 1: Extended diagnostic is indicated to the Profibus master.
 - 0: Status diagnostic is indicated to the Profibus master.
- **STA**
 - 1: Static diagnostic is indicated to the Profibus master.
- **OFL**
 - 1: Diagnostic overflow is indicated to the Profibus master.

Environmental Specification

Temperature

Operating

-10 to +70 degrees Celsius

Test performed according to IEC-68-2-1 and IEC 68-2-2.

Non Operating

-25 to +85 degrees Celsius

Test performed according to IEC-68-2-1 and IEC 68-2-2.

Relative Humidity

The product is designed for a relative humidity of 5 to 95% non-condensing.

Test performed according to IEC 68-2-30.

EMC compliance

Emission

According to EN 50 081-2:1993

Tested per 55011:1998, Class A, Radiated

Immunity

According to EN 61000-6-2:1999

Tested per	EN 61000-4-2:1995
	EN 61000-4-3:1996
	EN 61000-4-4:1995
	EN 61000-4-5:1995
	EN 61000-4-6:1996

Electrical Characteristics

Power Supply

The module requires a regulated +5V DC $\pm 5\%$ power supply.

Current Consumption

310mA @ 9,6kbps

280mA @ 12Mbps

Bus power

The maximum current consumption allowed from the +5V bus power (pin 19 and pin 20) is 100mA.

PE Grounding

See 3-1 “Shield and Protective Earth connection”.

