# User Manual Anybus<sup>®</sup> Communicator™ PROFINET/USS Gateway

Rev. 1.01

HMS Industrial Networks AB

+ 49	- 721 - 96472 - 0
+ 81	- 45 - 478 -5340
+ 46	- 35 - 17 29 20
+1	- 773 - 404 - 3486
	+ 49 + 81 + 46 + 1

 $\bowtie$ 

ge-sales@hms-networks.com jp-sales@hms-networks.com sales@hms-networks.com us-sales@hms-networks.com



# **Table of Contents**

#### Preface About This Document

How To Use This Document	P-1
Important User Information	P-1
Related Documents	P-2
Document History	P-2
Conventions & Terminology	P-3
Support	P-3

## Chapter 1 Introduction

General Information	1-1
Features	1-1
External View	1-2
Status LEDs	1-3

## Chapter 2 Data Exchange

Overview	
USS Master Implementation	
General Information	
Configuration	
Operation	
Slave Data Set	
General Information	
Slave Status Register	
Process Data (PZD)	
Parameter Data (PKW)	

## Chapter 3 Network Configuration

3-1
3-1
3-1
3-2
3-2
3-2
3-3
3-4
3-4
3-4
3-5
3-6
3-6

## Chapter 4 Web Interface

General Information	4-1
Administration Pages	4-2
General Information	4-2
IP Address Settings	4-2
Master Communication Settings	4-3
Master Configuration	4-3
E-Mail Notification Settings	4-4
Slave Diagnostics	4-5
General	4-5
Identification and Status	4-5
Slave Status	4-6
View Process Data of Operational Slaves	4-6

## Appendix A Anybus IPconfig (HICP)

General	A-1	L
Operation	A-1	l

## Appendix B Connector Pin Assignments

PROFINET Interface (RJ45)	B-1
Power Connector	B-1
USS Interface (DB9F)	B-1

## Appendix C Technical Specification

Mechanical Properties	C-1
Electrical Characteristics	C-1
Environmental Characteristics	C-1
Regulatory Compliance	C-2

# **About This Document**

## How To Use This Document

This document contains a general introduction as well as a description of the technical features provided by the Anybus Communicator PROFINET-USS Gateway.

The reader of this document is expected to be familiar with USS and PROFINET network technology, as well as communication systems in general. The reader is also expected to be familiar with the Microsoft Windows operating system.

## **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 safe-ty requirements including any applicable laws, regulations, codes, and standards.

Anybus® is a registered trademark of HMS Industrial Networks AB. All other trademarks are the property of their respective holders.

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 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
-	-

# **Document History**

#### Summary of Recent Changes (1.00... 1.01)

Change	Page(s)
Removed redundant section 'Gateway Status Register'	-
Misc. minor corrections and adjustments	-

#### **Revision List**

Date	Author	Chapter(s)	Description
2006-09-05	PeP	All	Initial revision
2007-08-27	PeP	-	Misc. minor corrections
	Date 2006-09-05 2007-08-27	Date         Author           2006-09-05         PeP           2007-08-27         PeP           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         - <t< td=""><td>Date         Author         Chapter(s)           2006-09-05         PeP         All           2007-08-27         PeP         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -</td></t<>	Date         Author         Chapter(s)           2006-09-05         PeP         All           2007-08-27         PeP         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -         -         -           -

# **Conventions & Terminology**

The following terms and conventions are used throughout this document:

- Numbered lists provide sequential steps
- Bulleted lists provide information, not procedural steps
- The terms 'gateway' and 'ABC' refers to the Anybus Communicator gateway.
- The term 'USS' refers to the Universal Serial Interface networking system.
- 'PRT' refers to the PROFINET networking system.
- 'Slave Data Set' refers to all data associated with a slave.
- Hexadecimal values are written in the format 0xNNNN, where NNNN is the hexadecimal value.

## Support

#### HMS Sweden (Head Office)

E-mail:	support@hms-networks.com
Phone:	+46 (0) 35 - 17 29 20
Fax:	+46 (0) 35 - 17 29 09
Online:	www.anybus.com

#### **HMS America**

E-mail:	us-support@hms-networks.com
Phone:	+1-773-404-2271
Toll Free:	888-8-Anybus
Fax:	+1-773-404-1797
Online:	www.anybus.com

#### **HMS Germany**

E-mail:	ge-support@hms-networks.com
Phone:	+49-721-96472-0
Fax:	+49-721-964-7210
Online:	www.anybus.com

#### **HMS Japan**

E-mail:	jp-support@hms-networks.com
Phone:	+81-45-478-5340
Fax:	+81-45-476-0315
Online:	www.anybus.com

# Introduction

# **General Information**

The Anybus Communicator Ethernet-USS Gateway functions as a gateway between the Universal Serial Interface Protocol (from now on referred to as 'USS') and PROFINET IO. Acting as a slave with Real Time capabilities on the PROFINET side, and as a master on the USS network, it controls up to 31 USS slaves.

The gateway can be configured solely via the PROFINET configuration tool, i.e. no proprietary configuration utilities are required.

The built-in web server allows monitoration of data through an easy to use web-based user interface. Additionally, a built-in email client can issue email-messages as the status of the slaves on the USS network changes.



# Features

- PROFINET IO slave, Real Time operation
- USS master, controls up to 31 USS slaves
- Up to 16 words of Process Data (PZD) per slave
- Up to 4 words of Parameter Data (PKW) per slave
- Configuration via PROFINET
- Web-based monitoration of data
- Status notifications via Email
- DCP (Discovery and Basic Configuration) capable
- DHCP capable
- Supports Anybus IPconfig (HICP)

## **External View**

(See also B-1 "Connector Pin Assignments").

#### A: PROFINET Interface

See also...

- B-1 "PROFINET Interface (RJ45)"

#### **B:** Status LEDs

See also ...

- 1-3 "Status LEDs"

#### C: Service Port

(reserved)

#### **D: USS Interface**

See also ...

- B-1 "USS Interface (DB9F)"

#### E: Power Supply Input

See also ...

- B-1 "Power Connector"
- C-1 "Technical Specification"

#### F: DIN-rail Mechanism

The DIN-rail mechanism works as follows:





To snap the gateway *on*, first press the it downwards (1) to compress the spring in the DIN-rail mechanism, then push it towards the DIN-rail as to make it snap on (2)



To snap the gateway *off*, push the it downwards (1) and pull it out from the DIN-rail (2), as to make it snap off.

# **Status LEDs**

#	State	Status	<u>[``@@</u> ´´]
1 - Comm. Status	Off	Off line	3
		- No connection with IO Controller	6 (
	Green	On line, RUN	Ť I I
		- Connection to IO Controller established	
		- IO Controller is in RUN state	
	Green, flashing	On line, STOP	
		- Connection to IO Controller established	
2 Madula Statua	0#	- 10 Controller III STOP state	
		No power of not initialized	
	Green	Initialized	
	Green, 1 flash	Diagnostic data available	
	Green, 2 flashes	Blink. Used by engineering tools for identification.	
	Red, 1 flash	Configuration Error:	
		- I/O Size or Configuration Mismatch	
	Red, 3 flashes	No Station Name or invalid TCP/IP configuration	
	Red, 4 flashes	Internal error	
3 - Link/Activity	Off	Ethernet link established	
	Green	Transmitting/receiving data on ethernet interface	
	Green, flashing	Ethernet link not established	
4 - (not used)	-	-	
5 - Gateway Status	Off	(no power)	
	Red (short period)	Accessing new configuration	
	Red, flashing (1Hz)	No configuration present	
	Red, flashing (2Hz)	Configuration error	
	Red, flashing (4Hz)	Initialization error	
	Green	Operational	
	Green, flashing (1Hz)	Configuration in progress	
	Green, flashing (4Hz)	Initialization in progress	
6 - USS Status	Off	Idle (or no power)	
	Green	Communication detected	
	Green, flickering	Transmitting data	
	Red	Communication timeout	

# Data Exchange

## **Overview**

The mapping of USS data to PROFINET is based on the mapping scheme defined by the PNO working group for PROFINET IO Proxy Devices. In short, this means that on PROFINET, each USS slave is represented through a dedicated slot. Slot #0 is reserved for the gateway itself, while slot #1... 31 is associated with the slaves on the USS network. Each slot uses one subslot for the mapping of its assigned data to PROFINET.

In addition to the Process Data (PZD) and Parameter Data (PKW), the Slave Data Set also features a Slave Status Register, which reflects the overall status of the slave.

Note that all data is exchanged transparently. This means that in order to be able to access Parameter Data (PKW), the parameter access protocol used to access PKW data must be implemented entirely on the PLC side.



See also ....

- 2-2 "USS Master Implementation"
- 2-3 "Slave Data Set"
- 3-4 "USS & PROFINET Configuration (SIMATIC Manager)"
- 4-1 "Web Interface" (4-3 "Master Configuration")

## **USS Master Implementation**

#### **General Information**

The USS protocol (Universal Serial Interface Protocol), defines an access technique according to the Master-Slave principle for communication via a serial RS-485 based communication bus. The protocol includes fixed- or variable frame length, cyclic, acyclic and point-to-point communications. The gateway communicates according to a subset of the protocol, implementing support for cyclic communication with fixed frame lengths.

All PKW and PZD data is exchanged transparently. This means that the parameter access protocol used to access PKW data, if required, must be implemented entirely on the PLC side.

#### Configuration

The gateway can be configured solely using the PROFINET Configuration Tool, e.g. Step 7. No local configuration tools or settings are required.

See also ....

• 3-1 "Network Configuration"

#### Operation

The gateway will only poll slaves marked as 'Operational' in the internal scanlist. Each time a bus cycle is completed, the gateway checks the status of slaves previously marked as 'Non-Operational' and updates the scanlist for the next cycle as necessary.

The status of each individual USS slave can be read in its' corresponding Slave Status Register.

See also ....

- 2-3 "Slave Status Register"
- 4-5 "Slave Diagnostics" (4-5 "Slave Diagnostics")

## **Slave Data Set**

#### **General Information**

The data associated with each slave is organized as follows:

Data from Gateway	I	Data from IO Controller	
Slave Status Register		(reserved, set to zero)	(2 bytes)
Parameter Data (PKW)		Parameter Data (PKW)	(size is device dependent)
Process Data (PZD)		Process Data (PZD)	- " -

#### **Slave Status Register**

This register reflects the current status of the slave.

(Isb)															(lsb)
b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
		RES			FNF	USSF	OP	RES	CFG	RES		S	Slave No	).	

#### • RES (Reserved)

Reserved for future use, mask off and ignore.

#### • FNF (Fieldbus Network Fault)

This bit indicates if the fieldbus has gone on- (set) or off- (cleared) line.

#### • USSF (USS Fault)

This bit is set if a USS master-slave communication fault has been detected.

#### • OP (Operational)

This bit is set if the gateway has detected the slave and found it operational.

#### • CFG (Configured)

This bit is set (1) if the node is configured in the master or cleared (0) if not configured.

• Slave No.

USS slave address (0... 31).

#### Process Data (PZD)

This is the actual Process Data (PZD) image.

#### Parameter Data (PKW)

The gateway does not process the Parameter Data (PKW) data in any way. This means that the parameter access protocol used to access PKW data, if required, must be implemented entirely on the PLC side. Exactly how this is done is beyond the scope of this document.

# **Network Configuration**

## **General Information**

As mentioned previously, the gateway can be configured solely via the PROFINET configuration tool (e.g. Step 7). No local configuration utilities or settings are required. The configuration is based on the PROFINET GSD-file, which can be downloaded from the HMS web site ('www.anybus.com').

## **TCP/IP Settings**

To participate on the PROFINET network, the gateway needs a valid TCP/IP configuration. The gateway fully supports the DCP protocol, allowing the IO Controller/Supervisor to change the TCP/IP settings of the gateway during runtime. In addition, the gateway supports DHCP and Anybus IPconfig (HICP). The TCP/IP settings can also be accessed via the web-based configuration interface.

When using DHCP, the gateway will attempt to retrieve the TCP/IP settings from a DHCP server during startup. If no DHCP server is found, the gateway falls back to its current settings (i.e. any manual settings that may have been specified earlier).

If no current settings are available (i.e. if the previous settings are invalid), the gateway will halt and indicate an error on the on-board status LEDs. The TCP/IP configuration may however still be accessed via Anybus IPconfig (HICP).

See also ....

- 4-2 "IP Address Settings"
- A-1 "Anybus IPconfig (HICP)"

## **SMTP Account Setting**

In addition, in order to be able to send notification messages via email, the gateway needs a valid SMTP server account. These settings can be accessed through the web-based configuration interface.

See also ....

• 4-2 "IP Address Settings"

## **Station Name**

#### **General Information**

When used for the first time, the gateway needs to be assigned a Station Name. This can either be done using the SIMATIC Manager or using the SIMATIC Primary Setup Tool. Both cases are described in this document.

#### SIMATIC Primary Setup Tool

**Note:** The following example uses the SIMATIC Primary Setup Tool. This tool is sometimes not included in a typical Step 7 installation. In such case, it is also possible to use a built-in function called 'Edit Ethernet node', see 3-3 "SIMATIC Manager (Edit Ethernet Node)"

To specify the Station Name using the Primary Setup Tool, perform the following steps.

- 1. Open the SIMATIC Primary Setup Tool
- 2. Select the 'Network Adapter'-entry in the 'Settings'-menu
- **3.** Highlight the ethernet interface used for the gateway, and select the 'Browse'-entry in the 'Network'-menu.
- 4. When prompted, enter the station name (e.g. 'ABC-USS-PRT')

ABC-USS-PRT : 00-30-11-02-45-F1 : 10.10.21.11	Ethernet interface MAC address 00 - 30 - 11 - 02 - 45 - F1 © Obtain IP address from DHCP server Identified by © MAC address © Device name © Client ID
Assign Name Station name  ABC-USS-PRT	C Assim IP narameters           XI           10         . 10           255         . 255
	Cancel         10         10         21         1           Image: Imag

See also ...

• 3-3 "SIMATIC Manager (Edit Ethernet Node)"

#### SIMATIC Manager (Edit Ethernet Node)

**Note:** The following example uses the SIMATIC Manager. It is also possible to use the SIMATIC Primary Setup Tool, see 3-2 "SIMATIC Primary Setup Tool"

To specify the Station Name using the SIMATIC Manager, perform the following steps.

- 1. Open the SIMATIC Manager.
- 2. Select the 'Edit Ethernet Node...'-entry in the 'PLC'-menu
- 3. Select the gateway in the list of devices ('Browse Network') and click 'OK'
- 4. Specify the Station Name in the 'Assign device name'-field.
- 5. When done, click 'Close'.

Edit Ethernet Node			é			
Ethernet node						
MAC <u>a</u> ddress:	00-30-11-02-4	Browse Network	- 2 Nodes	MAC address	Device type	
Set IP configuration		Stop	192.168.0.1	08-00-06-68-93-3C	S7-300	PN-10
IP address:	157.163.228					- 1
Subnet mask:	255.255.248					- 1
<ul> <li>Ubtain IP address trop</li> <li>Identified by</li> </ul>	om a DHCP serv		<			>
Client ID	С <u>м</u>		MAC address:			
Agsign IP Configural	ion	OK			Cancel	Help
Assign device name						
<u>D</u> evice name:	ABC-USS-PRT		Assign Nam	e		
─ Reset to factory settings			<u>R</u> eset			
<u>C</u> lose				Help		

See also ...

• 3-2 "SIMATIC Primary Setup Tool"

# **USS & PROFINET Configuration (SIMATIC Manager)**

#### **General Information**

The purpose of this section is to illustrate how to add the gateway and data from the USS slaves to the PROFINET configuration. Note that a prerequisite for the following examples is that all TCP/IP settings are properly configured.

#### Step 1: Set Up and Add the Gateway to the Configuration

To configure the gateway, perform the following steps.

- 1. Open the SIMATIC Manager and start a new project.
- 2. Select 'Set PG/PC Interface...'-entry in the 'Options'-menu.
- **3.** Change the PG/PC Interface to 'TCP/IP (Auto)'.

Set PG/PC Interface	×
Access Path	
Access Point of the Application:	
S70NLINE (STEP 7)> TCP/IP(Au	to) -> D-Link DFE-530 💌
(Standard for STEP 7)	
Interface Parameter Assignment Used:	
TCP/IP(Auto) -> D-Link DFE-530TX PCI F.	Properties
TCP/IP -> D-Link DFE-530TX PCI F	Diagnostics
TCP/IP -> NdisWanIp	Copy
IEID TCP/IP(Auto) -> D-Link DFE-5301X 週刊CP/IP(Auto) -> D-Link DFE-530TX	
	Dejete
(Assigning Parameters to Your NDIS CPs with TCP/IP Protocol (RFC-1006))	
_ Interfaces	
Add/Remove:	Sele <u>c</u> t
ОК	Cancel Help



- 4. Highlight the station and double-click on 'Hardware'.
- **5.** In the 'HW Config'-window, import the GSD-file by selecting the 'Install GSD file...'-entry in the 'Options'-menu.
- 6. Drag & Drop the ABC-USS-PRT into the network.

IUR						*	1		e xi
M CRI 217.2 DM	Ethernet[]	IL PROFINETIONS	sten (100)	-			Fug		n1 n.
ARMOP .	ENTI-	INCOMENTS.					Broble:	Standard	-
		SOUTH						IDFIBUS DA IDFIBUS PA IDFIBUS PA IDFIBU	IDevices I-C CUSS-PMT Other modules USS_Configure
							1000 2	MATIC 300	
							1 K H 1		
						1	- 8월 5	MATIC PC Base	f Control 300/40
(1) ABC-USS-PRT						<u></u>		MATIC PC Base MATIC PC Static	f Control 300/40 n
1) ABC-USS-PRT	Oxder Number	LAddress	Q address	Diagnostic address	Conment		- <b>- 9</b> 5	MATIC PC Base MATIC PC State	t Control 300/40 n
II) ABC-USS-PRT NodAe ASCUSS-PRT	Dider Number ABCUSS-APPT	LAddress	Q address	Diagnostic address	Conment	_		MATIC PC Base MATIC PC State	d Control 300/40 n
II) ABC-USS-PRT	Dider Number ARC-USS-ANT	LAddress	Q address	Diagnostic address	Conmert		- 9 <b>0</b> 5	MATIC PC Base	f Control 300/40 n
(1) ABCUSSPRT Module ABCUSSPRT	0 ider Number ABC-USS-A97	Laddress	Q address	Diagnostic address	Conment			MATIC PC Base MATIC PC State	f Control 300/40 n
II) ABC-USS-PRT Nod-Ac	0 der Nuniber ABC-USS-A97	1 Address	Q address	Diagnostic address 87.88*	Conment			MATIC PC Base MATIC PC State	f Control 300/40 n
II) ABC-USS-PRT Module ABC-USS-PR7	0 der Nunber ARCUSS-A97	1 Address	O address	Diagnostic address 87/8°	Conment		- 0 0 1 0 0 1	NATIC PC Base	f Control 300/40 n
<ul> <li>II) ABCUSSERI</li> <li>Noske</li> <li>ASCUSSERI</li> </ul>	Dider Number ARC/USS-A97	1Addeos	O address	Diagnostic address	Connert			MATIC PC Base	d Control 300/40 n
II) ABCUSSERT	Dider Number ARCUSS-ART	Address	Q address	Disgnostic address 87/8*	Conment		- 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01	MATIC PC Base	d Control 300/40 n
II) ABCUSSPRT Nodule ABCUSSPRT	034e Number 442/USF497	I Address	Q address	Diagnotic addess	Conment		- 0.01 0.00 0.01 0.01 0.01 0.01 0.01 0.01	MATIC PC Base	d Control 300/40 n
[1] ABCUSSERT ■ NoSA6 ■ ASCUSSERT ■ ASCUSSERT	Dider Number 4862/055-097	I Address	O address	Diagnostic address	Conserve			MATIC PC Base MATIC PC State	d Control 300/40 n
II) ABCUSSPRT	Dider Number ARC/USS #877	I Address	Q address	Diagnotic address	Connext			MATIC PC Base	d Control 300/40 n
● [1] ABCUSSPRT ■ Noda ■ AOCUSSPRT	Didet Number ABC/005/897	l Address	Q address	Diagnosite address	Commere			MATIC PC Base	d Control 300/40 n
I) ABCUSSPRT	Dider Number ARC-USS-PR7	1 Address	O address	Diagnatik addenn 8/18*	Conment			MATIC PC Base	d Control 300/40
In) ABCUSSPRT ■ Node ■ ASCOSSPRT ▲ ASCOSSPRT	Didet Number 482-085-897	1.659864	O address	Disgrafik addess 87.8*	Connert			MATIC PC Base	d Control 300/40
■ (T) 48CUSSFRT ■ Model ■ ASCUSSFRT	Dide Number 482-055-097	l Address	Q address	Diagnorik addrew 8/18*	Consert		× ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■	PRT PRT PRT PRT PRT	1 Control 300400 n
B (1) ABCUSSPRT ■ Nodae ■ ASCUSSPRT	Dele Number 482/05/997	1.6ddreos	O address	Disgrafik addess	Conmert			PRT PRT PRT PRT PRT PRT PRT PRT	1 Control 200400 n



## Step 2: Specify the Baudrate for the USS Network

To specify the baudrate for the USS communication, perform the following steps:

- 1. Highlight the gateway in the network configuration ('HW Config'-window, 'A')
- 2. Right-click on slot #0 ('B') and select 'Object Properties'.

							1		
CPU 317-2 PN/DF	Ethernet(1) PF	IDFINET-ID-Syste	em (100)	-		-	Eind: Profile:	Standard	nt ni
2 0 9840		<b>A</b>						RORBUS DP RORBUS PA RORNET IO Additional Field D Additional Field D Arybus C Arybus C Gateway General 1//0 MATIC 300	evices JSS-PRT ther modules SS_Configure
						<u>)</u>	÷∰ SI	MATIC 400 MATIC PC Based C	ontrol 388/40
I) ABCUSS-PRT		luce 1			1	<u> </u>	÷∰ ⊕∰ SI ⊕∰ SI	MATIC 400 MATIC PC Based C MATIC PC Station	ontrol 300/40
I) ABC-USS-PRT Module ABC-USS-PRT	Order Number	I Address	Q address	Diagnostic address	Comment	<u> </u>	: ⊕∰ ⊕ ⊕ SI € SI	MATIC 400 MATIC PC Based C MATIC PC Station	ontrol 300/46
(1) ABC-USS-PRT Module MCC/USS-PRT	Order Number	1 Address	Q address	Diagnostic address 8788°	Comment			MATIC 400 MATIC PC Based C MATIC PC Station	ontrol 300/40
II) ABCUSS-PRT	Order Number	1 Address	Q address	Diagnostic address	Comment	<u>×</u>	9 <b>9</b> 9 9 <b>9</b> 9 9 <b>9</b> 9 9 <b>9</b> 9	MATIC 400 MATIC PC Based C MATIC PC Station	antrol 300/40
II) ABCUSS-PRT	Didei Number (BCUSS-PRT	I Address	Q address	Diagnostic address	Comment	<u>ء</u>	9 <b>9</b> 9 9 <b>9</b> 9 9 <b>9</b> 9 9 <b>9</b> 9 9 <b>9</b> 9	MATIC 400 MATIC PC Based C MATIC PC Station	ontrol 300/40
(1) ABCUSS-PRT Module ABCUSS-PRT	Order Number BECUSS-PRT	Address	Q address	Diagnostic address	Comment	×	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	MATIC 400 MATIC PC Based C MATIC PC Station	antrol 300/40
<ul> <li>(1) ABCUSS#RT</li> <li>Module</li> <li>Module</li> <li>ABCUSS.PRT</li> <li>B</li> </ul>	Dider Number	1.Address	Q address	Diagnostic address	Comment			MATIC 400 MATIC PC Based C MATIC PC Station	iontrol 300/40
II) ABCUSSPRT	Order Number GPC-USS PRT	I Address	Q address	Diagnostic address	Comment			MATIC 400 MATIC PC Based C MATIC PC Station	iontrol 300/40
II) ABCUSS-PRT	Order Number GECUSS-PPT	I Address	Q address	Diagnostic address 8788*	Comment			MATIC 400 MATIC PC Bared E MATIC PC Station	ontrol 300/40
II) ABCUSSERT	Order Number	Address	Q address	Diagnostic address 8768*	Comment			MATIC 400 MATIC PC Bared C MATIC PC Station	ontrol 300/40
(1) ABCUSSPHT Module ABCUSSPHT B	Order Number	I.Address	Q address	Diagnostic address 8789*	Comment			MATIC 400 MATIC PC Based C MATIC PC Station	onixol 300/40
(1) ABCUSSPRT Module ABCUSSPRT B	Order Number	Address	Q address	Diagnostic address	Comment			MATIC PC Based C MATIC PC Based C MATIC PC Station	onirol 300/40
II) ABCUSS-PRIT	Order Number MC2055-097	Address	Q address	Diagnostic address	Comment			MATIC PC Based C MATIC PC Based C MATIC PC Station	ontrol 300/40
Moduk	Order Number	Address	Q address	Diagnostic address	Comment			MATIC PC Based C MATIC PC Based C MATIC PC Station	ontrol 300/46
DI ABCUSSPRT	Order Number Microsoftware	Address	Q address	Diagnostic address 878°	Comment			MATTIC PC Based C MATTIC PC Based C MATTIC PC Station	ontrol 300,44
(1) ABCUSSERIT Module ABCUSSERIT B	1 Order Namber <i>BRCUSS-BPT</i>	Address	Q address	Diagnostic address	Comment		* Si + Si + Si + Si + Si + Si + Si + Si +	PRT PRT PRT PRT PRT PRT PRT Strail Networks USS PRDPInet	ontrol 300/40

- **3.** Select the 'Parameter'-tab ('C')
- 4. Specify the baudrate for the USS network ('D')

perties - ABC-USS-PRT		×
ddresses Paramete		
	Value	
Parameter		
En Baudrate	38400 kbits	
	9600 kbits 19200 kbits	
	38400 kbits	
		Cancel Help

5. Click 'OK' when done ('E')

#### Step 3: Add Data from the USS Network to the Configuration

Each slave on the USS network is represented trough a dedicated slot. The slot number correlates 1:1 to the USS slave number, i.e. slot #23 on PROFINET represents USS slave #23.

To add data from the USS network to the configuration, perform the following steps:

- **1.** Right-click on a slot corresponding to the USS slave for which data shall be added.
- 2. Select the 'Insert Object...'-entry.
- **3.** Select an object which matches the data sizes (PKW and PZD) of the slave which shall be added.
- **4.** Repeat steps 1... 3 for all USS slaves which shall be included in the configuration.

#### Example:

Example with a single USS slave with the following properties:

- Slave address #1
- 4 words of Parameter Data (PKW)
- 16 words of Process Data (PZD)

Pasce	CUNHV
Insert Object	
Add Master System	
Disconnect Master System	
Disconnect PROFINET IO System	
Isochrone Mode	
Specify Module	
Delete	Del
Go To	•
Filter Assigned Modules	
Monitor/Modify	
Object Properties	Alt+Return
	Ctrl+F2
	Ctrl+F7
Find Manual	

Station Edit Incert RIC View Onli					<u>_     ×</u>
	1 and and 1891	2			
SIMATIC 300(1) (Configuration	n) 5D¥-7251-008_23_1				
		Ethernet	(1): PROFINE	F-IO-System (100)	
2 S CPU 317-2 PN/DP					
X1 MPI/DP		▲ (1) ABC-US	8		
3		DP-NORM			
4					
6					
7					
(1) ABC-USS-PRT					
Slot Module	Order Number	I Address	Q address	Diagnostic address	Comment
0 ABC-USS-PPT	ABC-USS-FR7		0.44	8188*	
2 words: PKW:04 ; PZD: 16		U41	U41		
3 ABC-USS					
4	Uther modules				
6	words: PKW:00				
7	words: PKW:00 ;				
8	words: PKW:00 ;				
10	words: PKW:00 ;				
11	words: PKW/00				
12	words: PKW:00 ;				
13	📕 🕅 words: PKW-00				
1 14			I		-

**Note:** The ranges shown in the 'I Address'- and 'Q address'- columns includes space for the Slave Status Register in both directions.

#### Step 4: Downloading the Configuration

To download the finished configuration to the IO Controller, select the 'Download...'-entry in the 'PLC'-menu.



# Web Interface

## **General Information**

The gateway features a web-based configuration and monitoration interface, used to set up basic communication properties (i.e. IP address, network mask etc.) as well as to monitor the status and data of the individual slaves on the USS network.

To access the web-based configuration interface, perform the following steps:

- 1. Open a web browser (e.g. Mozilla Firefox)
- **2.** Enter the IP address of the gateway in the address field. The gateway will ask for authentication. The username is 'USS Gateway', and the password is '1234'.

Siemens USS Gateway - Moz	illa Firefox	
<u>File Edit View History Bookm</u>	arks Tools Help	
(+·)→·C ⊗ ☆	⊡         http://10.10.20.240/httpd/index.html         ▼         ▶         □         Google         □	
🌮 Getting Started 🔝 Latest Headlin	les	
Administration	Master Communication USS Master Communication Anybus-S Profinet IO	
Drive Diagnotics	Authentication Required	X
User defined pages	Enter username and password for "USS-Ethernet Gateway" at http://10.10.20.2 User Name: Password:	:42
Done	OK Cancel	

The main page contains links to the following sub-pages:

• Administration

See also ...

- 4-2 "Administration Pages"
- Slave Diagnostics

See also ...

- 4-5 "Slave Diagnostics"
- User defined pages (Expert Users Only)

Optionally, advanced users may create custom web pages. Contact HMS for further information.

Note: Certain features requires a JAVA-capable browser.

- OX

\* > C.

## **Administration Pages**

#### **General Information**

The main administration page features the following sub-pages:

IP address settings ٠

See also ...

- 4-2 "IP Address Settings"
- Master Communication Settings ٠

See also ...

- 4-3 "Master Communication Settings"
- Master Configuration

See also ...

- 4-3 "Master Configuration"
- **E-Mail Notification Settings**

See also ...

- 4-4 "E-Mail Notification Settings"

# Setup E-Mail Notification functions « Back

nens USS Gateway - Mozilla Firefox Ele Edit View Higtory Bookmarks I

IP address settings USS Master communication parameter USS Master Configuration

Cot Cot

rks <u>T</u>ools <u>H</u>elp

USS Master Communication

#### **IP Address Settings**

This page provides access to basic network settings, i.e. IP address, subnet mask etc.

By default, the gateway retrieves these settings from a DHCP server. If using manually specified settings, make sure to uncheck the 'DHCP enabled'-checkbox.

See also ...

• 3-1 "TCP/IP Settings"

Note: Generally, any changes made to the settings on this page requires a reset to have effect.



- - ×

#### **Master Communication Settings**

This page presents the communication settings for the USS interface.

- Baudrate
  - The following baudrates are supported:
    - 9600bps
    - 19200bps
    - 38400bps

(Note that the baudrate is specified in the PROFINET configuration tool, see 3-5 "Step 2: Specify the Baudrate for the USS Network")

- Data bits (fixed to 8)
- Start bits

(fixed to 1)

- Stop bits (fixed to 1)
- Parity (fixed to even)

#### **Master Configuration**

This page presents an overview of the communication with the slaves on the USS network.

The leftmost column contains the USS device address, followed by the data sizes (specified in words) for that device.

The remaining columns reflects how the data is mapped internally in the gateway.

🗭 Getting Started 🔝	2 Latest Headines
нтs	USS Master Communication USS Master Communication
	Anybus-S Profinet IO
JSS Master co	ommunication parameter
Baudrate 38400 Data bits 8 Start bits 1 Stop bits 1 Parity Even * Back	

🖲 Siemens USS Gateway - Mozilla Firefox

Sieme Edit	ns USS (	Gateway History	- Mozilla F	Tools Help				
	A			7 7-+				
	P - 6	90	1	nttp://10.10.20	. 240/httpd/Pro	finet/USS 🔻	▶ G• ∞	ogle 4
Getting	Started	🖓 Lates	t Headlines					
,	,							
ыń	is	: U	ISS N	laster	· Com	nmun	icatio	n í
11	3	: `		USS I	laster	Comm	unicat	ion
_		·		Anybus-S	Profinet IC	)		
				and provide the				
55 M	aster (	Config	uration					
< Back				Vie	w File			Help
Dev	Len DKW	gth PZD	DKW	Read Registe	Status	DKW	Write Registe	Status
1	4	2	0x0000	0x0004	0x0006	0x0400	0x0404	0x0406
2	-							-
3	-	•					-	-
4	-	-					•	
5								
6		-				•	•	· · ·
7	-							-
8	•	•	•				•	
9		•	•				•	
10								
12								-
13								
14	-	•						
15	-							
16	-	•	-				-	•
17								
one								

#### **E-Mail Notification Settings**

The gateway continuously monitors the status of OP, USSF and FNF in the Slave Status Registers. Optionally, an email notification can be issued when the status of a slave changes.

• Recipient

Destination address.

- Sender Address of the sender.
- Subject Subject for the message.
- Message

Actual message body.

Optionally, additional keywords can be included in the message as follows:

Keyword	Action
<slave></slave>	Includes the number of the slave
<status></status>	Includes the status of the slave

Sigmonr II	ISS Gatoway Mori	IIa Eirofox			
ie Edit We	na History Rookma	arks Tools Help			
ie gat j.  e • ⇒ ·	· C 🖸 🖓 🏠	http://10.10.20.	240/httpd/Profinet/Er	nt 🔻 🕨 🖸 🕞 Go	ogle Q
Getting Star	ted 🔝 Latest Headlin	es			
нṁs II	USS	Master USS M Anybus-S I	Config laster Co	uration nfiguratio	n
etup E-N	ail Notification	functions			
« Back					Help
	Email Address	<receive@host.do< td=""><td>main&gt;</td><td></td><td></td></receive@host.do<>	main>		
	From	<sender@host.do< td=""><td>main&gt;</td><td></td><td></td></sender@host.do<>	main>		
	Subject	USS Slave status	report.		
		zow - «Devide_Z	awa		11
	Email Notific	ation Setup			
	Dev         Enable           1	Dev         Enable           9	Dev         Enable           17	Dev         Enable           25	
	Store				~
ne					

#### Email Notification Setup

Specifies which slaves that shall trigger email status notifications; to enable notification for a particular slave, check the corresponding checkbox. To disable notification for a slave, uncheck the checkbox.

Click 'Store' to save any changes.

#### Example:

Recipient:	'cliff@barnes.com'
Sender:	'bobby@ewing.com'
Subject:	'Oops'
Message:	'Slave no. <slave> has changed status to <status></status></slave>

**Note:** This features requires a valid SMTP server account. The SMTP account settings can be accessed via the built-in web server.

#### See also ....

• 4-2 "IP Address Settings"

# **Slave Diagnostics**

#### General

The main diagnostic page features the following sub-pages:

• Identification and Status

See also ...

- 4-5 "Identification and Status"
- Slave Status

See also ...

- 4-6 "Slave Status"
- View Process Data of Operational Slaves
  - See also ...
    - 4-6 "View Process Data of Operational Slaves"

#### **Identification and Status**

This page displays information about the gateway as well as the general status of the USS network (this information may be useful when contacting HMS support services).

• Gateway Name

('Profinet Gateway for Siemens Drives with USS Protocol').

Gateway Version

(General gateway firmware revision).

- Anybus Type (Higher level network interface type).
- Anybus Version (Fieldbus interface firmware revision).
- Gateway Status (Overall gateway status).
- USS Master Status (Status of USS master).
- **PROFINET Interface** (Fieldbus interface status).



de (bit (yee) Repair (bookers) (book (yeb)         · · · · · · · · · · · · · · ·	Siemens USS Gateway - Mozilla Firefox	- C X
	jie Edit View Higtory Bookmarks Tools Help	
Cetting Started Latest Headnes  USS Master Communication USS Master Communication Anybus-S Profiles 10  Display USS Starks  Starkaling of Starks  Weakhafting of Profiles Days	(= • 🛶 • 🕑 💿 🏠 🗈 http://10.10.20.240/httpd/DriveDiag.ht • 🕨 🕼 Google	Q
USS Master Communication USS Master Communication Anythess Profiles to Dialey USS Base States	Cetting Started 🔂 Latest Headlines	
Ally June 3 Province 40 Display identification and status Display USS Slave Status Visualization of Process Data of operational Drives	USS Master Communication	n
Object y memoration and status Display USS Slave Status Visualisation of Process Data of operational Drives	Dislauidastificatios and status	
Visualisation of Process Data of operational Drives	Display logical cardination status	
	Visualisation of Process Data of operational Drives	

#### **Slave Status**

This page shows status information for each slave device on the USS network.

• Dev

Device address.

• Operational

Device status (e.g. 'Operational', 'Non-Operational', 'Not Present' etc.).

• PKW Size

Size (in words) of Parameter Data (PKW) associated with the slave device.

• PZD Size

Size (in words) of Process Data (PZD) associated with the slave device.

temen	s USS Gateway - Mozilla Firefox		- O X
Edit	))ew Higtory Bookmarks Tools Help		
• 📦	- @ 🕢 🟦 🗋 http://10.10.2	0.240/httpd/Profinet/USS 🔻 🖟	C Google
setting S	Started 🔂 Latest Headines		
m	S USS Maste	r Communi Master Comm	cation unication
	Anybus-a	Profilec 10	_
S Sla Back	ve Status		Help
	Operational	PKW Size	PZD Size
1	Not Present	4	2
2	Not Configured		
3	Not Configured		
4	Not Configured		
5	Not Configured		
6	Not Configured		
7	Not Configured		
8	Not Configured		
9	Not Configured		-
10	Not Configured		
11	Not: Configured		
12	Not Configured	· · ·	
13	Not Configured		
14	Not Configured		
15	Not configured		
10	Not Configured		
17	Not Contigured		
18		· · ·	· · · · · · · · · · · · · · · · · · ·
19	not configured		· · · · · · · · · · · · · · · · · · ·

#### **View Process Data of Operational Slaves**

This page can be used to monitor the Process Data (PZD) of all operational slaves on the USS network. All data is represented as an array of words in hexadecimal format.

Siemens USS Gateway	Mozilla Firefox	×
Edit Yew History	jookmarks ∏ools Help	
••••••••••••••••••••••••••••••••••••••	1 http://10.10.20.240/httpd/Profine	tMisu ▼ ▶ G• Google Q
Getting Started 🖾 Latest	leadines	
ums U	SS Master Comr USS Master C	nunication ommunication
	Anyous official	
isualisation of Pro	cess Data of operational Driv	es
elect Device to view Proce	ss data	
1 2 3 4	5 6 7 8 9 10 11	12 13 14 15 16
17 18 19 20 2	1 22 23 24 25 26 27	28 29 30 31
	Process Data. Device 1.	
o USS: 0x0000 0x	000	
rom USSi 0x0000 0xi	000	
elect Device to view Proce	ss data	
1 2 3 4	5 6 7 8 9 10 11	12 13 14 15 16
17 18 19 20 2	1 22 23 24 25 26 27	28 29 30 31
	Process Data. Device 2.	
o USS: Not Configur	ed.	
rom USS: Not Configur	ed.	
« Back		
alot Chevrolatic started		
DIEC 31 IOVI VOICE STOLITED		

# Anybus IPconfig (HICP)

## General

The gateway supports the HICP protocol used by the Anybus IPconfig utility, which can be downloaded free of charge from the HMS web site. This utility may be used to access the TCP/IP settings of any Anybus product connected to the network via UDP port 3250.

# Operation

Upon starting the program, the network is scanned for Anybus products. The network can be rescanned at any time by clicking 'Scan'.

In the list of detected devices, the gateway will by default appear as 'ABC-PRT-USS'.

IP address:	10		10		12		246	DHCP
	I							C 01
Subnet mask:	255		255		255		0	1 011
	_							<ul> <li>Off</li> </ul>
Default gateway:	0		0		0		0	
			0		0		0	
Primary DINS:	0		0		0		0	
Secondary DNS:	0		0		0		0	
	-							
Hostname:	homer							
Deserved	_							<b>F</b> a
Password:	I							Change password
New password:		_		_		_		
	·							
								Set Cancel

See also ...

- 3-1 "TCP/IP Settings"
- 4-2 "IP Address Settings"

To alter the network settings of the gateway, doubleclick on its entry in the list. A window will appear, containing the actual IP settings.

Validate any changes by clicking 'Set', or click 'Cancel' to cancel.

Optionally, the configuration can be protected from unauthorized access by a password. To enter a password, click on the 'Change password' checkbox, and enter the password under 'New password'.

# **Connector Pin Assignments**

# **PROFINET Interface (RJ45)**

Pin	Signal	Notes
1	TD+	-
2	TD-	-
3	RD+	-
4	-	Normally left unused; to ensure signal integrity, these pins are tied
5	-	together and terminated to PE via a filter circuit.
6	RD-	-
7	-	Normally left unused; to ensure signal integrity, these pins are tied
8	-	together and terminated to PE via a filter circuit.



# **Power Connector**

Pin	Signal	Notes	
1	+24VDC	-	20 20
2	GND	-	

#### Notes:

- Use good quality 60/75 or 75×C copper (CU) wire only.
- Terminal tightening torque must be between 5... 7 lbs-in (0.5... 0.8 Nm)

# **USS Interface (DB9F)**

Pin	Signal	Notes
1	+5V Output	100mA max.
2	-	(do not connect)
3	-	
4	-	
5	Signal Ground	<b>IMPORTANT:</b> This pin should only be connected to the Signal Ground of other nodes (if available). It must <u>not</u> be connected to Protective Earth (PE), since doing so <u>may cause serious damage</u> to the serial transceivers in the gateway.
6	-	(do not connect)
7	-	
8	RS485 +	-
8	RS485 -	-



# **Technical Specification**

# **Mechanical Properties**

#### Housing

Plastic housing with snap-on connection to DIN-rail, protection class IP20

#### Dimensions

120 mm x 75 mm x 27 mm, L x W x H (inches: 4,72" x 2,95" x 1,06"; L x W x H)

# **Electrical Characteristics**

#### **Power Supply**

Power:  $24V \pm 10\%$ 

#### **Power Consumption**

Maximum power consumption is 280mA. Typically around 100 mA

# **Environmental Characteristics**

#### **Relative Humidity**

The product is designed for a relative humidity of 0 to 95% non-condensing

#### Temperature

Operating:	$\pm 0^{\circ}$ C to $+55^{\circ}$ C
Non Operating:	-25°C to +85°C

## **Regulatory Compliance**

#### **EMC** Compliance (CE)

This product is in accordance with the EMC directive 89/336/EEC, with amendments 92/31/EEC and 93/68/EEC through conformance with the following standards:

• EN 50082-2 (1993)

EN 55011 (1990) Class A

• EN 61000-6-2 (1999)

 EN 61000-4-3 (1996)
 10V/m

 EN 61000-4-6 (1996)
 10V/m
 (all ports)

 EN 61000-4-2 (1995)
 ±8kV
 Air Discharge

 ±4kV
 Contact discharge

 EN 61000-4-4 (1995)
 ±2kV
 Power port

 ±1kV
 Other ports

 EN 61000.4.5 (1995)
 ±0.5kV
 Power ports (DM/CM)

 ±1kV
 Signal ports

#### **UL/c-UL compliance**

The certification has been documented by UL in file E214107.