User Manual

Anybus® Communicator™ Ethernet/USS Gateway

Rev. 2.01

HMS Industrial Networks AB

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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 Ethernet-USS Gateway.

The reader of this document is expected to be familiar with USS network technology, as well 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 safety requirements including any applicable laws, regulations, codes, and standards.

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 (2.00 - 2.01)

Change	Page(s)
Added chapter 'FTP Server'	5-1
Misc. minor corrections & adjustments	-
-	

Revision List

Revision	Date	Author	Chapter(s)	Description
2.00	2006-09-05	PeP	All	Initial revision
2.01	2007-01-11	PeP	5	Added chapter

Conventions & Terminology

The following 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.
- Hexadecimal values are written in the format 0xNNNN, where NNNN is the hexadecimal value.

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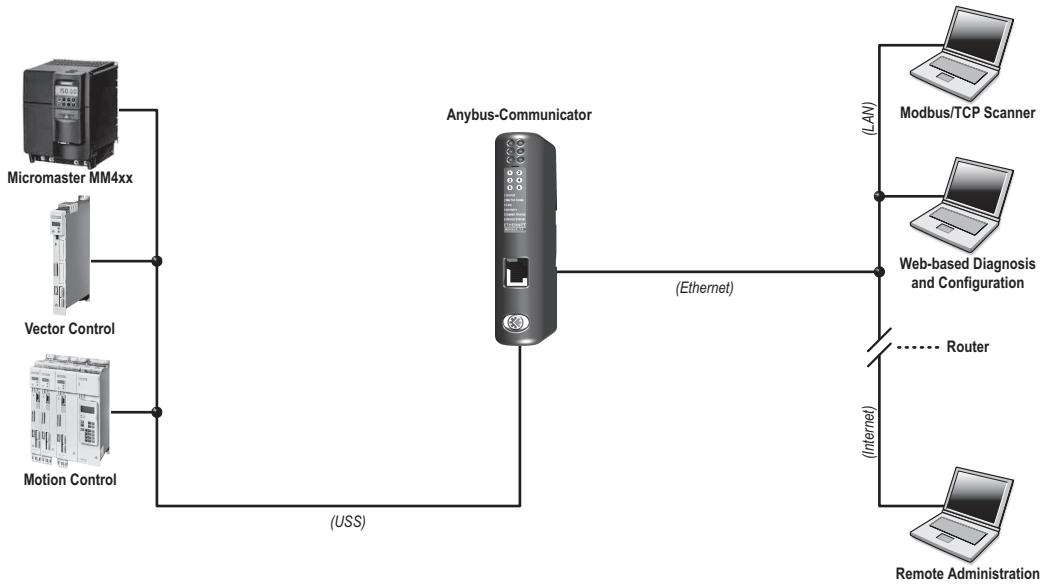
Introduction

General Information

The Universal Serial Interface, from now on referred to as 'USS', defines an access technique according to the Master-Slave principle for communication via a RS-485 based serial bus. The Anybus Communicator Ethernet-USS Gateway controls up to 31 USS slaves and allows their data to be represented on a Modbus/TCP-based network.

The built-in web server provides allows configuration and monitoration of data through an easy to use web-based user interface. Additionally, the built-in email client can issue email-messages based on status information from the USS network.



Features

- 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
- Auto Scan functionality
- Easy to use web-based configuration interface with self-explanatory command functions
- Status notifications via Email
- Concurrent access from multiple Modbus/TCP clients
- Flexible mapping of USS data to Modbus Registers
- Supports DHCP and gleaning (ARP)
- Upload configurations via FTP

External View

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

A: Ethernet Interface

See also...

- A-1 "Ethernet Interface (RJ45)"

B: Configuration Switches

See also...

- 1-3 "Configuration Switches"

C: Status LEDs

See also...

- 1-3 "Status LEDs"

D: Service Port

(reserved)

E: USS Interface

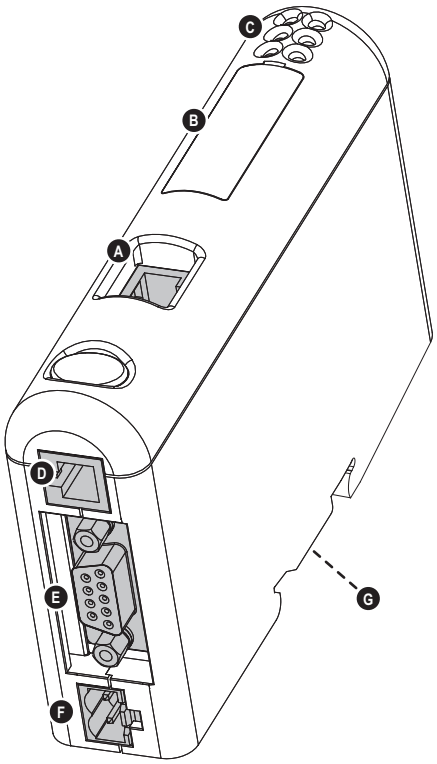
See also...

- A-1 "USS Interface (DB9F)"

F: Power Supply Input

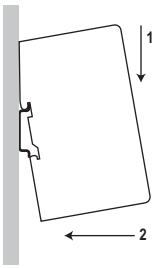
See also...

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

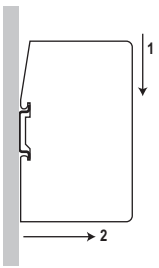


G: DIN-rail Mechanism

The DIN-rail mechanism works as follows:



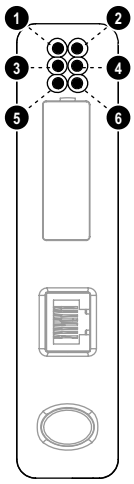
To snap the gateway *on*, first press the it downwards (1) to compress the spring in the DIN-rail mechanism, then push it towards the DIN-rail as to make it snap on (2)

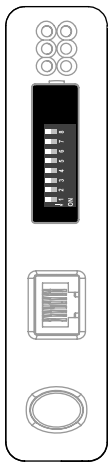


To snap the gateway *off*, push the it downwards (1) and pull it out from the DIN-rail (2), as to make it snap off.

Status LEDs

#	State	Status
1 - Module Status	Off	(no power)
	Green	Normal operation
	Green, flashing	Stand by, not initialized
	Red	Major fault
	Red, flashing	Minor fault
	Alternating Red/Green	(self test)
2 - Network Status	Off	No IP address (or no power)
	Green	EtherNet/IP connection(s) established
	Green, flashing	No EtherNet/IP connections established
	Red	Duplicate IP address detected
	Red, flashing	One or several connections timed out
	Alternating Red/Green	(self test)
3 - Link	Off	No link (or no power)
	Green	Connected to an ethernet network
4 - Activity	Off	No ethernet activity (or no power)
	Green	Receiving or transmitting ethernet packet
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)	Auto Scan 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





Configuration Switches

If set to a non-zero value, the configuration switches forces the gateway to use an IP address in the range 192.168.0.1 - 192.168.0.255.

Note that the switches are read once during startup; any changes require a reset in order to have effect.

SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	DHCP	Subnet	Gateway	IP
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	(settings specified by another source)			
OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	255.255.255.0	192.168.0.255	192.168.0.1
OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	255.255.255.0	192.168.0.255	192.168.0.2
...	...	...	...	...	...	...	...	...	...	...	...
ON	ON	ON	ON	ON	ON	ON	OFF	OFF	255.255.255.0	192.168.0.255	192.168.0.254
ON	ON	ON	ON	ON	ON	ON	ON	(invalid setting)			

See also...

- 2-1 “Network Settings (TCP/IP)”

Network Settings (TCP/IP)

General Information

To participate on the ethernet network, the gateway needs a valid TCP/IP configuration. In addition, in order to be able to send email messages, it needs a valid SMTP server account.

The gateway offers several ways to configure the IP settings:

- **Configuration Switches**

  If the on-board switches are set to a non-zero value, the gateway will use the following settings:

IP Address:	192.168.0.x	(x = switch value)
Gateway:	255.255.255.0	
Subnet:	255.255.255.0	
DHCP:	OFF	

- **Web Interface**

  See also...

  - 4-2 "IP Address Settings"

- **Anybus IPconfig (HICP)**

  See also...

  - 2-2 "Anybus IPconfig (HICP)"

- **Gleaning (ARP)**

  See also...

  - 2-2 "Gleaning (ARP)"

DHCP/BootP

The gateway supports DHCP. If enabled, this causes the gateway to retrieve the TCP/IP settings from a DHCP server. 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) or gleaning (ARP).

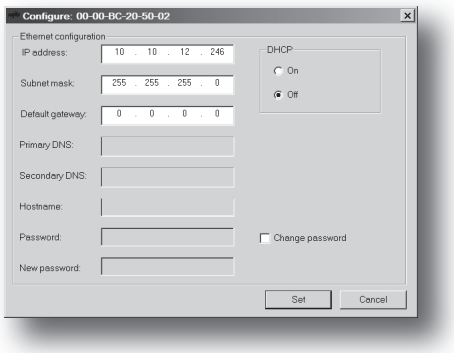
See also...

- 2-2 "Anybus IPconfig (HICP)"
- 2-2 "Gleaning (ARP)"

Anybus IPconfig (HICP)

The gateway supports the HICP protocol used by the Anybus IPconfig utility from HMS. This utility, which can be downloaded free of charge from the HMS website, can be used to access the TCP/IP settings of any Anybus product detected on the network.

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 appear as 'ABC-EIT-USS'. To alter its settings, double-click on its entry in the list.



A window will appear, containing the TCP/IP configuration and password settings. Validate the new settings by clicking 'Set', or click 'Cancel' to abort.

Optionally, the configuration may 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'. When protected, any changes in the configuration requires that the user supplies a valid password.

Note: The HICP protocol communicates over UDP port 3250.

Gleaning (ARP)

The gateway supports the Address Resolution Protocol (ARP), allowing the TCP/IP settings to be altered using the ARP-command on a PC.

Syntax:

```
arp -s <IP address> <MAC address>
ping <IP address>
arp -d <IP address>
```

The 'arp -s' command stores the IP and MAC address in the PCs ARP-table. When the 'ping'-command is issued, the PC will address the gateway with the new IP address; the gateway recognizes that it was addressed with the correct MAC address and adopts the new IP address from the 'ping' message.

If successful, new settings will be stored as follows:

IP Address:	xxx.xxx.xxx.xxx	(value supplied in ARP command)
Gateway:	0.0.0.0	(no gateway)
Subnet:	255.255.255.0	
DHCP:	OFF	

Note: This functionality may cause problems if multiple devices continuously issue 'ping'-messages towards the gateway. The reason for this lies in the very nature of this functionality; since the gateway adopts the IP address from all 'ping'-messages, any additional 'ping'-messages may cause the gateway to change back and forth between old and new settings.

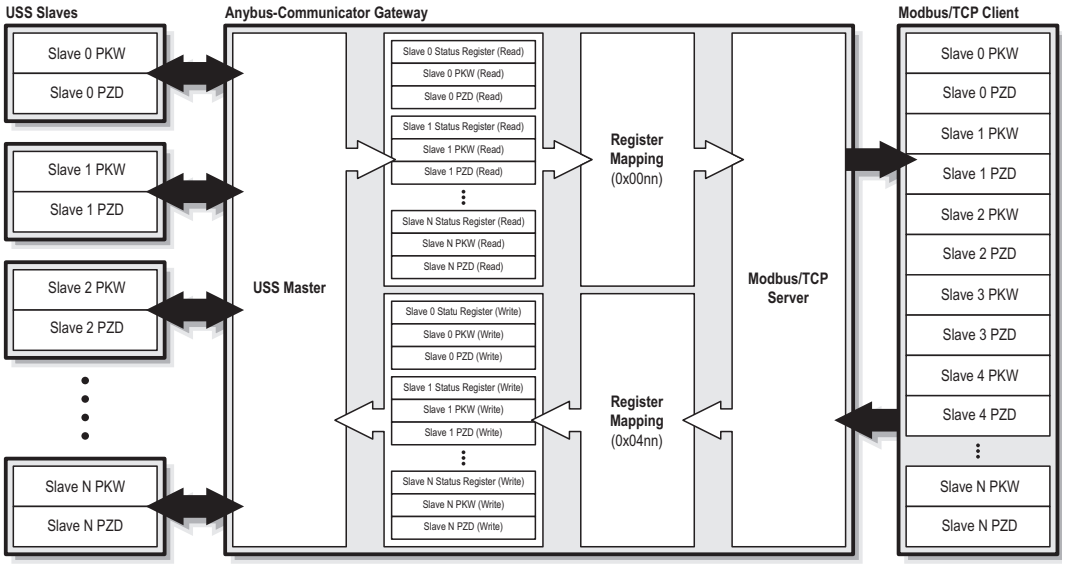
Data Exchange

Overview

The following figure illustrates the basic principles for data exchange. USS slave data is stored in two internal buffers, one for each direction. These buffers are mapped to Modbus Registers as specified in the web-based configuration interface.

In addition to the Process Data (PZD) and Parameter Data (PKW), each slave is associated with 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...

- 3-2 “USS Master Implementation”
- 3-3 “Slave Data Set”
- 3-6 “Modbus/TCP Server Implementation” (3-6 “Access Protocol”)
- 4-1 “Web Interface” (4-3 “Master Configuration”)

USS Master Implementation

General Information

The gateway polls the USS slaves and refreshes status information etc. cyclically according to the scanlist defined in the web-based configuration interface.

The gateway exchanges all PKW and PZD data transparently. It is assumed that the PKW and PZD sizes are identical in the request and response telegrams on the USS bus. Note that since PKW data is transferred transparently, the parameter access protocol used to access PKW data must be implemented entirely on the PLC side.

The total amount of data that can be exchanged on the USS network is limited to 510 bytes in each direction.

The following communication features are supported:

- **Process Data Size (PZD)**
  0... 16 words (default = 2 words)
- **Parameter Data Size (PKW)**
  0, 3 or 4 words (default = 4 words)
- **Baud Rate**
  9600, 19200 or 38400bps (default = 9600bps)
- **Auto Configuration**
  The gateway can be forced to scan the USS bus to detect all operational slaves and their data sizes automatically. In this case, very little user interaction is needed, and the scanlist is set up automatically.

See also...

- 4-1 “Web Interface”
- 4-3 “Master Configuration” (4-3 “Auto Scan”)

Operation

The gateway will only poll slaves marked as ‘Operational’ in the 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.

General status information is reported through the Gateway Status Register, and the status of each slave can be read in its’ corresponding Slave Status Register.

See also...

- 3-3 “Slave Status Register (Read)”
- 3-5 “Gateway Status Register”
- 4-5 “Slave Diagnostics” (4-5 “Slave Diagnostics”)

Slave Data Set

General Information

The information associated with each slaves is divided into three categories, Slave Status, Process Data (PZD) and Parameter Data (PKW). This information is duplicated in the Modbus Register map based on the direction of the communication.

See also...

- 3-7 "Modbus Register Map"

Slave Status Register (Read)

This register reflects the current status of the slave, as well as the ownership of the data associated with the slave. When reading the Slave Status Register, make sure to read from the proper Modbus Register range (0x0000... 0x00FF).

Note that the actual Modbus register location used for this register is specified separately for each slave in the web-based configuration interface.

(lsb) (lsb)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
A_PZD		A_PKW		RES	ENF	USSF	OP	RES		FP	Slave No.				

- **A_PZD (Actual Process Data Ownership)**
  Indicates the actual owner of the Process Data (PZD) associated with the slave, or 0 (zero) if not allocated.
- **A_PKW (Actual Parameter Data Ownership)**
  Indicates the actual owner of the Parameter Data (PKW) associated with the slave, or 0 (zero) if not allocated.
- **RES (Reserved)**
  Reserved for future use, mask off and ignore.
- **ENF (Ethernet Network Fault)**
  This bit is set if the gateway has detected a fault related to ethernet or Modbus/TCP.
- **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.
- **FP (Force Presence)**
  If true, the gateway will only exchange data when this slave is operational.
- **Slave No.**
  USS slave address (0... 31).

See also...

- 3-6 "Access Protocol"

Slave Status Register (Write)

This register is used when requesting ownership of the data associated with the slave, or when accessing the 'Force Presence'-functionality.When writing the Slave Status, make sure to write to the proper Modbus Register range (0x0400... 0x04FF).

Note that the actual Modbus register location used for this register is specified separately for each slave in the web-based configuration interface.

(lsb) (lsb)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
RO_PZD		RO_PKW		RES						FP	RES				

- **RO_PZD (Request Ownership for Process Data)**
  Used when requesting ownership for the Process Data (PZD) associated with the slave.
- **RO_PKW (Request Ownership for Parameter Data)**
  Used when requesting ownership for the Parameter Data (PKW) associated with the slave.
- **RES (Reserved)**
  Reserved for future use, set to zero.
- **FP (Force Presence)**
  If true, the gateway will only exchange data when this slave is operational.

See also...

- 3-6 "Access Protocol"

Process Data (PZD) (Read & Write)

This is the actual Process Data (PZD) image, and is accessed through two Modbus Register ranges based on the direction of the communication.

Note that the actual Modbus register locations used for the Process Data (PZD) are specified separately for each slave in the web-based configuration interface.

See also...

- 3-7 "Modbus Register Map"
- 4-3 "Master Configuration"

Parameter Data (PKW) (Read & Write)

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 must be implemented entirely on the PLC side. How this is done is beyond the scope of this document.

Note that the actual Modbus register locations used for the Parameter Data (PKW) are specified separately for each slave in the web-based configuration interface.

See also...

- 3-7 "Modbus Register Map"
- 4-3 "Master Configuration"

Gateway Status Register

General Information

The Gateway Status Register resides in Modbus Register 0x00FF, and reflects the overall status of the gateway.

See also...

- 3-7 "Modbus Register Map"

Register Layout

The register contains bit-encoded data as follows:

(lsb) (lsb)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Reserved				Error Code				General Status							

- **Reserved**
  Reserved for future use, mask off and ignore.

- **General Status**
  This field reflects the overall status of the gateway as follows:

Value	Status
0x00	Gateway operational, no faults detected.
0x01	Fatal error; USS master stopped. The 'Error Code'-field contains further information.
0x02	Error; USS master operational. The 'Error Code'-field contains further information.
(other)	Undefined, reserved for future use.

- **Error Code**
  In case of error (i.e. if 'General Status' equals 0x01 or 0x02), information about the source of the problem may be indicated in this field.

Value	Error
0x00	No error.
0x01	No USS Master configuration available.
0x02	Invalid TCP/IP settings.
0x03	Fatal software error i gateway firmware.
0x04	Fatal software error in USS master firmware.
0x05	Fatal software error in ethernet or Modbus/TCP software.
(other)	Unspecified error, reserved for future use.

Modbus/TCP Server Implementation

General Information

The Modbus/TCP server provides access to the data on the USS network via a subset of the functions defined in the Modbus/TCP specification.

All Modbus/TCP messages are received/transmitted on TCP port no. 502. For detailed information regarding the Modbus/TCP protocol, consult the Open Modbus Specification.

- **Function Codes**[1]

  The following functions shall be used when accessing the slaves on the USS network:

Modbus Function	Function Code
Read Multiple Registers	3
Write Multiple Registers	16

- **Exception Codes**

  The following exception codes may be returned by the gateway.

Code	Name	Description
0x01	Illegal function	The function code in the query is not supported
0x02	Illegal data address	The data address in the query was outside the defined range
0x03	Illegal data value	The data in the request is illegal

Access Protocol

The gateway allows multiple Modbus/TCP clients to access the USS slaves concurrently. For consistency reasons, only one client is permitted to access a particular block of data at a time. To ensure that this requirement is fulfilled at all times, a strict access protocol must be followed.

The access protocol is based on the following principles:

- Each client must be assigned a unique number (1... 3).
- Each block of USS data is tagged with it's current ownership (i.e. the unique number of the client that is currently allowed to access it). Unallocated data (i.e. data which has no owner) is tagged with 0 (zero).
- A client must never under any circumstances access data which it doesn't currently own.
- To gain ownership, the client must first check that the current ownership of the data is 0 (zero). It shall then write it's own unique number into the corresponding fields in the Slave Status Register, and wait until that number is mirrored by the gateway. If the gateway does not mirror the number as expected, the request failed because of a concurrent access from another client.
- To release ownership of the data, clear the data's current ownership tag in the corresponding Slave Status Register.

1. The gateway responds to other services as well, however the use of such functions is not encouraged by HMS, and the result when using them is undefined.

Modbus Register Map

For technical reasons, Read and Write data is mapped to separate Modbus register ranges as follows:

Register #	Access	Contents
0x0000	Read	This register range is used when reading information from the slaves on the USS network. **Note:** The exact register layout is defined in the web-based configuration interface. See also... - 3-1 “Overview” - 3-3 “Slave Data Set”
0x0001		
0x0002		
0x0003		
...		
0x00FD		
0x00FE		
0x00FF	Read	Gateway Status Register (see 3-5 “Gateway Status Register”)
0x0100	-	(reserved)
0x0101		
0x0102		
0x0103		
...		
0x03FE		
0x03FF		
0x0400	Write	This register range is used when writing information to the slaves on the USS network. **Note:** The exact register layout is defined in the web-based configuration interface. See also... - 3-1 “Overview” - 3-3 “Slave Data Set”
0x0401		
0x0402		
0x0403		
...		
0x04FE		
0x04FF		
0x0500	-	(reserved)
0x0501		
0x0502		
0x0503		
...		
0xFFFE		
0xFFFF		

Note: It is important to follow the access convention outlined above. While theoretically possible, reading from areas marked as ‘Write’ (0x04nn) will not return the same data as when reading from areas marked as ‘Read’ (0x00nn).

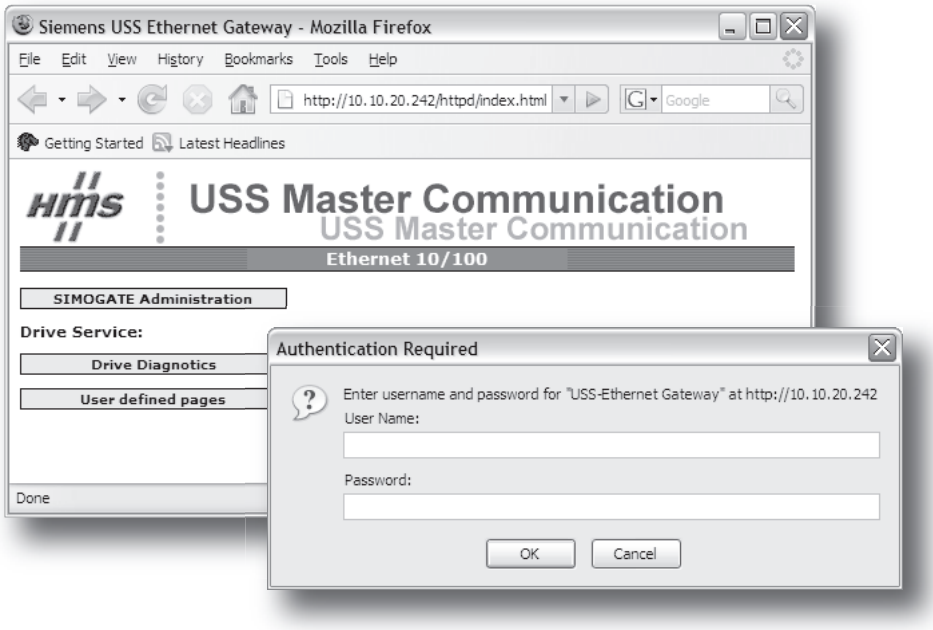
Web Interface

General Information

The gateway features a web-based configuration interface, used to set up basic communication properties (i.e. IP address, network mask etc) as well as operational parameters related to the USS communication.

To open 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 'SIMOGATEUSER', and the password is 'HMS4ALL'.



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.

Administration Pages

General Information

The main administration page features the following sub-pages:

- **IP address settings**

  See also...

  - 4-2 “IP Address Settings”

- **Master Communication Settings**

  See also...

  - 4-3 “Master Communication Settings”

- **Master Configuration**

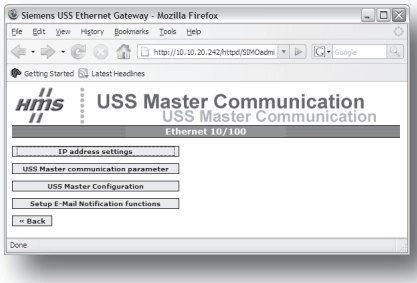
  See also...

  - 4-3 “Master Configuration”

- **E-Mail Notification Settings**

  See also...

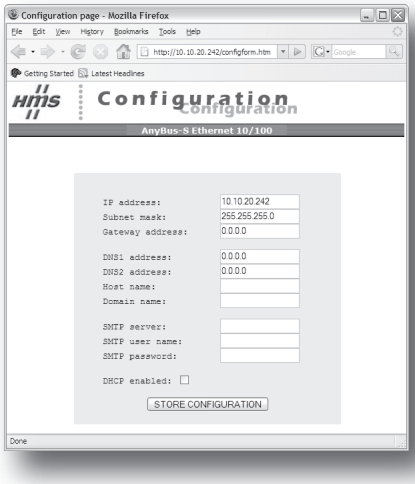
  - 4-4 “E-Mail Notification Settings”



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.



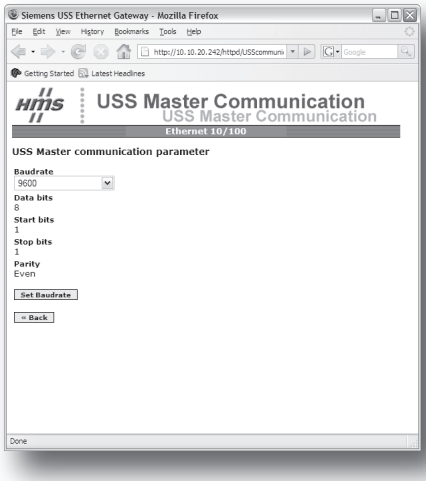
See also...

- 2-1 “Network Settings (TCP/IP)”

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

Master Communication Settings

This page provides access to the communication settings for the USS interface.



- **Baudrate**

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

- **Data bits**

  (fixed to 8)

- **Start bits**

  (fixed to 1)

- **Stop bits**

  (fixed to 1)

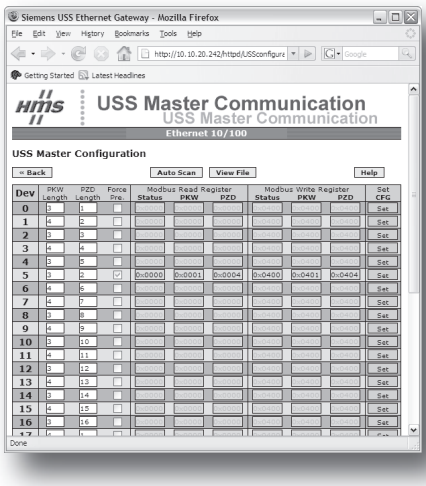
- **Parity**

  (fixed to even)

Confirm the new settings by clicking 'Set Baudrate'.

Master Configuration

This page is used when setting up 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 'Force Pre.'-checkbox, if cheched, enables data exchange for the corresponding slave (if present).

The remaining columns specify the mapping of the USS data to Modbus Registers. Make sure to follow the conventions outlined earlier in this document. Note that no checks for overlaps etc. are performed by the gateway.

All changes must be confirmed individually for each slave by clicking on the corresponding 'Set'-button. Changes which haven't been confirmed will be lost.

- **Auto Scan**

  Clicking this button initiates the Auto Scan feature, causing the gateway to scan the USS bus and create a configuration automatically. All operational slaves will be added and mapped to Modbus Registers in consecutive order. Note that any previous settings will be lost.

E-Mail Notification Settings

The gateway continuously monitors the status of OP, USSF and ENF 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**

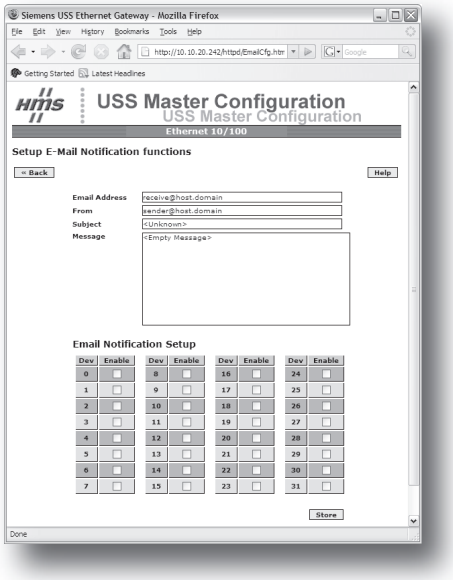
  Subject for the message.

- **Message**

  Actual message body.

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

Keyword	Action
<Slave>	Includes the number of the slave
<Status>	Includes the status of the slave



- **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>'

Note: This features requires a valid SMTP server account.

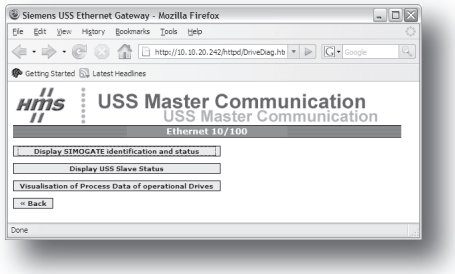
See also...

- 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"

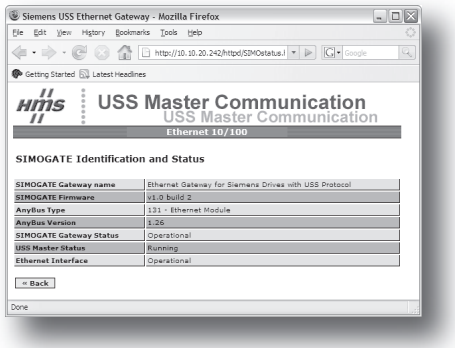
- **View Process Data of Operational Slaves**

  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).



- **Product Name**

  ('ABC-EIT-USS').

- **Gateway Firmware**

  (General gateway firmware revision).

- **Fieldbus Interface**

  (Higher level network interface type).

- **Fieldbus Firmware**

  (Fieldbus interface firmware revision).

- **Gateway Status**

  (Overall gateway status).

- **Master Status**

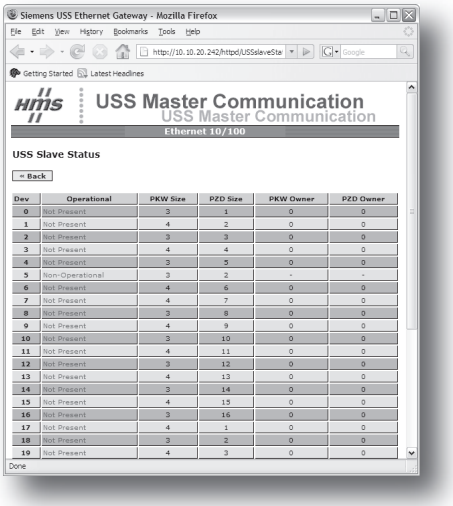
  (Status of USS master).

- **Fieldbus Status**

  (Fieldbus interface status).

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

- **PZD Size**

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

- **PKW Owner**

  Current PKW owner on the Modbus/TCP (Ethernet) side.

  See also...

  - 3-3 "Slave Data Set"
  - 3-6 "Access Protocol"

- **PZD Owner**

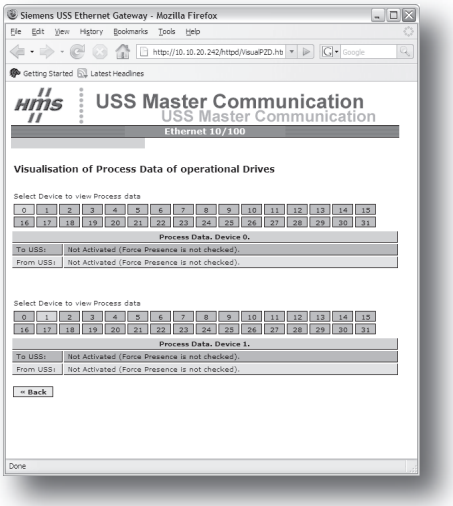
  Current PZD owner on the Modbus/TCP (Ethernet) side.

  See also...

  - 3-3 "Slave Data Set"
  - 3-6 "Access Protocol"

View Process Data of Operational Slaves

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



FTP Server

General Information

In some cases, the web interface may prove to be impractical, e.g. when setting up a greater number of gateways with the same configuration. In such case, the configuration may be uploaded via FTP using a standard FTP-client.

By default, the following port numbers are used for FTP communication:

- TCP, port 20 (FTP data port)
- TCP, port 21 (FTP command port)

IMPORTANT: It is strongly discouraged to edit any files except the USS slave configuration file ('SIMOGATE.CFG'). Doing so may result random behaviour and is thus not supported by HMS.

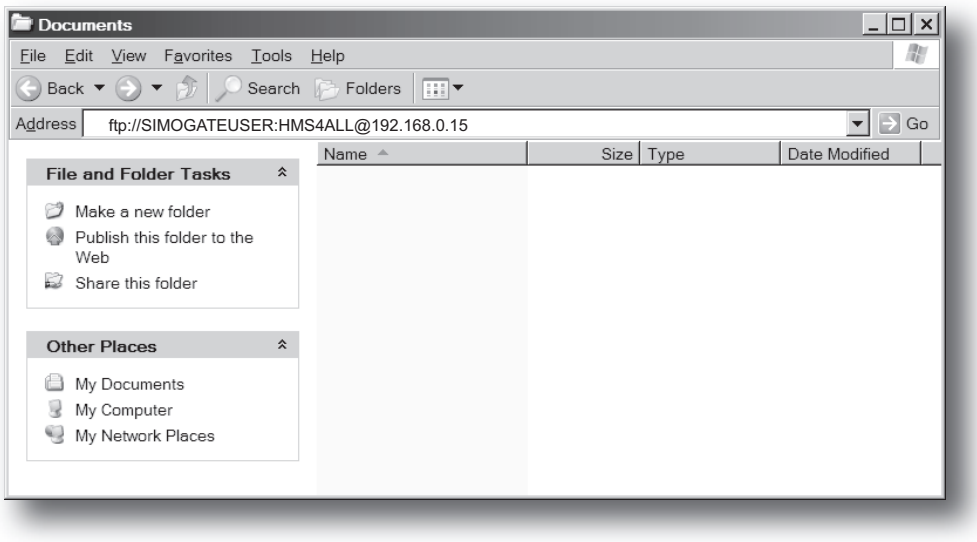
See also...

- 4-1 "Web Interface"

FTP Connection Example (Windows Explorer)

The built in FTP client in Windows Explorer can easily be used to access the file system as follows:

1. Open the Windows Explorer by right-clicking on the 'Start' button and selecting 'Explore'.
2. In the address field, type FTP://SIMOGATEUSER:HMS4ALL@xxx.xxx.xxx.xxx
   - Substitute 'xxx.xxx.xxx.xxx' with the IP address of the gateway
3. Press enter. The Explorer will now attempt to connect to the gateway using the specified settings. If successful, the built in file system is displayed in the Explorer window.



USS Slave Configuration File ('SIMOGATE.CFG')

The USS slave configuration file is stored in ASCII format (DOS/Windows standard, i.e. lines are separated by CRLF). The file must be named 'SIMOGATE.CFG' and placed in the root directory of the file system; if the file is missing or malformed in any way, the gateway will not be able to exchange data.

The file format is based on the concept of keys, where each key is assigned a value. Values can be specified either in decimal or hexadecimal format. In case of the latter, the value must be prefixed with '0x'.

Example:

```
[USS]
Baudrate=9600

[Slave 0]
Force_Presence=0
Length_PKW=3
Length_PZD=1
Offset_Read_Status=0x0000
Offset_Read_PKW=0x0000
Offset_Read_PZD=0x0000
Offset_Write_Status=0x0400
Offset_Write_PKW=0x0400
Offset_Write_PZD=0x0400

…

[Slave 31]
Force_Presence=1
Length_PKW=4
Length_PZD=15
Offset_Read_Status=0x0006
Offset_Read_PKW=0x0007
Offset_Read_PZD=0x000a
Offset_Write_Status=0x0406
Offset_Write_PKW=0x0407
Offset_Write_PZD=0x040a
```

As seen above, all slaves are listed in consecutive order. Note that all slaves must be listed in the file, even ones which aren't actually present on the USS network. Also note that all keys must be listed for each slave, in the order defined above. In case the value for a particular key isn't specified, the gateway assumes zero for the corresponding setting.

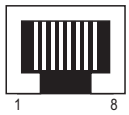
The following keys are used:

Keyword	Valid Settings	Description
[USS]	N/A	Keys that follow specifies general settings for the USS network
[Slave n]	N/A	Keys that follow specifies settings specific to slave 'n'
Baudrate	9600, 19200, 38400	Specifies the USS baudrate.
Force_Presence	0, 1	Value of the Force Presence Bit of the Slave Status Word
Length_PKW	0... 32	Specifies the Parameter Data (PKW) size
Length_PZD	0... 32	Specifies the Process Data (PZD) size
Offset_Read_Status	0... 0x00FE	Specifies the Modbus register offset for the Slave Status Register (Read)
Offset_Read_PKW	0... 0x00FE	Specifies the Modbus register offset for the Parameter Data (PKW, Read)
Offset_Read_PZD	0... 0x00FE	Specifies the Modbus register offset for the Process Data (PZD, Read)
Offset_Write_Status	0x0400... 0x04FF	Specifies the Modbus register offset for the Slave Status Register (Write)
Offset_Write_PKW	0x0400... 0x04FF	Specifies the Modbus register offset for the Parameter Data (PKW, Write)
Offset_Write_PZD	0x0400... 0x04FF	Specifies the Modbus register offset for the Process Data (PZD, Write)

Connector Pin Assignments

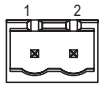
Ethernet Interface (RJ45)

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



Power Connector

Pin	Signal	Notes
1	+24VDC	-
2	GND	-

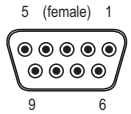


Notes:

- 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	**IMPORTANT:** 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 ± 10%

Power Consumption

Maximum power consumption is 280 mA on 24V. Typically around 100 mA

Environmental Characteristics

Relative Humidity

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

Temperature

Operating:	±0°C to +55°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.