



IloT

Anybus® X-gateway™ Network Interface

USER MANUAL

SCM-1202-109 1.0 en-US ENGLISH



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1 Preface

1.1 About This Document

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

The use of this product requires a basic knowledge of industrial network technology and of the MQTT and OPC UA protocols.

For additional documentation and software downloads, FAQs, troubleshooting guides and technical support, please visit www.anybus.com/support.

1.2 Document history

Version	Date	Description
1.00	2018-10-29	First release

1.3 Document Conventions

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

1. First do this
2. Then do this

Unordered (bulleted) lists are used for:

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

...and for action-result type instructions:

- ▶ This action...
 - ➔ leads to this result

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

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

This is a cross-reference within this document: [Document Conventions, p. 4](#)

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



This is additional information which may facilitate installation and/or operation.



This instruction must be followed to avoid a risk of reduced functionality and/or damage to the equipment, or to avoid a network security risk.



Caution

This instruction must be followed to avoid a risk of personal injury.



WARNING

This instruction must be followed to avoid a risk of death or serious injury.

2 Description

2.1 Overview

The Anybus X-gateway IIoT Interface allows you to seamlessly interconnect a PLC and its connected devices to IIoT networks using MQTT and OPC UA.

2.2 Connectors



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

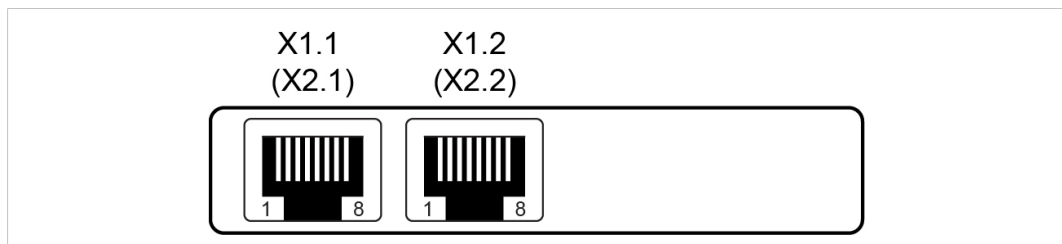


Fig. 1 IIoT interface

Ethernet Connectors

The IIoT interface contains a dual port Ethernet switch with RJ45 type connectors. The two Ethernet ports are labeled **X1.1** and **X1.2** if the interface is top-mounted, and **X2.1** and **X2.2** if the interface is bottom-mounted.

Pin	Signal	Description
1	TD+	Transmit data +
2	TD-	Transmit data -
3	RD+	Receive data +
4	-	(reserved)
5	-	(reserved)
6	RD-	Receive data -
7	-	(reserved)
8	-	(reserved)

2.3 LED Indicators

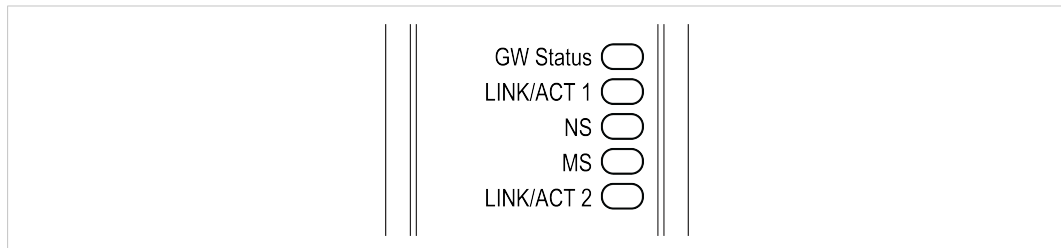


Fig. 2 IIoT interface LED indicators

The **GW Status** LED indicates operation status for the X-gateway. The other LEDs indicate network communication and status for the IIoT interface.

LED	Indication	Meaning
GW Status	Off	No power
	Green	Gateway running
	Red	Communication error
	Red, flashing	Network interface error
LINK/ACT	Off	Link not detected or no power
	Green	Link established (100 Mbit/s)
	Green, flickering	Link activity (100 Mbit/s)
	Red	Link established (10 Mbit/s)
NS	Red, flickering	Link activity (10 Mbit/s)
	Off	Offline or no power
	Green	Online, IP address assigned
	Green, flashing	Online, no IP address assigned
MS	Red	Fatal error, IP address conflict
	Alternating Red/Green	Firmware update in progress
	Off	No power
	Green	Normal operation
MS	Red	Fatal error
	Alternating Red/Green	Firmware update in progress

The **LINK/ACT** LED indicators will show a red light for 10 Mbit/s connections. This is normal and does not indicate an error.

The **NS** and **MS** LED indicators may flash green/red briefly during the startup self-test sequence. This is normal and does not indicate an error.

3 Installation

3.1 Installation Overview

Prerequisites

The following items are required for installation and basic configuration:

- Ethernet cable
- USB cable
- Anybus Configuration Manager - X-gateway (1.5.1.1 or later)
- Anybus Configuration Manager - IIoT
- IPconfig (3.2.1.1 or later)

The Anybus Configuration Manager and IPconfig applications can be downloaded from www.anybus.com/support.

Basic installation steps

1. Connect the Anybus X-gateway IIoT Interface to the Ethernet network.
2. Connect a computer to the USB connector on the X-gateway.
3. Power on the X-gateway.
4. Use IPconfig to configure the TCP/IP settings for the IIoT interface.
5. Use Anybus Configuration Manager - X-gateway to configure the data exchange options for the two interfaces in the Anybus X-gateway.
6. Use Anybus Configuration Manager - IIoT to create a tag configuration and transfer it to the IIoT interface.
7. Connect to the web interface of the IIoT interface and configure MQTT/OPC UA communication.

4 Configuration

4.1 TCP/IP Configuration

4.1.1 Installing the IPconfig Utility

IPconfig is a Windows-based tool for configuration of TCP/IP settings in HMS devices. The tool will detect all compatible and active HMS devices on the local network.

1. Download IPconfig from www.anybus.com/support.
2. Unpack the contents of the zip archive and run the installer program.

4.1.2 Scanning for Connected Devices

When IPconfig is started it will automatically scan all available local networks for HMS devices. Detected devices will be listed in the main window. To refresh the list, click on **Scan**.

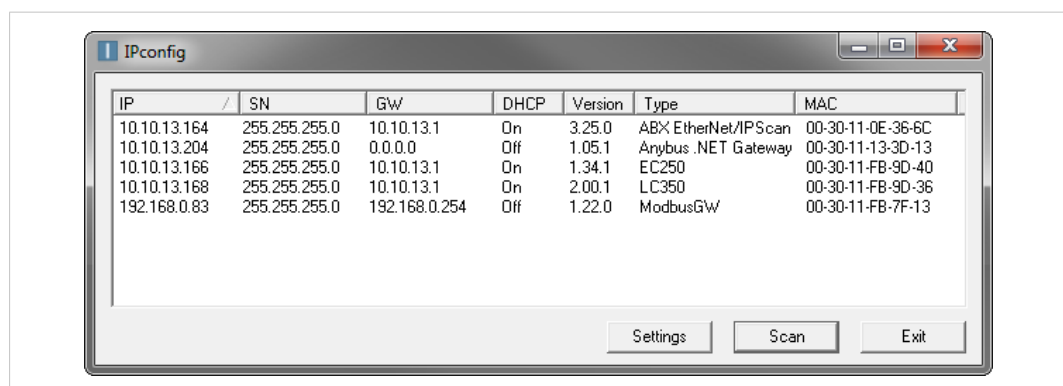


Fig. 3 IPconfig main window

IP	IP address of the device
SN	Subnet mask
GW	Default gateway
DHCP	Automatically managed IP configuration
Version	Firmware version
Type	Product name
MAC	Ethernet MAC address (System ID)

4.1.3 Ethernet Configuration

To change the IP settings for a device, double-click on the entry in the main window or right-click on it and select **Configuration**.

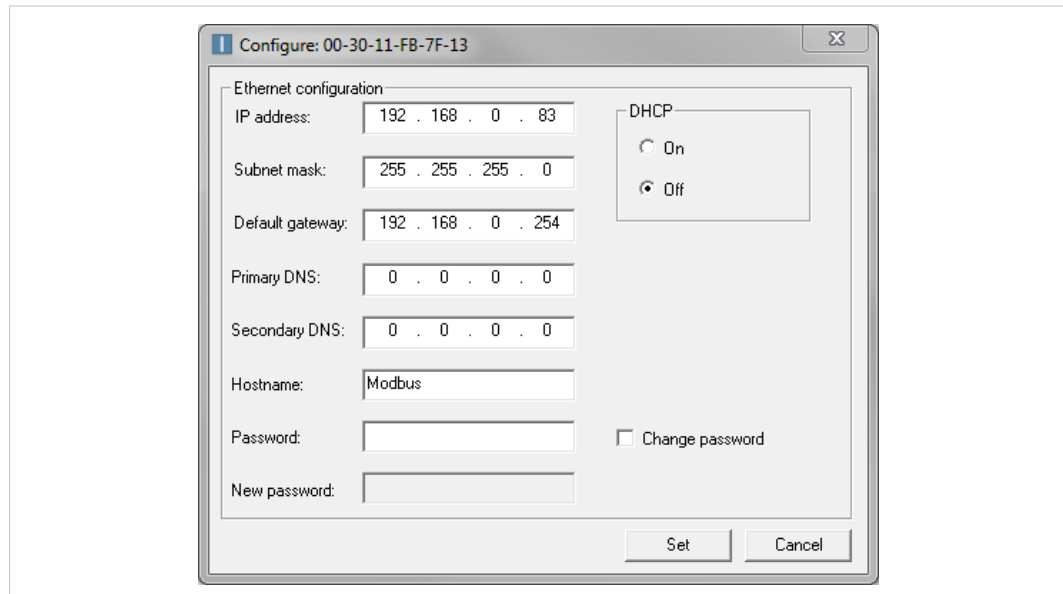


Fig. 4 Ethernet configuration

Enter static IP settings as required, or select DHCP if using dynamic IP addressing.



Do not enable DHCP if there is no DHCP server available on the network.

You can add a name for the device in the **Hostname** field. Only characters a–z, A–Z, 0–9 and _ (underscore) are allowed.

The default password for changing IP settings is blank (no password). If a password has been set for the device you must enter it to be able to change the settings.

To set a new password, check the **Change password** box and enter the current password in the **Password** field, then enter the new password in the **New password** field.



For security reasons the default password should always be changed.

Click on **Set** to save the new settings. The device will reboot automatically.

4.1.4 IPconfig Settings

Additional settings for IPconfig can be accessed by clicking on **Settings**.

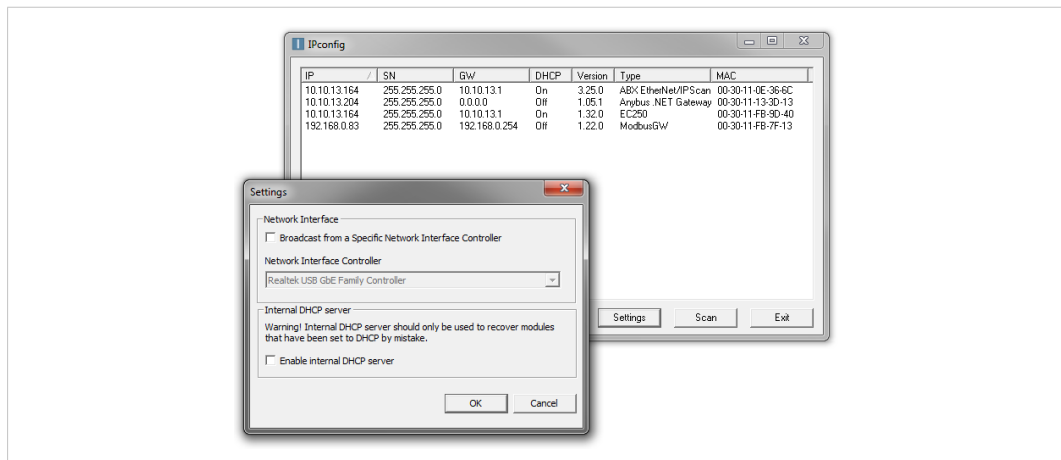


Fig. 5 IPconfig settings

Network Interface

Check this option to select a specific network interface to use when scanning for devices from a computer which has more than one interface. If this option is left unchecked, all available networks will be scanned.

Internal DHCP Server

If a device has been set to use DHCP but there is no DHCP server on the network, the device may not be detected by IPconfig. To recover access to the device an internal DHCP server in IPconfig can be temporarily activated:

1. Click the checkbox for **Internal DHCP Server**, then click **OK**. IPconfig will automatically refresh the scan and list the missing device in the main window.
2. Select the device and configure it to use static IP addressing instead of DHCP.
3. Disable the internal DHCP server.



Do not enable the internal DHCP server if there is already an active DHCP server on the network.

4.2 Anybus Configuration Manager - X-gateway

The data exchange between the IIoT interface and the other interface in the X-gateway is set up using the Windows-based configuration tool *Anybus Configuration Manager - X-gateway*, which can be downloaded from www.anybus.com/support.

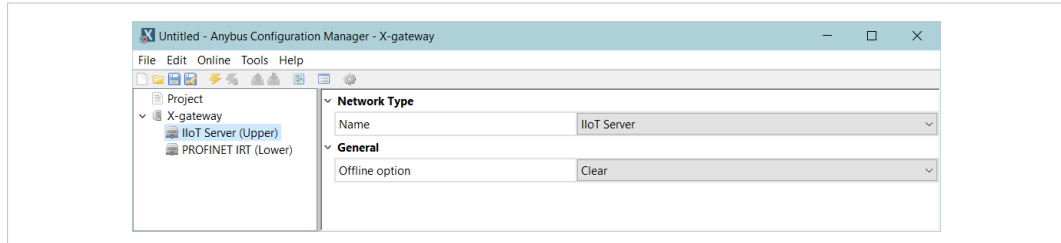


Fig. 6 Anybus Configuration Manager - X-gateway (IIoT interface settings)

Network Type

Name Select **IloT Server** as the network type.

General

Offline option The action that the X-gateway will take if the IIoT network goes offline.

Freeze = keep the current value

Clear = reset all values to zero

The input and output data sizes for the other network interface should be configured according to the actual PLC setup. Refer to the documentation for the PLC and the built-in help in Anybus Configuration Manager - X-gateway for help regarding the specific network interface.

The output data size is important when setting up the tag information for the IIoT interface. See [Anybus Configuration Manager - IIoT, p. 12](#).

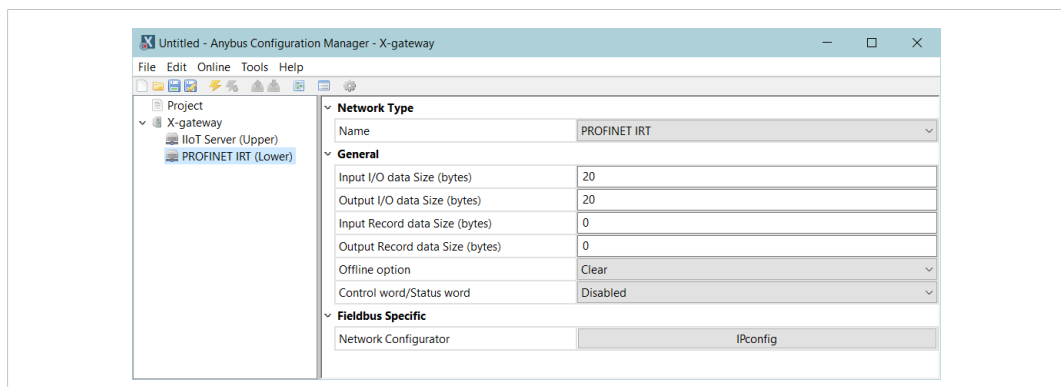


Fig. 7 Anybus Configuration Manager - X-gateway (other interface example settings)

4.3 Anybus Configuration Manager - IIoT

The IIoT interface is configured using *Anybus Configuration Manager - IIoT*, which can be downloaded from www.anybus.com/support.

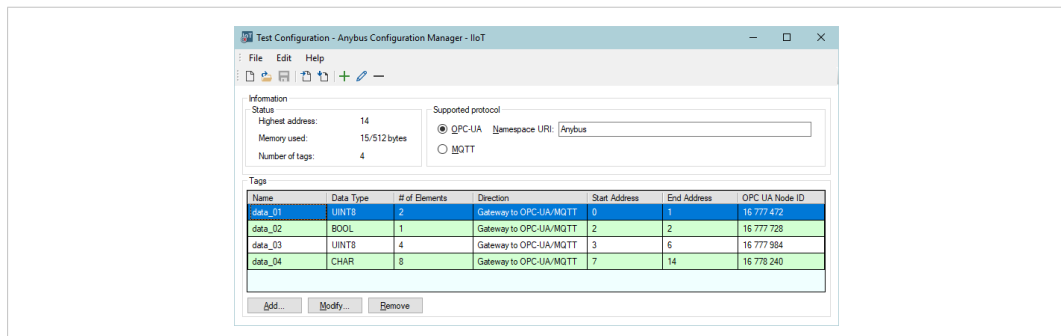


Fig. 8 Anybus Configuration Manager - IIoT

Setting up the IIoT tags

1. Select either OPC UA or MQTT as communication protocol.
For OPC UA you must also specify a **Namespace URI**. If this field is left empty a default value will be used.
2. Click on **Add** to add IIoT tags as required. The data types and addresses of the tags must match the IO data mapping set up with Anybus Configuration Manager - X-gateway.

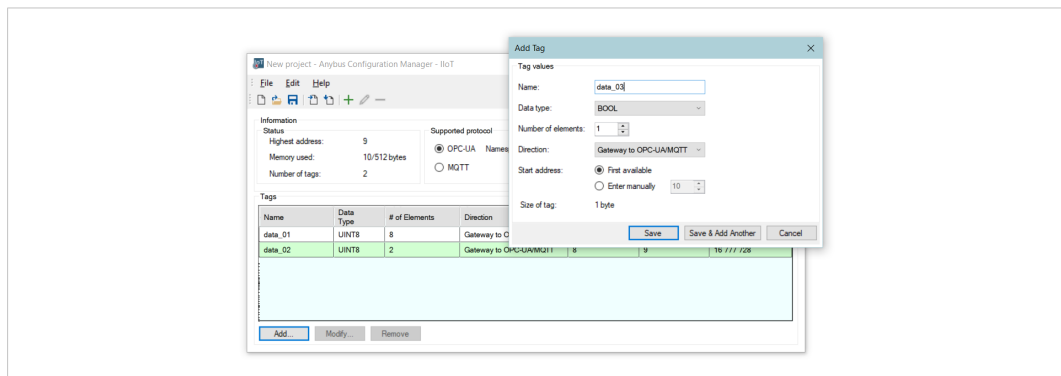


Fig. 9 Adding tags

3. Optionally, select **File ► Save** to save the current configuration project.

Note: The project file saves the current settings in Anybus Configuration Manager - IIoT and can be used as a starting point when creating configurations. It cannot be used as a configuration file by the Anybus X-gateway IIoT Interface.

When you have finished setting up the IIoT tags you must generate a configuration and apply it to the Anybus X-gateway IIoT Interface. This can be done directly from Anybus Configuration Manager - IIoT or by saving a configuration file and using an external FTP client.

Applying the configuration from Anybus Configuration Manager - IloT

1. Select **File ► Generate and send....**

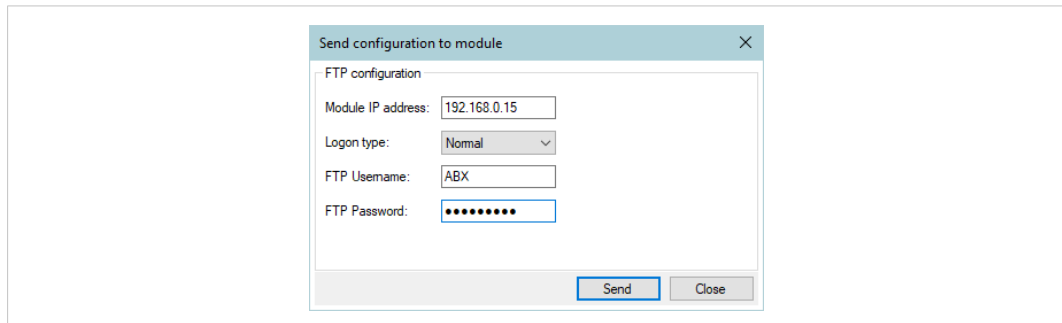


Fig. 10 Sending the configuration

2. Enter the IP address and the FTP username and password for the IloT interface.
The default username is **ABX** and the password is **FTPAccess**.
3. Click on **Send** to transfer the configuration to the IloT interface.
When the transfer is finished, click on **OK** to close the confirmation dialog.
The X-gateway will apply the new configuration and restart automatically.

Generating a configuration file and applying it using an external FTP client

1. Select **File ► Generate configuration....**
2. Save the generated configuration file to your computer.
3. Open an FTP client and connect to the IP address of the IloT interface.
The default username is **ABX** and the password is **FTPAccess**.
4. Transfer the saved configuration file from your computer to the IloT interface.
5. Power cycle the X-gateway to apply the new configuration.

4.4 Web Interface

The web interface of the Anybus X-gateway IIoT Interface provides additional configuration settings and status information. The web interface is accessed by entering the IP address of the Anybus X-gateway IIoT Interface in a web browser. The computer used for access must be in the same Ethernet subnet as the IIoT interface.

Overview

MODULE	Identification
Overview	Module name: Anybus X-Gateway IIoT
Parameters	Serial number: A03A9F1F
NETWORK	FW version: 3.29.01
Status	Uptime: 0 days, 0m22m57s
Configuration	CPU Load: 18%
SERVICES	
SMTP	

Fig. 11 Overview page

This page provides basic information about the IIoT interface including the serial number and the installed firmware version.

Parameters

MODULE	#	Name	Value	
Overview				
Parameters	1	data_01	0	Refresh
NETWORK				
Status				
Configuration				
SERVICES				
SMTP				

Fig. 12 Parameter page

This page shows the current data values for the configured IIoT tags.

Network Status

MODULE	Current IP Settings
Overview	DHCP: Disabled
Parameters	IP Address: 192.168.0.15
NETWORK	Subnet Mask: 255.255.255.0
Status	Gateway Address: 0.0.0.0
Configuration	Host Name:
SERVICES	Domain name:
SMTP	DNS Server #1: 0.0.0.0
	DNS Server #2: 0.0.0.0
	Current Ethernet Status
	MAC Address: 00:30:11:27:82:93
	Port 1: 100 FDX
	Port 2: No Link
	Interface Counters Media Counters MQTT Status
	Refresh
	Broker address: 192.168.0.12
	Connection status: Connecting
	Unexpected disconnections: 0
	Connect errors: 57
	Successful publications: 0
	Publication errors too large: 0
	Publication errors other: 0

Fig. 13 Status page

This page shows the current network settings and communication status. This information is mainly intended for troubleshooting.

Network Configuration

The screenshot shows a web-based configuration interface for network settings. It is divided into three main sections: IP Configuration, Ethernet Configuration, and MQTT Configuration. Each section has a 'Save settings' button.

IP Configuration

MODULE	IP Configuration
Overview	DHCP Disabled ▼
Parameters	IP Address 192.168.0.15
NETWORK	Subnet Mask 255.255.255.0
Status	Gateway Address 0.0.0.0
Configuration	Host Name
SERVICES	Domain name
SMTP	DNS Server #1 0.0.0.0
	DNS Server #2 0.0.0.0

Ethernet Configuration

Port 1	Auto ▼
Port 2	Auto ▼

MQTT Configuration

Broker URL	192.168.0.12
Client identifier	
Keep alive time (s)	60
Broker username	
Broker password	
Base topic	
Quality of service	QoS 0 ▼

Fig. 14 Configuration page

IP Configuration

TCP/IP network settings. These parameters can also be configured using *IPconfig*.

Ethernet Configuration

Port 1/2

- 10 HDX = 10 Mbit/s half duplex
- 10 FDX = 10 Mbit/s full duplex
- 100 HDX = 100 Mbit/s half duplex
- 100 FDX = 10 Mbit/s full duplex
- Auto = Automatic mode (default)

MQTT Configuration

Broker URL	The URL of the MQTT broker.
Client identifier	The MQTT ClientID of the Anybus X-gateway IIoT Interface.
Keep alive time (s)	The time interval in seconds between the keep alive messages sent from the client to the broker.
Broker username/ password	Authentication to send to the MQTT broker (if required).
Base topic	The base topic name to use in MQTT messages.
Quality of service	The MQTT QoS level to use.

OPC UA Configuration

TCP port	The TCP port to use for OPC UA. Default = 4840.
Discovery server URL	The URL of the OPC UA discovery server (required for timestamp information).

5 Technical Data

Data sheets and additional documentation including technical specifications and compliance information are available at www.anybus.com/support.

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ftpd.c - This file is part of the FTP daemon for lwIP

Print formatting routines

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Format - lightweight string formatting library.
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Source code for the "strtod" library procedure.

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Buffer-based memory allocator

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