


# Network Interface Appendix

## Anybus<sup>®</sup>-CompactCom USB/Passive

Rev. 1.01

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## About This Document

## How To Use This Document

This document is intended to provide a good understanding of the functionality offered by the Anybus-CompactCom USB/Passive communication module. The document only describes the specific features of the Anybus-CompactCom USB/Passive, i.e. for general information regarding the Anybus-CompactCom platform, consult the Anybus-CompactCom Hardware- and Software Design Guides.

The reader of this document is expected to be familiar with higher level software design, and communication systems in general.

For more information, documentation etc., please visit the HMS website, '[www.anybus.com](http://www.anybus.com)'.

## Important User Information

Anybus-CompactCom and the technology used in Anybus-CompactCom is protected by patent, pending patents, copyright and trademark laws under the United States of America and international law.

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.

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.

<b>Warning:</b>	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.
<b>ESD Note:</b>	This product contains ESD (Electrostatic Discharge) sensitive parts that may be damaged if ESD control procedures are not followed. Static control precautions are required when handling the product. Failure to observe this may cause damage to the product.

## Related Documents

Document	Author
Anybus-CompactCom Software Design Guide	HMS
Anybus-CompactCom Hardware Design Guide	HMS
-	-

## Document History

### Summary of Recent Changes (x.xx - 1.00)

[illegible]

## Revision List

[illegible]

## Conventions & Terminology

The following conventions are used throughout this document:

- Numbered lists provide sequential steps
- Bulleted lists provide information, not procedural steps
- The terms 'Anybus' or 'module' is used when referring to the Anybus-CompactCom module.
- The terms 'host' or 'host application' is used when referring to the hardware and software that hosts the Anybus-CompactCom module.
- Hexadecimal values are written in the format NNNNh, where NNNN is the hexadecimal value.

## Support

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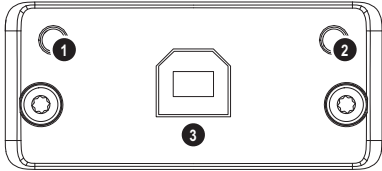
# About the Anybus-CompactCom USB/Passive

## General

The Anybus-CompactCom USB/Passive is a physical layer converter which allows the serial host interface signals to be controlled via USB.

To the USB host, the module appears as a standard communications port (a.k.a. COM-port), which makes it fully transparent to any software using serial communications (i.e. no software modifications are needed to be able to use the module).

## Front View

#	Item	
1	USB Status LED	
2	Power LED	
3	USB Connector	

### USB Status LED

State	Indication
Off	No power - <i>or</i> - not connected to USB host
Green	Connected to USB host

### Power LED

State	Indication
Off	No power
Green	Module powered

### USB Connector

Pin	Signal	Comment
1	+5V	+5V input
2	USBDM	USB communication signals
3	USBDP	
4	GND	Signal GND
Housing	Shield	Cable shield

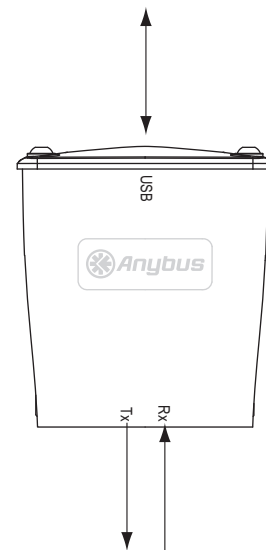


# Operation

## General

The Anybus-CompactCom USB/Passive converts the serial bitstream of the serial host interface to USB and vice versa.

Based on the CP2102 from Silicon Laboratories, the module acts like a standard serial communication port (a.k.a. COM-port).



## Implementation Details

### Supported Baudrates

When using the Virtual COM Port (VCP) drivers, the module supports all common baudrates up to 921.6kbps<sup>1</sup>.

**Note:** The baudrate is set from the host computer side, i.e. it cannot be set by neither the host application nor the Anybus module. Note also that the baudrate must not be confused with the USB operating speed, which is fixed to 12Mbps (full speed) and *cannot* be changed.

### DE (Data Enable) Behaviour

The module acts as a full duplex interface and thus does not use this signal.

### /CA (Communication Active) Behaviour

This signal normally indicates whether the network (In this case USB) is able to exchange data or not (i.e. this signal is active when properly connected to a USB host).

### Reset Behaviour

The USB host will sense a reset as if the USB cable has been disconnected. The /CA signal will indicate to the host application that no communication is possible until the reset is released and the connection to the USB host has been re-established

### Identification Code

The identification code for the Anybus-CompactCom USB/Passive is 03h.

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1. To ensure compatibility with all Anybus-CompactCom products, it is recommended not to use baudrates higher than 115.2kbps.

# Software & Drivers

## General

The Anybus-CompactCom can operate using one of two types of drivers:

- **Virtual COM Port Drivers (VCP)**

When using these drivers, the module appears as a standard communications port (a.k.a. COM-port), which makes it fully transparent to any software using serial communications (i.e. no software modifications are needed to be able to use the module).

Note that the RTS/CTS signals are not available in the Anybus-CompactCom implementation.

- **Advanced Drivers**

For more information, see A-1 “Advanced Functionality”.

**Important Note:** The use of this driver is not supported by HMS.

## Supported Platforms (VCP Driver)

The Virtual COM Port drivers supports the following platforms:

- **Microsoft Windows™ 2000**

Separate driver required. For more information, see 3-2 “Windows 2000”

- **Microsoft Windows™ XP**

For more information, see 3-2 “Windows XP”

- **Microsoft Windows™ 98SE**

Separate driver required. For more information, see 3-3 “Windows 98SE”

- **Mac OS 9**

Mac OS-9 VCP drivers are currently available by request only. To obtain a copy of these drivers, contact a Silicon Laboratories MCU Tools Support representative at [www.silabs.com](http://www.silabs.com).

- **Mac OS-X**

Separate driver required. For more information, see 3-3 “Mac OS X”.

- **Linux (kernel 2.40 or higher)**

Separate driver required. For more information, see 3-3 “Linux”.

## Driver Installation

This section describes the installation process for the most common operating systems. For other platforms, consult the installation guides provided with the driver.

### Windows 2000

Before proceeding, download the latest VCP drivers for Windows 2000 from the HMS website and extract them to a temporary location on your PC.

Follow these steps to install the VCP driver:

1. Connect the USB cable between the host computer and the CP2102 target device.
2. Windows will open a 'Found New Hardware Wizard' window. Press Next to continue.
3. Select 'Search for a suitable driver for my device (recommended)' and press Next.
4. Check 'Specify a location' and press Next.
5. Press Browse to locate the files extracted earlier. Once this directory is selected press Next.
6. Verify that the correct path and filename are shown and press Next.
7. Press Finish to finish installing the 'CP210x USB Composite Device'.
8. Windows will open a second 'Found New Hardware Wizard' window. Press Next to continue.
9. Select 'Search for a suitable driver for my device (recommended)' and press Next.
10. Check 'Specify a location' and press Next.
11. Press Browse to locate the 'slabw2k.inf' driver installation file. Once this file is selected press OK.
12. Verify that the correct path and filename are shown and press Next.
13. Press Finish to finish installing the 'CP210x USB to UART Bridge Controller'.

### Windows XP

Before proceeding, download the latest VCP drivers for Windows XP from the HMS website and extract them to a temporary location on your PC.

Generally, no driver is needed. To manually install the VCP driver, perform the following steps:

1. Connect the USB cable between the host computer and the CP2102 target device.
2. Windows will open a 'Found New Hardware Wizard' window.
3. Select 'Install from a list or specific location (Advanced)' and press Next.
4. Select 'Include this location in the search'.
5. Press Browse to locate the files extracted earlier. Once this directory is selected press Next.
6. Verify that the correct path and filename are shown and press Next.
7. Press Finish to finish installing the 'CP210x USB Composite Device'.
8. Windows will open a second 'Found New Hardware Wizard' window.
9. Select 'Install from a list or specific location (Advanced)' and press Next.
10. Select 'Include this location in the search'.
11. Press Browse to locate the 'C:\SiLabs\MCU\CP210x\WIN' directory. Once this directory is selected press OK.
12. Verify that the correct path and filename are shown and press Next.
13. Press Finish to finish installing the 'CP210x USB to UART Bridge Controller'.

## Windows 98SE

Before proceeding, download the latest VCP drivers for Windows 98SE from the HMS website and extract them to a temporary location.

Follow these steps to install the VCP driver:

1. Connect the USB cable between the host computer and the CP2102 target device.
2. Windows will open a 'Found New Hardware Wizard' window. Press Next to continue.
3. Select 'Search for the best driver for your device (Recommended)' and press Next.
4. Select 'Specify a location'.
5. Press Browse to locate the files extracted earlier. Once this directory is selected press Next.
6. Verify that the correct path and filename are shown and press Next.
7. Press Finish to finish installing the 'CP210x USB Composite Device'.
8. Windows will open a second 'Found New Hardware Wizard' window. Press Next to continue.
9. Select 'Search for the best driver for your device (Recommended)' and press Next.
10. Select 'Specify a location'.
11. Press Browse to locate the 'C:\SiLabs\MCU\CP210x\WIN' directory. Once this directory is selected press Next.
12. Verify that the correct path and filename are shown and press Next.
13. Press Finish to finish installing the 'CP210x USB to UART Bridge Controller'.

## Mac OS X

Before proceeding, download the latest VCP drivers for Mac OS X from the HMS website and extract them to a temporary location.

To install the Macintosh OS X virtual COM port driver, extract 'cardinal-osx-V1\_00c-release.zip', and run the extracted file 'SLAB\_USBtoUART Installer'.

To uninstall the driver, run the extracted file 'SLAB\_USBtoUART Uninstaller'.

## Linux

Before proceeding, download the latest VCP drivers for Linux from the HMS website and extract them to a temporary location. The drivers support kernel versions 2.40 and later.

To install the driver, extract 'cardinal-redhat9-V0\_81a.tar', and run the extracted file 'load\_mcci\_usb'.

To uninstall the driver, run the extracted file 'unload\_mcci\_usb'.

# Advanced Functionality

## General

**Important Note:** *HMS offer no technical support for the CP210x Host API. All questions regarding this functionality shall be addressed to Silicon Laboratories ([www.silabs.com](http://www.silabs.com)).*

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The CP210x Host API gives access to additional advanced functionality through a dedicated software library. The available functions are listed in the CP210x Device Customization Guide which can be downloaded from Silicon Laboratories' website ([www.silabs.com](http://www.silabs.com)).

In the case of the Anybus-CompactCom, certain restrictions apply:

- Modem/handshaking/GPIO signals are not available (except DTR, see below)
- The DTR signal on the CP2102 is connected to the /CA signal on the host connector
- To ensure compatibility with all Anybus-CompactCom products, it is recommended not to use baudrates beyond 115.2kbps

## Supported Platforms

The CP210x Host API Functions are supported on the following platforms:

- **Microsoft Windows™ 2000**
- **Microsoft Windows™ XP**
- **Microsoft Windows™ 98SE**

# Technical Specification

## Features

### Hardware Features

- Complies to the Anybus-CompactCom host interface for passive modules
- Galvanically isolated USB-interface
- Based on the CP2102 chip from Silicon Laboratories ([www.silabs.com](http://www.silabs.com))
- USB status indication (on-board LED)
- Supports 7 or 8 Data Bits, 1 or 2 Stop Bits and Odd/Even/Mark/Space/No Parity
- Supports all common baudrates from 300bps to 921.6kbps
- USB 1.1 and USB 2.0 compatible
- Full Speed Device (12Mbit/s)<sup>1</sup>
- On-board EEPROM programmable via USB

### Virtual Com Port (VCP) Drivers

These drivers acts as a standard communications port in the following operating systems:

- Windows 98SE
- Windows 2000
- Windows XP
- MAC OS-X
- Linux 2.40 and greater

### Advanced Functionality

Additional advanced functionality is available through the CP210x Host API on the following platforms:

- Windows 98SE
- Windows 2000
- Windows XP

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1. Not to be confused with the operating baudrate on the Anybus-CompactCom host interface.

## Electrical Characteristics

### Protective Earth (PE) Requirements

In order to ensure proper EMC behaviour, the module must be properly connected to protective earth via the PE pad / PE mechanism described in the general Anybus-CompactCom Hardware Design Guide.

### Power Supply

#### Supply Voltage

The module requires a regulated 3.3V power source as specified in the general Anybus-CompactCom Hardware Design Guide.

#### Power Consumption

The Anybus-CompactCom USB/Passive is designed to fulfil the requirements of a Class A module. For more information about the power consumption classification used on the Anybus-CompactCom platform, consult the general Anybus-CompactCom Hardware Design Guide.

The current hardware design consumes up to 50mA<sup>1</sup>.

**Note:** It is strongly advised to design the power supply in the host application based on the power consumption classifications described in the general Anybus-CompactCom Hardware Design Guide, and not on the exact power requirements of a single product.

## EMC Compliance

Consult the Anybus-CompactCom Hardware Design Guide for further information.

## Environmental Specification

Consult the Anybus-CompactCom Hardware Design Guide for further information.

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1. Note that in line with HMS policy of continuous product development, we reserve the right to change the exact power requirements of this product without prior notification. Note however that in any case, the Anybus-CompactCom USB/Passive will remain as a Class A module.

