

Anybus[®] CompactCom[™] Adapter Board for Raspberry Pi
INSTALLATION GUIDE

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Important User Information

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1. Preface

1.1. About this Document

This document is intended to provide a good understanding of how to install and get started using the Anybus CompactCom Adapter Board for Raspberry Pi.

The reader of this document is expected to be familiar with hardware design and communication systems in general. For additional related documentation and file downloads, please visit the support website at www.hms-networks.com.

1.2. Related Documents

Document	Author	Document ID
Anybus CompactCom 40 Software Design Guide	HMS	HMSI-216-125
Anybus CompactCom M40 Hardware Design Guide	HMS	HMSI-216-126
Anybus CompactCom Host Application Implementation Guide	HMS	HMSI-27-334
Anybus CompactCom 40 Network Guides (separate document for each supported fieldbus or network system)	HMS	-

1.3. Document History

Version	Date	Description
1.0	2023-11-07	First release
1.1	2023-12-15	Updated information about Raspberry Pi model compatibility
1.2	2024-04-09	Updated information about Raspberry Pi model compatibility Updated information in chapters Configuration and Host Interfaces
1.3	2024-10-29	Updated information about Raspberry Pi model compatibility

1.4. Trademark Information

Anybus® is a registered trademark of HMS Industrial Networks AB.

Raspberry Pi is a trademark of Raspberry Pi Ltd.

All other trademarks are the property of their respective holders.

1.5. Document Conventions

Lists

Numbered lists indicate tasks that should be carried out in sequence:

1. First do this
2. Then do this

Bulleted lists are used for:

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

User Interaction Elements

User interaction elements (buttons etc.) are indicated with bold text.

Program Code and Scripts

```
Program code and script examples
```

Cross-References and Links

Cross-reference within this document: [Document Conventions \(page 1\)](#)

External link (URL): www.hms-networks.com

Safety Symbols



DANGER

Instructions that must be followed to avoid an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

Instructions that must be followed to avoid a potential hazardous situation that, if not avoided, could result in death or serious injury.



CAUTION

Instruction that must be followed to avoid a potential hazardous situation that, if not avoided, could result in minor or moderate injury.



IMPORTANT

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

Information Symbols



NOTE

Additional information which may facilitate installation and/or operation.



TIP

Helpful advice and suggestions.

2. General Information

The Raspberry Pi is an alternative platform on which the Anybus CompactCom can be evaluated. An adapter board, similar to a “HAT” (Hardware Attached on Top) specified by Raspberry Pi community, is provided by Anybus to enable a simple hardware interface towards the Anybus CompactCom module. Along with the adapter board comes a version of the host application example code ported to the Raspberry Pi. The host application example code contains a driver for the CompactCom 40-series and an example of a simple host application to help a developer to get started.

2.1. Disclaimer

The Anybus CompactCom Adapter Board is not tested, nor verified, for integration into commercial products. The intended use is for evaluation of the Anybus CompactCom only.

3. Starter Kit Contents

- Anybus CompactCom 40 Adapter Board (for Raspberry Pi 3 model B+ and later)
- 4 plastic spacers

4. Required Items

The following items are required, but not included in the starter kit.

Hardware:

- Anybus CompactCom 40 module - Consumption Class A or B
- Network cable for Anybus CompactCom
- Raspberry Pi¹
The following models have been tested for compatibility:

- Raspberry Pi 3 model B+
- Raspberry Pi 4 model B
- Raspberry Pi Compute Module 4
- Raspberry Pi 5
- Raspberry Pi Zero W
- Raspberry Pi Zero 2 W

- Micro-SD card (minimum 16 GB)
- Micro-SD card reader
- Power source 5 VDC / ≥3A
- Monitor
- Keyboard
- Mouse

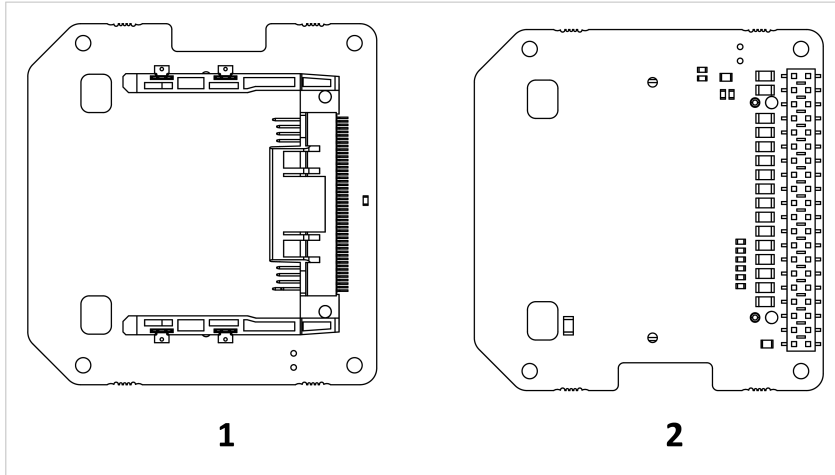
Software

- **HMS Networks Software**
 - Host Application Example Code (zip file downloaded from www.hms-networks.com) version 3.12 or later.
- **Third Party Software**
 - Raspberry Pi OS

¹If the Raspberry Pi Compute Module 4 is used, the associated IO Board is needed.

5. Hardware Overview

5.1. Connectors



1. Top side
2. Bottom side

Figure 1. Top and bottom view of the Anybus CompactCom Adapter Board for Raspberry Pi

The Raspberry Pi GPIO female connector on the bottom side is a 2x20 pin socket header that physically covers the entire 40W GPIO male header of the Raspberry Pi. The host application example code port for the Raspberry Pi in combination with the Anybus CompactCom Adapter Board is using the pins of the Raspberry Pi GPIO header as seen in [Raspberry Pi GPIO header pins used by the Anybus CompactCom Adapter Board \(page 6\)](#).

J8						
Anybus	Name	Pin		Pin	Name	Anybus
	3.3V	1	⊠	2	5V	
	GPIO02	3	⊙	4	5V	
	GPIO03	5	⊙	6	GND	
	GPIO04	7	⊙	8	GPIO14	Rx
	GND	9	⊙	10	GPIO15	Tx/OM3
/RESET	GPIO17	11	⊙	12	GPIO18	
MD0	GPIO27	13	⊙	14	GND	
MD1	GPIO22	15	⊙	16	GPIO23	MI0
	3.3V	17	⊙	18	GPIO24	MI1
SPI_MOSI	GPIO10	19	⊙	20	GND	
SPI_MISO	GPIO09	21	⊙	22	GPIO25	
SPI_CLK	GPIO11	23	⊙	24	GPIO08	/SPI_SS
	GND	25	⊙	26	GPIO07	
	GPIO00	27	⊙	28	GPIO01	
OM0	GPIO05	29	⊙	30	GND	
OM1	GPIO06	31	⊙	32	GPIO12	
OM2	GPIO13	33	⊙	34	GND	
Tx/OM3*	GPIO19	35	⊙	36	GPIO16	
/IRQ	GPIO26	37	⊙	38	GPIO20	
	GND	39	⊙	40	GPIO21	

*Tx/OM3 is connected via 2,2kΩ series resistor.

Figure 2. Raspberry Pi GPIO header pins used by the Anybus CompactCom Adapter Board

The Anybus CompactCom is fed power through the Anybus CompactCom connector from the 3.3V pins on the Raspberry Pi GPIO header, via the adapter board. The two 5V pins on the Raspberry Pi GPIO header are unconnected.

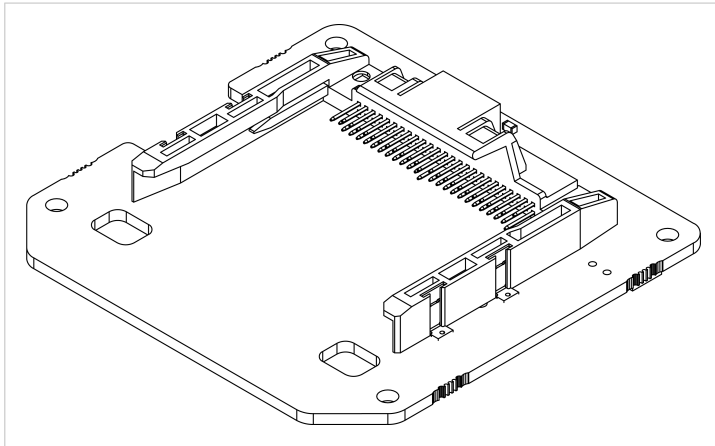


Figure 3. Anybus CompactCom connector on the top side of the adapter board

5.2. Assembly



Assembly of Anybus CompactCom 40 module, Adapter Board, and Raspberry Pi 4 model B

Figure 4. Adapter Board Assembly

The setup in [Adapter Board Assembly \(page 7\)](#) includes the plastic spacers that can be mounted in each corner of the Adapter Board and Raspberry Pi. It is recommended to use these spacers to provide rigidity to the assembly. If these spacers are used, the GPIO header pins are supposed to show some metal, do not try to push the Adapter Board all the way down.

5.3. System Setup

A basic block diagram of how the system can be set up is presented in [Block diagram of hardware system setup](#). (page 8).

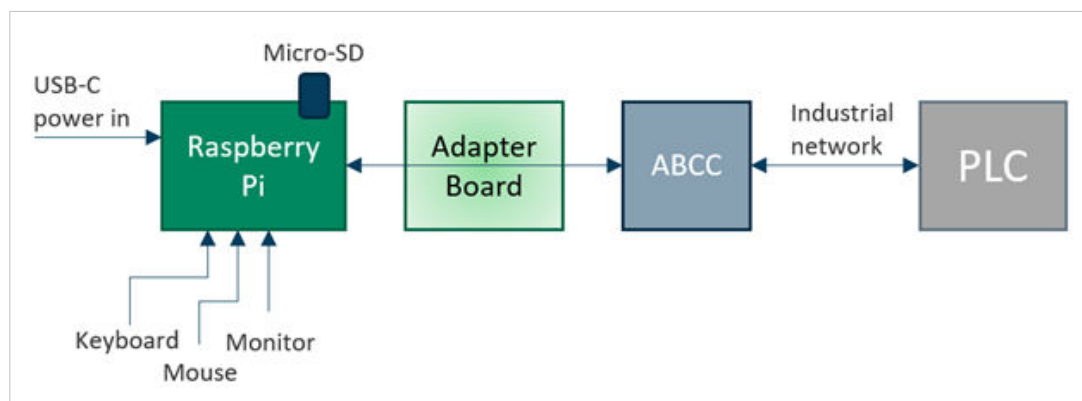


Figure 5. Block diagram of hardware system setup.

6. Configuration

6.1. Setting Up the Raspberry Pi

1. First, install the 64-bit Raspberry Pi OS on the micro-SD card using Raspberry Pi Imager. More information can be found on [raspberrypi.com](https://www.raspberrypi.com).
2. Insert the micro-SD card into the micro-SD card slot on the Raspberry Pi.
3. Connect the adapter board to the Raspberry Pi with the plastic spacers.
4. Insert the CompactCom into the adapter board.
5. Connect keyboard, mouse, and screen to the Raspberry Pi.
6. Connect power to the Raspberry Pi.
7. The Raspberry Pi should now boot. Follow the steps of the “Welcome to Raspberry Pi” service. Connect to your Wi-Fi network if available, otherwise skip this step in the service.
8. The libgpod header file `gpod.h` is not installed by default. Open a terminal window and run `apt install libgpod-dev` to fetch this from the repositories.
9. Download the host application example code zip file from www.hms-networks.com to the Raspberry Pi and then unzip the folder. The folder will contain another folder named *Projects* in which only the ported project in the folder named *RaspberryPi* is required.

7. Host Interfaces

The supported Anybus CompactCom host interfaces for the Raspberry Pi adapter board are SPI and serial (UART), where SPI is set to run by default. The host interface is chosen in *abcc_adapt/abcc_drv_cfg.h* in the host application example code, see the Anybus CompactCom Host Application Implementation Guide for more information.

7.1. SPI Interface

The SPI interface uses a clock frequency of 12,5 MHz. This interface has a higher data rate than the serial interface. To use the SPI interface it must be enabled via the Raspberry Pi Configuration tool.

Go to **Applications Menu**→**Preferences**→**Raspberry Pi Configuration** and type your password if prompted. In the Raspberry Pi Configuration menu, go to **Interfaces** and enable SPI.

7.2. Serial Interface

The UART port in the GPIO connector is normally set up as the system console, this must be changed via the "Raspberry Pi Configuration" tool if the UART is to be used for the Anybus CompactCom.

Go to **Applications Menu**→**Preferences**→**Raspberry Pi Configuration** and type your password if prompted. In the Raspberry Pi Configuration menu, go to **Interfaces**, enable Serial Port, and disable Serial Console.

The highest verified serial baud rate is 115.2 kbps.

8. Example Application

8.1. Compile

To compile and build the host application example code, open a terminal window and navigate to the root folder of the Raspberry Pi ported project. In there, type `make release` and if there are no compile errors this will create an executable file.



NOTE

It is assumed that GNU Make and GCC is available which it should if Raspberry Pi OS is used.

8.2. Execute

To execute, or “run”, the host application example code, open a terminal window and navigate to the root folder of the Raspberry Pi ported project. In there, type `./main` and the program should now be running. The Anybus CompactCom will start up and its LED lights should be blinking. The terminal will output the state of the Anybus CompactCom. When the Anybus CompactCom is in `WAIT_PROCESS` state, it is ready to be configured and to communicate on an industrial network.

8.3. Terminate

To terminate the host application example code, press **q** on the keyboard in the terminal window that is running the program.

8.4. Develop

For more information on how to customize and extend the simple host application in the host application example code, see the Anybus CompactCom 40 Host Application Implementation Guide.

9. Industrial Network Communication

Communicating on an industrial network requires connecting your device to a network master, when a connection has been established successfully, the Anybus CompactCom will enter PROCESS_ACTIVE state. The course of action differs depending on the network in question and is out of the scope of this document. For more information, see the appropriate Network Guide.

Appendix A. Electrical Schematic

