Anybus® CompactCom Starter Kit

REFERENCE GUIDE

HMSI-27-224 2.2 en-US ENGLISH

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1 Preface

1.1 About this Document

This document is intended to provide a good understanding of how to install the Anybus CompactCom Starter Kit. It does not cover any of the network specific features offered by the Anybus CompactCom products; this information is available in the appropriate Network Guide.

The reader of this document is expected to be familiar with hardware design and communication systems in general. For additional information, documentation, support etc., please visit the support website at www.anybus.com/support.

1.2 Related Documents

Document	Author	Document ID
Anybus CompactCom 40 Software Design Guide	HMS	HMSI-216-125
Anybus CompactCom 30 Software Design Guide	HMS	HMSI-168–97
Anybus CompactCom 40 Hardware Design Guide	HMS	HMSI-216–126
Anybus CompactCom 30 Hardware Design Guide	HMS	HMSI-168–31
Anybus CompactCom B40–1 Design Guide	HMS	HMSI-27-230
Anybus CompactCom B30 Design Guide	HMS	HMSI-227–242
Anybus CompactCom Host Application Implementation Guide	HMS	HMSI-27-334
Anybus CompactCom Network Guides (separate document for each supported fieldbus or network system)	HMS	

1.3 Document history

Version	Date	Description
1.00	2014-05-26	First revision
1.10	2014-12-12	Misc. corrections
2.0	2018-01-09	Moved to DOX General update
2.1	2018-11-08	Updates to figures of USB card and to description of control switches
2.2	2019-02-25	Rebranded

1.4 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.
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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.

1.5 Document Specific Conventions

- The terms “Anybus” or “module” refers to the Anybus CompactCom module.
- The terms “host” or “host application” refer to the device that hosts the Anybus.
- Hexadecimal values are written in the format NNNNh or 0xNNNN, where NNNN is the hexadecimal value.
- A byte always consists of 8 bits.
- All dimensions in this document have a tolerance of ±0.20mm unless otherwise stated.
- Outputs are TTL compliant unless otherwise stated.
- Signals which are “pulled to GND” are connected to GND via a resistor.
- Signals which are “pulled to 3V3” are connected to 3V3 via a resistor.
- Signals which are “tied to GND” are directly connect GND,

- Signals which are “tied to 3V3” are directly connected to 3V3.

1.6 Trademark Information

2 General Information

The Anybus CompactCom Starter Kit is a development kit for the Anybus CompactCom platform (chip, brick and module), which gives designers instant access to the capabilities of the Anybus CompactCom range of products.

The kit allows both quick demonstration and in depth evaluation capabilities, and enables a potential application to be designed and debugged into an advanced stage.

2.1 Package Contents

Depending on configuration, the Anybus CompactCom Starter Kit package consists of the following items:

- Configuration 1 (Anybus CompactCom M40/M30):
  - HMS USB development board
  - Power adapter with cable, 24 V
  - USB cable
  - Option board module
  - Front cover
  - Torx key T8
  - CompactCom host connector
  - Expansion board
- Configuration 2 (Anybus CompactCom M40/M30 without housing):
  - HMS USB development board
  - Power adapter with cable, 24 V
  - USB cable
  - Option board module without housing
  - Mounting kit
  - Torx key T9
  - 3M connector
  - Samtec connector
  - Expansion board
- Configuration 3 (Anybus CompactCom B40):
  - HMS USB development board
  - Power adapter with cable, 24 V
  - USB cable
  - Option board brick
  - Mounting screws (3 pcs) for brick and connector board

3 Description

3.1 General Information

The starter kit package includes a development board, which can be used to develop networking applications via the host interface channels of the Anybus CompactCom module. Depending on selected starter kit , the kit includes either an option board for Anybus CompactCom M40/M30 (module) or Anybus CompactCom B40 (brick).

The development board connects to a standard USB2 port, and operates at 24 V ±20%.

The Anybus CompactCom B40 option board as well as the expansion board, included with the Anybus CompactCom M40/M30 option board, both provide in-circuit access to all signals of the Anybus CompactCom host interface, allowing in-circuit debugging and evaluation capacities. These boards operate at 3.3 VDC.

3.2 Option Board Overview (Module)

The starter kit holds two PCBs joined as shown in the picture. An optional module, with or without housing, or an expansion board (see *Expansion Board Overview, p. 10*), can be connected to the top board (1).

All three contacts have to be joined as shown for correct functionality. Any other position of the upper PCB will result in the starter kit not working.

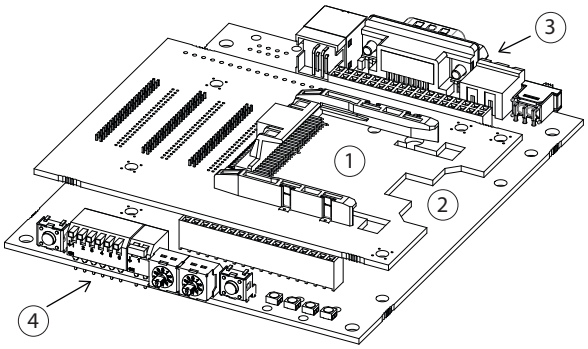


Fig. 1

No	Description
1	Module adapter card
2	USB base board
3	See *Connectors, p. 8*.
4	See *Control Switches, p. 9*.

3.2.1 Connectors

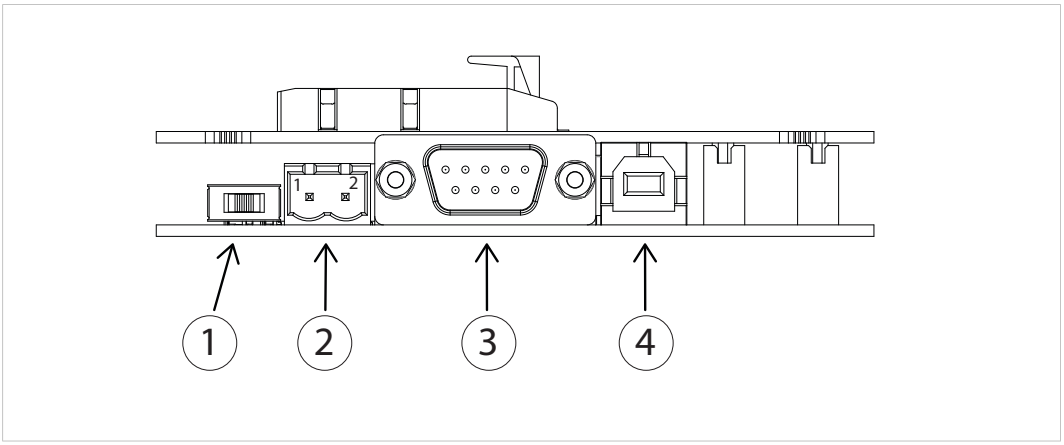


Fig. 2

No	Description
1	Power switch
2	Power connector (24 V) 1: 24 V 2: GND
3	RS-232 connector
4	USB2 connector

3.2.2 Control Switches

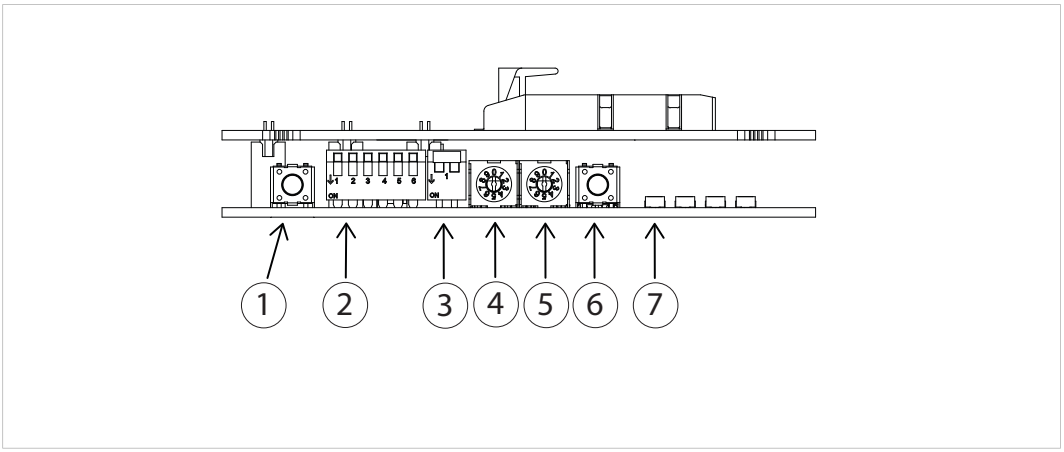


Fig. 3

No.	Description
1	Reset button. Triggers a hardware reset of the board..
2	Control Switch **Note**: Switch 1 and 2 should be OFF when the Anybus CompactCom is controlled via a Transport Provider path. 1 OFF: Power to the Anybus CompactCom is controlled by the presence of a Transport Provider path from the PC side. ON: Power to the Anybus CompactCom is always on. 2: OFF: The Anybus CompactCom operation mode and the reset signals are controlled via the Transport Provider path from the PC side. ON: The operating mode is set to [0,0,0,0] (OM[0.. 3]), and the reset signal is deactivated. 3 - 6: (not used)
3	Reserved. Shall always be ON
4	This switch controls linking of the serial RX/TX signals between the three serial interfaces on the board: the USB Transport Provider serial channel, the serial application interface of the Anybus CompactCom, and the RS-232 connector, see *Connectors, p. 8* **Note**: Set the switch to position 2 when the Anybus CompactCom is controlled via a Transport Provider path. 0: No interfaces are linked 1: The USB Transport Provider serial channel and the serial application interface of the Anybus CompactCom are linked. The RS-232 connector is unconnected. 2: The RS-232 connector and the serial application interface of the Anybus CompactCom are linked. The USB Transport Provider serial channel is unconnected 3: The USB Transport Provider serial channel and the RS-232 connector are linked. The serial application interface of the Anybus CompactCom is unconnected 4 - 9: Reserved.
5	Board ID switch. If several USB boards are connected to the same PC, each board must have a unique ID. Note that the ID is stored with the other Transport Path-related settings on the PC side when a Transport Provider path is created. If the ID is changed, any corresponding Transport Provider paths must to be reconfigured to match the new ID.
6	(not used)
7	Dual color LEDs. Only the LED to the left is used. Off: No power to the Anybus CompactCom module Green: Power on or Control Switch 1 is on (see no. 2 above) Red: Power off, path closed correctly

3.3 Expansion Board Overview

The Anybus CompactCom Expansion Board is plugged into the host application connector of the development board and provides in-circuit access to all signals of the Anybus CompactCom host interface, allowing in-circuit debugging and evaluation capacities. Any Anybus CompactCom , with or without housing, can be connected to this board.

The expansion board operates at 3.3 VDC, supplied from the development board connector.

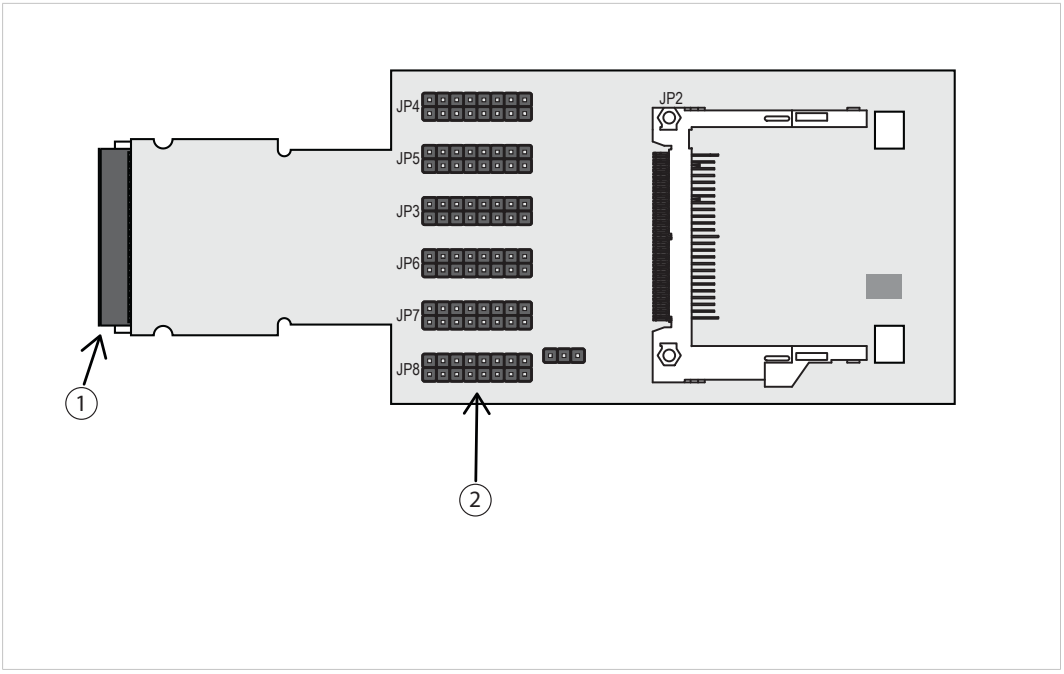


Fig. 4

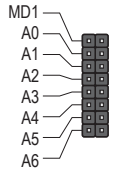
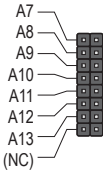
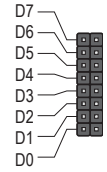
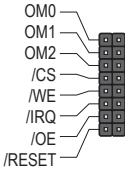
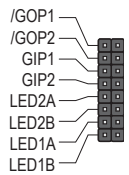
No	Description
1	Connector to development board (host application interface)
2	See *Host Interface Signals, p. 11*

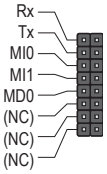
3.3.1 Host Interface Signals

The Anybus CompactCom host interface signals are available through six 16-pin headers (2.54 mm).

- The upper row of each header is connected to signal ground.
- The lower row of each header holds the host interface signals.

Depending on operating mode, the pins have different names and different functionality. Presented below is an overview of all pins.

Header	Signal Name Printed on Board	Signal Name				
		Serial Mode	Shift Register	SPI Mode	8-bit Mode	16-bit Mode
JP4 	MD1	MD1	MD1	MD1	MD1	MD1
	A0	DIP1_0	DIP1_0	DIP1_0	A0	$\overline{\text{WEH}}$
	A1	DIP1_1	DIP1_1	DIP1_1	A1	A1
	A2	DIP1_2	DIP1_2	DIP1_2	A2	A2
	A3	DIP1_3	DIP1_3	DIP1_3	A3	A3
	A4	DIP1_4	DIP1_4	DIP1_4	A4	A4
	A5	DIP1_5	DIP1_5	DIP1_5	A5	A5
	A6	DIP1_6	DIP1_6	DIP1_6	A6	A6
JP5 	A7	DIP1_7	DIP1_7	DIP1_7	A7	A7
	A8		$\overline{\text{LD}}$	$\overline{\text{SS}}$	A8	A8
	A9		SCLK	SCLK	A9	A9
	A10		DO	MISO	A10	A10
	A11		DI	MOSI	A11	A11
	A12	ASM RX			A12	A12
	A13	ASM TX			A13	A13
	(NC)					
JP3 	D7	DIP2_7	DIP2_7	DIP2_7	D7	D7
	D6	DIP2_6	DIP2_6	DIP2_6	D6	D6
	D5	DIP2_5	DIP2_5	DIP2_5	D5	D5
	D4	DIP2_4	DIP2_4	DIP2_4	D4	D4
	D3	DIP2_3	DIP2_3	DIP2_3	D3	D3
	D2	DIP2_2	DIP2_2	DIP2_2	D2	D2
	D1	DIP2_1	DIP2_1	DIP2_1	D1	D1
	D0	DIP2_0	DIP2_0	DIP2_0	D0	D0
JP6 	OM0	OM0	OM0	OM0	OM0	OM0
	OM1	OM1	OM1	OM1	OM1	OM1
	OM2	OM2	OM2	OM2	OM2	OM2
	$\overline{\text{CS}}$				$\overline{\text{CS}}$	$\overline{\text{CS}}$
	$\overline{\text{WE}}$		CT		$\overline{\text{WE}}$	$\overline{\text{WEL}}$
	$\overline{\text{IRQ}}$		PA	$\overline{\text{IRQ}}$	$\overline{\text{IRQ}}$	$\overline{\text{IRQ}}$
	$\overline{\text{OE}}$				$\overline{\text{OE}}$	$\overline{\text{OE}}$
	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$
JP7 	$\overline{\text{GOP1}}$	$\overline{\text{LED4A}}$	$\overline{\text{LED4A}}$	$\overline{\text{LED4A}}$	$\overline{\text{LED4A}}$	D15
	$\overline{\text{GOP0}}$	$\overline{\text{LED4B}}$	$\overline{\text{LED4B}}$	$\overline{\text{LED4B}}$	$\overline{\text{LED4B}}$	D14
	GIP1	$\overline{\text{LED3A}}$	$\overline{\text{LED3A}}$	$\overline{\text{LED3A}}$	$\overline{\text{LED3A}}$	D13
	GIP0	$\overline{\text{LED3B}}$	$\overline{\text{LED3B}}$	$\overline{\text{LED3B}}$	$\overline{\text{LED3B}}$	D12
	LED2A	LED2A	LED2A	LED2A	LED2A	D11
	LED2B	LED2B	LED2B	LED2B	LED2B	D10
	LED1A	LED1A	LED1A	LED1A	LED1A	D9
	LED1B	LED1B	LED1B	LED1B	LED1B	D8

Header	Signal Name Printed on Board	Signal Name				
		Serial Mode	Shift Register	SPI Mode	8-bit Mode	16-bit Mode
JP8 	RX	RX	ASM RX	ASM RX	ASM RX	ASM RX
	TX	TX / OM3	ASM TX / OM3	ASM TX / OM3	ASM TX / OM3	ASM TX / OM3
	MI0	MI0	MI0	MI0/SYNC	MI0/SYNC	MI0/SYNC
	MI1	MI1	MI1	MI1	MI1	MI1
	MD0	MD0	MD0	MD0	MD0	MD0
	(NC)					
	(NC)					
	(NC)					

Please refer to the Anybus CompactCom M40/M30 Hardware Design Guide for more information.

3.4 Option Board Overview (Brick)

The option board for brick provides in-circuit access to all signals of the Anybus CompactCom host interface, allowing in-circuit debugging and evaluation capacities.

The option board operates at 3.3 VDC.

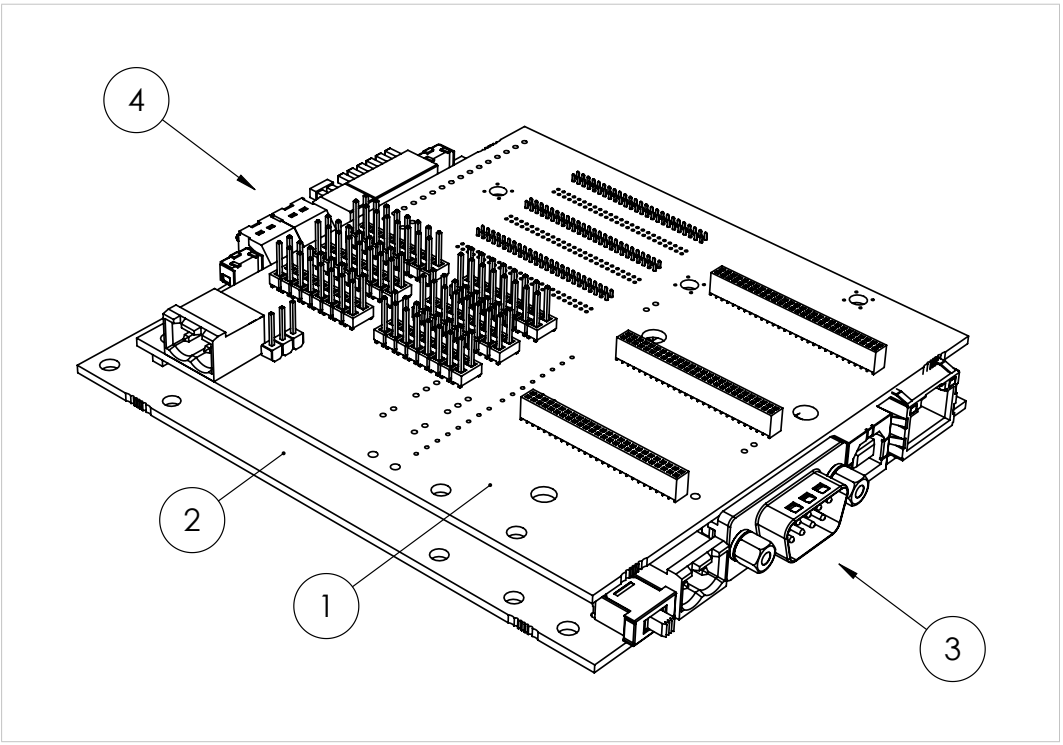


Fig. 5

No	Description
1	Brick adaptor card
2	USB base board
3	See *Connectors, p. 8*.
4	See *Control Switches, p. 9*.

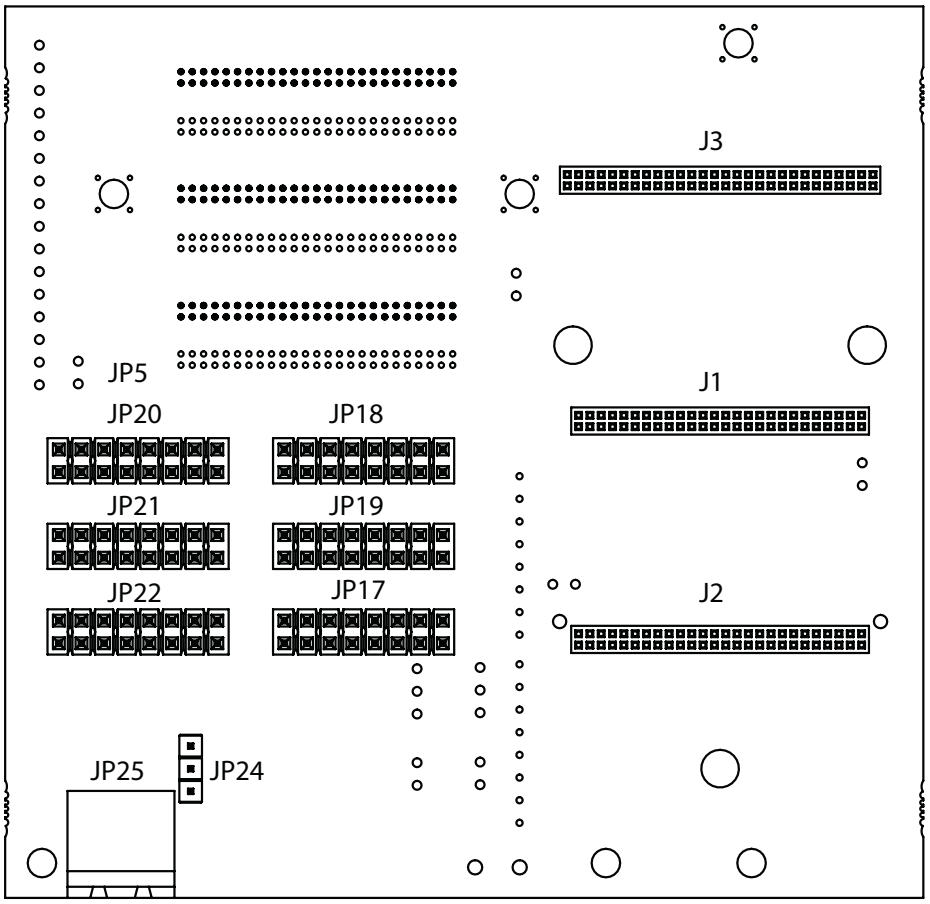
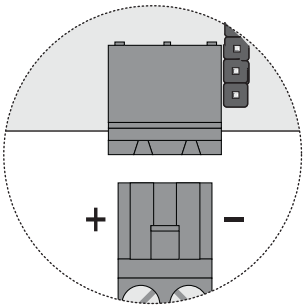


Fig. 6

Header/Connector	Description
JP5	Reserved, do not use
JP3	Host application interface of brick
JP1	Network interface of brick
JP2	Network interface of connector board
JP17 - JP22	Headers providing access to Anybus CompactCom host interface signals, see *Host Interface Signals, p. 16*
JP24	See *Power Source Selection (JP24), p. 15*
JP25	See *External Power Connector (JP25), p. 14*

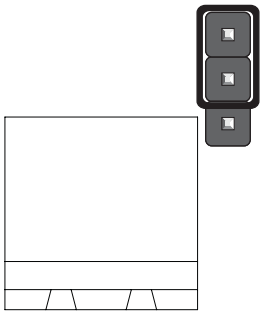
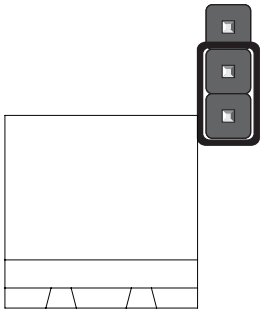
3.4.1 External Power Connector (JP25)

Details	Connector (Male)
The connector can be used to power the Anybus CompactCom module from en external power source. The board has no on board power regulation, i.e. it is required to use a regulated 3.3 VDC power source as specified by the Anybus CompactCom M40/M30 Hardware Design Guide.	

> **!** Exceeding the specified voltage WILL cause irreparable damage to the Anybus CompactCom and/or the host application.

3.4.2 Power Source Selection (JP24)

The power for the expansion board can be supplied either from the development board connector (1) or from an external power source (4).

Power Source	Jumper Location
Internal (via developmnet board connector)	 1-2
External (via external power connector)	 2-3

3.4.3 Host Interface Signals

The Anybus CompactCom host interface signals are available through six 16-pin headers (2.54 mm).

- The lower row of each header is connected to signal ground.
- The upper row of each header holds the host interface signals.

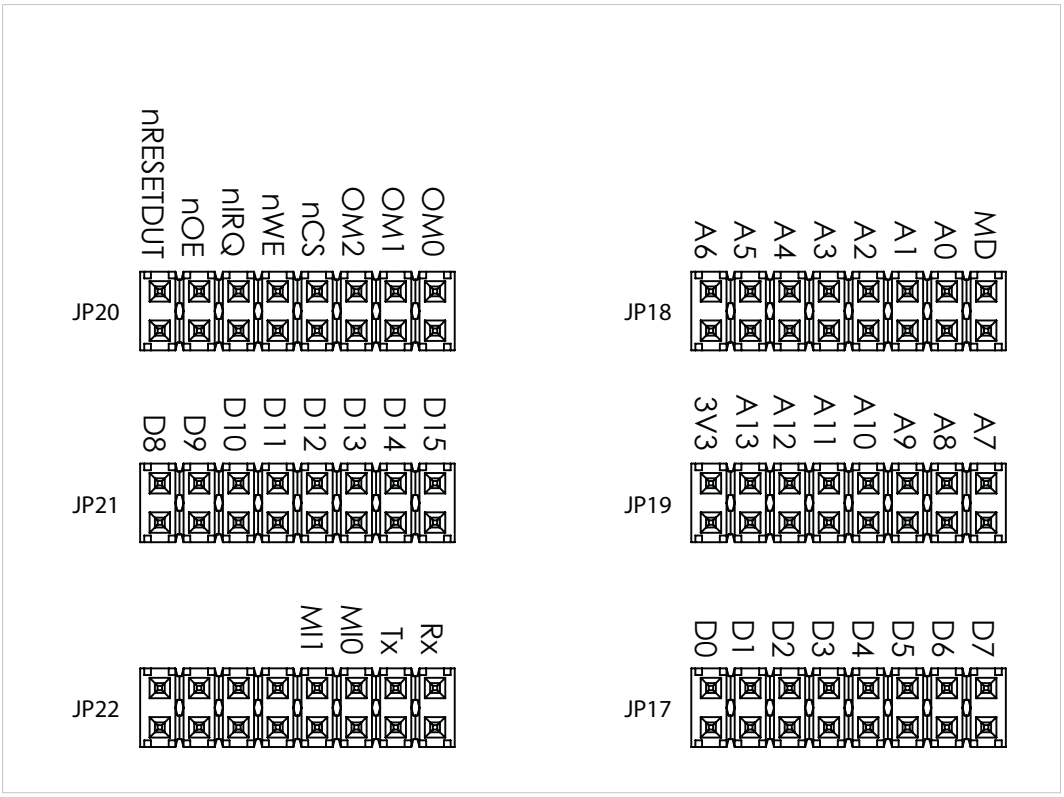


Fig. 7

Depending on operating mode, the pins have different names and different functionality. Presented below is an overview of all pins.

Header	Signal Name Printed on Board	Signal Name				
		Serial Mode	**Shift Register**	**SPI Mode**	**8-bit Mode**	**16-bit Mode**
JP18	MD	MD0	MD0	MD0	MD0	MD0
	A0	DIP1_0	DIP1_0	DIP1_0	A0	WEH
	A1	DIP1_1	DIP1_1	DIP1_1	A1	A1
	A2	DIP1_2	DIP1_2	DIP1_2	A2	A2
	A3	DIP1_3	DIP1_3	DIP1_3	A3	A3
	A4	DIP1_4	DIP1_4	DIP1_4	A4	A4
	A5	DIP1_5	DIP1_5	DIP1_5	A5	A5
	A6	DIP1_6	DIP1_6	DIP1_6	A6	A6
JP19	A7	DIP1_7	DIP1_7	DIP1_7	A7	A7
	A8		$\overline{LD}$	$\overline{SS}$	A8	A8
	A9		SCLK	SCLK	A9	A9
	A10		DO	MISO	A10	A10
	A11		DI	MOSI	A11	A11
	A12	ASM RX			A12	A12
	A13	ASM TX			A13	A13
	3V3	3V3	3V3	3V3	3V3	3V3

Header	Signal Name Printed on Board	Signal Name				
		Serial Mode	**Shift Register**	**SPI Mode**	**8-bit Mode**	**16-bit Mode**
JP17	D7	DIP2_7	DIP2_7	DIP2_7	D7	D7
	D6	DIP2_6	DIP2_6	DIP2_6	D6	D6
	D5	DIP2_5	DIP2_5	DIP2_5	D5	D5
	D4	DIP2_4	DIP2_4	DIP2_4	D4	D4
	D3	DIP2_3	DIP2_3	DIP2_3	D3	D3
	D2	DIP2_2	DIP2_2	DIP2_2	D2	D2
	D1	DIP2_1	DIP2_1	DIP2_1	D1	D1
	D0	DIP2_0	DIP2_0	DIP2_0	D0	D0
JP20	OM0	OM0	OM0	OM0	OM0	OM0
	OM1	OM1	OM1	OM1	OM1	OM1
	OM2	OM2	OM2	OM2	OM2	OM2
	nCS				$\overline{CS}$	$\overline{CS}$
	nWE		CT		$\overline{WE}$	$\overline{WEL}$
	nIRQ		PA	$\overline{IRQ}$	$\overline{IRQ}$	$\overline{IRQ}$
	nOE				$\overline{OE}$	$\overline{OE}$
	nRESET	$\overline{RESET}$	$\overline{RESET}$	$\overline{RESET}$	$\overline{RESET}$	$\overline{RESET}$
JP21	D15	$\overline{LED4A}$	$\overline{LED4A}$	$\overline{LED4A}$	$\overline{LED4A}$	D15
	D14	$\overline{LED4B}$	$\overline{LED4B}$	$\overline{LED4B}$	$\overline{LED4B}$	D14
	D13	$\overline{LED3A}$	$\overline{LED3A}$	$\overline{LED3A}$	$\overline{LED3A}$	D13
	D12	$\overline{LED3B}$	$\overline{LED3B}$	$\overline{LED3B}$	$\overline{LED3B}$	D12
	D11	LED2A	LED2A	LED2A	LED2A	D11
	D10	LED2B	LED2B	LED2B	LED2B	D10
	D9	LED1A	LED1A	LED1A	LED1A	D9
	D8	LED1B	LED1B	LED1B	LED1B	D8
JP22	Rx (TxD, see note below)	RX	ASM RX	ASM RX	ASM RX	ASM RX
	Tx (RxD, see note below)	TX / OM3	ASM TX / OM3	ASM TX / OM3	ASM TX / OM3	ASM TX / OM3
	MI0	MI0	MI0	MI0/SYNC	MI0/SYNC	MI0/SYNC
	MI1	MI1	MI1	MI1	MI1	MI1
	(NC)					
	(NC)					
	(NC)					
	(NC)					

Signals Tx and Rx (JP22) are printed on the board as seen from the brick. Please note that on the first version (0327 - 1.0.1) of the option board, these signals are printed as TxD and RxD and as seen from the application, not from the Anybus CompactCom.

The signal names for the different modes are given as seen from the brick.

Please refer to the Anybus CompactCom B40 Hardware Design Guide for more information.

4 Software

4.1 General

The software described below, is part of the Anybus CompactCom Starter Kit and is available at www.anybus.com/starterkit40.

4.2 Transport Provider

The Transport Provider is a set of drivers that allows a PC with Microsoft Windows™ installed to communicate with HMS products via so called Transport Paths.

A Transport Path is set up once and can then be reused by all PC applications from HMS that need a Transport Path.

4.3 Host Application Example Code

When starting an implementation of the Anybus CompactCom 30 or the Anybus CompactCom 40, the example code and the guide describing it will help to speed up the development process. The host application example code includes a driver, which acts as glue between the Anybus CompactCom module and the host application. The driver has an API (Application Programming Interface), which defines a common interface to the driver. Also included in the example code is an example application which makes use of the API to form an application that can be used as a base for the final product.

The host application example code is available from www.anybus.com/starterkit40, along with the Host Application Implementation Guide. This document describes the code, and also provides a guide for making a simple implementation and tips for further development.

A Technical Specification

A.1 Power Supply

A.1.1 USB Development Board

Supply Voltage	24 V DC (±20%).
Power Consumption	Maximum power consumption is 300 mA @ 24 V DC. Typical power consumption: 150 mA @ 24 V DC

A.2 Environmental Specification

Consult the Anybus CompactCom Hardware Design Guide for further information.

A.3 EMC Compliance

Consult the Anybus CompactCom Hardware Design Guide for further information.

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