multus general description

The multus is a multi purpose expandable control system based on a single board computer, joining classic control technology and modern Internet technology in a unique and cost effective way.

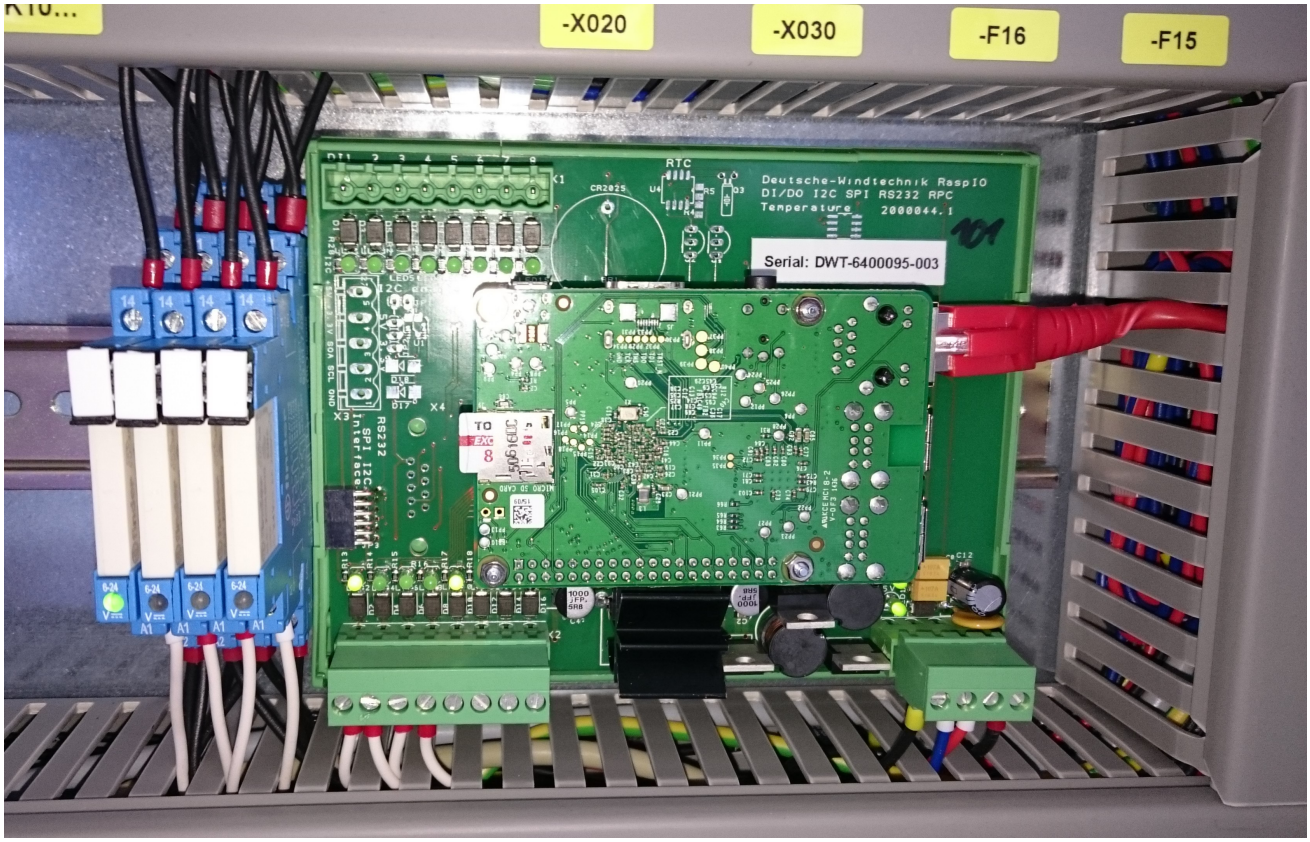

Abbildung 1: multus Basis Board Version 1.1 mounted within a cubicle

Features of the multus Basis Board (Version 1.3)

- Raspberry Pi B+, 2B, 3B; Banana Pro
- 24V power supply, 5V signal levels
- 8 Digital IN
- 8 Digital Out
- 1 1-Wire (5V)
- RS232 (RX, TX, CTS, RTS)
- RS485
- Connector for external I^2C based hardware, 5V power and interrupt line.

The multus Basis Board comes with a board to board connector for extension PCBs which provides 5V I^2C and SPI Bus signals, power and 2 programmable interrupt lines.

There are several extensions availabe:

- 8 Digital In
- 8 Analog in, 12 Bit, 0..10V including PT100 and current transformer input
- 2 Analog out, 12 Bit 0..10V or 0..20mA
- CAN Bus controller
- 8 channel 1-Wire Master
- Fully qualified USB – RS232 adapter for Din Rail mounting and output via RJ45
- SATA HD carrier (Banana Pro)
- 7” Touch Display

The input and outputs can be accessed via;

- Codesys Modbus
- Thrift Server
- OWServer, OWFS

Other Services:

- OpenVPN
- stronSwan (IPSec VPN)
- SSH
- Postfix mailserver
- Samba
- apache Web server
- cron
- mysql database

Proper usage of multus series systems

The multus boards are designed for industrial and home usage.

As a electrical device the multus PCBs have to be handled with care. No damaged or modified boards shall be powered. Any modifications on the SD-Card the multus comes with lead to a loss of warranty on the SD-Card.

Always use the plastic interface supports, the multus comes with. Never run the PCBs without it.

Before powering on the multus PCBs should be first mounted within a electric cubicle or a dedicated box for electrical devices on a DIN Rail.

All voltages should never exceed the specified limits:

Supply Voltage (X5) 12V up to 24V DC

Digital in Voltages (X1): 12V up to 24V DC

RS232 voltages (X4, X8): -12V up to +12V

RS485 voltage (X9): 5V

All signal voltages, SPI, I^2C, S0, 1-Wire, interrupt lines (X3, X10, X7, JP3): 5V

Short circuits on all supply outputs have to be avoided (X2, X3, X6, X7), the specified current (see pinout declarations) should not be exceeded.

Outputs should not be powered with any external voltage. The PCBs should never be electrically contacted externally except the dedicated connectors.

The Board to Board connector JP3 should only be contacted by DWT-Multus extension boards.

Operation Temperature 0 °C up to 50 °C

Dry humidity, no fluids onto the boards.

The DWT-Multus is air cooled, provide a proper air flow or at least a sufficient air volume for cooling. Check the board temperature (build in LM75) so ensure this.

Disclaimer

Any usage violating these terms leads to the loss of warranty and liability of the manufacturer.

Pinouts

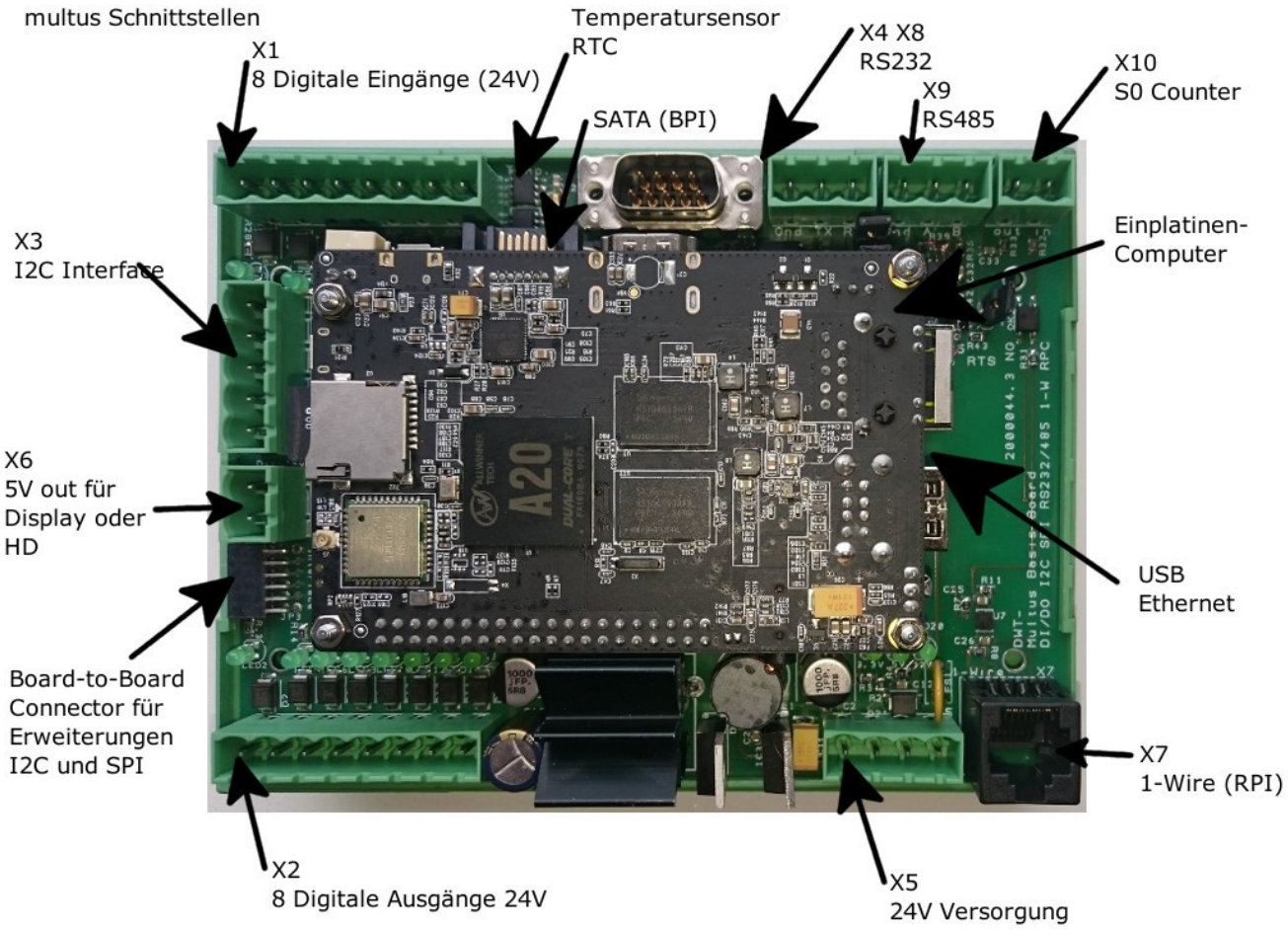

Abbildung 2: multus interfaces

Board to Board connectors:

There is the same pinout of the board to board connectors on the extension PCBs and DWT Multus Basis Board

Board to Board Connector *All signal lines have 5V level* *only to be connected by DWT-Multus extensions*	
Pin	Function
1	Gnd
2	+24V
3	+5V
4	GPIO20 (5V pullup)
5	GPIO21 (5V pullup)
6	SPI CS0
7	SPI MISO
8	SPI CS1
9	SPI MOSI
10	SPI SCLK
11	I^2C SCL
12	I^2C SDA

DWT-Multus Basis Board

X1 Digital In (since Version 1.3) 12V .. 24V PCF8574A I²C variable address	
Pin	Function
1	DI-1 (GPIO12)
2	DI-2 (GPIO24)
3	DI-3 (GPIO27)
4	DI-4 (GPIO18)
5	DI-5 (GPIO22)
6	DI-6 (GPIO23)
7	DI-7 (GPIO05)
8	DI-8 (GPIO06)

X3 I²C Connector (since Version 1.3) All signal lines 5V level	
Pin	Function
1	+5V out 500mA max
2	Interrupt line (GPIO19, 5V pullup)
3	SDA
4	SCL
5	Gnd

X2 Digital Out (since Version 1.3) 24V PCF8574A I^2C driven Address 0x38	
Pin	Function
1	DO-1 50mA max
2	DO-2 50mA max
3	DO-3 50mA max
4	DO-4 50mA max
5	DO-5 50mA max
6	DO-6 50mA max
7	DO-7 50mA max
8	DO-8 50mA max

X4 D-Sub RS232 connector Pin 1, 4, 6, 9 not connected	
Pin	Function
2	RX
3	TX
5	Gnd
7	RTS
8	CTS

X6 5V Power out HD or Display Option	
Pin	Function
1	+5V out 1A max
2	Gnd

X7 RJ45 1-Wire Master out	
Pin	Function
1	Gnd (5V)
2	+5V out 50mA max
3	n.c.
4	1-Wire data (GPIO4, 5V level)
5	Gnd (signal)
6	n.c.
7	+12V out 20mA max
8	Gnd (12V)

X5 Power Supply	
Pin	Function
1, 2	+24V in 500mA max
3,4	Gnd

X8 RS232 out (same as X4)	
Pin	Function
1	Gnd
2	TX
3	RX

X9 RS485	
Pin	Function
1	Gnd
2	A (5V level)
3	B (5V level)

Normally the RS485 switching between sending an receiving is done by the RTS/CTS signal which should be enabled.

If this is not possible to enable the RTS signal, there can be an automatic switching between sending and receiving enabled via JP6 and JP7.

Using JP11 and JP12 it can be switched between RS232 and RS485 communication.

X10 S0 counter input	
Pin	Function
1	+5V out
2	S0 signal in (GPIO26)

DWT Multus designed and manufactured by

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Ordering:

multus Basis Board	6400095
multus 8DI Extension Board	6400111
multus 8AI Extension Board	6400094
multus 2AO Extension Board	6400093
multus 8 1-Wire Master Extension Board	6400102
multus LED-Receptor	6400108
multus USB-RS232 Converter Din-Rail	6400110
multus Elspec Supervision Box	6400112