



USB-RS485/422 converter **SB485**

Isolation

Virtual serial port



SB485

Datasheet

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CONTENT

Description.....	4
Features	4
Technical Parameters	5
Indicators	5
Installing options	5
Connection and installation	6
Connection.....	6
Installation of RS485/422	6
Installation for RS422.....	6
Installation under Windows XP	8
Procedure	8
Changing the COM port number	14
Manual installation of the driver.....	14
Uninstalling	14
Temporarily removing the converter.....	14
Installation in Linux Operating System.....	15
Settings.....	16
Line termination and idle mode	16

DESCRIPTION

This module is suitable for converting USB interface to an RS485 or RS422 line. A virtual serial port is created in the PC, via which the RS485 or RS422 can be accessed. The conversion settings can be set by switches, as described below. The indicators show the ON/OFF status and both directions of data flow.

FEATURES

- User settings of the RS485, RS422 or RS422 "multimaster"
- Access to the RS485 or RS422 via a Virtual serial port
- Automatic no-delay switching of the data flow direction for the RS485
- Isolation of the USB interface from RS485 or RS422, surge protection
- Transmission speed up to 2 Mb/s
- User settings of the RS485/RS422 termination
- Indication of power supply and data flow by three indicators (ON, TxD, RxD)
- A unique serial number, which enables connection of several converters with other USB devices via a USB-HUB
- Connection to a PC via a usual USB cable (included in the converter's delivery)
- Possible installation on a DIN rail
- 5 V power supply from the USB interface
- Dimensions 54 x 62 x 24 mm

TECHNICAL PARAMETERS

USB:

USB specification 1.1 (USB 2.0 compatible)
Length of integrated cable 1.6 m

RS485/422:

Modes.....RS485, RS422, and RS422 Multimaster
Maximum speed2 Mb/s
Terminal resistors 120 Ω
Bias resistors which define the idle status680 Ω
Maximum number of connected devices31
Surge protection yes, 12 V bipolar transiles
Connector Slip-on connector board (Fig. 1)

Other:

Power supply voltage5 V (from the USB interface)
Mechanical workmanshipanodised aluminium box
Dimensions (without connector)54 x 62 (55) x 24 mm

INDICATORS

There are three indicators on the SB485 module.

ON (green).....it is on when the USB port provides power supply
TxD (yellow).....it indicates data transmission from USB to RS485/422
RxD (yellow)it indicates data receiving from RS485/422 to USB

INSTALLING OPTIONS

Bracket:

- Without a DIN rail holder (*standard*)
- With a DIN rail holder

Please do not hesitate to contact us if you have specific requirements for the SB485 module's workmanship and functionality.

CONNECTION AND INSTALLATION

Connection

The **USB** is connected to a PC via an integrated cable with a USB connector.

The **RS485/422** is connected via a slip-on terminal. The terminal wiring is seen in Fig. 1.



Fig. 1 – Contacts of RS485/422 line connection

Installation of RS485/422

The following steps are used for the SB485 converter installation for communication on RS485:

- 1) Connect the converter to a PC and install the driver according to the instructions on p. 8.
- 2) Set the switch **SW3** to the **OFF** position and **SW4** to the **ON** position.
- 3) Connect the RS485 conductors to the slip-on terminal according to Table 1.

Conductor	Comment
RxTx+ (A)	Bidirectional data ⇔
RxTx- (B)	Bidirectional data ⇔
GND	Signal grounding – possibly the cable-shielding connection

Table 1 – RS485 line connection

- 4) If the converter is at a line endpoint, the termination resistors are to be connected by TERM485. Switch consider connection of bias resistors which define the idle status.

Installation for RS422

The following steps are used for the SB485 converter installation for communication between two devices on an RS422 line:

- 1) Connect the converter to a PC and install the driver according to the instructions on p. 8.
- 2) Set the switch **SW3** to the **ON** position.
- 3) The **SW4** switch should be set according to the use of the RS422. If only two devices are interconnected via an RS422, or if data are from all devices only transmitted to the SB485 converter, set SW4 to the **OFF** position. This is a **standard** setting – the RS422 driver in the SB485 converter is continuously on, which increases noise immunity.

If another device is to transmit to the line together with the SB485 converter (the "multimaster" mode), the driver in the converter must be disconnected. The "multimaster" mode is enabled by setting the SW4 switch to the **ON** position.

- 4) Connect the RS485 conductors to the slip-on terminal according to Table 2.

Conductor	Comment
RxTx+ (A)	⇒ data from the SB485 converter (or a PC)
RxTx- (B)	⇒ data from the SB485 converter (or a PC)
Rx+ (A')	⇐ data to the SB485 converter (or a PC)
Rx- (B')	⇐ data to the SB485 converter (or a PC)
GND	Signal grounding – possibly the cable-shielding connection

Table 2 – RS422 line connection

- 5) If the converter is at a line endpoint, the termination resistors are to be connected with the aid of TERM422. For the multimaster mode, consider connection of bias resistors which define the idle status.

Installation under Windows XP

Procedure

A driver must be installed for the SB485 converter. Connect the SB485 converter to USB port of a switched-on PC with an MS Windows operating system. The green indicator on the converter is on and after a while (in which the Windows OS detects the new device), the screen shown in Fig. 2 is displayed.¹



Fig. 2 – Found New Hardware Wizard

Select "Install from a list or specific location." Select the "Next" button.

¹ If the operating system has not detected the new device, you can activate the driver installation manually – cf. the "Manual installation of the driver" on p. 14.

In the screen of Fig. 3 choose "Search for the best driver in these locations" and specify the path (A:\). Put the supplied floppy disk into the floppy-disk drive and select "Next" again. (You can also download the drivers from www.papouch.com.)

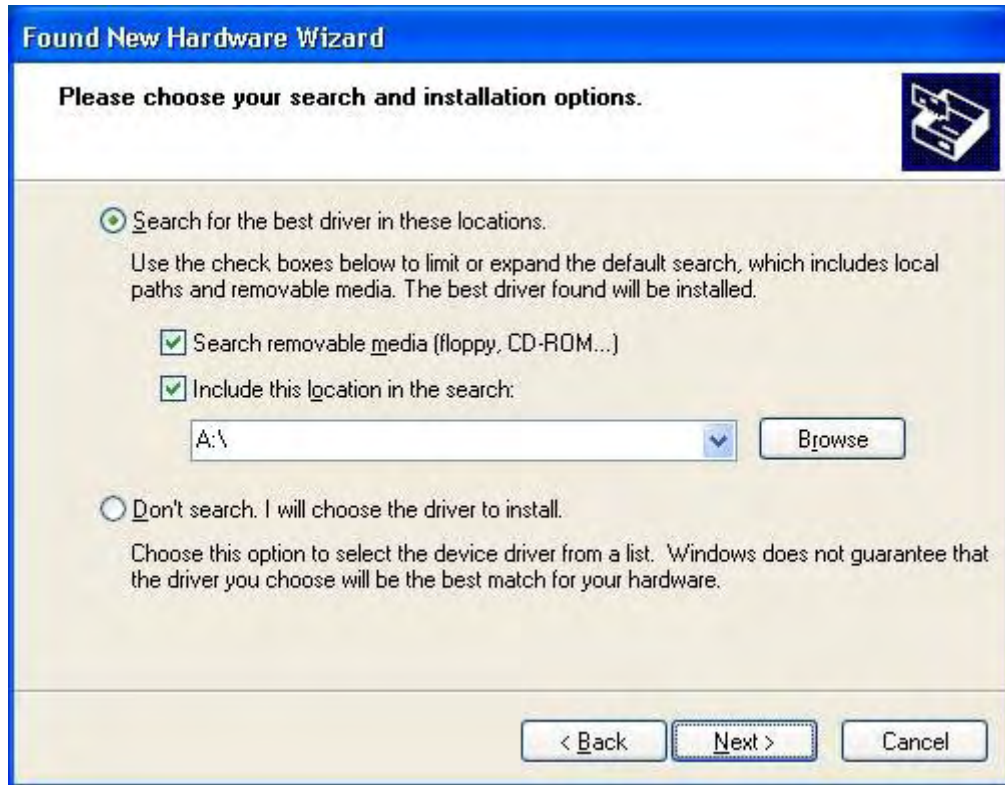


Fig. 3 – Driver Location

In the dialog box of Fig. 4 select the "Continue Anyway" button.



Fig. 4

Select the "Finish" button. You have successfully completed the first part of the installation now.



Fig. 5

In the second part, a driver is installed for the virtual serial port via which the RS485 or RS422 line can be accessed.

The screen shown in Fig. 6 is displayed. Select "Install from a list or specific location" as before. Select the "Next" button.



Fig. 6 – Found New Hardware Wizard

The screen shown in Fig. 3 is displayed. In the screen for driver selection, choose "Search for the best driver in these locations" and specify the path (A:\). Put the supplied floppy disk into the floppy-disk drive and select "Next" again.

In the dialog box of Fig. 7 select the "Continue Anyway" button.



Fig. 7

In the dialog box of Fig. 7 select the "Next" button. At this moment, both drivers for the SB485 converter and for the virtual serial port have been successfully installed.



obr. 8 – Finish

The "Device Manager" can be viewed as follows (the actual procedure may be slightly different according to the Windows version): Right click the "My Computer" icon and choose "Properties" in the dropdown menu. Select the "Hardware" tab and the "Device Manager" button (cf. the dialog box shown in Fig. 9).²



Fig. 9 – System Properties

² Alternatively, click the "Start" menu and go Control Panel / System, tab "Hardware," button "Device Manager"

In the "Ports (COM & LPT)" item of the "Device Manager," you can see the COM port on which the RS485 or RS422 line is accessible. Set the number of this port in your application. The SB485 converter is shown in the "Universal Serial Bus controllers." (cf. the dialog box shown in Fig. 10)

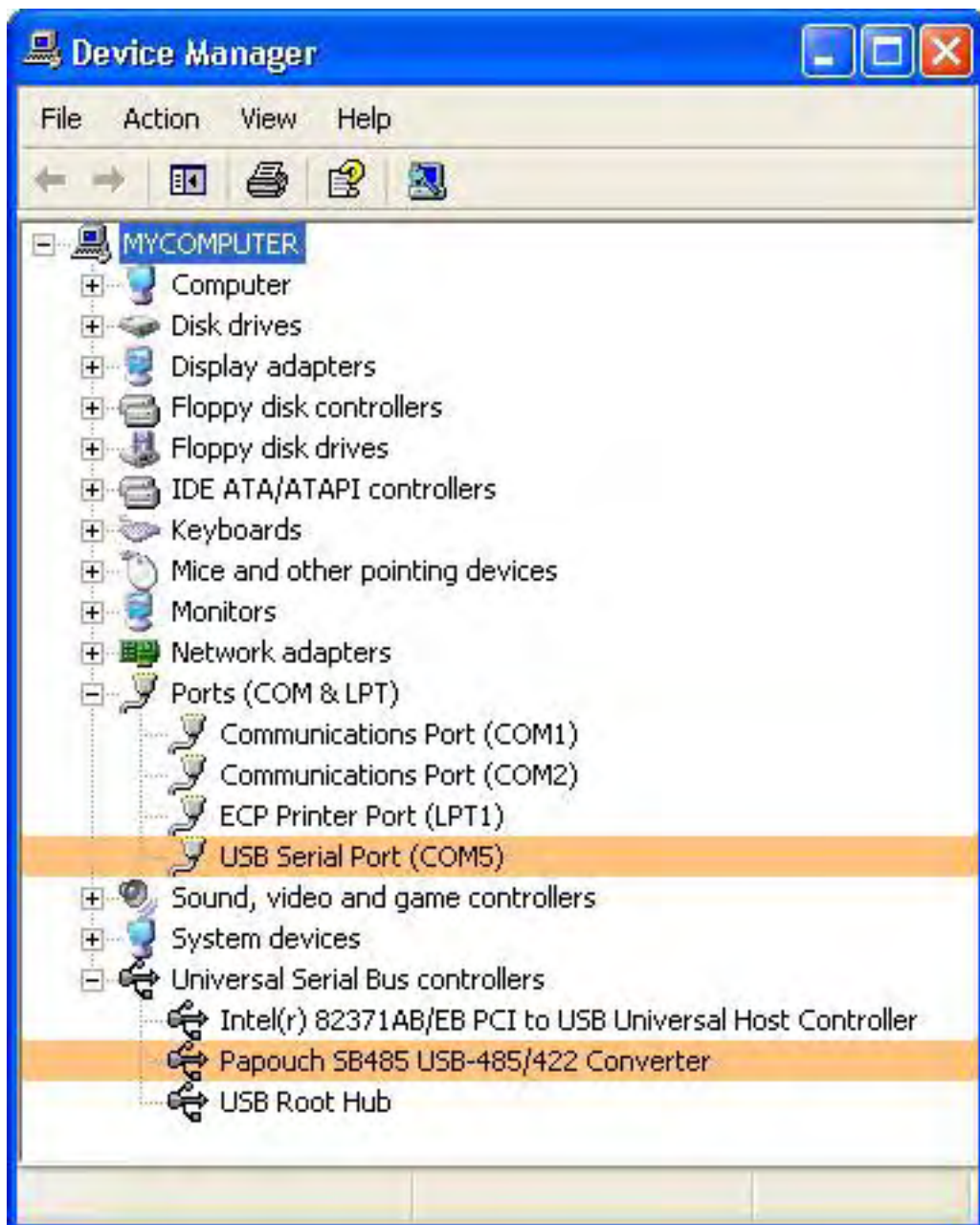


Fig. 10 – Device Manager

Changing the COM port number

If the automatically assigned number of the COM port is unsuitable, you can change it. Click on the "Ports (COM & LPT)" item of the "Device Manager." Right-click the "USB Serial Port" and choose "Properties." Select the "Port Settings" tab and the "Advanced..." button. Here you can select the "Com Port Number."

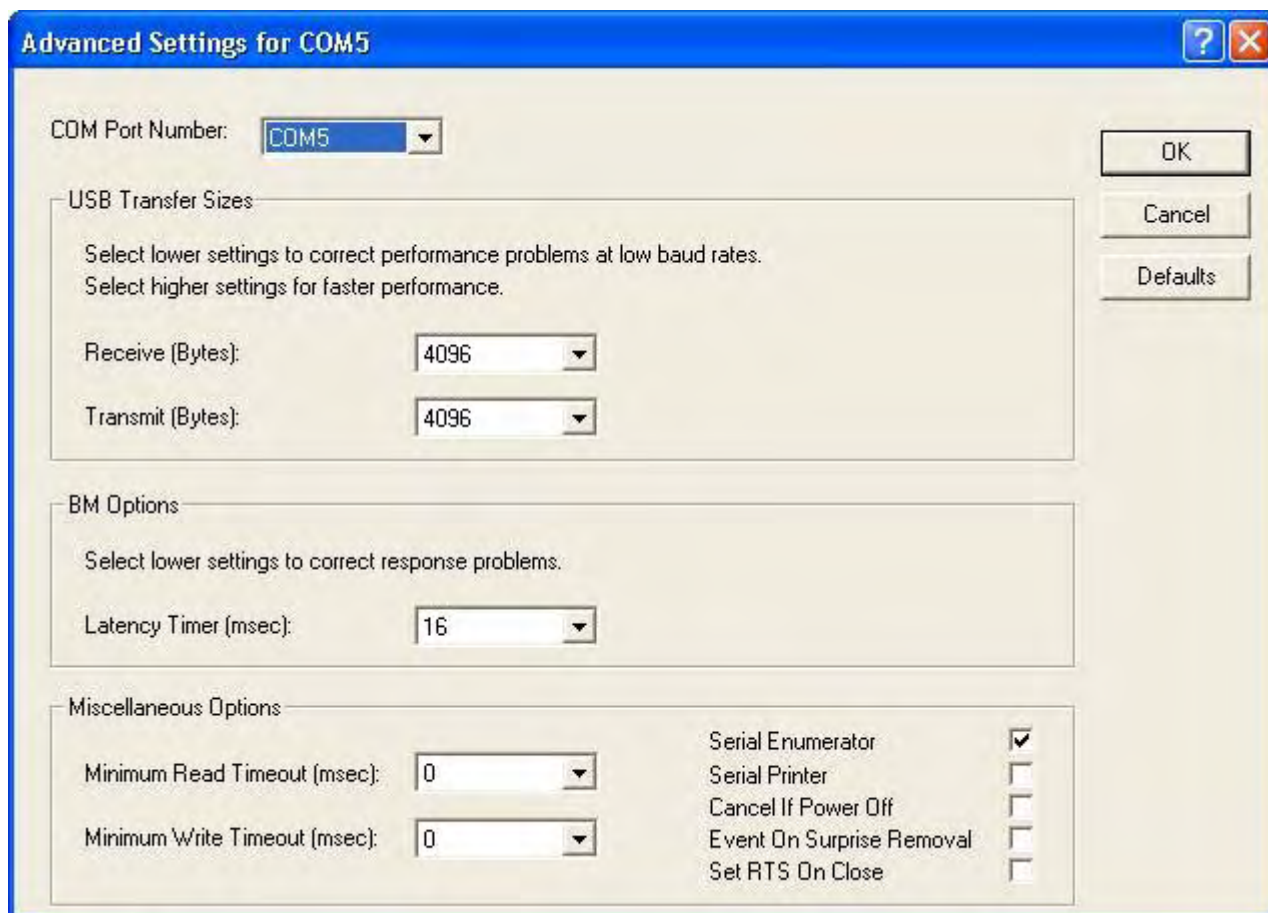


Fig. 11 – Changing the COM port number

Confirm the change by the "OK" button.

Manual installation of the driver

If the system does not start searching for the driver automatically after connection of the new device, you can proceed as follows: Open the "Control Panel" (in the "Start" menu, go Settings / Control Panel), choose the "Add Hardware" item and select the "Next" button. When installing the driver, insert the floppy disk and continue as described above.

Uninstalling

If you wish to completely uninstall the converter, it is not sufficient to remove the port from the system. Disconnect the SB485 converter from the PC and uninstall the driver using the "Add or Remove Programs" item in the "Control Panel."

Temporarily removing the converter

When the SB485 converter is disconnected, the COM port will disappear from the "Device Manager." After reconnecting the converter, the port will be displayed in the Device Manager again, with the original settings.

Installation in Linux Operating System

Linux drivers can be downloaded from <http://www.ftdichip.com> .

SETTINGS

The SB485 converter is set by six switches on the front panel (Fig. 12).

The type of the communication is set by the SW3 and SW4 switches according to the Table below:

SW3	SW4	line
OFF	ON	RS485
ON	OFF	RS422
ON	ON	RS422 – Multimaster



Fig. 12 – Configuration switches

Line termination and idle mode

TERM485

This device connects the impedance termination of RS485 or RS422 on the transmitter's side. It prevents signal from bouncing at the line ends. These resistors should be connected at both ends of the communication line.

TERM422

This device connects the impedance termination of RS422 on the receiver's side. It prevents signal from bouncing at the line ends. These resistors should be connected at both ends of the communication line.

BIAS485

This device connects the resistors which define the idle mode of RS485 or RS422 on the transmitter's side. They determine the idle-status levels of the communication line. (More detailed information can be found in the section "Idle mode" on page 17.)

Idle mode

When communicating on RS485 or RS422 multimaster, there may be a no-transmission status (all lines are in the receiving mode). If this is the case, the status of the line is undefined and it is extremely sensitive to any induced voltage (interference), which is deemed incoming signals. Therefore an idle mode should be defined by connecting suitable resistors to a line point. If the line is long, the best point is at the SB485 end-of-line modules or equipment.

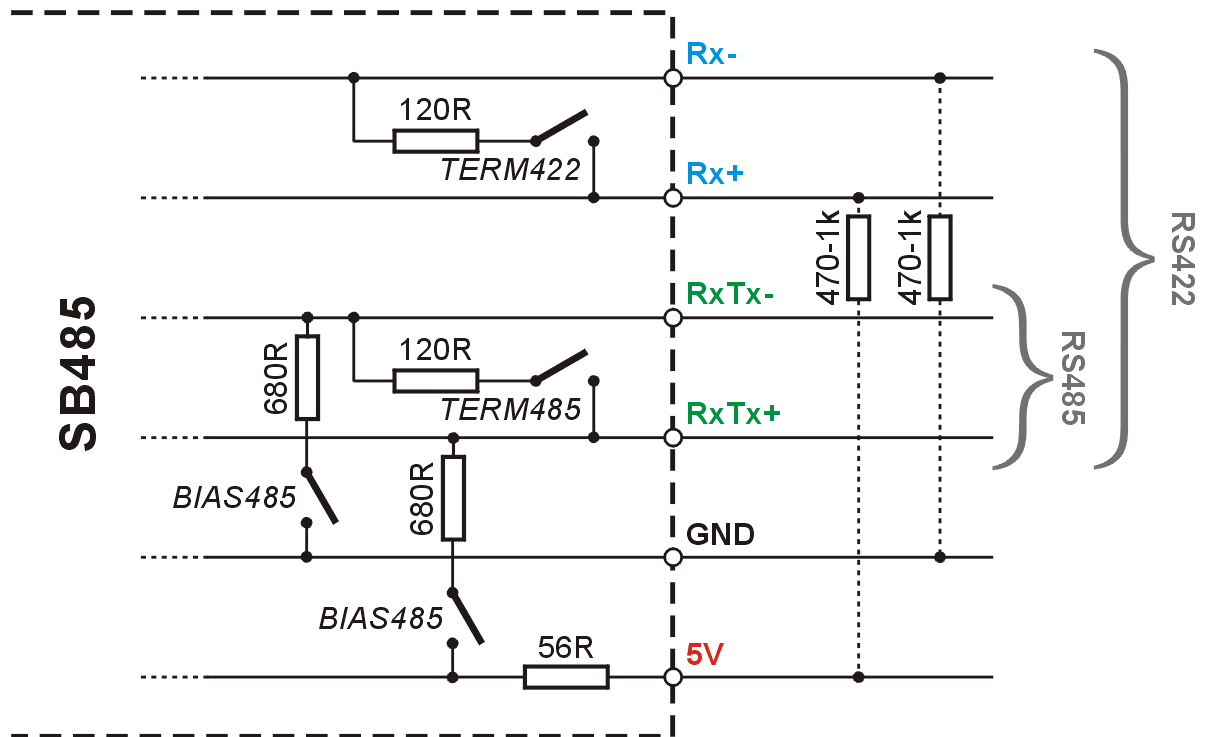


Fig. 13 – Connection of external resistors

With the SB485 converter, build-in resistors can be used, connected by the BIAS485 switches; if a definition of idle mode of RS422 receiver's side is required, external resistors may be connected directly to the RS485 connector Fig. 13. For long lines, the resistor values should be larger and the termination should be connected simultaneously. GND can also be used for connection of the cable shielding contact.

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