

# Docklight Application Note: RS422/485 communication

Docklight can access any COM communication port available in Windows. Physically, these ports will be RS232 SUB D9 interfaces in many cases. However, it is also possible to use Docklight for other communication standards such as RS485 and RS422, which have a different electrical design to RS232 but follow the RS232 communication mechanism.

Unlike RS232, a RS422/485 communication link allows bus topologies that connect e.g. one master with several slave devices. The following sections describe additional settings and options available in Docklight that facilitate analyzing and debugging such data links.

## 1 Monitoring a 2-wire link (RS485 / half duplex)

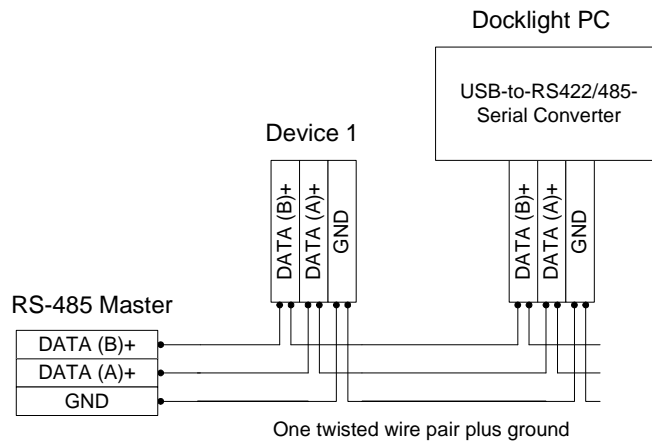
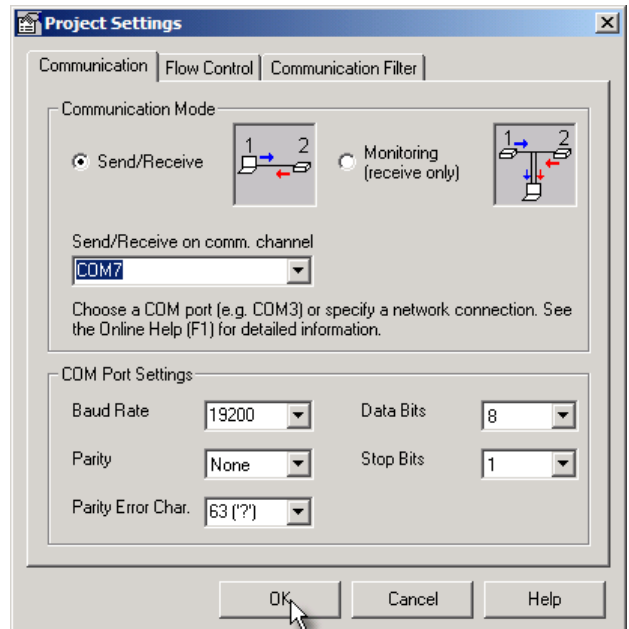


Figure 1: Simplified 2-wire RS485 connection

For monitoring a two-wire RS485 bus, one free RS422/485 interface is required on the Docklight PC.

Use the following setup:

- Open the **Project Settings** dialog and choose **Send/Receive Mode**
- At **Send/Receive on comm.. channel**, select the COM port assigned to your RS422/RS485 interface.



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**Docklight Application Note: RS422/485 communication**  
**Applies to:**  
**Docklight V1.7 / V1.8, Docklight Scripting V1.7 / V1.8**



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When monitoring a two-wire bus, Docklight cannot distinguish between two different data directions and use two different colors (blue / red) to distinguish between master and slave device telegrams. You will only see one data direction (red) inside the communication window. But Docklight provides a number of functions to process such data streams and separate the master and slave telegrams:

1. In most applications there is a significant pause time between the master requests and the slave answers. In this case use the menu menu **Tools-->Options...-->Date/Time Stamps**, then activating **Pause detection....** and choosing a time small enough to safely detect this silence between the master and slave telegrams. E.g. choosing "0.1 seconds" for a start.
2. If there is no significant pause between the master telegrams and the slave responses, you need to teach Docklight something about your data stream and the application protocol used: Using so-called **Receive Sequence** definitions (see <http://docklight.de/manual/receivesequence.htm> ), you can make Docklight trigger on certain data that defines the telegram end. For example, if your protocol uses an ETX (ASCII code 03) character to mark the telegram end, you could define a "Receive Sequence" that triggers on this character, and inserts an additional line break / time stamp after receiving such a character.

## 2 Monitoring a 4-wire link (RS422 or RS485 full duplex)

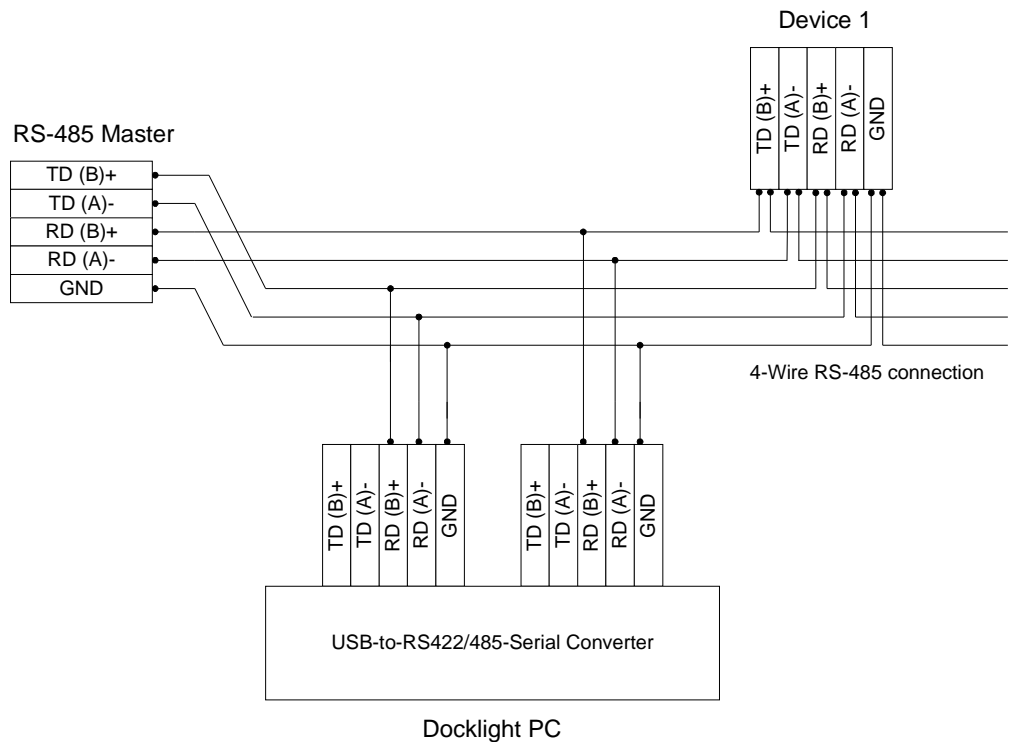



Figure 2: Simplified 4-Wire RS485 connection

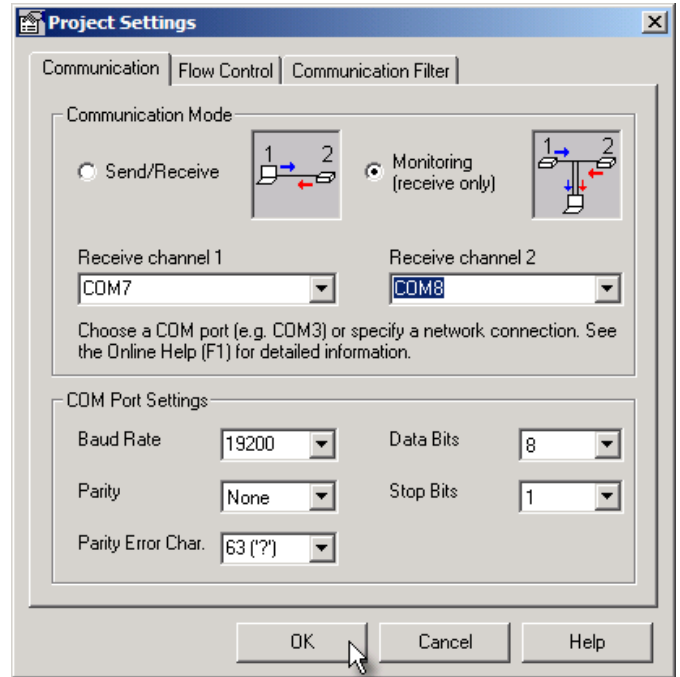
For monitoring a 4-wire RS422 or RS485 link, two free RS422/485 interfaces are required on the Docklight PC.

Monitoring a 4-wire RS422/RS485 network is similar to RS232 monitoring applications (see <http://docklight.de/manual/monitortheserialcommunicationb.htm> ) – two COM ports are required for monitoring, and Docklight can distinguish between two data directions, e.g. master telegrams (blue) and slave responses (red).

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V1.0	First release	2007-08-13	FI			2 / 4
Ver.	Comment	Date	Name			

Use the following setup:

- Open the **Project Settings** dialog and choose **Monitoring Mode**
- At **Receive channel 1** and **Receive channel 2**, choose the two COM portx assigned to the RS422/RS485 interfaces.



### 3 RS422/485-Specific Project Settings in Docklight

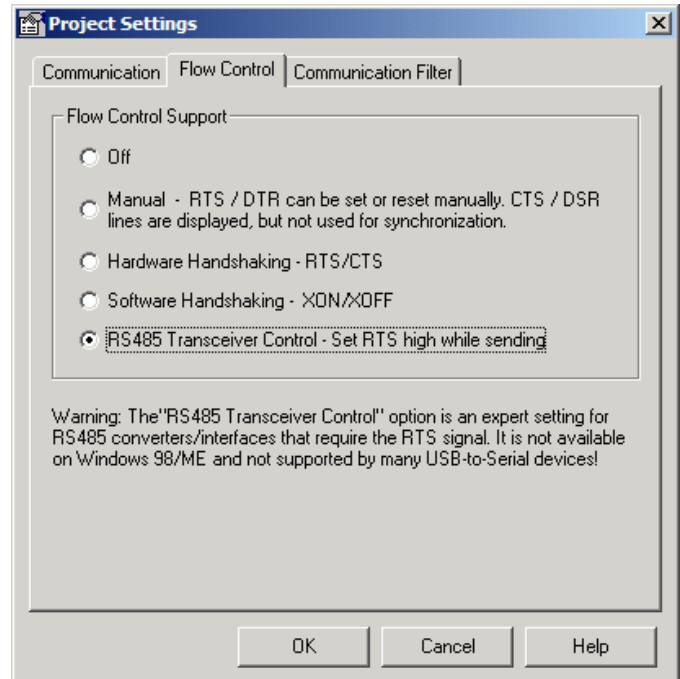
#### RS485 Transceiver Control (menu 'Project Settings...', tab 'Flow Control')

Some RS232-to-RS485 converters require manual RTS control, i.e. the COM device (PC) needs to tell the converter when it should enable its RS485 driver for transmission. This is usually done using the RTS status line of the COM port. If you choose **RS485 Transceiver Control** in Docklight, the serial port driver sets **RTS=High** before transmitting the first character, and **RTS=Low** after the last character has been transmitted.

Please refer to the operating manual of your RS485 interface/converter, if the RS485 Transceiver Control setting is required or not. Most RS485 products offer an "automatic mode" where the RTS signal is not required, and **Flow Control Support = Off** (default setting) can be used in Docklight.

**Note:**

Many USB-to-Serial converters do not implement the Windows RTS\_CONTROL\_TOGGLE mode properly. If you experience problems with the **RS485 Transceiver Control** setting, try using a PC with an on-board COM interface or a PCI serial comm. board.




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## 4 RS422/RS485 Reference Hardware

- USB Edgeport/2i ([www.digi.com](http://www.digi.com))  
2 RS-422/485 serial DB-9 interfaces
- PCI Board CP-132UL V2 ([www.moxa.com](http://www.moxa.com))  
2-port RS-422/485 Universal PCI Board
- TCC-100/100I ([www.moxa.com](http://www.moxa.com))  
Isolated RS232 to RS-422/485 converter

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V1.0	First release	2007-08-13	FI			4 / 4
Ver.	Comment	Date	Name			