USB DAQ & Relay Card Products
Low cost DAQ & Control products
Using "Terminal Emulators" to control and test EasyDAQ cards

EasyDAQ
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Using "Putty" and "Realterm" to control and test EasyDAQ cards

Introduction

This application note should help a new user to simply control the relays via USB connected EasyDAQ board using free "Terminal Emulator" programs called "PuTTY" and "RealTerm".

PuTTY can be downloaded from https://putty.org/

RealTerm can be downloaded from https://realterm.sourceforge.io

RealTerm is by far the more useful of the two but is more complex.

1. **PuTTY**: Windows and Unix

Unfortunately PuTTY has problems with sending byte values to a serial port. It is based around ASCII characters rather than numbers.

For this application we will be using an EasyDAQ USB4xxx board. The "xxx" denotes the relay type and output connections so are not an issue for this application note.

Connecting the PC to the EasyDAQ board
Connect a USB cable to both the PC and the EasyDAQ USB4xxx board.

The FT232 USB to serial chip will cause a serial port to be enumerated by the operating system.

PuTTY on Linux: (For Windows see further on)
On a Linux based system the port can be found by looking for ttyUSBx where "x" is the number given to the channel.

The serial port can be found by starting a "Terminal" session on the PC. Type "cd /dev" to change to the device directory then type "ls ttyUSB*". It is likely that there will be just 1 USB device listed if not you will have to repeat this procedure with and without the EasyDAQ board connected and note the port that is added when the EasyDAQ board is connected.
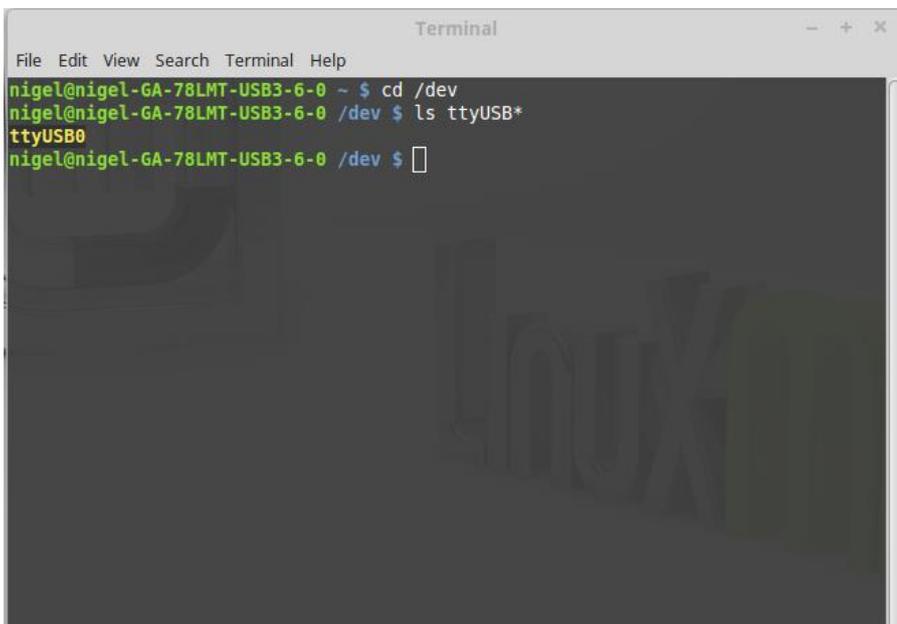
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In the above case just ttyUSB0 is listed. This is our board.

Run the PuTTY Terminal Emulator program. Select the connection type as Serial which will change the parameter boxes.

1. Select Serial.
2. Enter the port number, "/dev/ttyUSB0" in this case in the "Serial line"
3. Set 9600 in the "Speed" box.
4. Open the COM port.

I have named the session "ttyUSB0" and saved this setting among others in PuTTY.
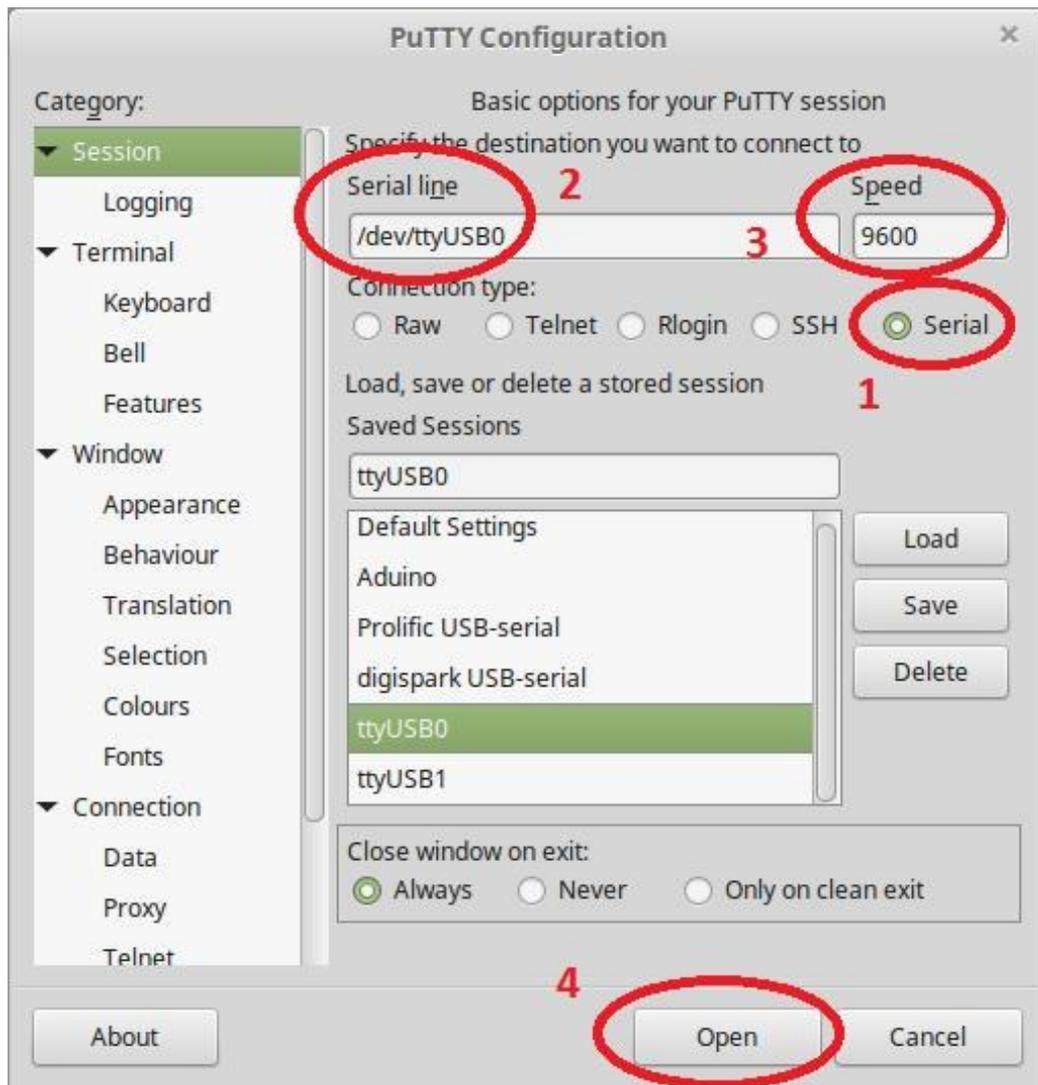
Skip past the next section to **EasyDAQ board control using PuTTY** for entering data etc.

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PuTTY on Windows:

In Windows the port is known by a "COM" number i.e. COM25. Use "Device Manager" find which COM number your EasyDAQ board is plugged into. In Windows 7 and Windows 10 type "Device Manager" into the start menu search function and click on the link to the program found in the list.

The COM port number is listed under "Ports (COM & LPT). In this case the board has been allocated COM25.
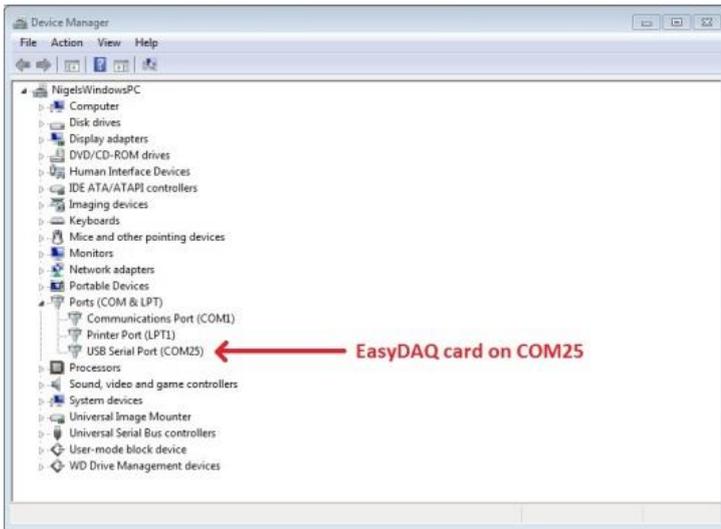
Run the PuTTY Terminal Emulator program:
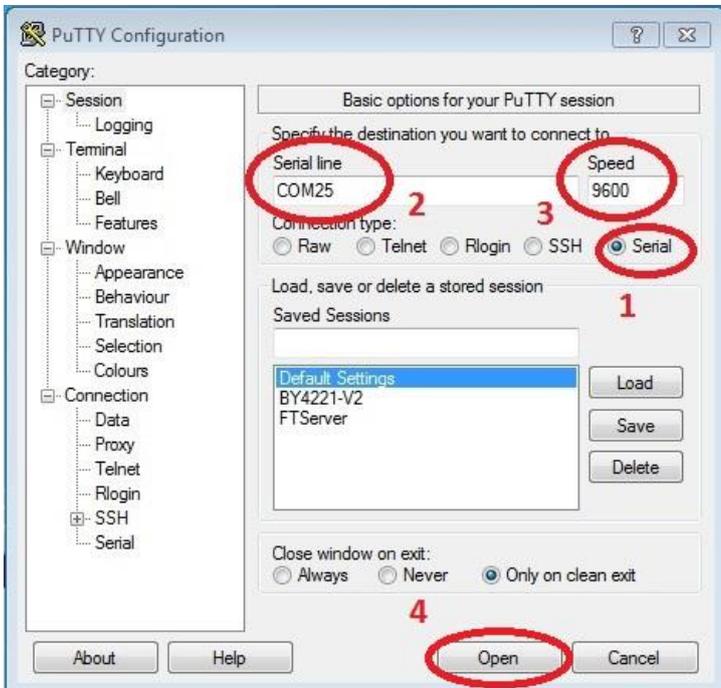
1. Select "Serial".
2. Then enter the COM number (in this case "COM25") into the "Serial Line box"
3. Then set the "Speed" to 9600
4. Open the COM port

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From here on it the same for Linux or Windows...

EasyDAQ board control using PuTTY:
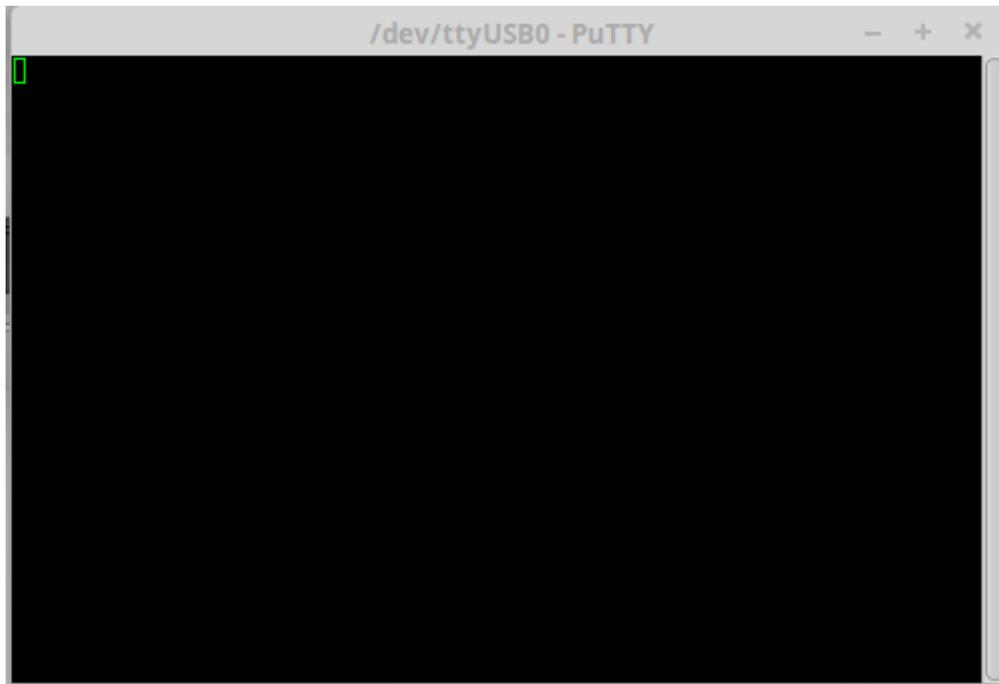
Type "B0", that's "B" and zero without the quote marks and NO carriage return or newline

Port "B" on the EasyDAQ processor is initially set as all outputs so we have to switch some of these to outputs where they are connected to relays in order to control them.

<u>NOTE</u> Make sure you use capital letters and numerical zero not the letter "O".

The command "B0" sets the directions of port "B" to:

Bit 0 = output
Bit 1 = output
Bit 3 = output
Bit 4 = input
Bit 5 = input
Bit 6 = output
Bit 7 = output

This is because ASCII "0" (zero) will translate to 0011000 in binary (30 in hex).

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The relays are controlled by bits 0 to 3 on port "B" of the EasyDAQ processor. Selecting all 4 bottom bits as Output means that we can now control the relays connected to the port.

Now typing "C1" will switch on relay 1.
"C2" will switch on relay 2.
"C3" will switch on relays 1 and 2.

This is because the last 4 bits of the binary values of ASCII "1", "2" and "3" are 0001, 0010 and 0011 respectively. So the first 3 relays are easily controlled. "C7" will turn on relays 1, 2 and 3. Typing "C8" will turn on relay 4 and "C9 will be relays 1 and 4. To get relays 2 and 4 you can enter "CJ". "CO", that's capital "O" not zero will turn on all 4 relays.

If suddenly nothing seems to be working then it is likely that you and the EasyDAQ board have become out of sync. Try typing an extra second character then start again. i.e. "0" (which it will ignore if it is waiting for a command) then "C1". The board is looking for a valid 2 digit sequence.

Unfortunately trying to use command "A" to read port B will usually return an unprintable character on the Terminal Emulator. So it is not easy to test the input of an EasyDAQ board this way.

So Putty is not the best way to control these EasyDAQ boards but it is an easy way to check things are working. Remember, there is no new line or carriage return required and the quote marks above are not required.

2. **RealTerm**: Windows

RealTerm is a very complex and useful tool which can do a lot more than serial RS232 terminal emulation we will be using here. Unfortunately, RealTerm is a Windows only program.

Start RealTerm then:
1. Select "Hex[space]" on the "Display" tab
2. Select the "Port" tab

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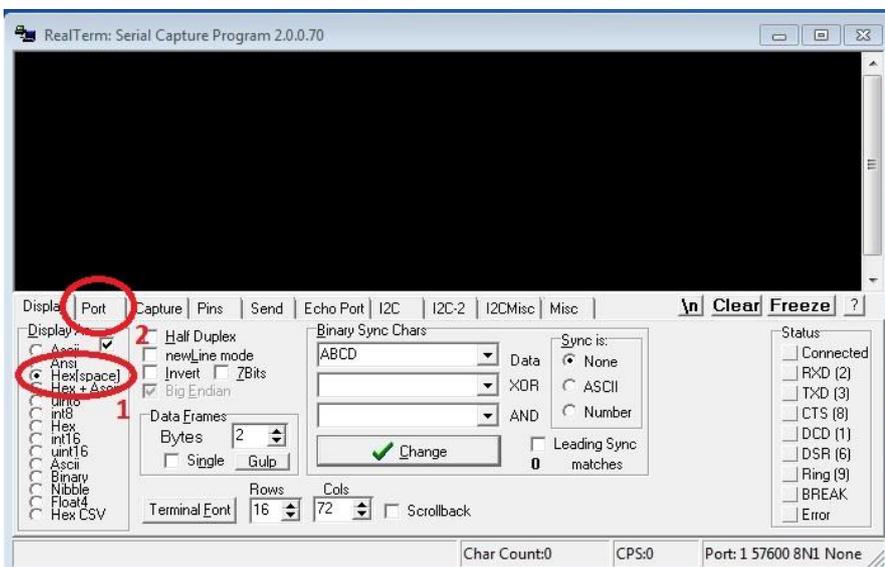
3. Use the dropdown to select 9600 baud
4. Use the dropdown to select the virtual com port (VCP) for the EasyDAQ board. In this case it is number 25.
5. Push the "Change" button to update the settings
6. Select the "Send" tab
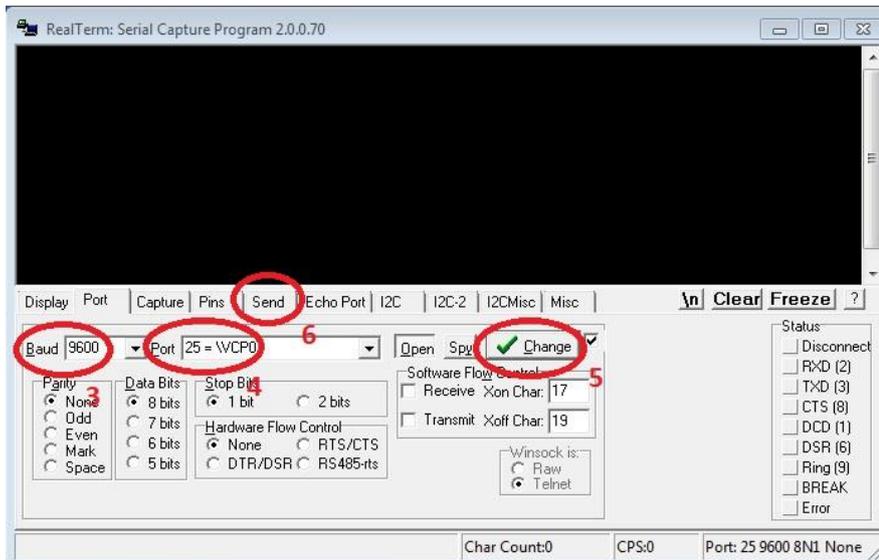
Now to send some data:

The RealTerm emulator has the ability to send streams of data. In this case we will set up one stream to configure the board's Port B I/O pins and the second stream to control the relays:

7. Type "0x42 0xf0" into the first line. This sets Port B to bits 0:3 as output and bits 4:7 as output.
8. Type "0x43 0x01" into the second line. This will switch on relay 1 which is connected to bit 0 on port B.
9. Press the first line "Send Numbers" button to setup port B.
10. Press the second line "Send Numbers" button to control the relays.

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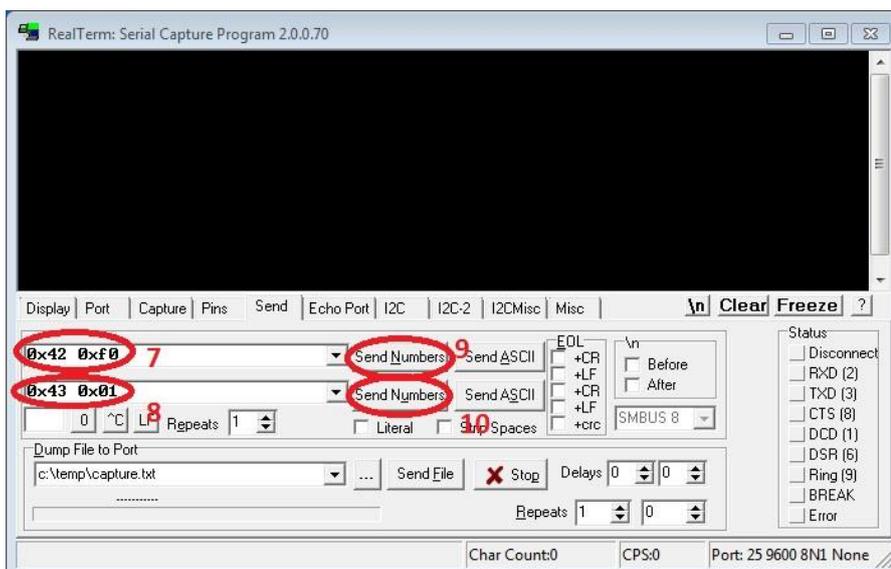
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Nothing will appear in the black terminal area as the EasyDAQ board doesn't echo data back.

Now to switch off relay 1 and turn on relay 2:

11. Change the values on line 2 to "0x43 0x02", bit 0 off and bit 2 on.
12. Press the second line "Send Numbers". This will switch relay 1 off and relay 2 on.
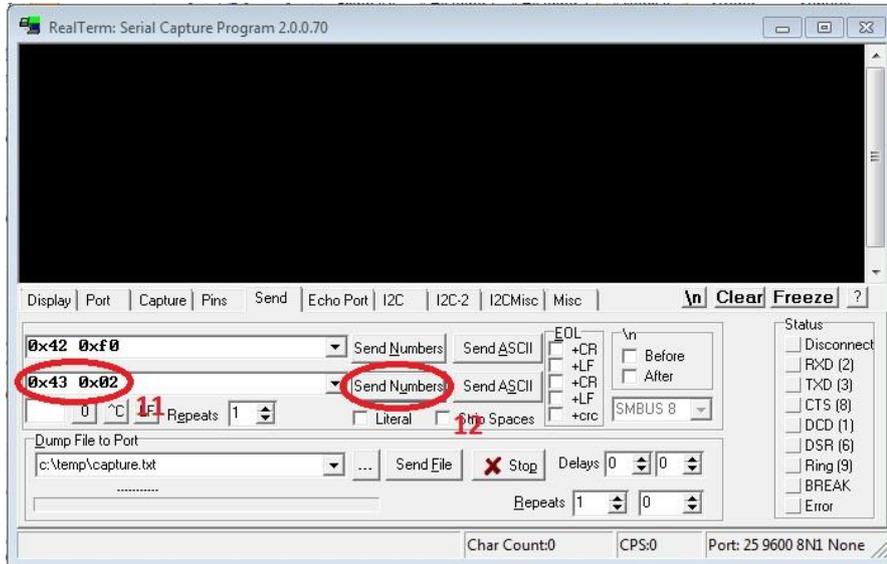
Changing the last hex nibble on line 2 between 0 to f hex will control all 4 relays according to the bit pattern.

To read data we need to send a read data command to the EasyDAQ board:

13. Change line 1 to "0x41 0x00". The "0x41" sends a read command to the EasyDAQ board Port B and the "0x00" is a dummy value which is ignored.
14. Press the first line "Send Numbers" button to request the Port B data
15. The value of Port B is read back and displayed in the black area.
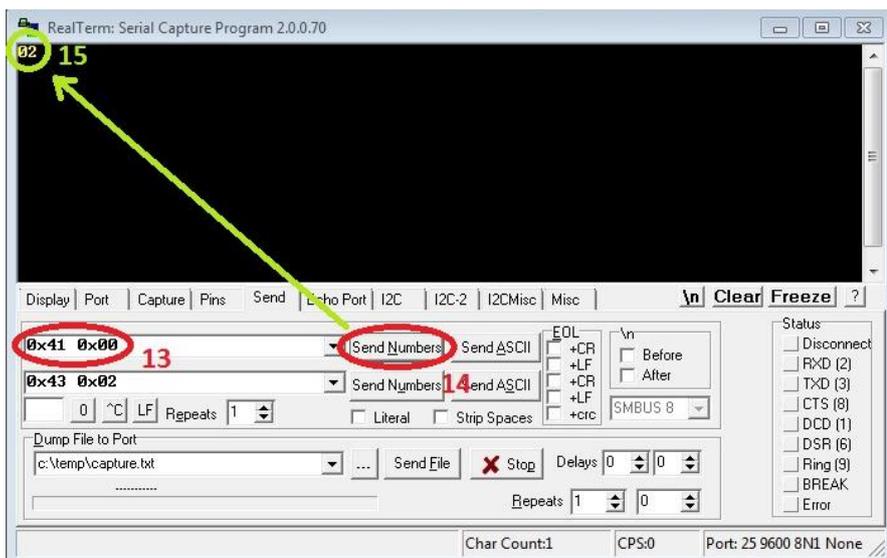
In this case the value "02" hex has been read back as there is nothing attached to the 4 input ports (bits 4:7) of Port B of the EasyDAQ card and the values controlling the relay (bits 0:3), relay 2 on.

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Conclusion

RealTerm is far more useful for testing and basic controlling of EasyDAQ USBxxx relay cards. However PuTTY is available on Windows and Unix.

Please contact us if you find any problems with any of the above information and with any suggestions for other free terminal emulator software that we should consider including in this datasheet.

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