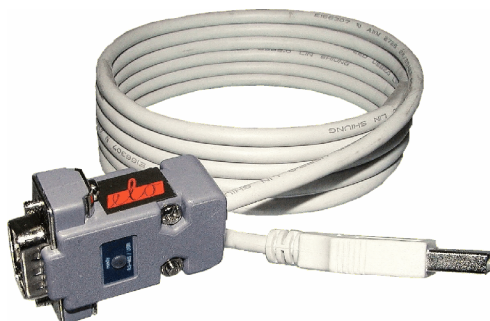


Let's communicate

elo

USB – RS-485/422 Communication adapter
– virtual serial port



ELO E214

Operation manual

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1.0 Introduction

The USB interface is preferred to the COM port with RS-232 interface in personal computer technology. To connect the peripheral devices of the RS-232 interface, the USB/RS-232 adapters along with the driver are applied to create so-called virtual COM on the PC.

ELO E214 is a device which converts virtual COM to the asynchronous line of the symmetric signal via the USB interface. The signals transmission to the half-duplex RS-485 interface allows the range, communication partners' number and the transmission interference immunity to increase.

1.1 Use of the adapter

The converter increases transmission immunity against electrical disturbance and isolates both interfaces USB / RS-485 hence it is intended to be used in the environments where lightning over-voltage is not necessary to be considered. To lead the RS-485 link cable outside buildings, it is necessary to provide additional over-voltage protection on the input points.

The adapter allows the transmission rate up to 1 Mbps. This maximum attainable rate decreases due to the line length and/or its impedance growth. Recommended maximum line length is 1200 m at the rate of 9600 bps.

2.0 Operation principles

The adapter E214 converts the RS-485 interface to the USB interface, transmits TxD and RxD signals. The transmission is half-duplex that means switching on the RS-485 transmitter only during its own transmitting to allow other communication partners to transmit. The RS-485 transmitter is automatically controlled. USB and RS-485 interfaces are galvanic connected. There are the internal terminators of RS-485 that can be used.

There are two LED indicators - READY and DATA. READY indicates that drivers are installed correctly, DATA indicates that data are transmitted (red) or received (green) over RS-485.

Adapter is supplied from USB port.

3.0 Installation

E214 adapter installation is described in this part. There are two problems to be solved: the hardware installation and the SW driver installation.

3.1 RS-485 Installing

The connector DB9M is used to connect the adapter to the peripheral device or to the bus:

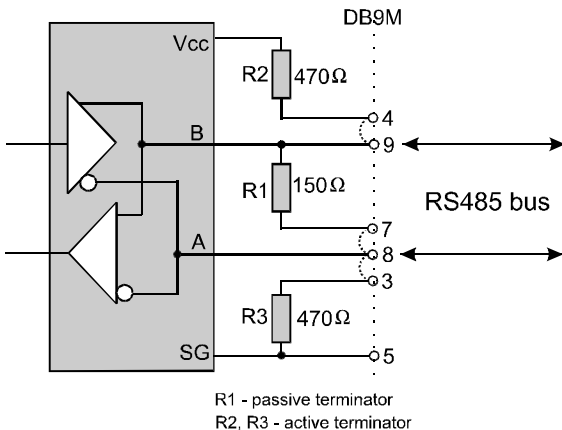
SIGNAL RS-485	Abbrev.	E214 connector (DB9M)
Signal Ground	SG	5
Data +	B	9
Data -	A	8

On the long lines there it is necessary to suppress the echo and the electromagnetic interference so the 100-120Ω resistors (so-called passive terminators) placed between Data + and Data - wires on the link ends are applied.

The RS-485 recommendation uses the same symmetric signal as the RS-422 hence it requires the use of the passive terminators as the RS-422. On the RS-485 link, another state is defined when no communicating partner transmits all are of the high impedance state and just listening.

The partner differential receiver interprets the difference U_A-U_B . The receiver interprets the obtained signal as $|U_A - U_B| > 200$ mV as log 1 or log 0. In the described still state, so-called IDLE, no communicating partner transmits so $|U_A - U_B| < 200$ mV. The problem is how to interpret the state (so-called the third) in the two-state logic. The active terminator (may be only one in each section) gives the signal $|U_A-U_B| > 200$ mV into the idle state line and it is interpreted as IDLE in the two-state logic.

Both passive and active terminators can be applied by means of pins 4, 7 and 8 as



shown in the picture.

3.2 USB interface connection

The adapter operates as per specification USB 2.0 full-speed (12 Mbps). The USB adapter connector is of A male type.

3.3 Installing driver

The E214 adapter may be applied on the PC computers under the MS Windows 98/Me/2000/XP or Linux operating systems. The drivers are supplied together with the other files at the installation CD. They may be downloaded from the producer web-sides www.elo.cz.

The proper installation of the drivers is indicated via the lit READY indicator on the cover connected to the adapter.

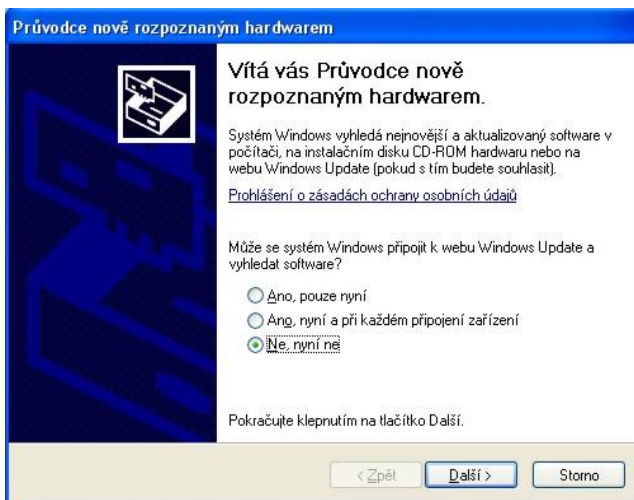
Following part of the user manual describes the process of installing under MS Windows XP only.

3.3.1 Installing virtual port under Windows XP

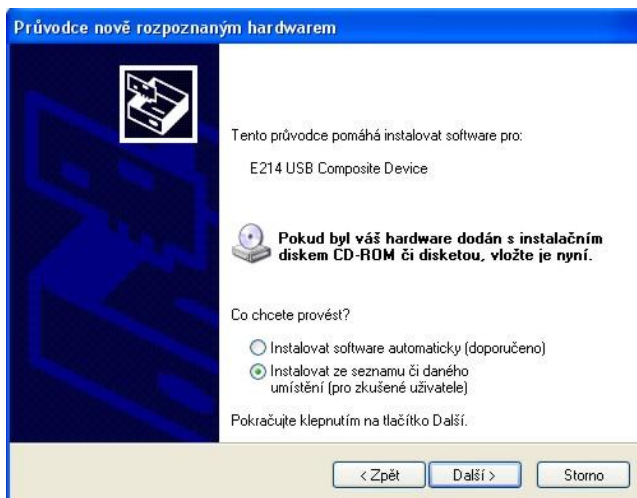
1. When the PC turned on and the adapter connected to the USB port via the cable is detected the operating system reports a new hardware has been found:



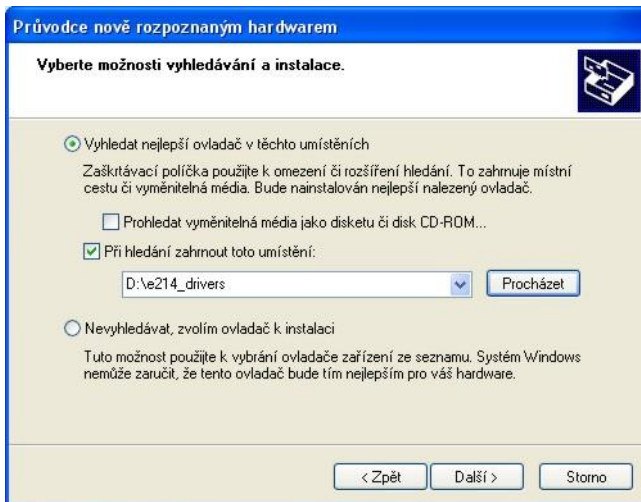
2. The system runs the Add New Hardware Wizard automatically. Failing this, the **Control panel** may be used to start the Wizard. Select the third option in the Wizard menu - „Ne, nyní ne“ („No, not now“) – and click the button „Další“ („Next“):



3. Select the second option in the Wizard menu „Instalovat ze seznamu či daného umístění“ (“Install from a list or specific location”) and click „Další“ („Next“):



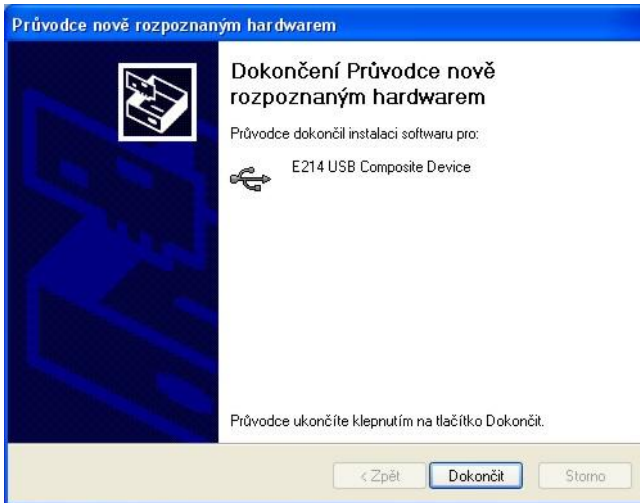
4. In the next Wizard menu select „Při hledání zahrnout toto umístění“ and by the help of button „Procházet“ („Browse“) select the directory **e214_drivers** on the supplied CD. Then click „Další“ („Next“):



5. Don't be worry if the Wizzard will write: „Warning“ and click „Pokračovat“ („Continue“):



6. Now click “Finish” in the dialog box of the installing device completion.



7. Then it is necessary to continue with the virtual port installation. System will write „New hardware found“ again and the installation is running the same way as shown in steps from 2 to 4:



8. When the correct drivers of virtual COM port are found a new Warning is displayed. Click „**Pokračovat**“ („Continue“):



9. The virtual COM port installation has been completed:

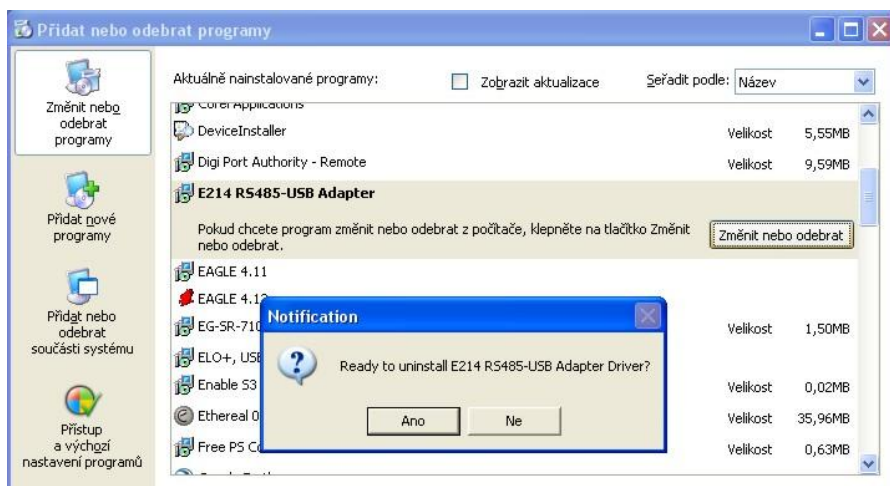


10. „Nalezen nový hardware“ („New hardware found and prepared for use“):



3.3.2 Uninstalling virtual port under Windows XP

1. Select the part „Add or remove programs” from „Control panels”. Then select the row *E214 RS422/485-USB Adapter*. Press button „Change or remove” and confirm by pressing „Yes”. Adapter and its drivers are uninstalled:



2. Pressing button „**OK**“ you'll confirm uninstalling



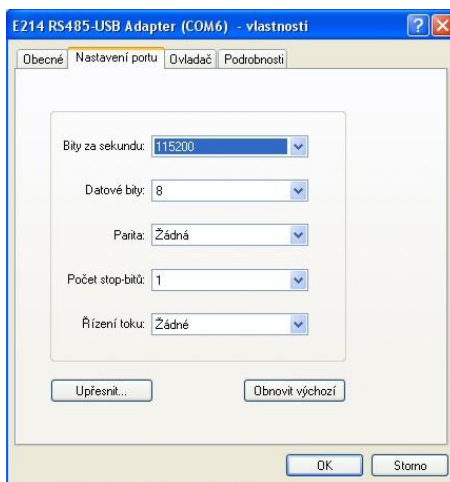
3. After the uninstalling the LED „**READY**“ will switch off. Adapter E214 can be disconnected.

3.3.3 Virtual port properties setting

When connection is established the adapter virtual port appears as the next COM port in the **Device Manager**. Go to **Control panel** and select **System / Hardware** and run the **Device Manager**. The next COM called **E214 RS-485-USB Adapter** has appeared among the **Ports**. In **Properties**, its setting, e.g. transmission speed, character format and/or flow control can be changed.

Caution!!! The control signals are not transmitted hence no hardware flow control can be used.

The port number assignment (e.g. COM3, COM4,) may be changed under the **Specify option**.



4.0 Specification

4.1 Parameters

R USB interface	2.0 full-speed (12Mb/s)
USB connector	typ A – male
RS-485 medium	twisted pair,
RS-485 connector	DB9M
Terminators	internal,
Maximum data rate	921 600 kbps
Transmission mode	asynchronous, half-duplex

4.2 Other

Supply	from USB interface
Power take-off	max. 50 mA
Power take-off (with terminators)	max. 100 mA
Indicators	READY, data
Cable length	cca 1.8 m
Weight	cca 95 g
Stocking temperature	- 10° to +55 °C
Working temperature	+ 0° to +50 °C
Humidity	0 – 85% (non-condensing)

5.0 Troubleshooting

Symptom	Action
Adapter does not work after installation	Check if the cable is connected properly Check if READY is alight. Unplug and plug USB connector. Repeat the driver installation.
Connection in normal operation quit working.	Check if READY is alight. Check the cable connection.. Unplug and plug USB connector.

6.0 Ordering information

Supply code is ELO E214. The adapter is supplied with the installation CD and this manual.

Notes

