INTRODUCTION

The USB to RS-232 converter facilitates the connection of legacy RS-232 products to the modern USB-equipped host PCs for the purposes of configuration and test. Peripherals used with the USB to RS-232 converter include the host PC and the connected valve actuator. The USB to RS-232 converter is typically only connected during the configuration of the valve actuator.

Figure 1: Diagram of the intended application for the USB to RS-232 converter

Items Required

- USB to RS-232 converter module (1)
- Badger Meter product featuring an RS-232 serial interface
- USB cable with ferrites and A connector to mini-USB (1)
- Terminal emulator with VT52 emulation
- Access to FTDI drivers (within the Windows® driver base, or on the included CD/DVD, or from the FTDI site http://www.ftdichip.com/FTDrivers.htm)
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DRIVER INSTALLATION

1. Download and install a terminal emulator similar to HyperTerminal®. This action requires administrative privileges.
2. If you are using a device with a legacy or non-Internet connected version of Windows®, download and extract the appropriate FTDI driver package from the FTDI website. Copy these files to a convenient location so you can find them during the driver installation process.
3. Plug the USB cable and the USB to RS-232 converter into a free port on the host PC.
4. When prompted about the Windows Update driver installation, select Yes only if the PC is connected to the Internet, as shown in Figure 1.

![Figure 1: Driver installation from the Internet, for Internet-connected PCs only](image)

5. Select Install USB Converter Software Automatically only if the PC is connected to the Internet, as displayed in Figure 2.

![Figure 2: Automatic installation of the drivers, for Internet-connected PCs only](image)

6. Alternately, if the PC used with the USB to RS-232 converter is not internet connected, or is running a legacy (pre XP) version of the Windows operating system, it may be easier to download the FTDI driver package to a flash drive, CD-ROM or floppy disk.
7. To facilitate the off-line installation of the drivers, select **No** to the search Windows Update prompt, as shown in *Figure 3*.

![Figure 3: Selection of an off-line installation of the FTDI driver files](image)

8. Next, opt for a specific location at the automated installation prompt, as shown in *Figure 4*.

![Figure 4: Opt out of the automated installation](image)

9. When prompted about a specific location to check for the FTDI drivers, check **Include this search location** and browse to the location of the extracted FTDI driver package, as displayed in *Figure 5*.

![Figure 5: Include a relevant search path](image)

10. If a prompt appears warning about the lack of Windows logo testing, opt to **Continue Anyway**, as shown in *Figure 6*.

![Figure 6](image)
11. A status bar indicates that the driver files are being copied to the required destination. Subsequently, the final prompt indicates that the processes either succeeded or failed, as shown in Figure 7 and Figure 8.

12. An additional driver installation prompt requests the installation of a USB Serial Port driver. Repeat the installation process starting at step 3.
SOFTWARE CONFIGURATION

1. Prior to the configuration and use of the RS-232 combo software, determine the proper COM port. To do this, start the device manager by selecting Start > Run, and typing "devmgmt.msc" in the run dialog box, as shown in Figure 9.

![Figure 9: Starting the device manager from the run dialog](image)

2. Next, determine the COM port number assigned to the USB serial port by checking the enumeration under the device manager ports listing. For the installation shown in Figure 10, this number is 10. For other installations and computers, this number will be different.

![Figure 10: The device manager ports listing, with the USB serial port identified as COM 10](image)

3. Subsequently, the terminal emulator software is configured to use the COM port number of the USB serial port, as detailed in the software documentation or help file for use with the terminal emulator similar to HyperTerminal.

4. Configure the terminal emulator with the following settings:
   - Baud: 9600
   - Data bits: 8
   - Stop bit: 1
   - Parity: n
   - Flow cont: none
   - Emulation: VT-52
EVA I – Terminal Emulator Menu Advanced Configuration

Adjusting the 4-20 mA Zero Output
1. Press M until 4-20 Zero out adj w/Arrow keys displays.
2. Use the U and D keys to change the value.
NOTE: You must connect an ammeter to the output terminals and connect the power supply to the input terminals of EVA I to see a change in the current. Also must be calibrated before changing.
3. Press E to accept changes, or M to cancel and move to the next menu.

Adjusting the 4-20 mA Span Output
1. Press M until 4-20 Zero out adj w/Arrow keys displays.
2. Use the U and D keys to change the value.
NOTE: You must connect an ammeter to the output terminals and connect the power supply to the input terminals of EVA I to see a change in the current. Also must be calibrated before changing.
3. Press E to accept changes, or M to cancel and move to the next menu.

Adjusting the Actuator Speed
1. Press M until ACTUATOR SPEED – steps/second displays.
2. Use the U and D keys to change the value up and down respectively.
3. Press E to accept changes, or M to cancel and move to the next menu.

Checking the Input Signal
1. Press M until INPUT SIGNAL – % Full Scale displays.
2. The percentage of full scale displays on the bottom line of the terminal window.
3. Press M to move to the next menu.

Checking the Internal Temperature
1. Press M until Internal Temp- Degrees C displays.
2. The temperature displays in degrees Celsius.
NOTE: The first time you access this menu, please allow a few moments for the value to stabilize.
3. Press M to move to the next menu.

Checking the Motor Current
1. Press M until Motor Current- mA per phase displays.
2. The motor current displays on the bottom line in milliamps per phase.
NOTE: The first time you access this menu, please allow a few moments for value to stabilize.
3. Press M to move to the next menu.

Adjusting the Servo Deadband
1. Press M until Servo Deadband - % Stem Travel displays.
2. Use the U or D keys or the left arrow key to adjust.
3. Set to a percentage in the range of 0-1% by 0.1% increments.
4. Press E to send data to EVA I or M to cancel and move to the next menu.

Running a Diagnostics Test
1. Press M until Diagnostics – Key Enter to Begin displays.
2. Press E to run Diagnostics.
3. Upon completion, press M to move to the next menu.
Setting the Overdrive
1. Press M until Set Overdrive – <--- Enter displays.
2. Press D, U, or the left arrow key to change to ON or OFF.
3. Press E to enter data or press M to cancel and move to the next menu.

Viewing the Stem Position
1. Press M until Stem Position – % Travel displays.
2. The percentage of total position is displayed on the bottom line.
3. Press M to move to the next menu.

Applying a Zero Signal
1. Press M until Apply zero Signl Adj w/ Arrow keys displays.
2. Use D or the left arrow key to move the stem position down.
3. Use U key to move the stem position up.
4. Press E to lock in the zero signal or press M to cancel and move to the next menu.

Applying a Span Signal
1. Press M until Apply Span Signl Adj w/Arrow keys displays.
2. Use D or the left arrow key to move the stem position down.
3. Use U key to move the stem position up.
4. Press E to lock in the span signal or press M to cancel and move to the next menu.