USB to RS-485 Converter

Part Number: USB-485-1



Communications made easy

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C E F© 🖉

# Windows 8 / 7

For Windows 8 and 7, drivers will be installed automatically when your computer is connected to the Internet. Alternatively, you may install the drivers from the CD provided with the product.

# ■ INTRODUCTION

The USB-485-1 is a port-powered USB to RS-485 converter that can be used to convert any standard USB port (USB 2.0 - backward compatible) into a two-wire balanced RS-485 port and vice versa. The unit can be used to communicate with one loop of up to 256 units of RS-485 devices and it comes with a built-in selectable 120-Ohm terminator for system reliability and easy installation. This USB to RS-485 converter cable is powered from the USB port and it supports data auto-sensing & self-adjusting, therefore, no baud rate setting is required; and with the data direction auto-turnaround technology, no flow control is necessary for RS-485 communications. The USB-485-1 uses the latest FTDI chipset and is fully compatible with Windows 8/7/Vista/XP/Server 2008/Server 2003/2000/98 (32-bit), Windows 8/7/Vista/XP/Server 2008/Server 2003 (64-bit), Win CE, Mac, and Linux.

### FEATURES

- Adds one RS-485 port to your USB port.
- Supports 256 nodes of 2-wire RS-485 devices.
- Rugged terminal block with built-in selectable  $120\Omega$  terminator.
- Operates reliably from 300 to 3M baud.
- Supports Windows 8/7/Vista/XP/Server 2008/Server 2003/2000/98 (32-bit), Windows 8/7/Vista /XP/Server 2008/Server 2003 (64-bit), Win CE, Mac, and Linux.
- Supports remote wakeup and power management.
- Built-in 15kV ESD static and circuit protection.
- Port-powered, no external power required.
- Plug and play (hot-pluggable, data format auto-sensing and self-adjusting).
- Data direction auto-turnaround, no flow control is required.
- No IRQs required, no IRQ conflicts.
- Surface Mount Technology manufactured to RoHS and ISO-9001 standards.
- Safety: Strictly certified by SGS (Cert no. E1/2013/90010C; E1/2013/90011C).
- 5-year manufacturer's warranty.

### ■ SPECIFICATIONS

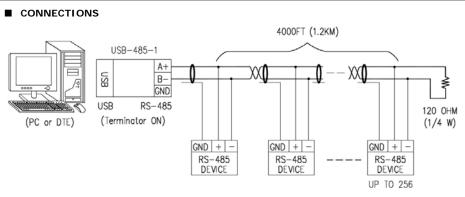
| Compatibility:           | USB 2.0 and EIA/TIA RS-232/RS-485 standards                          |
|--------------------------|--|
| Power Source:            | From USB port  |
| Current Consumption:     | Less than 60mA   |
| RS-232 Data Rate:        | 300 to 3M bps (auto-sensing and self-adjusting)                      |
| Distance:                | USB side: 10ft (3m); RS-485 side: Up to 4000ft (1.2km) at 19,200 bps |
| Connectors:              | USB side: Type A Female; RS-485 side: DB-9 Male/5-Way                |
|                          | Terminal Block   |
| LEDs:                    | TX, RX and Power   |
| Maximum number of drops: | 256  |
| End-of-Line Terminator:  | 120Ω (built-in, selectable)  |
| Static Protection (ESD): | Up to 15KV   |
| Dimensions (H x W x D):  | 0.8 x 1.3 x 3.6 in (20 x 32 x 92 mm) (excluding cable)               |
| Cable Length:            | 3.3 ft (1 m)   |
| Weight:                  | 3.8 oz (108 g)   |
| Operating Temperature:   | 32°F to 104°F (0°C to 40°C)  |
| Operating Humidity:      | Up to 90% RH (no condensation)                                       |

#### PIN ASSIGNMENT

RS-485 Side (DB-9 Male Connector / Terminal Block):

| DB-9 Male:      | 1      | 2      | 5   | 67  |
|-----------------|--------|--------|-----|---|
| Function:       | B-     | A+     | GND | Tie to turn ON the $120\Omega$                    |
|                 |        |        |     | end-of-line terminator                            |
| Terminal Block: | A+     | B-     | G   | 120   |
| Function:       | RS485+ | RS485- | GND | Tie to turn ON the 120Ω<br>end-of-line terminator |

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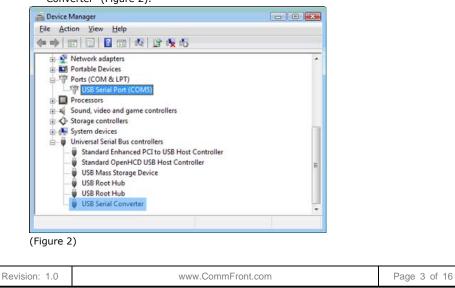


(Figure 1: 2-WIRE RS-485 MASTER-SLAVE MULTI-DROP CONNECTIONS)

Note: The  $120\Omega$  end-of-line terminator adds heavy DC loading to a system; connect it only when the data rate is over 19.2kbps or the RS-485's distance exceeds 660ft (200m).

#### DRIVER INSTALLATION – QUICK GUIDE

- For Windows 8 and 7, drivers will be installed automatically when your computer is connected to the Internet.
- For other Operating Systems, drivers are included on the CD supplied with the converter, please refer to the details below:
  - 1) Insert the CD into the drive.
  - 2) Connect the USB-485-1 to an available USB port, and the "Found New Hardware Wizard" will guide you through the installation process. When prompted to connect to Windows Updates to search for drivers, select "No, not at this time", and follow the instructions for installing from the CD.
  - 3) Once the drivers are successfully installed, the USB-485-1 will show up in the Windows Device Manager: under "Ports (COM & LPT)" – labeled as "USB Serial Port (COMx)", and under "Universal Serial Bus controllers" - labeled as "USB Serial Converter" (Figure 2).



#### Important notes:

- If it's the first time you install the driver for CommFront's USB to Serial device, you will need to install the driver twice. One is for "USB Serial Converter", and the other one is for "USB Serial Port". DO NOT close the 2<sup>nd</sup> "Found New Hardware Wizard" window while installing the driver.
- 2) Upon completion of driver installations, remember to check the Windows Device Manager to make sure that the drivers are installed properly (Figure 2). If the drivers are not installed correctly, there will be a yellow exclamation icon displayed under the "Ports (COM & LPT)" or "USB Serial Bus controllers", right-click on the yellow exclamation icon and select "Update driver". Then search for the driver in the CD supplied.
- 3) The drivers are not available via Microsoft Windows Updates, however, Windows Vista will search for the drivers via Microsoft Windows Updates by default, so **disconnect your Vista PC from the internet before the driver installation**.

#### ■ DRIVER INSTALLATION - EXAMPLES

- Example 1 (Windows Vista)
  - 1) **Disconnect your PC from the internet before driver installation**. This is because the drivers are not available via Microsoft Windows Updates, but Windows Vista will search for the drivers via Microsoft Windows Updates by default.
  - 2) Insert the CD into the drive and connect the USB-485-1 to an available USB port, the "Found New Hardware" window will pop up. Click on the "Locate and install driver software (recommended)" button to continue (Figure 3).

| Wir | und New Hardware Indows needs to install driver software for your USB HS   |
|-----|--|
| ۲   | Locate and install driver software (recommended)<br>Windows will guide you through the process of installing driver software<br>for your device. |
| +   | Ask me again later<br>Windows will ask again the next time you plug in your device or log on.  |
| ۲   | Don't show this message again for this device<br>Your device will not function until you install driver software.                                |
|     | Cancel   |

(Figure 3)

 Windows Vista will look for the driver in the CD, click on the "Next" button to continue. This will start the driver installation for "USB Serial Converter" (Figure 4).



(Figure 4)

4) When the driver is successfully installed, the following window will pop up - confirming that the driver installation of "USB Serial Converter" has been completed successfully. Click on the "Close" button to continue (Figure 5).

| 0    | 2 Found New Hardware - USB Serial Converter  |       |  |
|------|--|-------|--|
|      | The software for this device has been successfully installed   |       |  |
| 7    | Windows has finished installing the driver software for this device:   |       |  |
|      | USB Serial Converter   |       |  |
|      |  |       |  |
|      |  |       |  |
|      |  |       |  |
| -    |  | Close |  |
| _    |  |       |  |
| (Fig | ure 5)   |       |  |
| driv | 2 <sup>nd</sup> "Found New Hardware" window will pop up, pron<br>er for "USB Serial Port". <b>DO NOT close this window!</b><br>o install the driver for "USB Serial Port". |       |  |

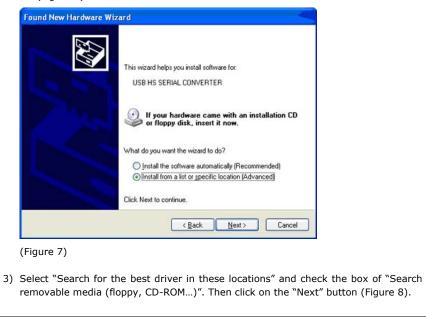
6) When the 2<sup>nd</sup> driver installation is completed, remember to check the Windows Device Manager to confirm that the drivers are installed successfully (Figure 2). The USB-485-1 will show up in the Windows Device Manager: under the "Ports (COM & LPT)" – labeled as "USB Serial Port (COMx)", and "Universal Serial Bus controllers" - labeled as "USB Serial Converter".

#### • Example 2 (Windows XP)

 Insert the CD into the drive and connect the USB-485-1 to an available USB port, the "Found New Hardware Wizard" window will pop up. Select "No, not this time" and click on the "Next" button to continue (Figure 6).

| Found New Hardware Wiz | ard   |
|------------------------|---|
|                        | Welcome to the Found New Hardware Wizard         Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).         Read our privacy policy         Can Windows connect to Windows Update to search for software?         Yes, this time only         Yes, this time only         Yes, now and gvery time I connect a device         Who, not this time |
|                        | < <u>Back</u> Next> Cancel  |
| Figure 6)              |   |

 Select "Install from a list or specific location (Advanced)" to install the driver from CD (Figure 7).



| lease cho      | ose your search and installation options.   |
|----------------|---|
| ⊙ <u>S</u> ear | ch for the best driver in these locations.  |
|                | he check boxes below to limit or expand the default search, which includes local<br>and removable media. The best driver found will be installed.   |
|                | Search removable media (floppy, CD-ROM)   |
|                | Include this location in the search:  |
|                | Browse  |
| O Don'         | search. I will choose the driver to install.  |
|                | se this option to select the device driver from a list. Windows does not guarantee the<br>iver you choose will be the best match for your hardware. |
|                |   |
|                | <back next=""> Cancel</back>  |

| (Figure 8) |
|------------|
|------------|

4) When the driver is successfully installed, the following window will pop up, confirming that the driver installation of "USB Serial Converter" has been completed. Click on the "Finish" button to continue (Figure 9).

(Figure 9)

- 5) The 2<sup>nd</sup> "Found New Hardware" window will pop up, prompting you to install the driver for "USB Serial Port". DO NOT close this window! And repeat steps 1) to 4) to install the driver for "USB Serial Port".
- 6) When the 2<sup>nd</sup> driver installation is completed, remember to check the Windows Device Manager to confirm that the drivers are installed successfully (Figure 2). The USB-485-1 will show up in the Windows Device Manager: under "Ports (COM & LPT)" – labeled as "USB Serial Port (COMx)", and under "Universal Serial Bus controllers" – labeled as "USB Serial Converter".

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- Example 3 (Windows 2000)
  - Insert the CD into the drive and connect the USB-485-1 to an available USB port, the "Found New Hardware Wizard" window will pop up. Click on the "Next" button to continue (Figure 10).

| Found New Hardware Wizard |  |
|---------------------------|--|
|                           | Velcome to the Found New<br>lardware Wizard<br>his wizard helps you install a device driver for a<br>ardware device. |
|                           | < <u>B</u> ack Next> Cancel  |

## (Figure 10)

 Select "Search for a suitable driver for my device (recommended)" and click on the "Next" button to continue (Figure 11).

| Found New Hardware Wizard   |   |
|---|---|
| Install Hardware Device Drivers<br>A device driver is a software program that e<br>an operating system.   | mables a hardware device to work with       |
| This wizard will complete the installation for  | this device:                                |
| USB HS SERIAL CONVERTER   |   |
| A device driver is a software program that m<br>needs driver files for your new device. To lo<br>installation click Next.<br>What do you want the wizard to do? |   |
| Search for a suitable driver for my de  | vice (recommended)                          |
| <ul> <li>Display a list of the known drivers for<br/>driver</li> </ul>  | this device so that I can choose a specific |
|   | < <u>B</u> ack Next> Cancel                 |
| Figure 11)  |   |

 Check the box of "CD-ROM drives", and then click on the "Next" button to continue (Figure 12).

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| Search for driver files for the following hardware device:<br>USB HS SERIAL CONVERTER<br>The wizard searches for suitable drivers in its driver database on your computer and in<br>any of the following optional search locations that you specify.<br>To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive,<br>insert the floppy disk or CD before clicking Next.<br>Optional search locations: | .ocate Driver Files<br>Where do you want Windows to searc | sh for driver files?         |
|---|---|------------------------------|
| The wizard searches for suitable drivers in its driver database on your computer and in<br>any of the following optional search locations that you specify.<br>To start the search, click Next, If you are searching on a floppy disk or CD-ROM drive,<br>insert the floppy disk or CD before clicking Next.<br>Optional search locations:  | Search for driver files for the following h               | hardware device:             |
| any of the following optional search locations that you specify.<br>To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive,<br>insert the floppy disk or CD before clicking Next.<br>Optional search locations:   | USB HS SERIAL CONVERT                                     | ER                           |
| inset the floppy disk or CD before clicking Next.<br>Optional search locations:   |   |                              |
|   |   |                              |
| C Change dist. doined   | Optional search locations:                                |                              |
| I (Ploppy gisk drives)  | Floppy disk drives  |                              |
| CD-ROM drives   | CD-ROM drives   |                              |
| Specify a location  | Specify a location  |                              |
| Microsoft Windows Update  | Microsoft Windows Update                                  |                              |
|   |   | <back next=""> Cancel</back> |
| < Back Next > Cancel  |   |                              |

4) Windows will automatically locate the driver, for example, "e:\drivers\windows 2000\_server 2003\_xp\_vista x32\ftdibus.inf". Click on the "Next" button to continue (Figure 13).

| river File | es Search Results   |
|------------|---|
| The wi     | zard has finished searching for driver files for your hardware device.  |
| The wid    | and found a driver for the following device:  |
| 2          | USB HS SERIAL CONVERTER   |
| Window     | vs found a driver for this device. To install the driver Windows found, click Next.   |
| -050       | e:\drivers\windows 2000_server 2003_xp_vista x32\ftdibus inf  |
|            | and also found other drivers that are suitable for this device. To view a list of<br>rivers or install one of these drivers, select the following check box, and then click |
| 🗖 Inst     | all one of the other drivers  |
|            | < Back Next> Cancel   |

5) When the driver is successfully installed, the following window will pop up, confirming that the driver installation of "USB Serial Converter" has been completed. Click on the "Finish" button to continue (Figure 14).

| Completing the Found New<br>Hardware Wizard   |  |
|---|--|
| Windows has finished installing the software for this device.<br>The hardware you installed will not work until you restart<br>your computer. |  |
| To close this wizard, click Finish.   |  |

# (Figure 14)

- 6) The 2<sup>nd</sup> "Found New Hardware" window will pop up, prompting you to install the driver for "USB Serial Port". DO NOT close this window! And repeat steps 1) to 5) to install the driver for "USB Serial Port".
- 7) When the 2<sup>nd</sup> driver installation is completed, remember to check the Windows Device Manager to confirm that the drivers are installed successfully (Figure 2). The USB-485-1 will show up in the Windows Device Manager: under "Ports (COM & LPT)" – labeled as "USB Serial Port (COMx)", and under "Universal Serial Bus controllers" - labeled as "USB Serial Converter".

### ■ TROUBLESHOOTING

#### General

- Make sure that the USB-485-1 is connected to your USB port, and the driver is installed correctly (Figure 2); otherwise, please reinstall the driver (Please refer to the "Driver reinstallation examples" below).
- 2) Make sure the "Power" LED on USB-485-1 is lit up.
- 3) Perform a loopback test by using CommFront's 232Analyzer software (included on the CD supplied with the converter): Connect two numbers of USB-485-1 converters (A+ to A+, B- to B-) to your USB ports and run two instances of the 232Analyzer software, then send commands from one COM port, you should receive an echo of the commands sent on the other COM port. By performing a simple loopback test like this, you can test both the transmitter and receiver of the converter. This is very helpful when you are in doubt about the performance of your converter (Figure 15).

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| Data format                  |  |
|------------------------------|--|
| C Hex C                      | Dec C Oct C Bin C ASCII  |
| 10 (10)                      | Delay 0 ms Repeat 0 Interval 0 ms Stop   |
|                              | sed commands   Oth OFh   Information (ASCII)  Infor |
| NUL SO                       |  |
| BS HT                        | T LF VT FF CR SO SI S1 S2 S3 S4 S5 S6 S7 S8  |
| Data format (R               | 8  |
|                              | Des C Det C Bin @ ASCI   |
|                              | Formatted view   Description   HX time: S0 ms - Clear  |
|                              | Baud rate: 19200bps; Parity: Even; Data bit 8; Stop bit 1; Handshaking: None 🔷   |
|                              | tion mode: Debugging / Simulating<br>hat: ASCII, RX data format: ASCII   |
| ********                     | * COM Port Opened ********   |
|                              |  |
| Data sent Co                 | ammFront   |
|                              |  |
| G TX G DSF                   | R & CTS & DCD & RI & DTR & RTS & BRK &   |
| ommunication<br>Send command | mode: Debugging / Simulating   |
| Data format (                | TX) Input ASCII (e.g. ATI1) and control code (Hex format: e.g. D, A,) to be sent   |
| C Hex C                      | Dec C Oct C Bin @ ASCI   |
| Francist                     | - Delay 0 ma Repeat 0 Interval 0 ms Stop   |
|                              | ed commands ← 00h - 0Fh ← 10h - 1Fh Programmable buttons (ASCII) ← 1-16 ← 17-32  |
| Announced announced          | H STX ETX EOT ENQ ACK BEL AT1 AT2 AT3 AT4 AT5 AT6 AT7 AT8  |
| BS HT                        | LF VT FF CR SO SI S1 S2 S3 S4 S5 S6 S7 S8  |
| Data format (R0              | A contain F  |
|                              | Search sang  |
|                              |  |
|                              | Baud rate: 19200bps; Parity: Even; Data bit: 8; Stop bit: 1; Handshaking: None   |
|                              | at ASCII: PX data format ASCII   |
| ******                       | COM Port Opened *********  |
|                              |  |
| Data receive                 |  |
|                              |  |
| G TX G DSR                   | R & CTS & DCD & RI & DTR & RTS & BRK &   |
| igure 15)                    |  |
|                              |  |
| iver reir                    | nstallation examples   |
| ivers mig                    | ght not be installed properly if the above driver installation procedures we   |
| -                            | d; for example, the user did not disconnect the PC from the internet whi   |
|                              | rivers on Vista machines, or the 2 <sup>nd</sup> "Found New Hardware Wizard" windo   |
|                              | before the driver installation was completed. Below are some example   |
|                              | w to reinstall the drivers.  |
|                              |  |
| ample 1                      | (Windows Vista)  |
| •                            | : A yellow exclamation icon appears besides the "USB Serial Converter". Als  |
|                              |  |
| ).                           | display of the "Ports (COM & LPT)" in the Windows Device Manager (Figure   |
| J.                           |  |
|                              |  |
|                              |  |
|                              |  |
|                              |  |
|                              |  |

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|   |   | 0 0 × |
|---|---|-------|
| ile Action View Help  |   |       |
|   | 12 夜心   |       |
| COMMFRONT-PC  Computer  Dishay adapters  Dishay adapters | ers   |       |
| Network adapters     Portable Devices     Processors     Sound, video and game     Storage controllers     System devices     Universal Serial Bus cont   | trollers<br>PCI to USB Host Controller<br>USB Host Controller |       |
| sunches the Update Driver Softw   | Disable   |       |

- Right-click on the "USB Serial Converter" that displays with the yellow exclamation icon, and select "Update Driver Software..." (Figure 16).
- Click on the "Browse my computer for driver software" button to continue (Figure 17).

| low do you want to search for driver software?  |        |
|---|--------|
| Search automatically for updated driver software<br>Windows will search your computer and the Internet for the latest driver software<br>for your device. |        |
| Browse my computer for driver software<br>Locate and install driver software manually.  |        |
|   |        |
|   | Cancel |
| ure 17)   |        |

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| Browse for driver software on your computer  |          |  |
|--|----------|--|
| Search for driver software in this location:   |          |  |
| E\Drivers\Windows 2000_Server 2003_XP_VISTA X32  | · Browse |  |
| Let me pick from a list of device drivers on n<br>This list will show installed driver software compatible wit<br>software in the same category as the device. |          |  |
|  |          |  |

4) When the driver is successfully updated, the following window will pop up, confirming that the driver installation of "USB Serial Converter" has been completed. Click on the "Close" button to exit (Figure 19).

| Update Driver Software - USB Serial Converter                        |       |
|--|-------|
| Windows has successfully updated your driver software                |       |
| Windows has finished installing the driver software for this device: |       |
| USB Serial Converter   |       |
|  |       |
|  |       |
|  | Close |

# Example 2 (Windows Vista)

Symptoms: A yellow exclamation icon appears besides the "USB Serial Port" (Figure 20).

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|---------------|-------------------|--------------|
|               |                   |              |

| Device Manager  |  |  |
|---|--|--|
| File Action View Help   |  |  |
| • • I I I I I I I I I I I I I I I I I I   | 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1        |  |
| Disk drives     Display adapters     Display adapters     Display adapters     Display adapters     Display disk drives     Display | s<br>es<br>lers                                |  |
| Ports (COM & LPT)   | Update Driver Software<br>Disable<br>Uninstall |  |
| <ul> <li>System devices</li> <li>Universal Serial Bus</li> <li>Standard Enhander</li> </ul>   | Scan for hardware changes Properties           |  |
| USB Mass Storage I<br>USB Mass Storage I<br>USB Root Hub<br>USB Root Hub  | Device   |  |

# (Figure 20)

- 1) Right-click on the "USB Serial Port" that displays with the yellow exclamation icon, and select "Update Driver Software..." (Figure 20).
- 2) Click on the "Browse my computer for driver software" button to continue (Figure 21).

| ch automatically for updated driver software<br>ws will search your computer and the Internet for the latest driver software<br>ar device. |  |
|--|--|
|  |  |
| rse my computer for driver software<br>and install driver software manually.   |  |

#### (Figure 21)

 Locate the driver in the CD provided, and click on the "Next" button to continue (Figure 22).

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| Browse for driver software on your computer   |          |
|---|----------|
| Search for driver software in this location:  |          |
| E:\Drivers\Windows 2000_Server 2003_XP_VISTA X32  | - Browse |
| Include subfolders  |          |
| Let me pick from a list of device drivers on n<br>This list will show installed driver software compatible with<br>software in the same category as the device. |          |

4) When the driver is successfully updated, the following window will pop up, confirming that the driver installation of "USB Serial Port" has been completed. Click on the "Close" button to exit (Figure 23).

| te Driver Software - USB Serial Port (COM5)                  |   |
|--|---|
| vs has successfully updated your driver software             |   |
| has finished installing the driver software for this device: |   |
| USB Serial Port  |   |
|  |   |
|  |   |
|  |   |
|  | Close   |
|  | tte Driver Software - USB Serial Port (COM5)<br>ws has successfully updated your driver software<br>: has finished installing the driver software for this device:<br>USB Serial Port |

#### Example 3 (Windows Vista/XP/2003/2000/98/ME)

Symptoms: No yellow exclamation signs, but COM port does not exist or is not functioning.

- Locate and execute the driver un-installation program FTDIUNIN.exe in its respective folder. For example, for Windows 2000/Server\_2003/XP/Vista 32-bit, the un-installation program is located at "E:\Drivers\Windows 2000\_Server 2003\_XP\_Vista X32\"
- Unplug the USB-485-1, and click on the "Continue" button to uninstall the drivers (Figure 24).

| lf your USB device is connected, please unplug    | it now      |
|---|-------------|
| Press Continue to uninstall the drivers, or Cance | el to quit. |
|   |             |
|   |             |
|   |             |
| Continue Cancel                                   |             |

3) Click on the "Finish" button to complete the un-installation of the drivers (Figure 25).

| Deleting registry entr<br>Deleting files | es |  |
|--|----|--|
| Press Finish to exit.                    |    |  |



4) Follow the correct driver installation procedures above to reinstall the drivers for your USB-485-1 converter.

## SUPPORT

Check out CommFront's website: <u>www.CommFront.com</u> for product updates, FAQs, and other support.

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