

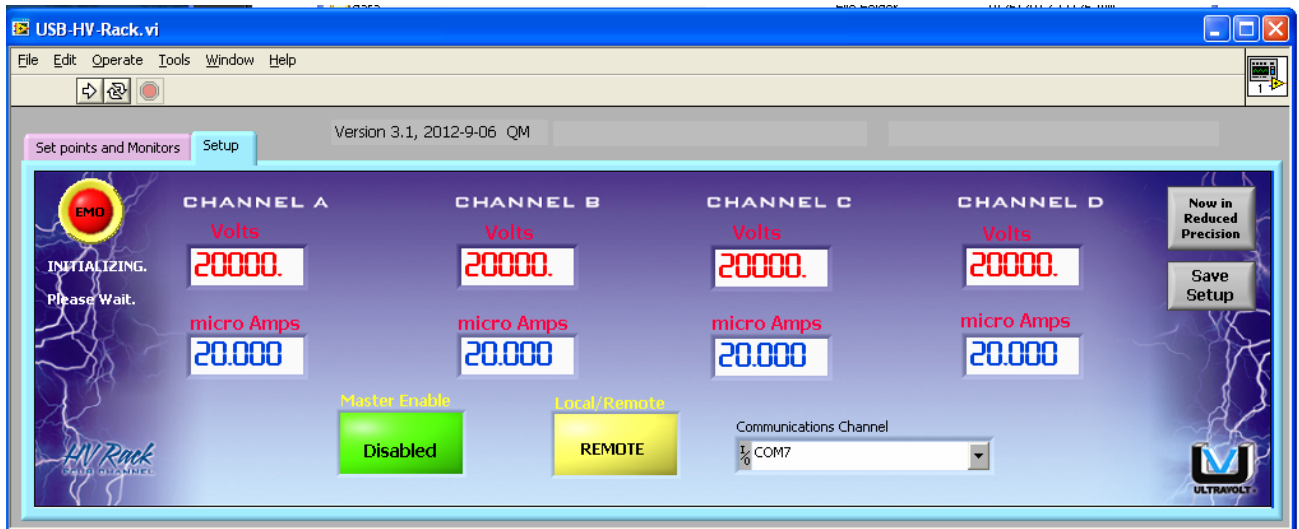


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# Manual for USB-HV-RACK Interface







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#### Revision History

Revision Number	Date	Description
A	2008-12-15	USB-HV-Rack Manual
B	2011-3-30	Revise instructions for determining the COM port.
C	2012-9-26	Add auto-detect for COM port

<b>Part A</b>	
A-1.0 Introduction to Software Installation.....	5A
A-2.0 Copy contents of the CD.....	5A
A-3.0 Software and Hardware Installation.....	5A
A-3.1 Installation of the Application Program.....	5A
A-3.2 Installation of USB Virtual Com Port Drivers.....	5A
A-3.2.1 Install Drivers for Windows 98.....	6A
A-3.2.2 Install Drivers for Windows 2000.....	10A
A-3.2.3 Install Drivers for Windows XP.....	16A
A-3.2.4 Install Drivers for Windows Vista.....	21A
A-3.3 Installation of the VISA Driver.....	21A
A-4.0 Determining the USB Virtual Com Port (VCP).....	26A
A-4.1 Saving the Virtual Com Port.....	30A
<b>Part B</b>	
B-1.0 Introduction to Users Manual.....	2B
B-2.0 Software and Hardware Installation.....	2B
B-3.0 Starting the Application Software.....	2B
B-4.0 Controlling the HV Rack with the Application Software.....	3B
B-4.1 Turning the Channels On.....	3B
B-4.2 Setting the Current or Voltage Set Points.....	3B
B-4.3 Shutting down the Application Software.....	4B
B-4.4 Voltage and Current Mode indication.....	4B
B-5.0 Changing the Units of Measure.....	4B
B-6.0 Saving and Recalling the Setup settings.....	6B
B-7.0 Selecting between Full-Precision and Reduced-Precision.....	6B
<b>Part C</b>	
C-1.0 Introduction to Labview Modules.....	2C
C-2.0 Description of the Labview VI's.....	2C
C-2.1 Read_INI.vi.....	2C
C-2.2 Init USB Port.vi.....	2C
C-2.3 Read SW Version.vi.....	2C
C-2.4 Local_Remote_and_Enables.vi.....	2C
C-2.5 Format_PCMM.vi.....	2C
C-2.6 Send and Receive Data Block.vi.....	2C
C-2.7 Send Set Points.vi.....	3C
C-2.8 Perform Serial Write and Read.vi.....	3C
C-2.9 Parse Response Array.vi.....	3C
C-2.10 LED Test.vi.....	3C
C-2.11 Close USB Port.vi.....	3C
C-3.0 Description of the Labview example application.....	3C
C-3.1 Simulation Control tab.....	4C
C-3.2 Set Points tab.....	5C
C-3.3 Enables tab.....	6C
C-3.4 LED tab.....	7C
APPENDIX A SPECIFICATIONS.....	8C
APPENDIX B VISA DRIVERS.....	9C



**Part A**  
**Software Installation**  
**for the**  
**USB-HV-RACK module**

## A-1.0 Introduction to Software Installation

This manual describes how to install the drivers for the USB module and how to configure the USB Application Program to recognize the USB port. It covers software installation for a PC -Windows 98, Windows 2000, Windows XP and Windows Vista.

This installation document is contained in the 'C:\Program Files\USB-HV-Rack\Documents' directory and is named "MANUAL-1001.pdf".

## A-2.0 Copy contents of the DVD

The software is supplied on a DVD which must be copied to the PC. Create a folder in the 'C:\Program Files' directory named 'USB-HV-Rack'. Copy the contents of the DVD into this folder.

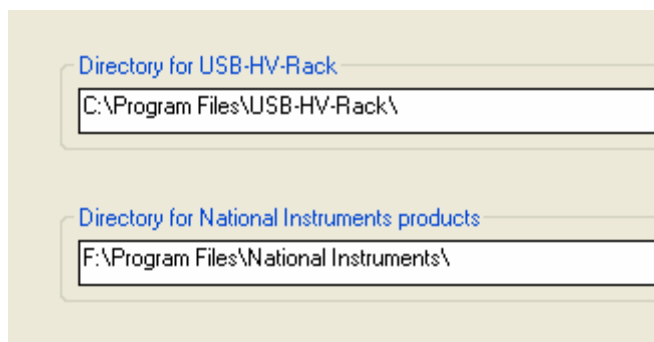
## A-3.0 Software and Hardware Installation

The install procedure consists three parts. The first part is to install the UV application program and associated files. The second part is to install the Virtual COM Port (VCP) drivers for the USB interface. The third part is to install the VISA driver for the COM port. This third part will normally be done automatically when installing part one. However, if problems are encountered when trying to run the USB application program, this third part may have to done explicitly.

These three parts are described in sections A-3.1 through A-3.3.

### A-3.1 Installation of the Application Program

Start the program, 'C:\Program Files\USB-HV-Rack\Installer\Volume\setup.exe'.



Follow the on-screen instructions. When the installation of the application program is complete, there will be a program file named "USB-HV-Rack.exe" located in folder

'C:\Program Files\USB-HV-Rack\'. Please see Part B of this document for details on running this application program. This application program should not be started until the remaining steps in Part A are completed.

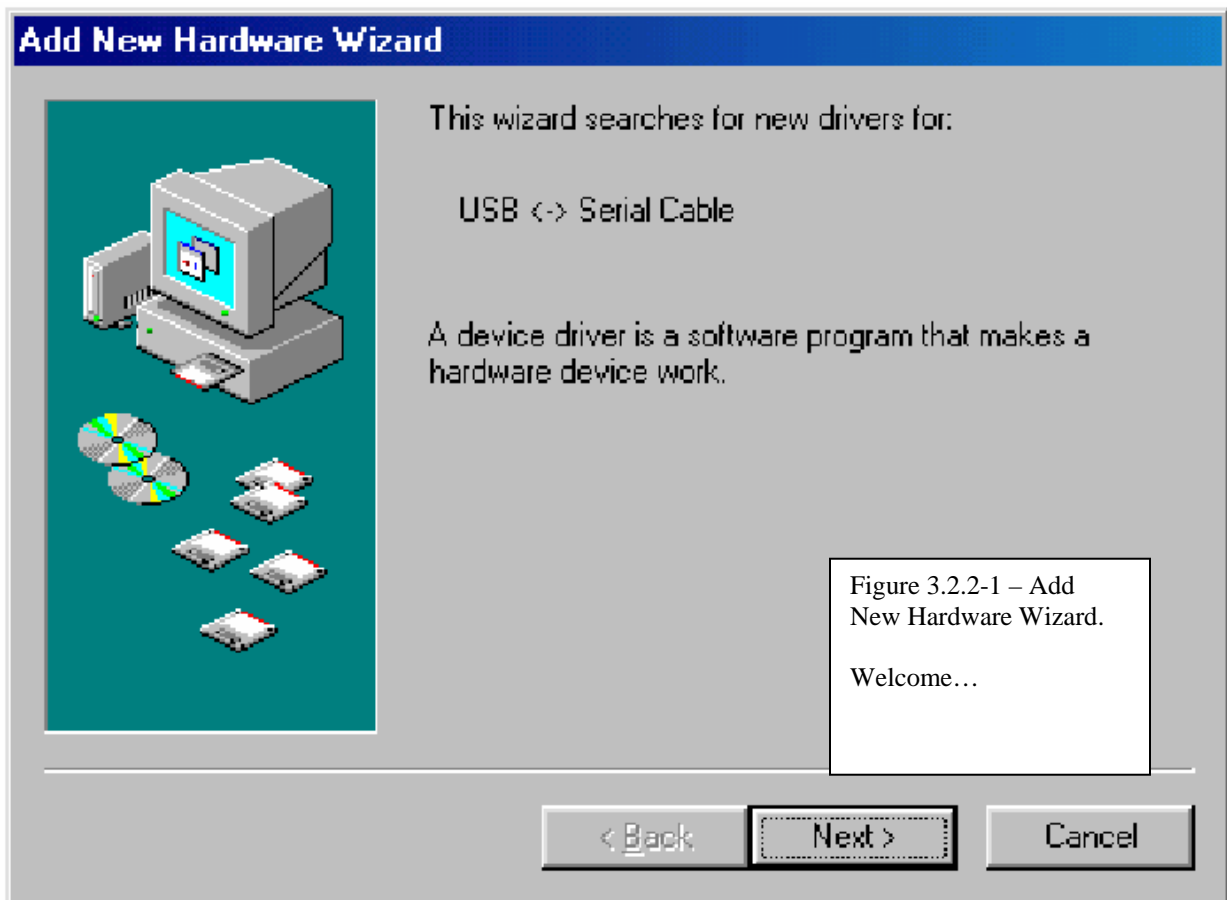
### **A-3.2 Installation of USB Virtual Com Port Drivers**

This installation process for the Virtual Com Port (VCP) drivers needs to be done twice. Each install appears identical to the user. The specific steps will depend on what operating system is being used.

The VCP driver installation instructions begin on the next page. Go to the section that matches your operating system.

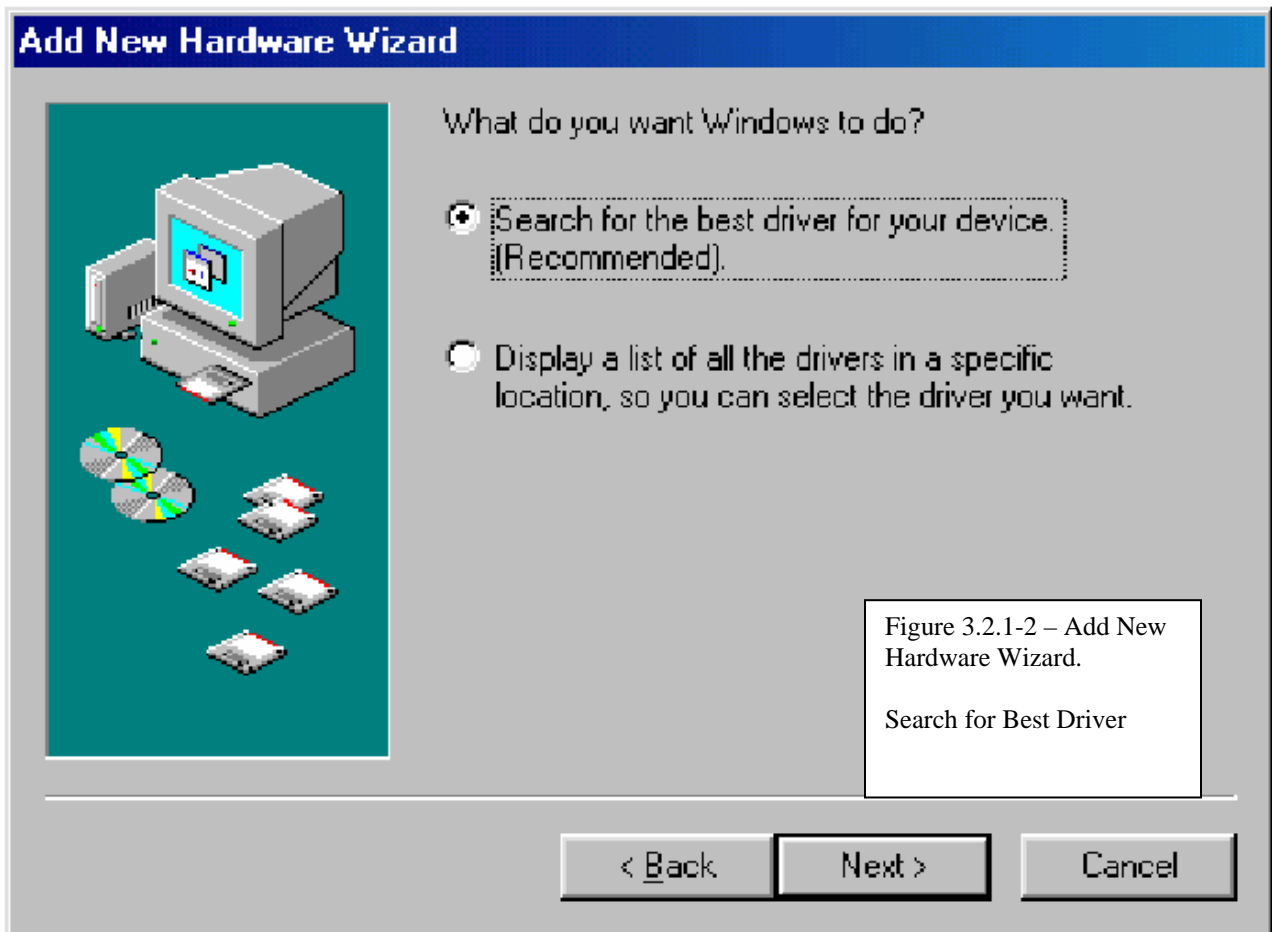
### A-3.2.1 Install Drivers for Windows 98

Connect the supplied USB cable to the USB Interface Module. Then connect the other end of the USB cable to a dedicated USB port on the PC. The PC will then recognize a new device and bring up the following 'Add New Hardware Wizard' screen.

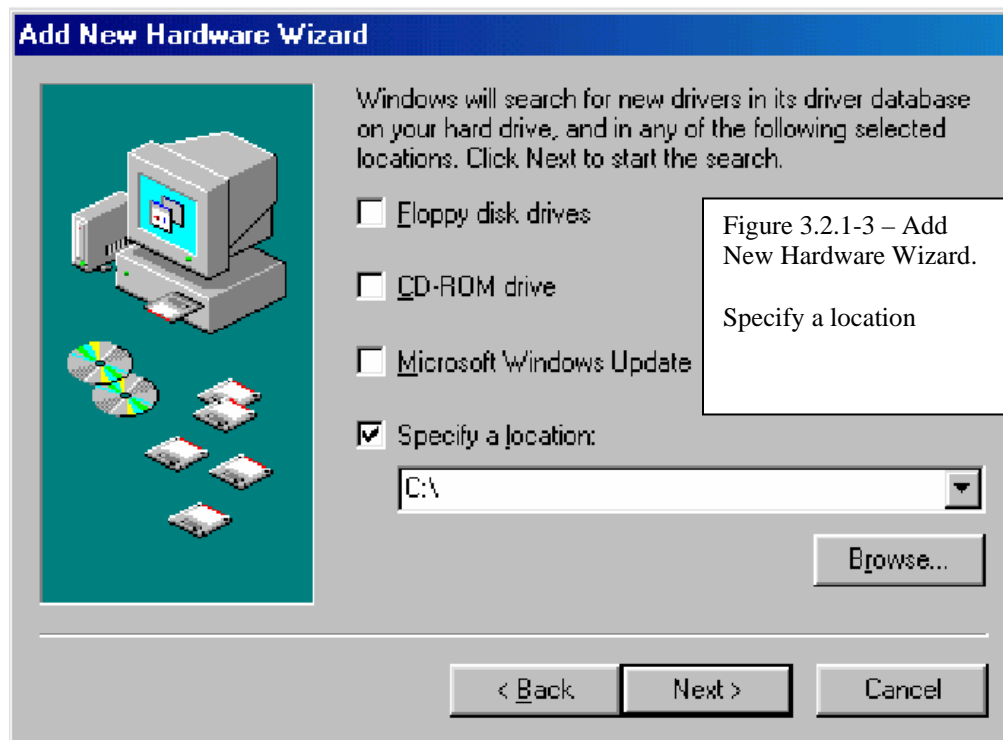


On the screen shown above (figure 3.2.1-1) click the 'Next' button. This will bring up the screen shown in figure 3.2.1-2.



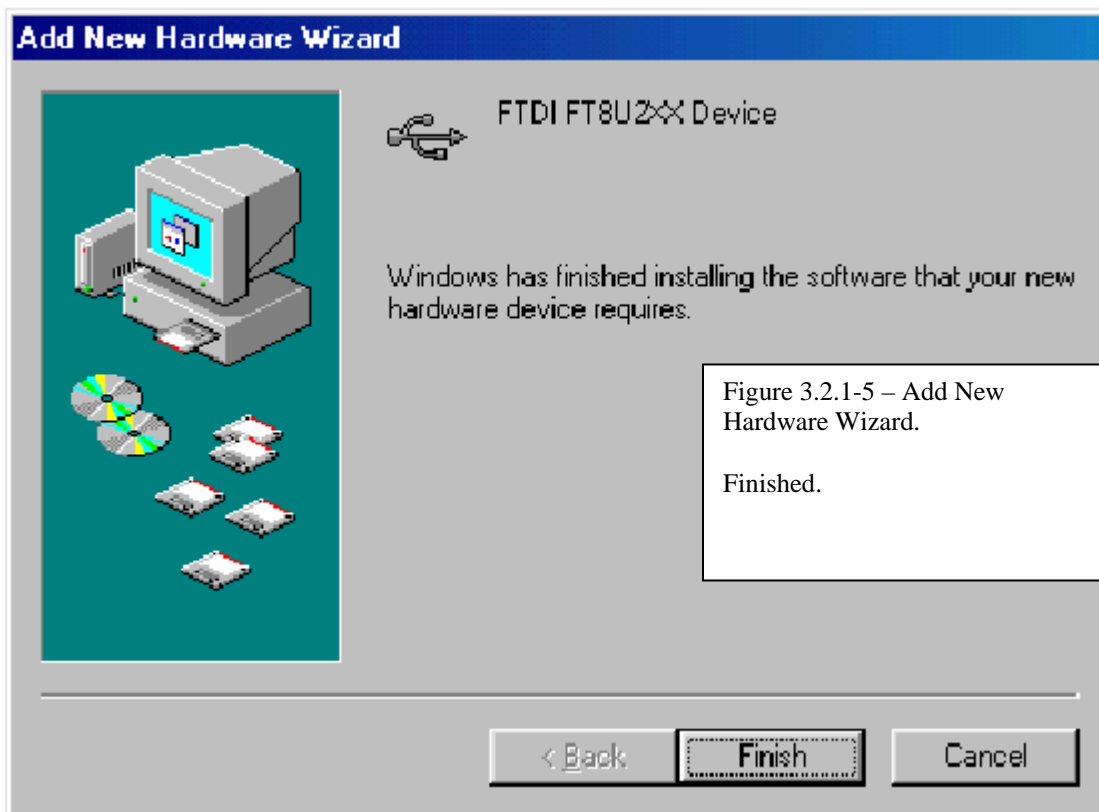


On the screen above (figure 3.2.1-2) click the radio button for 'Search for the best driver for your device (Recommended)'. Then click the 'Next' button. This will bring up the screen shown in figure 3.2.1-3.



On the above screen click the check box for 'Specify a location'. Then click the 'Next' button. This will bring up figure 3.2.2-4 below. (Windows may display a message reading "Building driver data base" at this point which may take a few minutes to pass.) Once windows has found the required files, click "Next" to install the device.



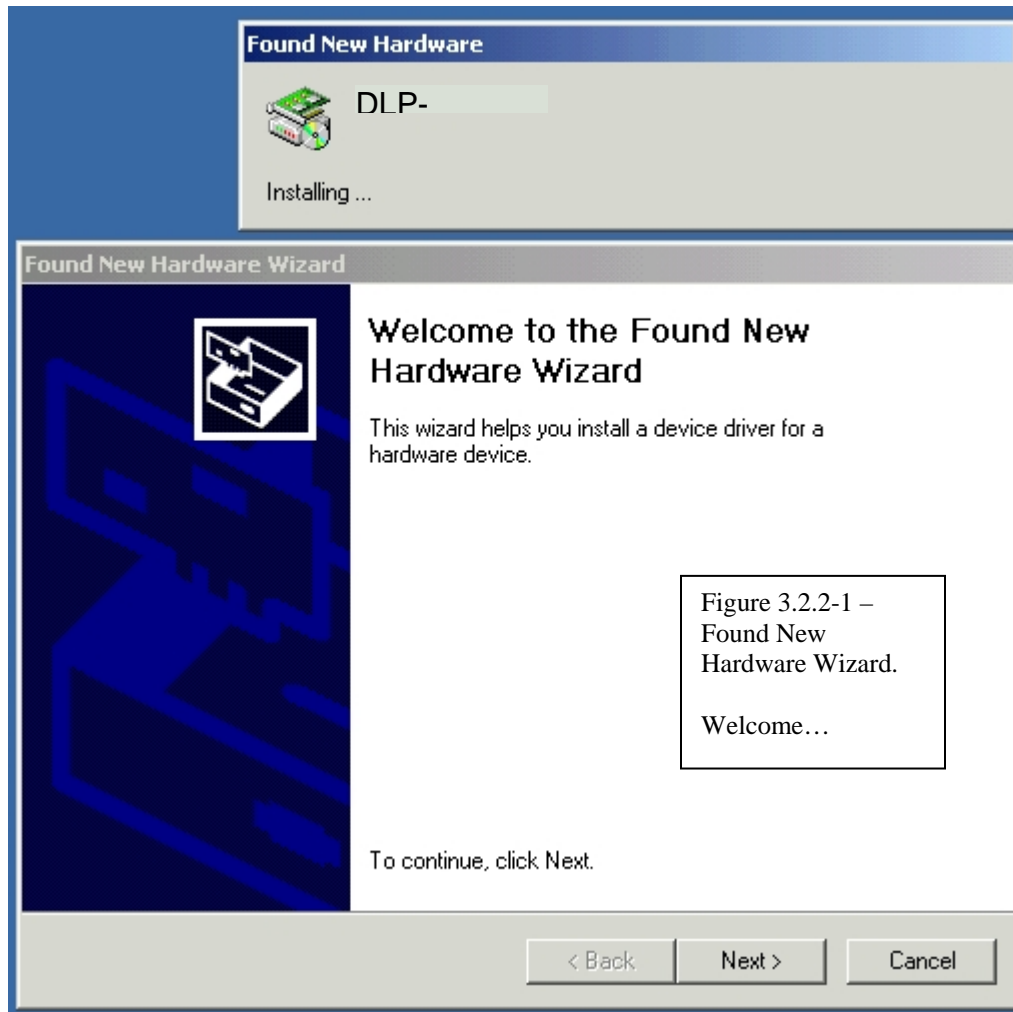


Click the 'Finish' button. This will complete the first of two parts for the USB installation. The installation of the second part is exactly the same and begins with the screen show in figure 3.2.1-1. Follow the same steps again. After you click 'Finish' on this second time around, the 'Found New Hardware Wizard' will close.

Proceed to section A-4.0.

### A-3.2.2 Install Drivers for Windows 2000

Connect the supplied USB cable to the USB Interface Module. Then connect the other end of the USB cable to a dedicated USB port on the PC. The PC will then recognize a new device and bring up the following 'Found New Hardware Wizard' screen.



On the screen shown above (figure 3.2.2-1) click the 'Next' button. This will bring up the screen shown in figure 3.2.2-2.



Figure 3.2.2-2 –  
Found New  
Hardware Wizard.

Install Hardware....

On the screen above (figure 3.2.2-2) click the radio button for ‘Search for a suitable driver for my device (recommended)’. Then click the ‘Next’ button. This will bring up the screen shown in figure 3.2.2-3.



Figure 3.2.2-3 –  
Found New  
Hardware Wizard.  
  
Locate Driver Files

On the above screen click the check box for 'Specify a location'. Then click the 'Next' button. This will bring up figure 3.2.2-4 below.

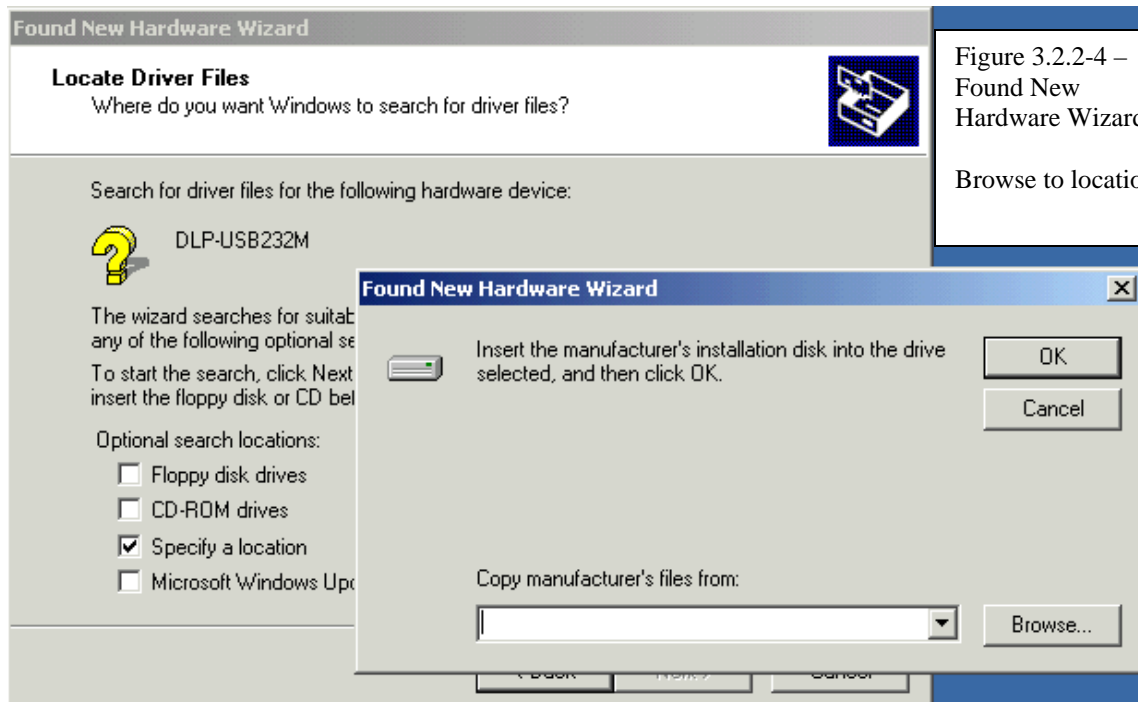
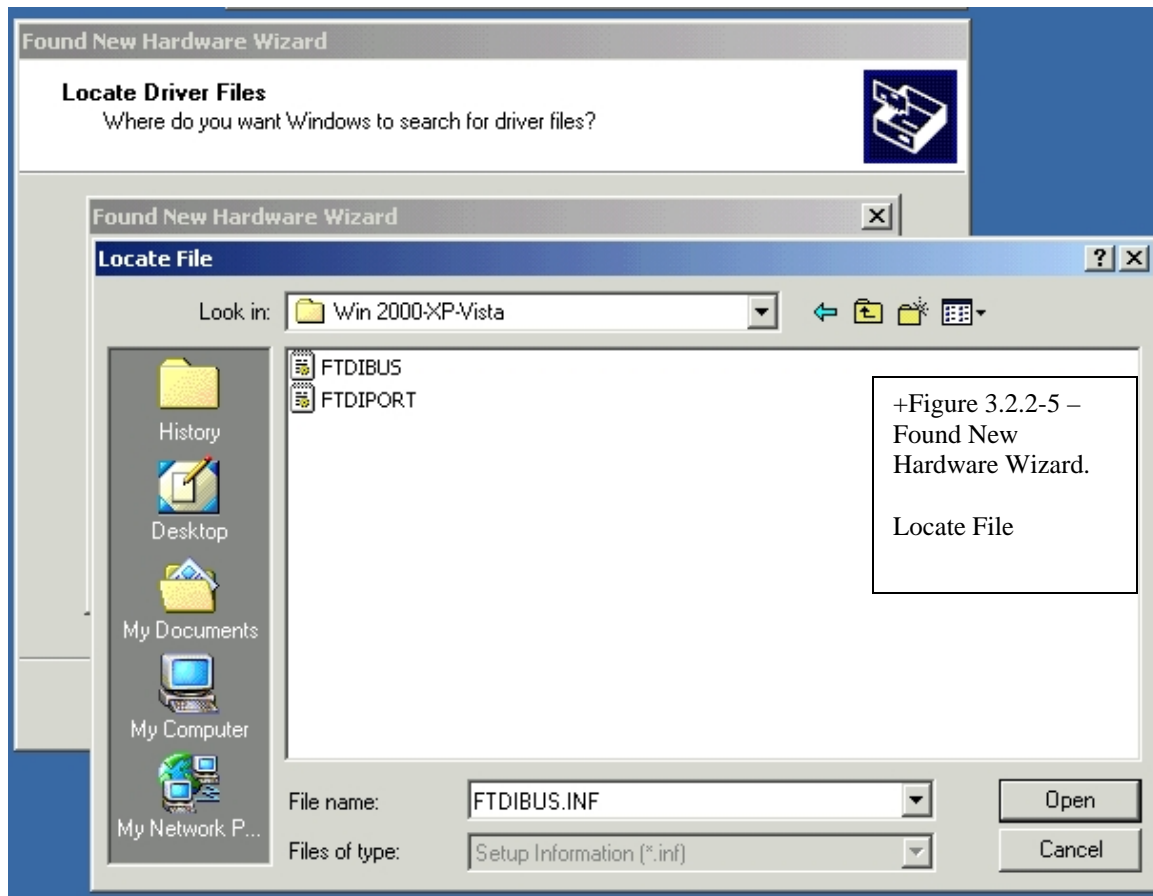


Figure 3.2.2-4 –  
Found New  
Hardware Wizard.  
  
Browse to location.

Click on the 'Browse' button and navigate to 'C:\Program Files\USB-HV-Rack\USB Drivers\Win 2000-XP-Vista\'. This is shown in Figure 3.2.2-5 below.



Click the 'Open' button. This will return to the previous screen but now with the file location placed in field adjacent the 'Browse' button. This is shown in figure 3.2.2-6.

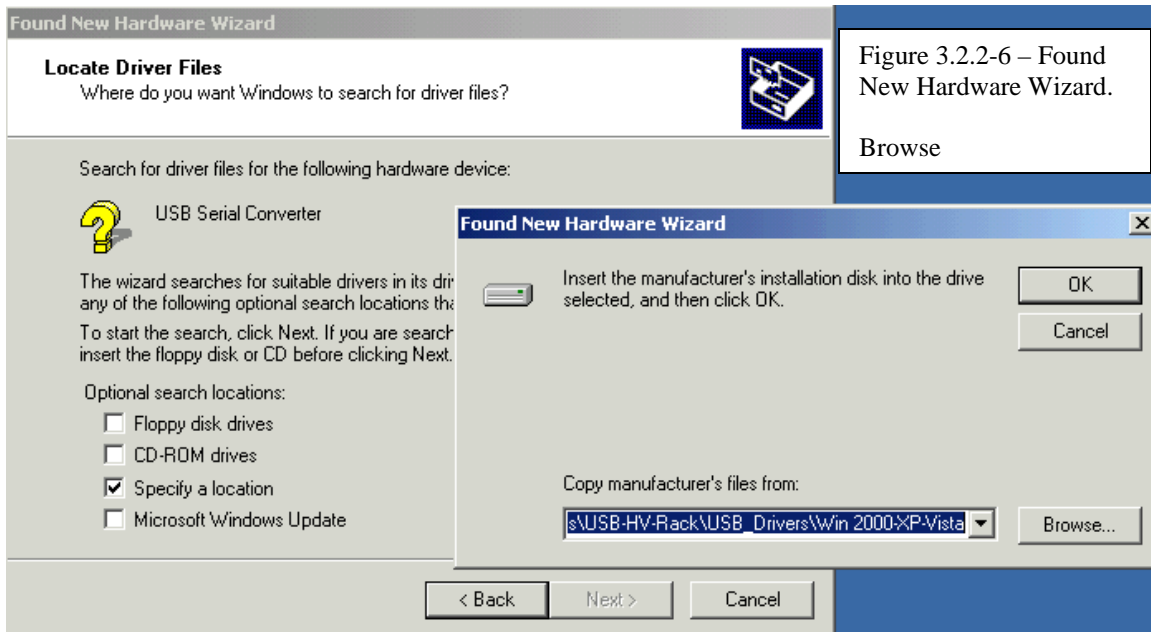


Figure 3.2.2-6 – Found New Hardware Wizard.

Browse

Click the 'OK' button. This will bring up the screen shown below that indicates that a driver was found.

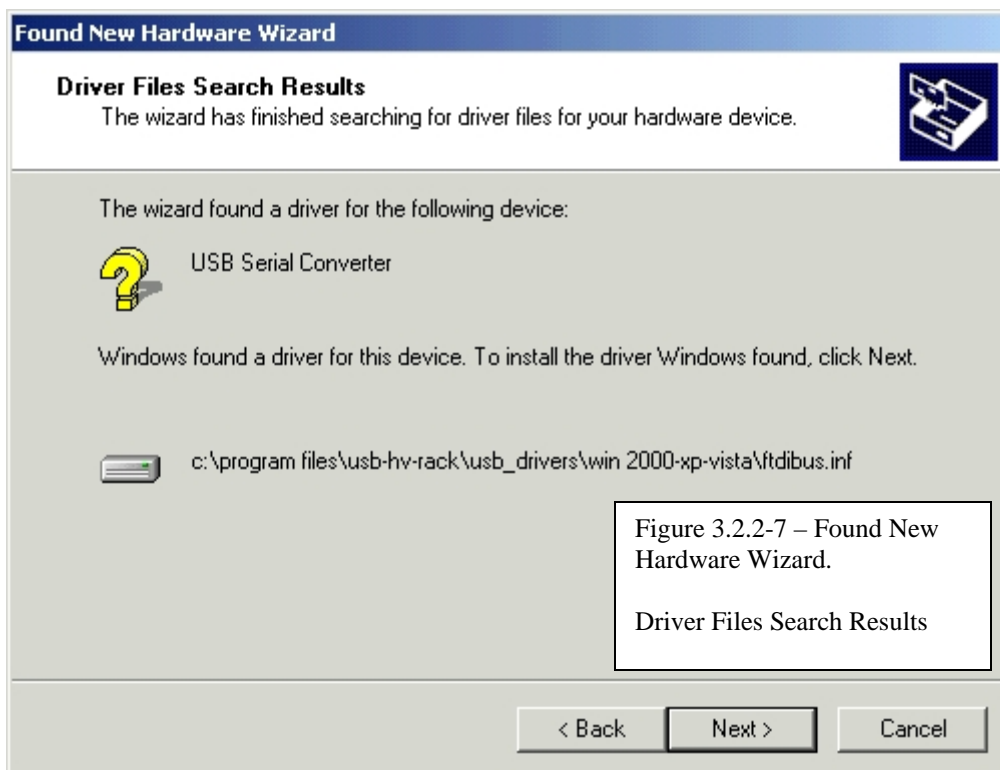


Figure 3.2.2-7 – Found New Hardware Wizard.

Driver Files Search Results

From the screen shown in figure 3.2.2-7, (Above), click the 'Next' button to install the driver. After the driver is installed the following screen will be displayed.



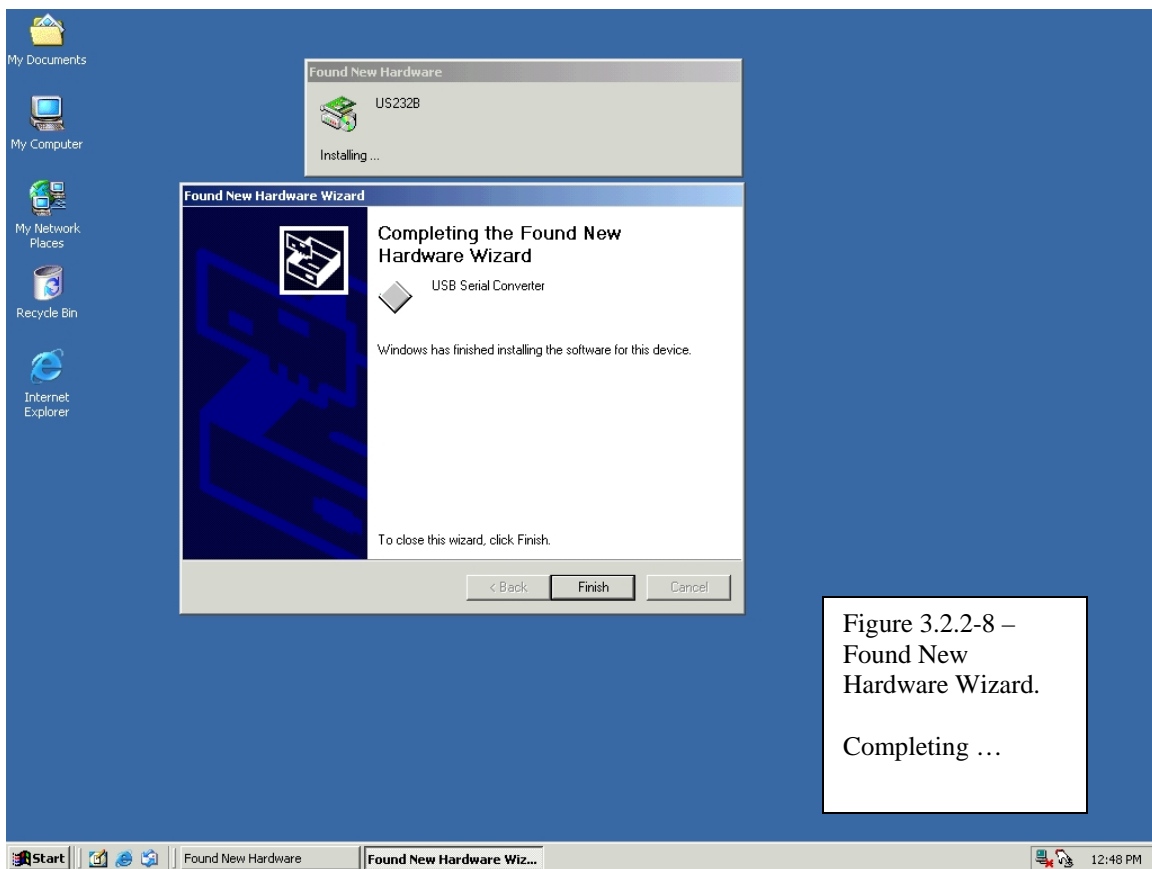


Figure 3.2.2-8 –  
Found New  
Hardware Wizard.  
  
Completing ...

Click the 'Finish' button. This will complete the first of two parts for the USB installation. The installation of the second part is exactly the same and begins with the screen show in figure 3.2.2-1. Follow the same steps again. After you click 'Finish' on this second time around, the 'Found New Hardware Wizard' will close.

Proceed to section A-4.0, *Determining the USB Virtual Com Port (VCP)*.

### A-3.2.3 Install Drivers for Windows XP

Connect the supplied USB cable to the USB Interface Module. Then connect the other end of the USB cable to a dedicated USB port on the PC. The PC will then recognize a new device and bring up the following 'Found New Hardware Wizard' screen.



Figure 3.2.3-1 –  
Found New  
Hardware Wizard.  
  
Welcome...

On the screen shown above (figure 3.2.3-1) click the 'Next' button. This will bring up the screen shown in figure 3.2.3-2.

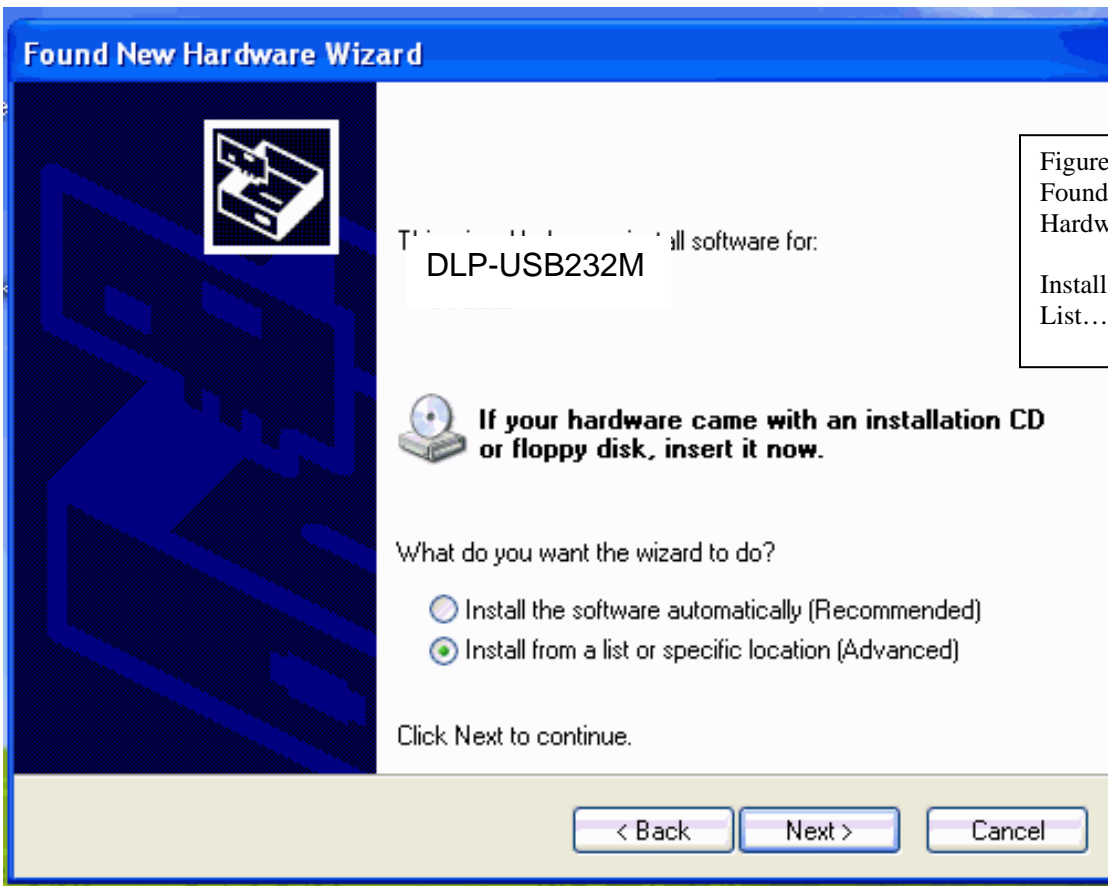


Figure 3.2.3-2 –  
Found New  
Hardware Wizard.

Install From a  
List....

On the screen above (figure 3.2.3-2) click the radio button for 'Install From A List or Specific Location (Advanced)'. Then click the 'Next' button. This will bring up the screen shown in figure 3.2.3-3.



Figure 3.2.3-3 – Found New Hardware Wizard.

Include this location.

On the screen above (figure 3.2.3-3), un-click the first option and click the option for 'Include This Location in the Search'. Then click the 'Browse' button. This will bring up the screen shown in figure 3.2.3-4 below. Browse to the location 'C:\Program Files\USB-HV-Rack\USB\_Drivers\Win 2000-XP-Vista\'. This is shown in Figure 3.2.3-5.

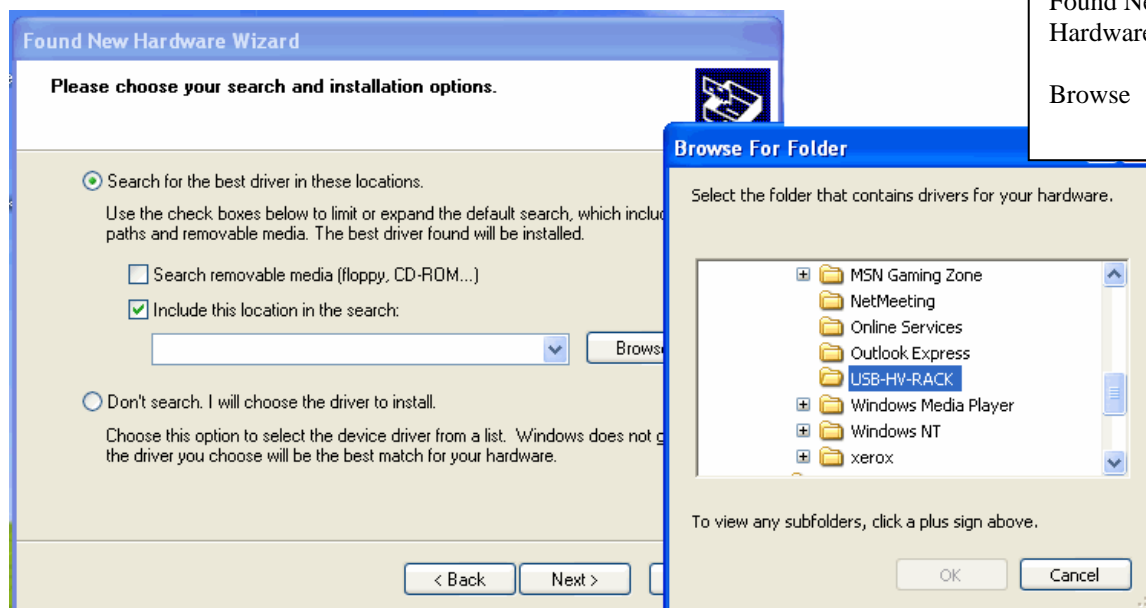


Figure 3.2.3-4 – Found New Hardware Wizard.

Browse

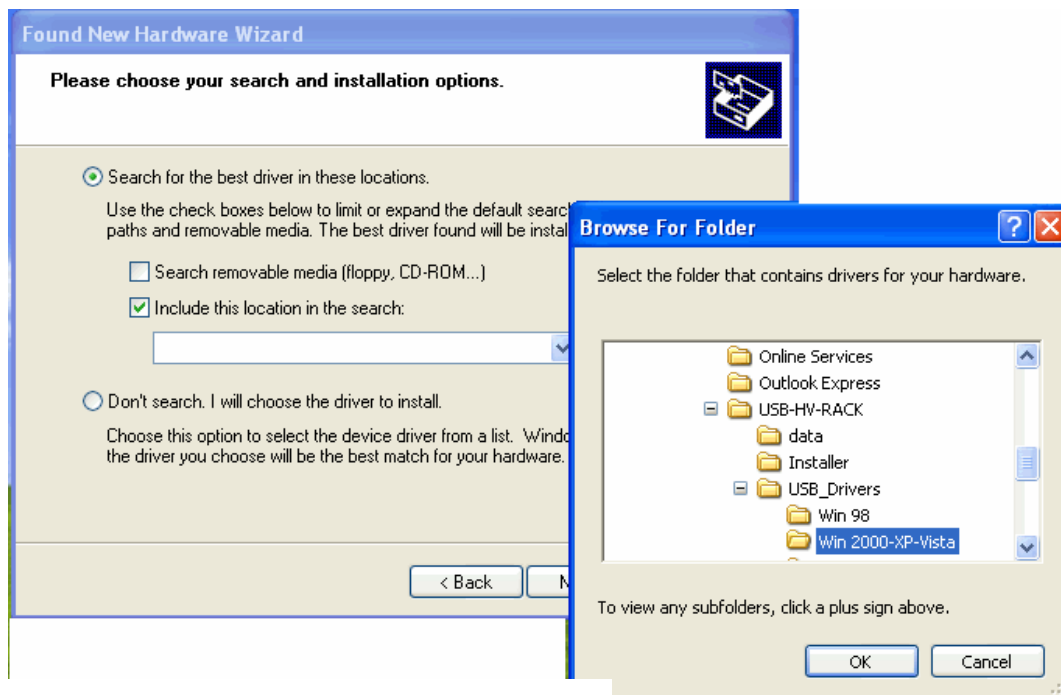


Figure 3.2.3-5 –  
Found New  
Hardware Wizard.  
  
Locate File

Click the 'OK' button. This will return to the previous screen but now with the file location placed in field adjacent the 'Browse' button. This is shown below in figure 3.2.3-6.

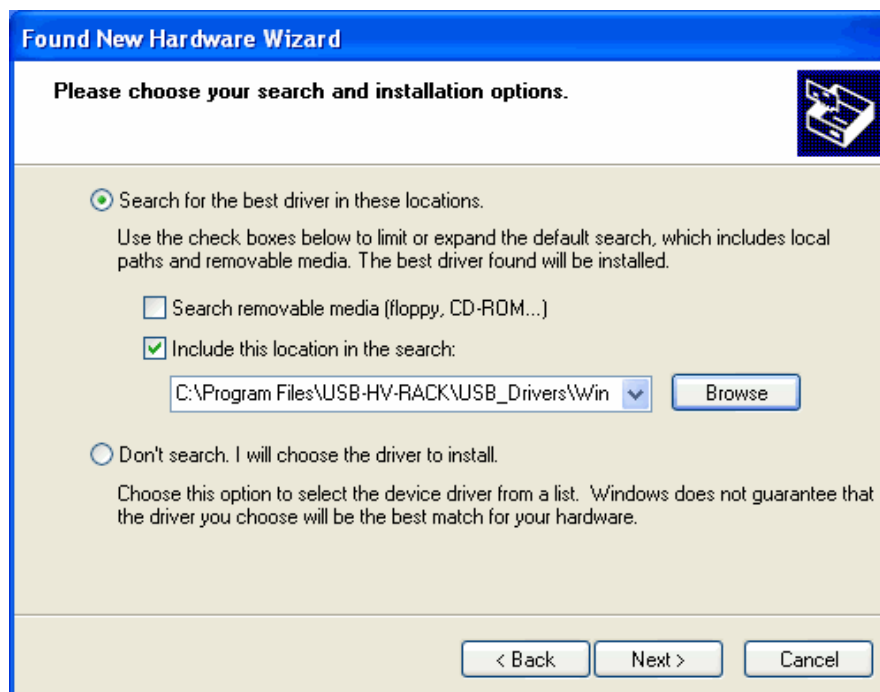


Figure 3.2.3-6 –  
Found New  
Hardware Wizard.  
  
Driver Files  
Location

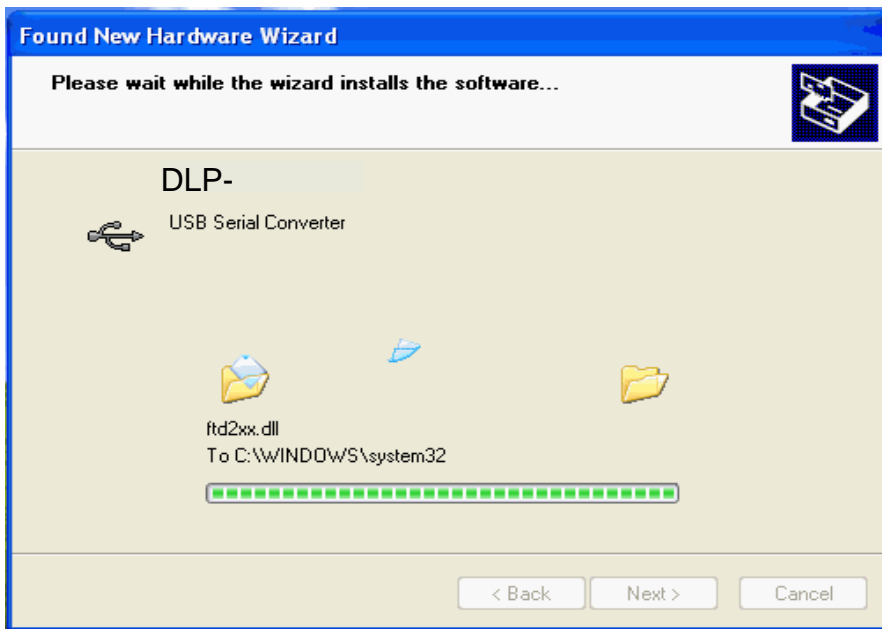


Figure 3.2.3-7 –  
Found New  
Hardware Wizard.  
  
Installing...

From the screen above (figure 3.2.3-7), click the ‘Next’ button to install the driver. After the driver is installed the following screen will be displayed:

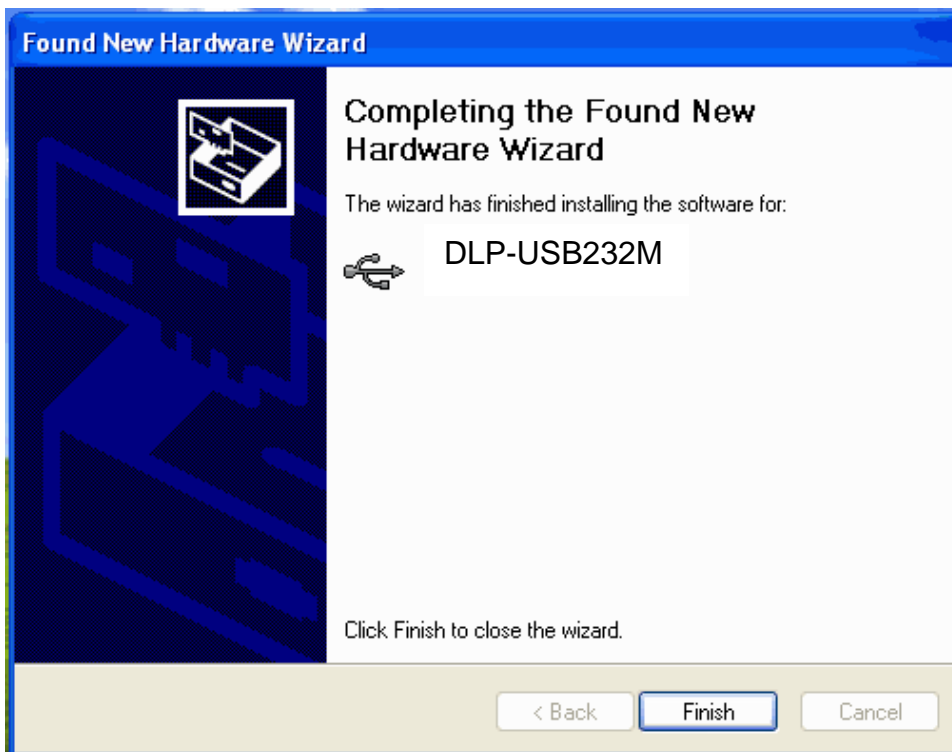


Figure 3.2.3-8 –  
Found New  
Hardware Wizard.  
  
Completing ...

Click the ‘Finish’ button. This will complete the first of two parts for the USB installation. The installation of the second part is exactly the same and begins with the screen show in figure 3.2.3-1. Follow the same steps again. After you click ‘Finish’ on this second time around, the ‘Found New Hardware Wizard’ will close. Now proceed directly to section 4.0 *Determining the USB Virtual Com Port (VCP)*.

### A-3.2.4 Install Drivers for Windows Vista

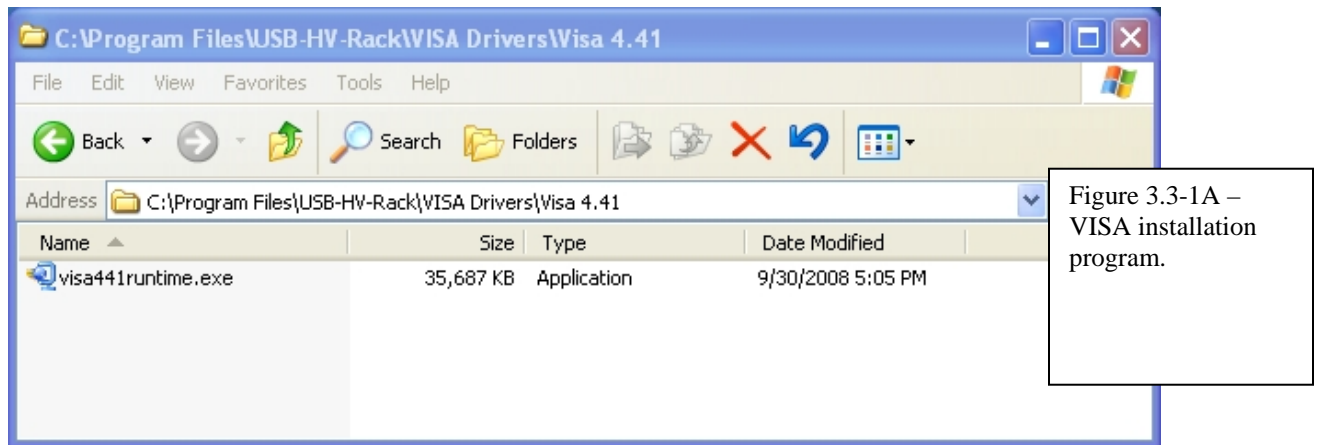
Follow the procedure used for Windows XP (Section A-3.2.3).

### A-3.3 Installation of the VISA Driver

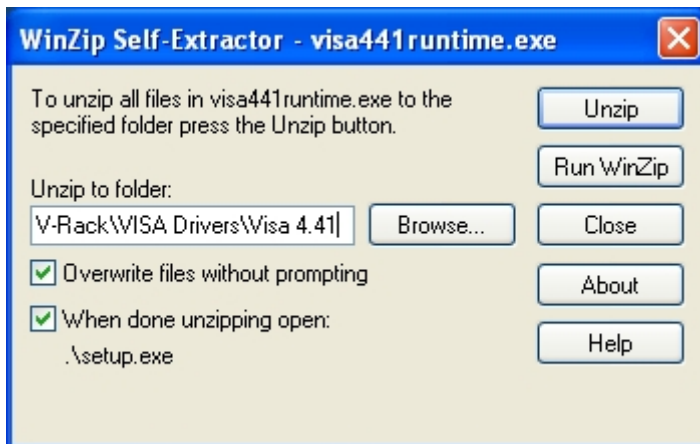
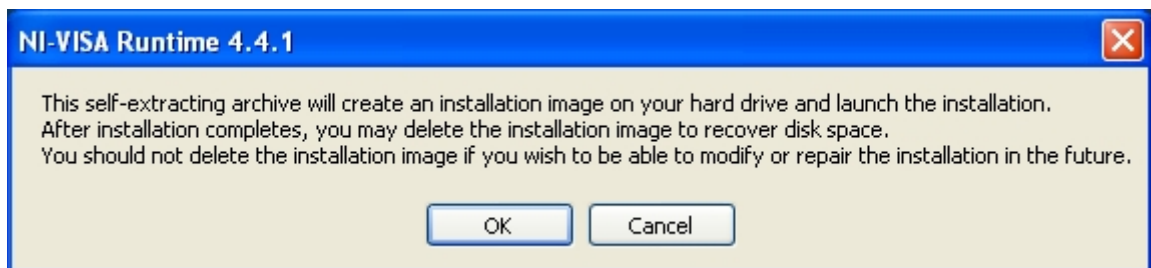
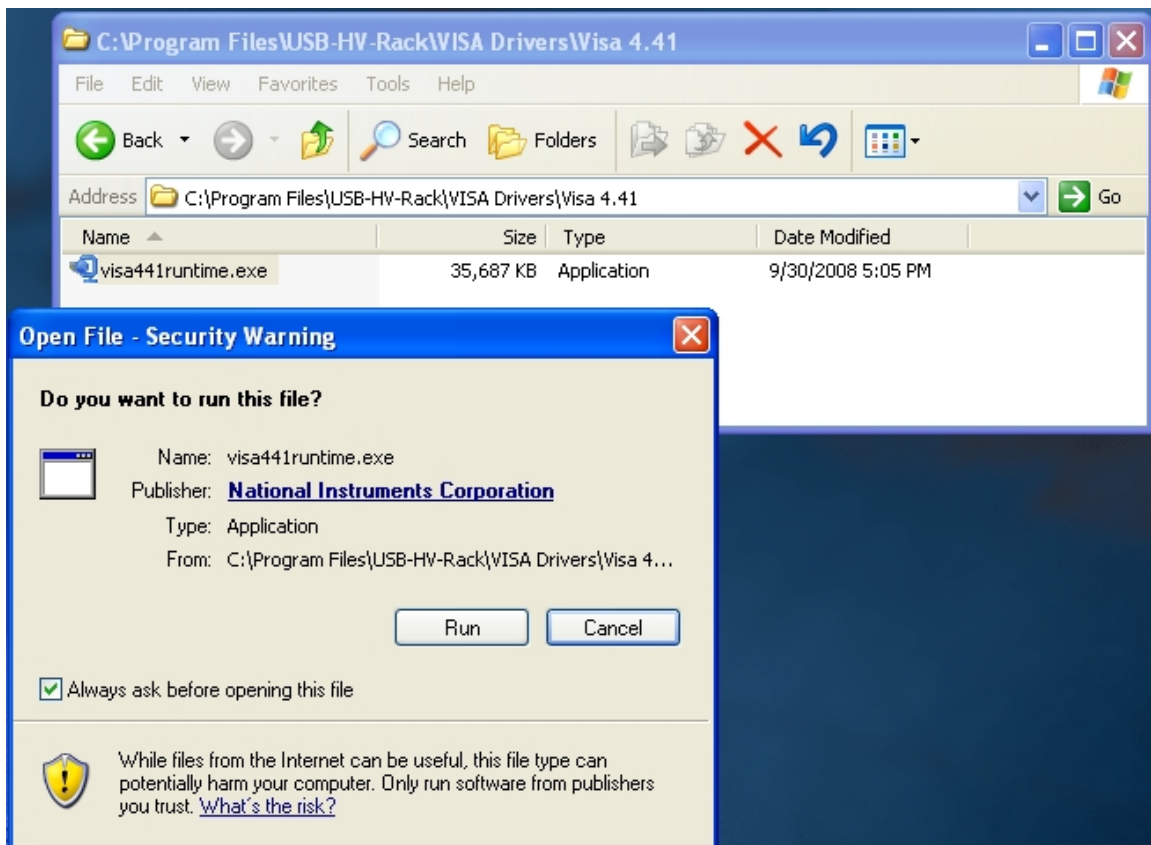
A VISA (Virtual Instrument Software Architecture) driver is automatically installed as part of the installation procedure of the previous sections. You should be able to run your USB interface after you perform the steps in A-4.0 through A-4.1. However, if you experience problems when you try the USB interface you may have to come back to this section and explicitly install version 4.41 of the VISA drivers. This installation is described below.

In order to communicate to the Virtual Com Port (VCP), the VISA driver must be installed. VISA is an industry standard that is used for Serial, GPIB, VXI, PXI, USB, and Ethernet. Use the following procedure to explicitly install the VISA driver, version 4.41.

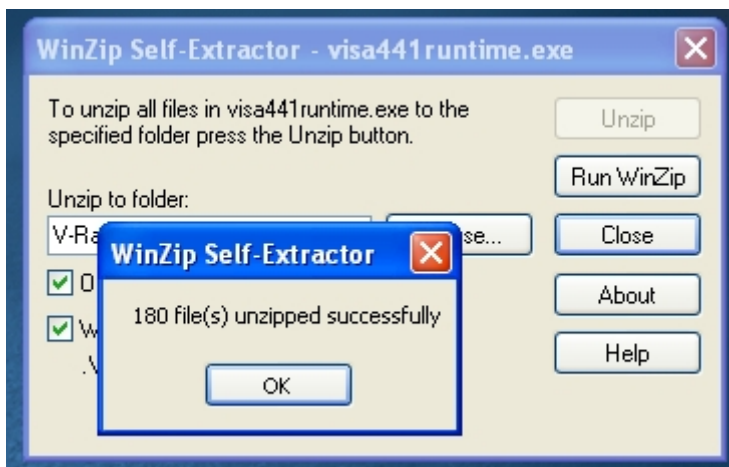
Use Windows Explorer to navigate to '**C:\Program Files\USB-HV-Rack\VISA Drivers\Visa 4.41**' and then execute the program, '**visa441runtime.exe**', as show in figure 3.3-1A below.

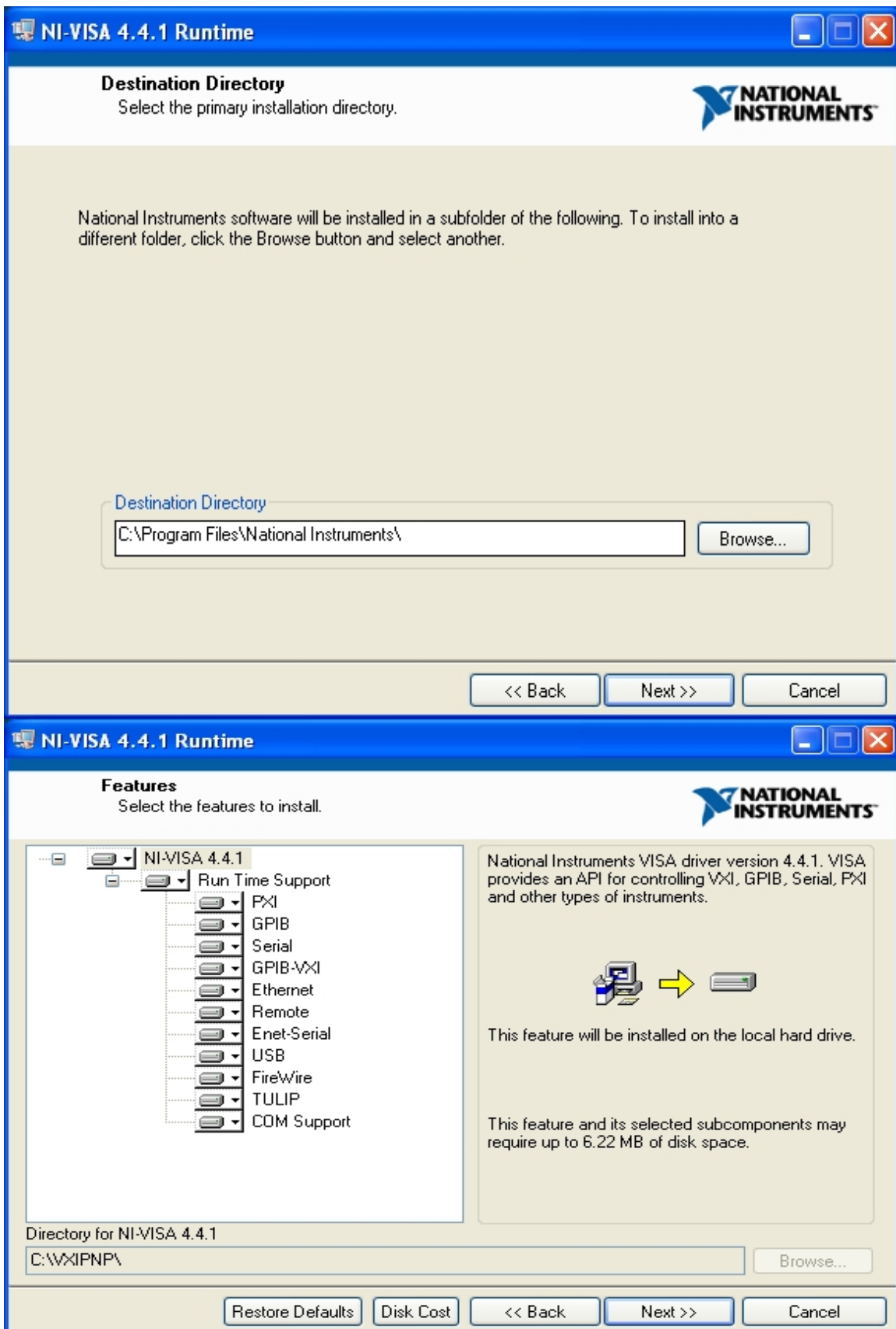


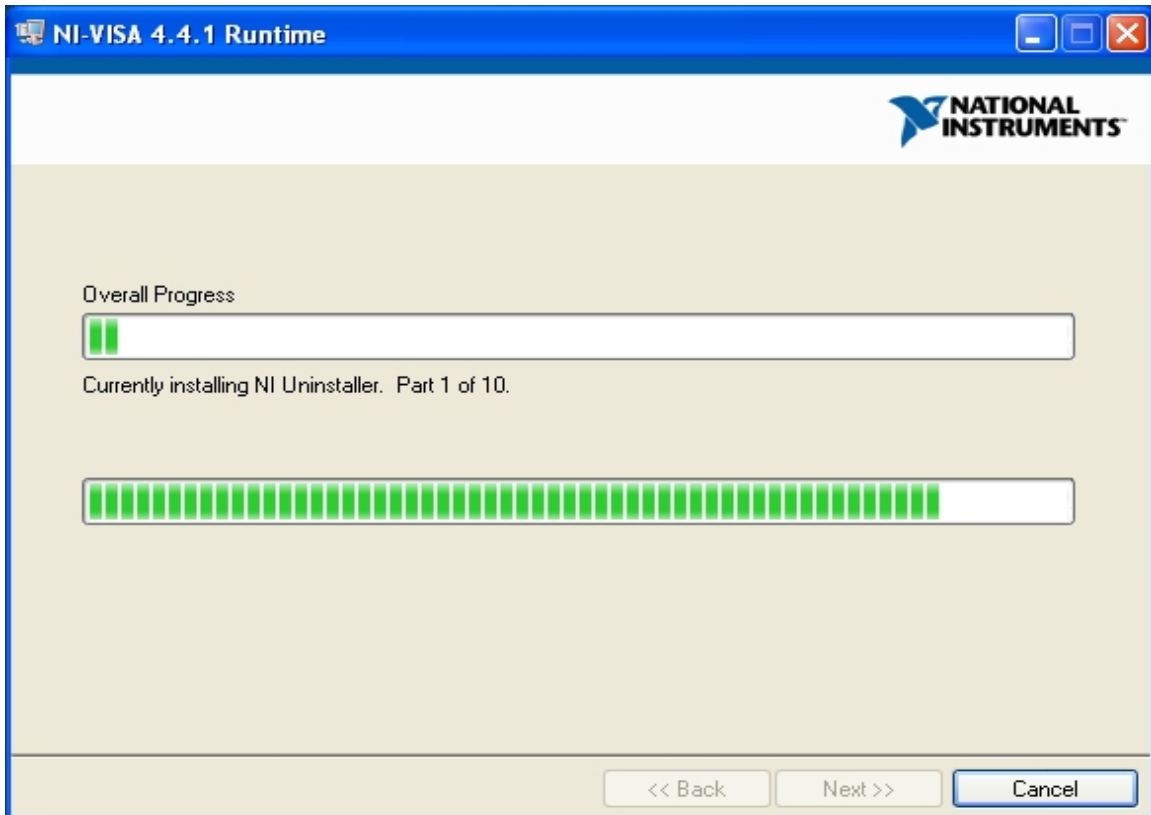
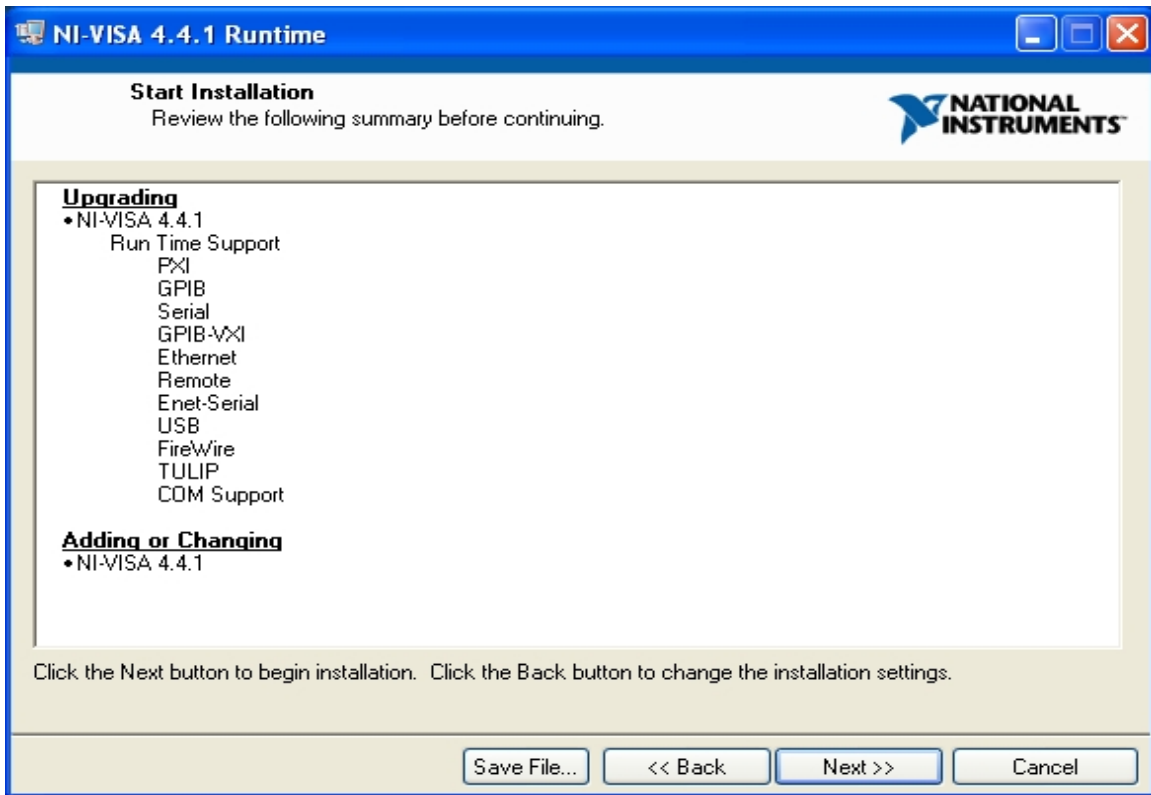
You will proceed through a series of standard installation screens. These are shown in the figures below during an installation on a system running Windows XP Pro.

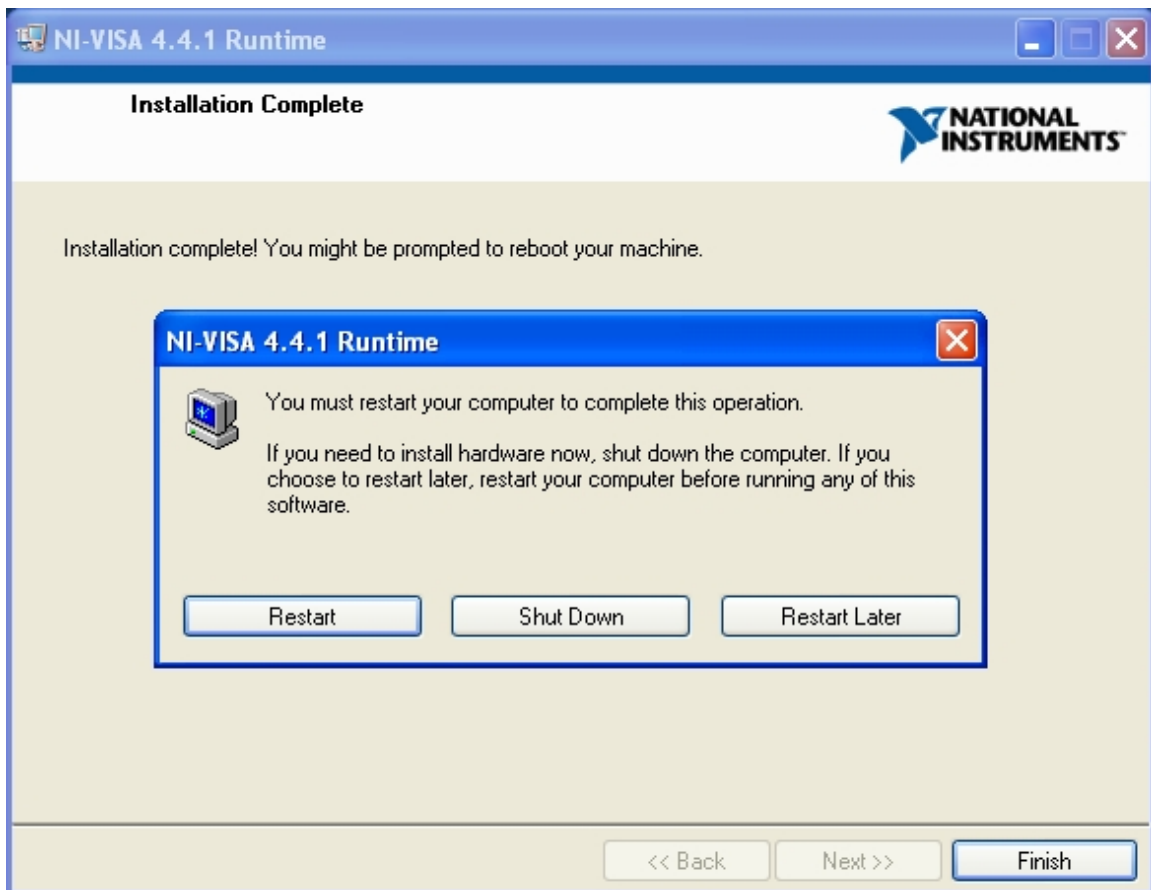












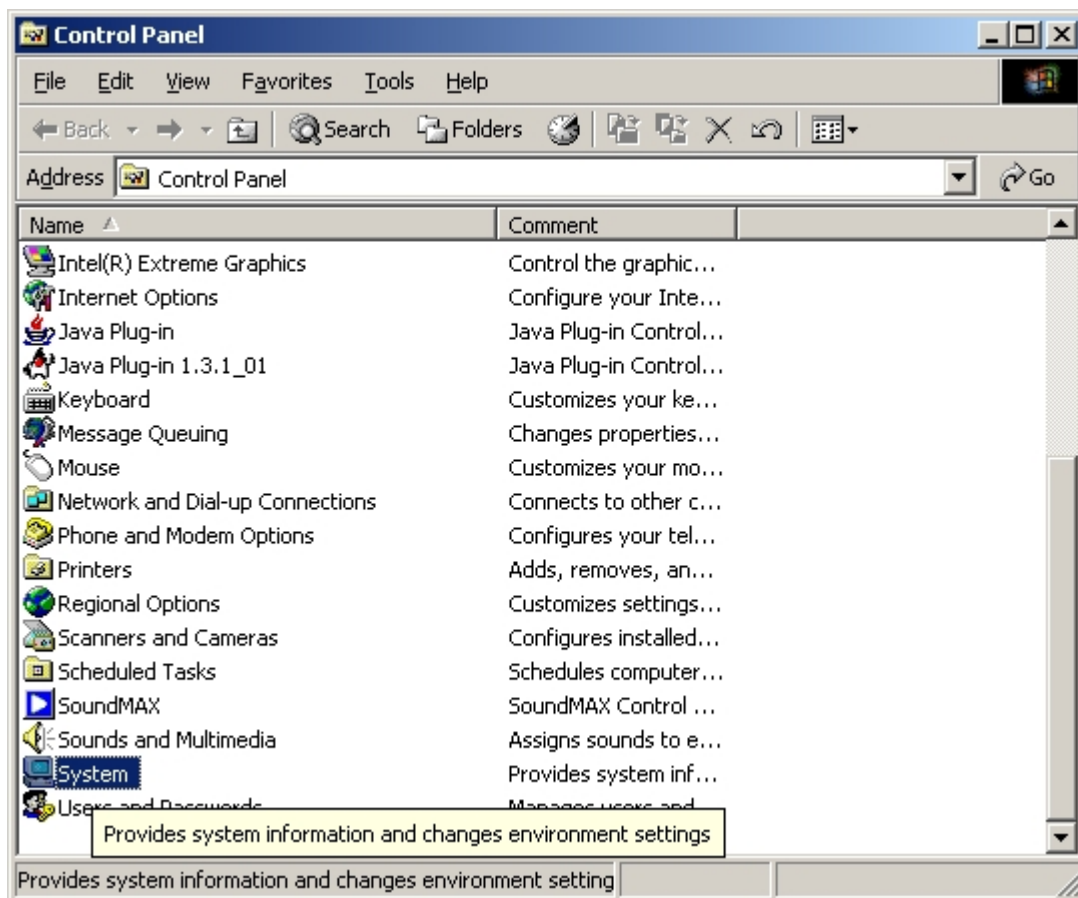
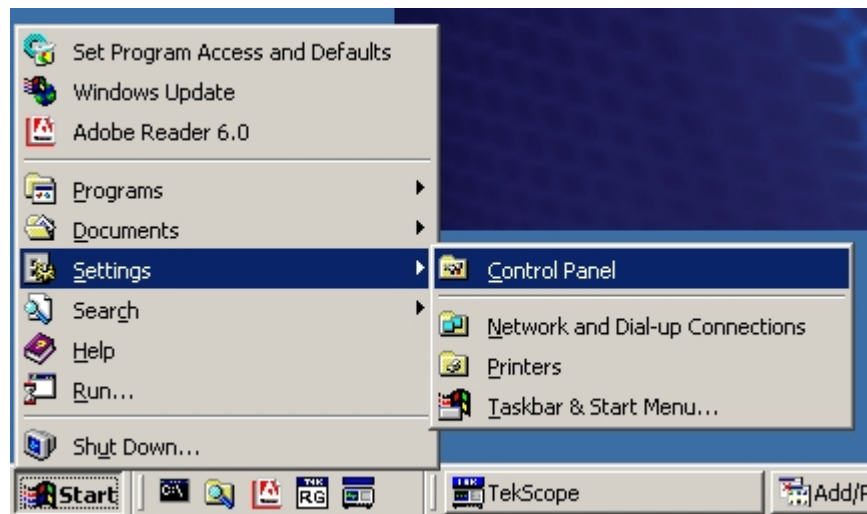
At this point select the 'Restart' option.

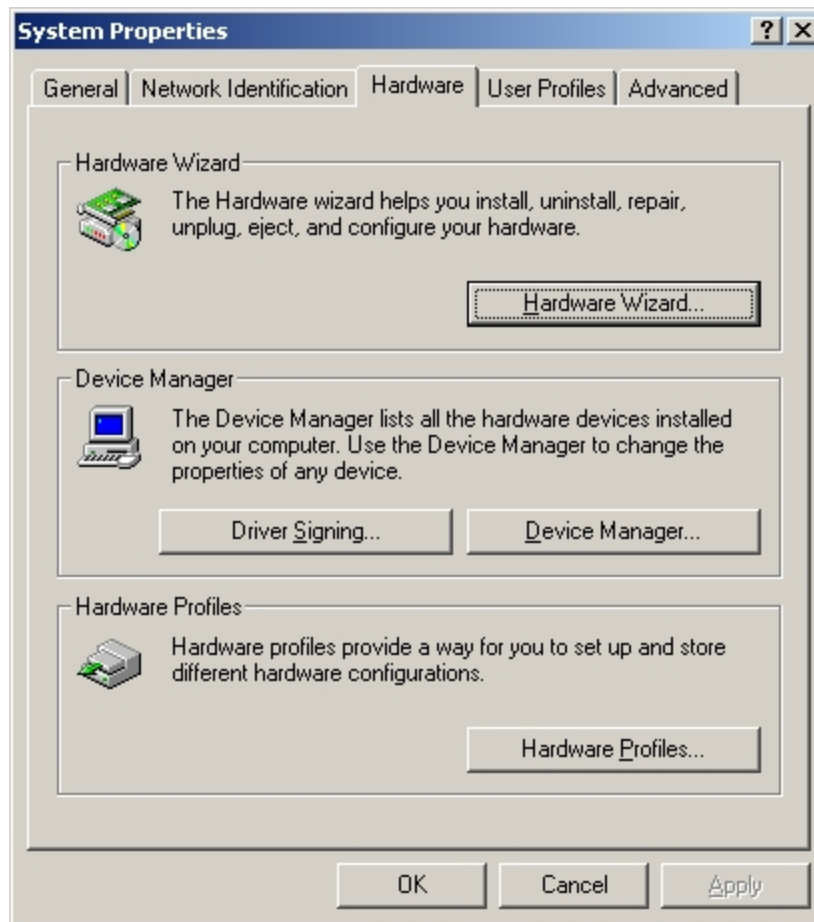
#### **A-4.0 Determining the USB Virtual Com Port (VCP)**

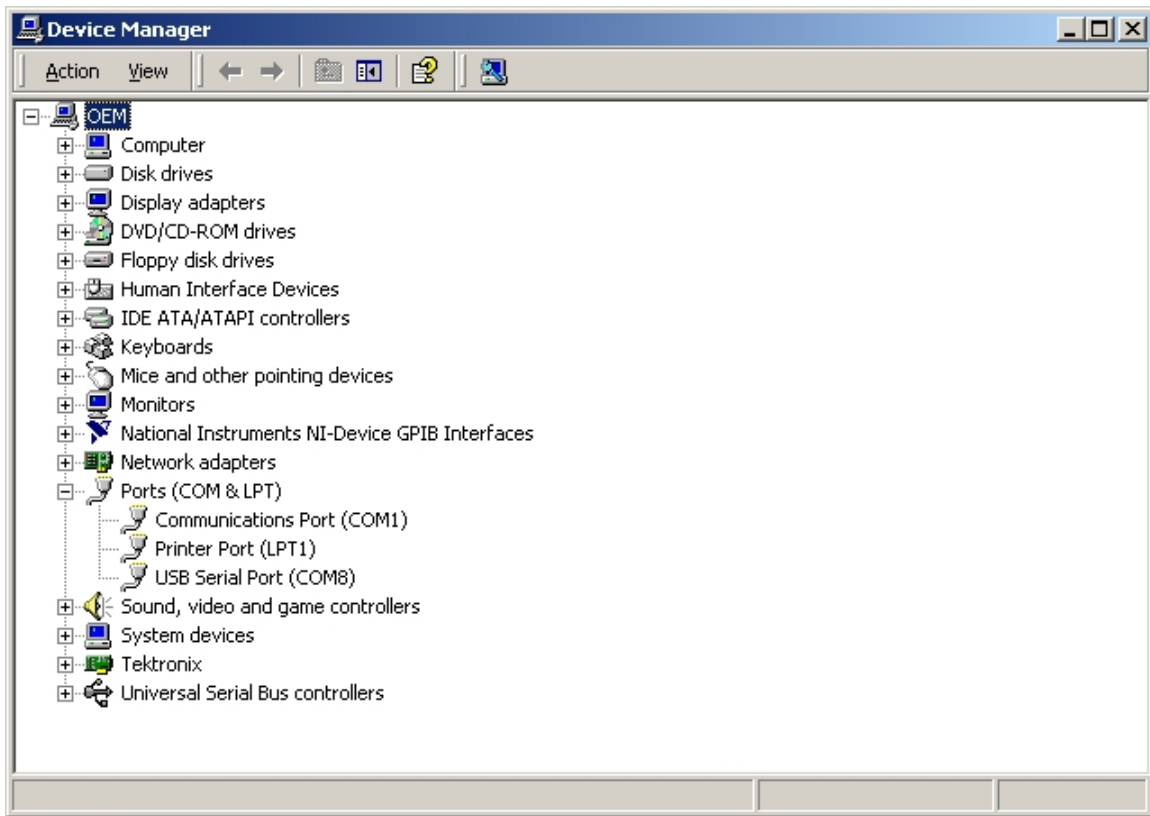
Connect the USB cable that was included with the kit. One end is connected to the PC and the other end to the USB-HV-RACK interface. The PC will display a message that new hardware has been found. After this message, please continue with determining the VCP designation described below.

Utilize 'Device Manager' to locate the COM port used by the USB interface.

Access by: "Start" > "Settings" > "Control Panel" > "System" > "Device Manager" (on the 'Hardware' tab).



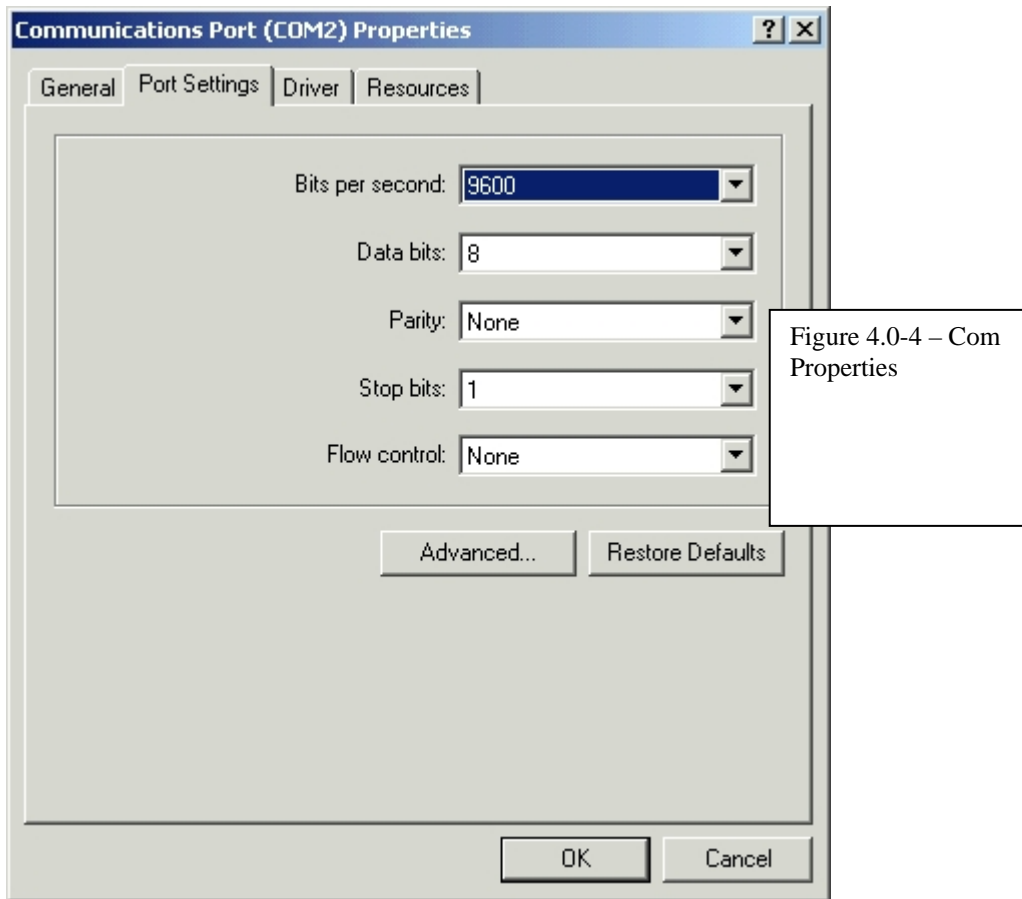




Expand the 'Ports (COM & LPT)' and identify which port is mapped to the USB Serial Port. In the example above, it is "COM8".

Pull up the properties for the 'USB Serial Port' by right clicking on the entry, 'USB Serial Port (COM8)' shown above in figure 4.0-3. This will pull up the 'Communications Port Properties' panel. Select the 'Port Settings' tab and be sure the settings match those shown below. Then click the 'OK' button.

Exit out of the 'Control Panel' screen.

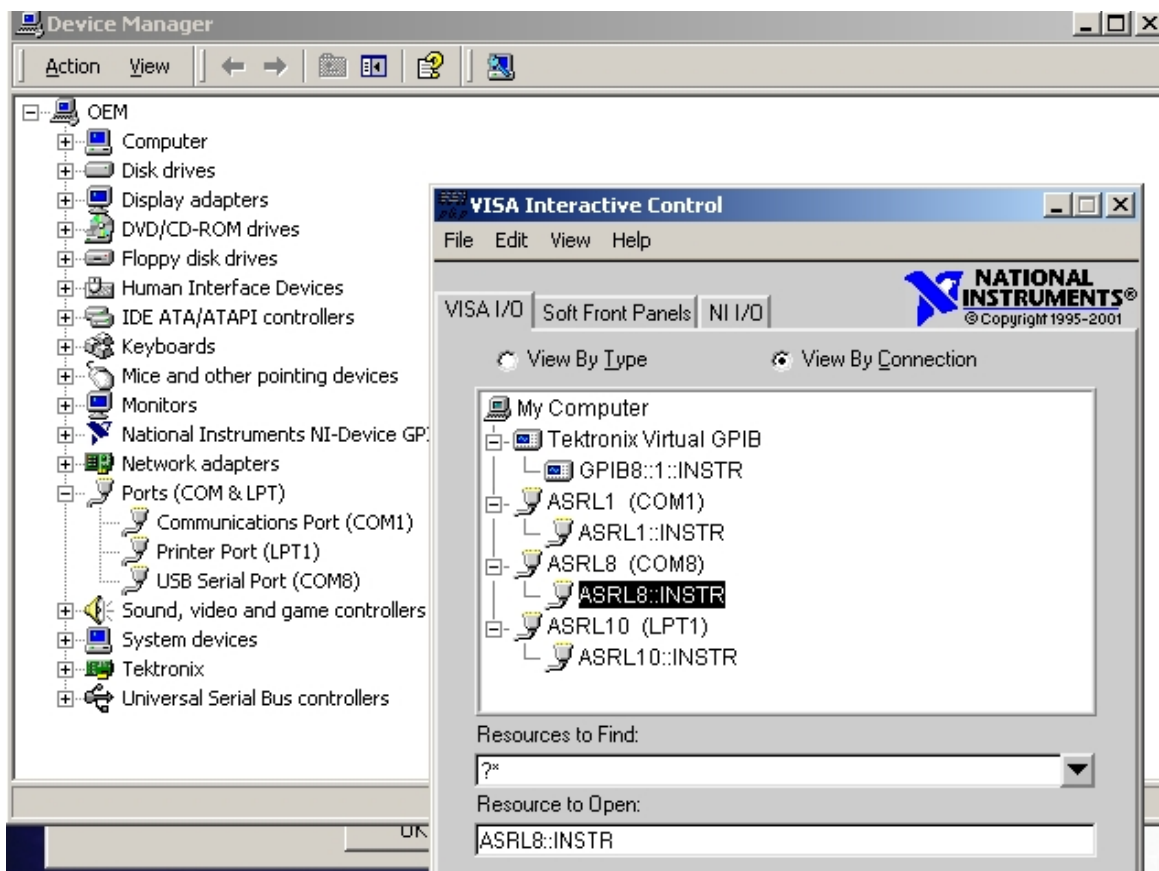
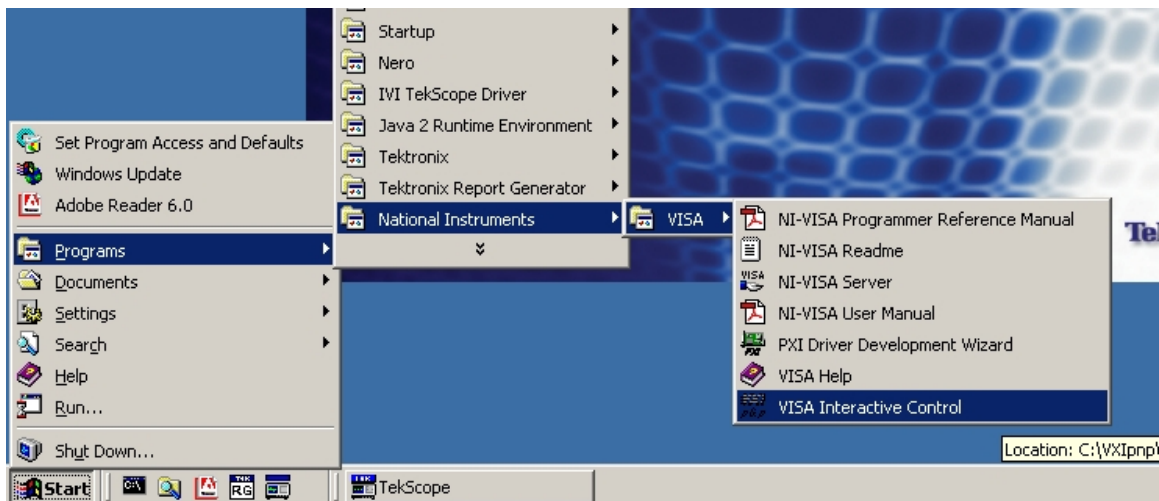


Now, we determine how National Instruments identifies 'COM8'. We do this by using the National Instruments, 'VISA Interactive Control' program.

Open the National Instruments, 'VISA Interactive Control' program.

Accessed by: "Start" > "Programs" > "National Instruments" > "VISA" > "VISA Interactive Control" (if this program does not exist, you will need to go back to section 3.3 *Installation of the VISA Driver* and explicitly install the driver via the instructions).



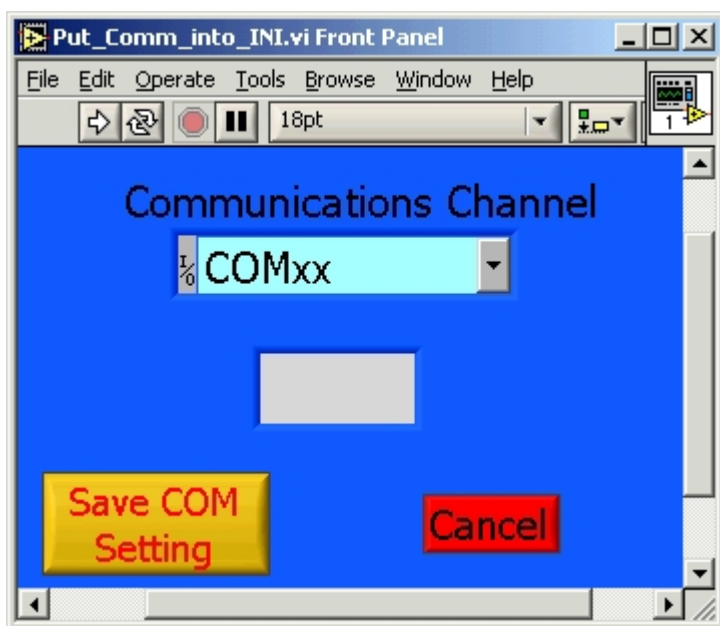


From the example above, we can see that the National Instruments, 'VISA Interactive Control' has identified 'COM8' as 'ASRL8' or as 'ASRL8::INSTR'. In most cases, we can simply tell the program to utilize 'COM8'. However, in some cases we must use the designation of 'ASRL8::INSTR'. That is what we will do now.

### A-4.1 Saving the Virtual Com Port

Saving the Virtual Com Port is normally not necessary and therefore the rest of this section need not be performed. That is, you should not need to utilize the program 'Put\_Comm\_into\_INI.exe'. This is because the program, 'USB-HV-Rack.exe' will find the first appropriate COM port and use that port. However, if you run into a problem, the remainder of this section will allow you to specify to the program what port to use.

If you need to explicitly define which port to use, then start the Ultravolt program named 'Put\_Comm\_into\_INI.exe' (found in the 'c:\Program Files\USB-HV-Rack' folder. The front panel GUI (Graphical User Interface) for this program is shown below.



Put the Com VCP channel into the field that now shows as 'COMxx'. (For the example previously shown, put in ASRL8::INSTR). Then click the "Save COM Setting" button. When the 'Done' message is displayed, use the close icon ('x') on the upper right corner, to exit and close the program. The VCP channel is now stored in the configuration file 'Ultravolt\_USB\_HV\_Interface.INI'. The particular entry in this file is the line: "USB\_Port= ASRL8::INSTR" (if the VCP was identified as COM8 or ASRL8::INSTR). Also, edit the 'Ultravolt\_USB\_HV\_Interface.INI' (with a text editor) and change the entry – *USB\_Auto\_Detect*='True' – from 'True' to 'False', and save the file. When the USB application program (USB-HV-Rack-Application.EXE) begins, it will read the VCP from the configuration file.

If you experience problems communicating to the USB module, you may have to install an alternate VISA driver. See Appendix B for further details. Normally, this step will not be necessary.

The “USB-HV-Rack-Application” program is now ready to be run. Proceed to Part B for detailed instructions on loading and operating this PC program.



# **Part B**

## **USB-HV-Rack**

### **Users Manual**

## B-1.0 Introduction to Users Manual

The USB-HV-RACK module is used to control the Ultravolt HV Rack via a PC and a standard USB cable. The Windows application program supplied, 'USB-HV-Rack.exe' is then used to control the HV Rack.

## B-2.0 Software and Hardware Installation

First install the Driver and Application software from the CD that is supplied with the USB-HV-RACK module. The instructions are contained in Part A of this document. Then connect the USB-HV-RACK module to the back of the HV Rack. Connect the USB cable (supplied) to the USB-HV-RACK module and to a dedicated USB port on the PC.

## B-3.0 Starting the Application Software

Prior to starting the UV-HV-Rack-Application software, power up the HV rack by using the following steps –

1. Set the ten-turn potentiometers on the front panel to the minimum (fully counter-clockwise) values.
2. Insure that the 'HV ON' push-buttons are set to 'disabled'. Depressing these buttons sets the channel to enable. When they are not depressed the channels are disabled.
3. Turn on the power to the HV Rack. The HV Rack has two power-on switches. One is located on the rear panel and one is located on the front panel. Both must be on.
4. Start the UV-HV-Rack-Application software by selecting '**Start | All Programs | USB-HV-Rack**'. The Graphical User Interface (GUI) will be presented as shown in the figure below.



Start the USB application program by pressing the ‘Run’ icon near the upper left corner of the ‘Main\_UV\_USB\_2007.vi Front Panel’ window shown above. This icon appears as an outline of a right-pointing arrow. When the program is running, this arrow changes from a white outline to a solid black arrow. When the program begins running, it will load the VCP from the configuration file, ‘Ultravolt\_USB\_HV\_Interface.INI’.

If you receive an error message on startup, insure that the virtual comm port number is correct. See section 3.3 of Part A for details. If this does not solve the problem please refer to Appendix B for alternate VISA drivers.

## **B-4.0 Controlling the HV Rack with the Application Software**

The default start-up mode for the HV Rack is ‘Remote’ mode, meaning that all operations are controlled by the Application Software. This mode can be toggled between ‘Remote’ and ‘Local’ modes by using the ‘Remote/Local’ button on the Setup tab of the GUI. When in ‘Local’ mode the user controls the set points using the multi-turn pots on the HV Rack. However, the ‘Disable’ button on the Application Software must still be set to ‘Enable’, as this is the master ‘Enable/Disable’ button and is used in both ‘Remote’ and ‘Local’ modes. In ‘Local’ operation, the ‘Set points and Monitors’ tab can only be used to monitor the read-back monitors from the HV Rack. In ‘Local’ mode all GUI controls on this tab are rendered invisible.

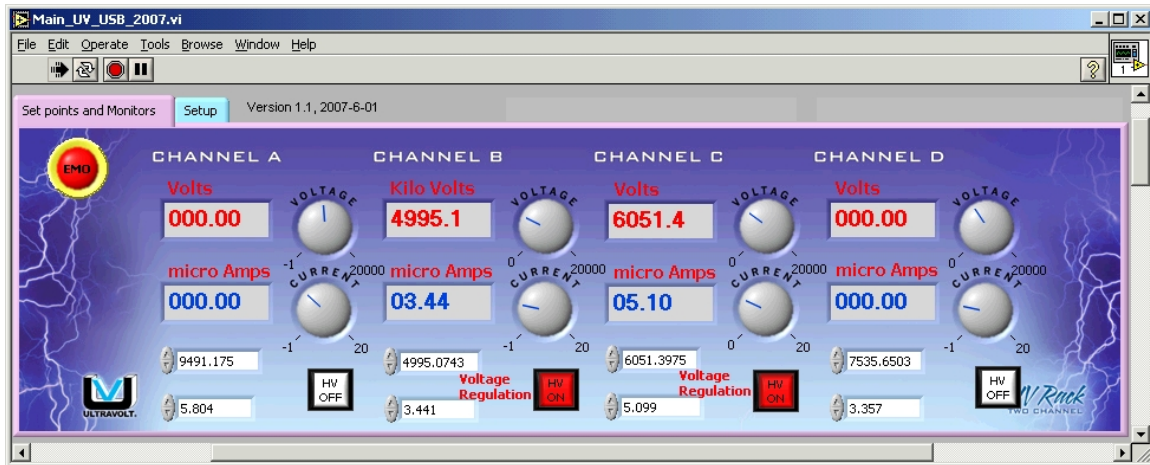
With the GUI set to ‘Remote’ mode and the *Master Enable* set to ‘Master Enabled’, the GUI controls on the ‘Set points and Monitors’ tab are visible and are used to turn on each channel and to set the current and voltage set points for each channel.

### **B-4.1 Turning the Channels On**

The ‘Set point and Monitors’ tab contains an ‘HV ON/HV OFF’ button for each channel. These are each defaulted to HV OFF. If the *Master Enable* is set to ‘enable’ then clicking the channel ‘HV ON/HV OFF’ button causes it to go to the HV ON mode. Clicking again goes back to the HV OFF mode. The mode must be set to HV ON in order to control the HV output.

### **B-4.2 Setting the Current or Voltage Set Points**

The set points for current and voltage can be set in one of two ways. The simulated potentiometer can be used to make a gross change or to set the HV output to the approximate setting. This is done by clicking and holding the left mouse button on the dial control and causing the dial to rotate. The control set point is indicated in the numeric text field as shown below. For a more precise setting the desired set point can be typed in as numeric text in the data entry field, also shown below.



The numeric data entry field has an up/down control located on the left side of the field. This can be used to increment or decrement by one unit (one Volt or one Kilo Volt for example) at a time. Please note – You must set the current control to some positive value to insure that the output voltage will respond to the voltage control.

#### B-4.3 Shutting down the Application Software

Each of the two tabs has a red circular button labeled 'EMO' (Emergency Off). The application software is halted by clicking this button. When the application software is in the 'Remote' mode, the 'EMO' button causes each HV channel to go to zero output and sets all channels to the HV OFF mode. Then the software stops running but stays in memory and the GUI continues to be shown. To remove the application from memory and from the PC monitor, click the 'X' icon on the top right corner of the application display.

When the application software is running but set to 'Local' mode, clicking the 'EMO' button merely stops the application program and does not change any of the set points.

To restart the application, click the 'Run' icon on the application tool-bar as described above in section 2.1.

#### B-4.4 Voltage and Current Mode indication

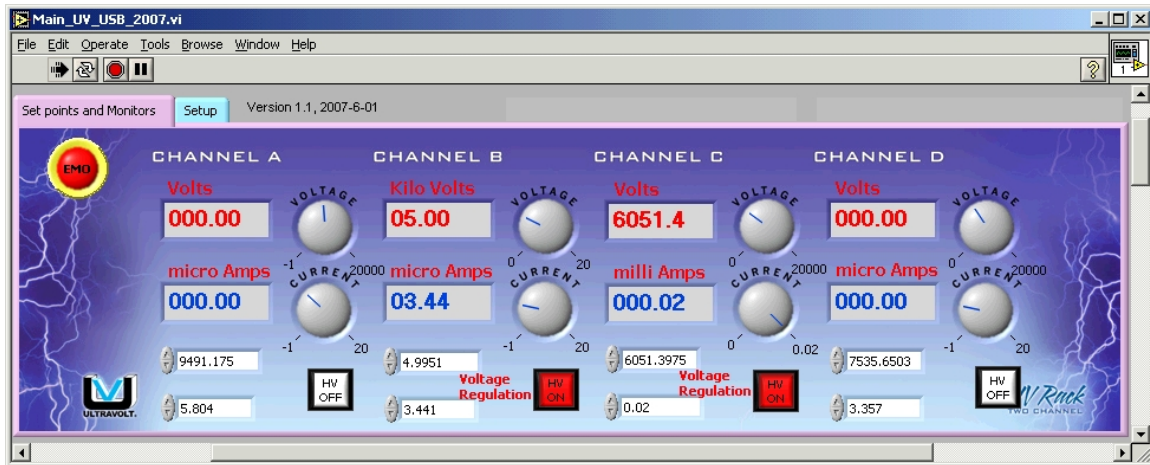
The control mode, either voltage control or current control, is shown just to the left of the 'HV ON/HV OFF' buttons.

#### B-5.0 Changing the Units of Measure

The units of measure for voltage can be controlled and displayed, independently for each channel, as either KiloVolts or Volts. The current can be controlled and displayed as either amps, milliamps, or micro amps for each channel. This selection is made from the drop-down menu on the Setup tab as shown below. This menu is accessed by clicking on the units indication above the digital display.



When the Channel B is changed from Volts to Kilo Volts, and Channel C is changed from micro Amps to milli Amps, the ‘Set points and Monitors’ tab will display the data as shown below.





## B-6.0 Saving the Setup settings

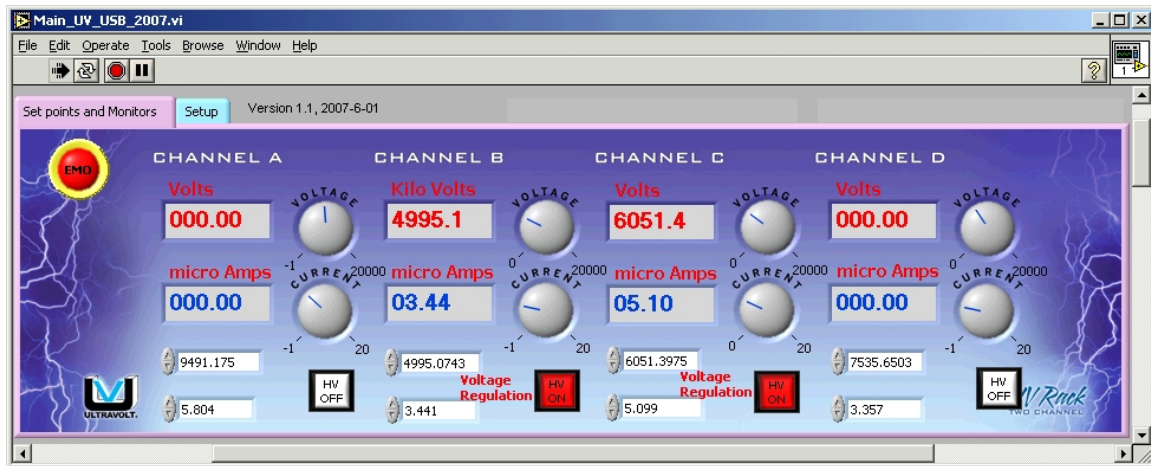
After the desired settings are made, they can be saved to the 'Ultravolt\_USB\_HV\_Interface.INI' file by clicking the 'Save Setup' button on the Setup tab.

## B-7.0 Selecting between Full-Precision and Reduced-Precision

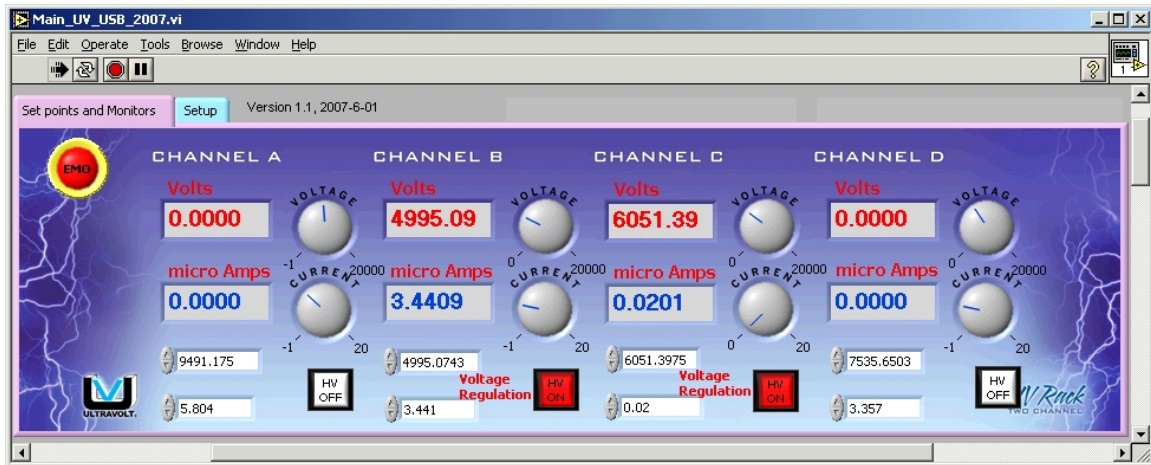
'Full-Precision and Reduced-Precision' refer to the precision of displaying the data on the GUI. The GUI has the ability of displaying data in greater precision than can be displayed on the front panel of the actual HV Rack. To emulate the actual HV Rack, the application software defaults to the reduced precision of the HV Rack panel indicators.

The precision setting of the application software can be changed by toggling the button labeled as either, 'Now in Reduced Precision' or 'Full Precision'. The text on the button indicates the precision that is being used.

The difference in the two displays is shown below. The first is the default, lower-precision display. The second is the full precision display.



(Reduced Precision Display)



(Full Precision Display)



## **Part C**

# **Description of the USB Labview Modules**

## **C-1.0 Introduction to Labview Modules**

Ultravolt supplies Labview Virtual Instruments (VI's) as source code so that users can create their own software for controlling the USB to HV Rack interface. This manual describes these Labview VI's. An example Labview program is included to show how these modules can be used. These VI's are in Labview version 2009 format. To use these VI's, the user must have the Labview development software loaded on the computer. Labview is a graphical programming environment from National Instruments.

## **C-2.0 Description of the Labview VI's**

The Labview VI's supplied by Ultravolt are described here in the approximate order in which they would normally be used. These VI's are in a NI Library file named *LV\_9\_Ultravolt\_USB\_Interface\_Example Ver 3.0.llb*. A LabView project is provide and is named *Ultravolt\_USB\_Interface\_Example.lvproj*.

### **C-2.1 – Find\_USB\_Comm\_Port.vi**

This determines what port is connected to the USB interface.

### **C-2.2 – Init USB Port.vi**

Sets the USB communications for 9600 baud, 8 data bits, one stop bit, no parity, and no flow control.

### **C-2.3 – Read SW Version.vi**

Sends a command to the USB interface, requesting that the interface return the version numbers for each of the two microprocessors, M1 and M2. This vi returns two strings representing the software versions. The versions for M1 and M2 should be the same.

### **C-2.4 – Local\_Remote\_and\_Enables.vi**

Sends the HV ON/OFF bit for each of the four HV channels and sends a bit for the Master Enable/Disable. Also sends a bit to command the 'Remote' or 'Local' mode.

### **C-2.5 – Format\_PCMM.vi**

Formats the enable bits.

### **C-2.6 – Send and Receive Data Block.vi**

Sends a properly formatted message to the USB interface and waits for the USB response. Each message to the USB interface causes a response to be returned.

**C-2.7 – Send Set Points.vi**

Formats the set points for voltage and current and sends the formatted message to the USB interface. The set points consist of two bytes for each of 8 set points (4 voltage and 4 current set points).

**C-2.8 – Perform Serial Write and Read.vi**

Sends a string of data to the USB interface and, returns the response string if appropriate.

**C-2.9 – Parse Response Array.vi**

Takes the raw data response from the USB interface and decodes it into the Voltage and Current monitors.

**C-2.10 – LED Test.vi**

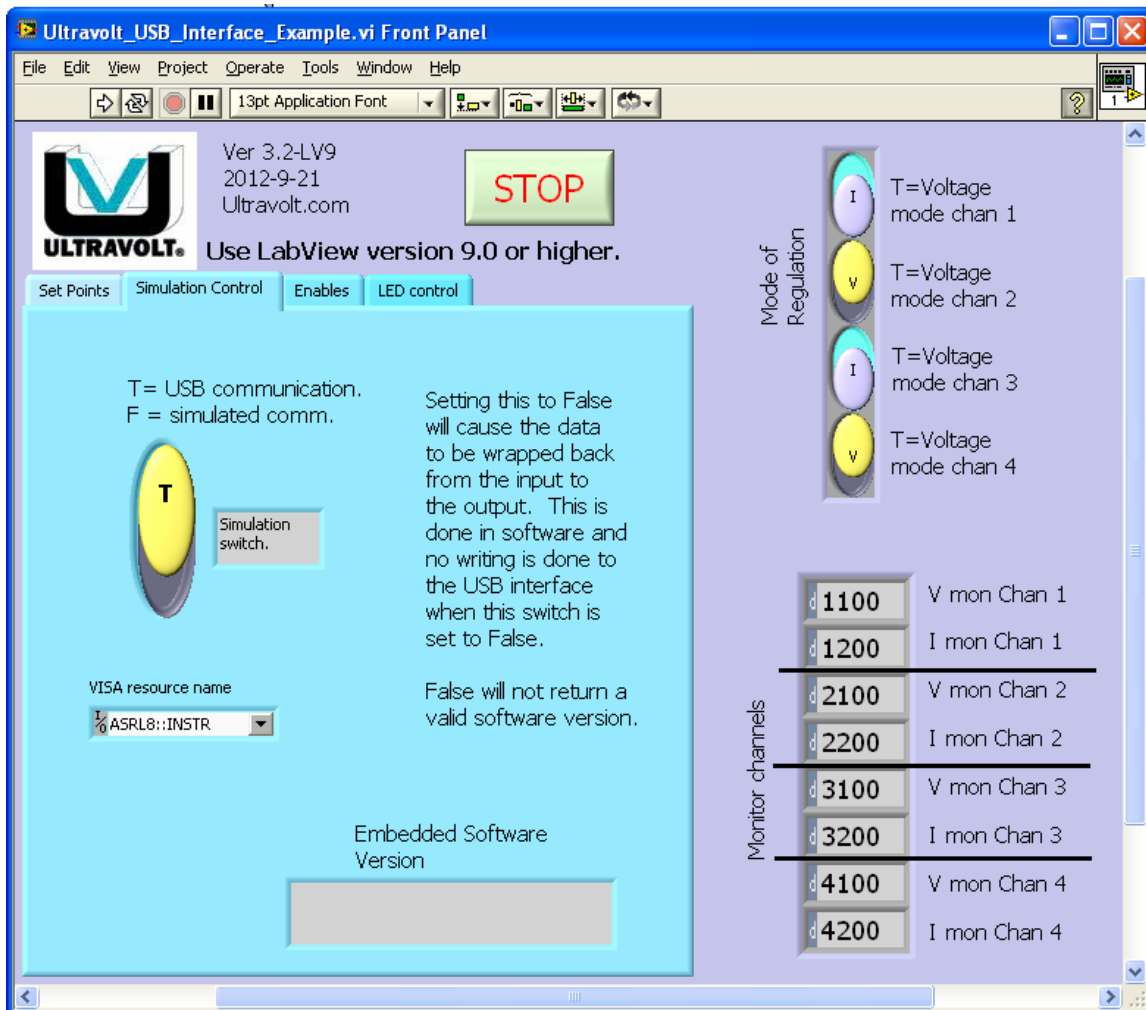
Sends a command to the USB interface to turn a designated LED on or off. When this command is sent, the normal operation of the LED is bypassed so that it can be controlled remotely from the PC. The normal functioning of the LEDs is restored whenever a new message, other than this LED Test message, is sent to the USB module.

**C-2.11 – Close USB Port.vi**

Breaks the connection to the Virtual Com Port and closes the VCP and releases the connection resources.

**C-3.0 Description of the Labview example application**

The example Labview GUI uses the VI's described in section 2. The name of this example is 'Ultravolt\_USB\_Interface\_Example.vi'. When this example program is loaded the users screen, shown below, is presented.



This program uses the Labview VI's described earlier to exercise various aspects of the USB interface. With these VI's and a description of the USB communications protocol, a programmer can build a custom interface for the Ultravolt USB module with Labview version 9.0 or later. The communications protocol is described in the document 'Ultravolt USB Message Protocol'. This document is on the CD (in the *Documents* folder) that came with the USB module.

### C-3.1 – Simulation Control tab

The example software can be run without having it connected to a USB module by setting the simulation switch to the down position. If the switch is in the up position the contents of the 'VISA resource name' must be set to the VCP for the USB module. However, the switch just below the 'VISA resource name' field can be set to cause the VCP to be read from the USB configuration INI file.

### C-3.2 – Set Points tab

The set points for Voltage and Current are input on this tab. When the 'Send' button is clicked, these settings are sent to the USB module. Each set point is a hexadecimal number in the range of 0 to ffff. This will cause the USB-HV-RACK module to create analog output voltages in the range of 0 to +5 volts for each of 8 channels.

The screenshot shows the 'Set Points' tab of a software interface. At the top, there are four tabs: 'Set Points' (selected), 'Simulation Control', 'Enables', and 'LED control'. Below the tabs, on the left, is a large yellow 'Send' button. To the right of the button, the text 'Set points for V & I' is displayed. Below this text, there are eight input fields arranged in four pairs, separated by horizontal lines. Each pair consists of a small icon (a circle with 'V' or 'I') and a text box. The text boxes are labeled 'V set pt. Chan 1', 'I set pt. Chan 1', 'V set pt. Chan 2', 'I set pt. Chan 2', 'V set pt. Chan 3', 'I set pt. Chan 3', 'V set pt. Chan 4', and 'I set pt. Chan 4'. All text boxes currently contain the value '0'.

Channel	Voltage Set Point (V)	Current Set Point (I)
1	0	0
2	0	0
3	0	0
4	0	0

### C-3.3 – Enables tab

The data put in here is sent to the USB module when the 'Send' button is clicked.

Set Points Simulation Control **Enables** LED control

**Send**

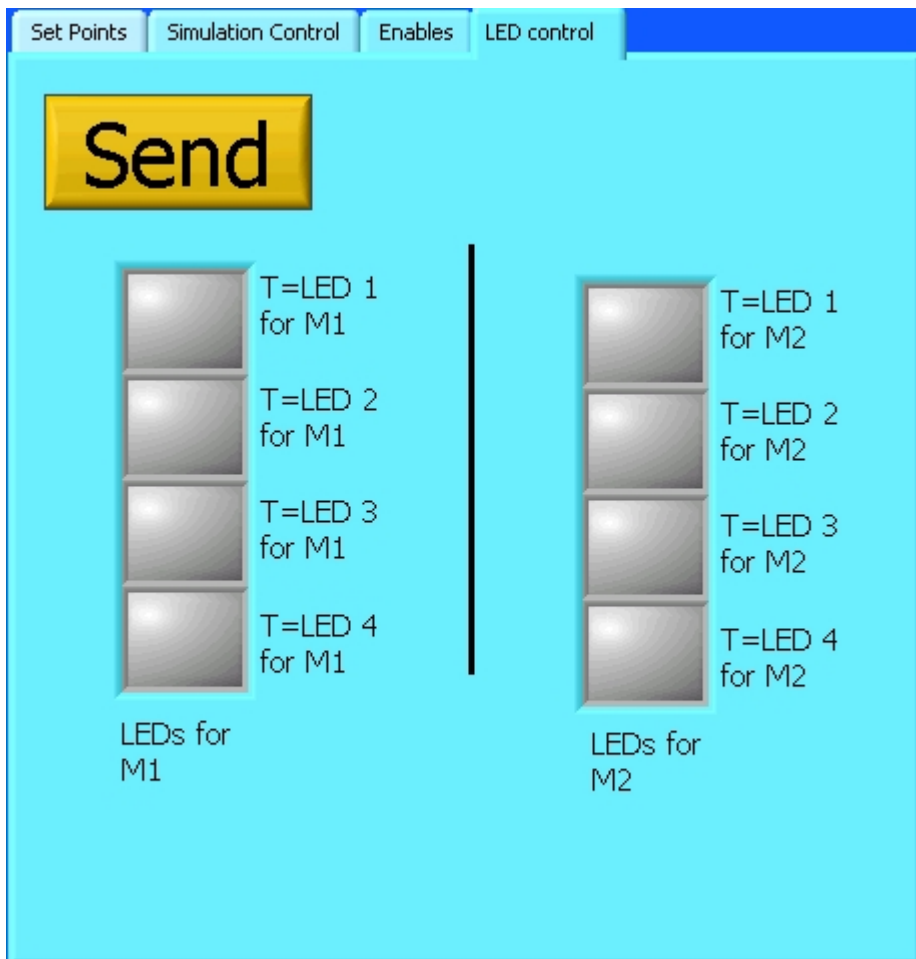
CAUTION: Master Enable uses negative logic. A Low results in the HV rack being enabled.

F	T=Remote control
T	T=Master disable
F	T=Chan 1 (A) enable
F	T=Chan 2 (B) enable
F	T=Chan 3 (C) enable
F	T=Chan 4 (D) enable



### C-3.4 – LED tab

This tab is used to override the normal operation of the LEDs on the USB module. This tab causes the LEDs to take the ON/OFF state directed by the settings on this tab when the 'Send' button is clicked. The LEDs on the USB module revert to their normal operation whenever one of the other tabs is used to send data to the module.



## APPENDIX A

### **SPECIFICATIONS**



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#### **Storage Temperature**

Storage temperature range is -55C° to +105C°.

#### **Operating Altitude, Humidity & Temperature:**

**UltraVolt *HV Rack*** Series operating performance is guaranteed between sea level and 10,000ft in non-condensing relative humidity up to 95% between temperatures of +10°C and +40°C.

#### **Shock and vibration**

TBD

#### **Package**

Chassis dimensions: 3.1" wide x 2.5" deep x 4.5" high.

Weight: Approximately 0.44 pounds.

## **APPENDIX B**

### **VISA DRIVERS**

In some rare cases, the NI-VISA (National Instruments – *VXIplug&play* Systems Alliance) driver that is installed may not function on your computer. If this is what you experience, Ultravolt has provided other versions of the NI-VISA drivers. The latest driver (version 5.2) may not function with versions of Windows 9x. For those versions, you may have to use VISA version 2.6.1. These two other VISA drivers are located on the DVD, in the ‘VISA Drivers’ folder along with version 3.0.1. VISA version 5.2 can be downloaded from National Instruments with this link:

<http://joule.ni.com/nidu/cds/view/p/id/3337/lang/en>

The latest NI driver for VISA can be found at the National Instruments web site:

<http://www.ni.com>

Navigate to: NI Home > Support > Drivers and Updates

In the search field in the upper right corner, enter ‘VISA’ and click search. In the window that comes up, click the first entry, “National Instruments VISA”. On the next window – near the bottom – click the ‘Downloads’ text, and then click the ‘NI-VISA Run-time’ text. Then, select the latest version consistent with your operating system. Finally (I promise), click the “.exe” file that is presented and select the Save option. These steps are shown below for VISA version 4.41.

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**National Instruments VISA**

The Virtual Instrument Software Architecture (VISA) is a standard for configuring, programming, and troubleshooting instrumentation systems comprising GPIB, VXI, ...  
[www.ni.com/visa](http://www.ni.com/visa)

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PREPARED BY:	William Grauer	Date:	2012/10/02
REVIEWED BY:	Melvyn Maxwell	Date:	2012/10/11
APPROVED BY:	Peter Match	Date:	2012/10/11

## REVISION HISTORY

REV	DATE	DESCRIPTION	APPROVED
A	2007-10-05	USB-HV-Rack manual.	
B	2011-3-30	Revise the procedure for determining the COM port.	
C	2012-9-26	Add auto-detect for COM port.	Peter Match



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