USB Adaptor

USB Serial Port Adaptors USB-TTL/USB232A/USB232B

Technical Manual

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Important Notice

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Temperature readings for controllers are based on the results of limited sample tests; they are provided for design reference use only.

1.1 Functional Description

TERN's USB Adaptor provides a USB interface to TERN UART based controllers. More and more new computers today are not equipped with standard serial communication ports (UARTS). The USB Adaptor was developed to allow computers without serial ports to seamlessly download and debug software on TERN controllers at 115,200 baud.

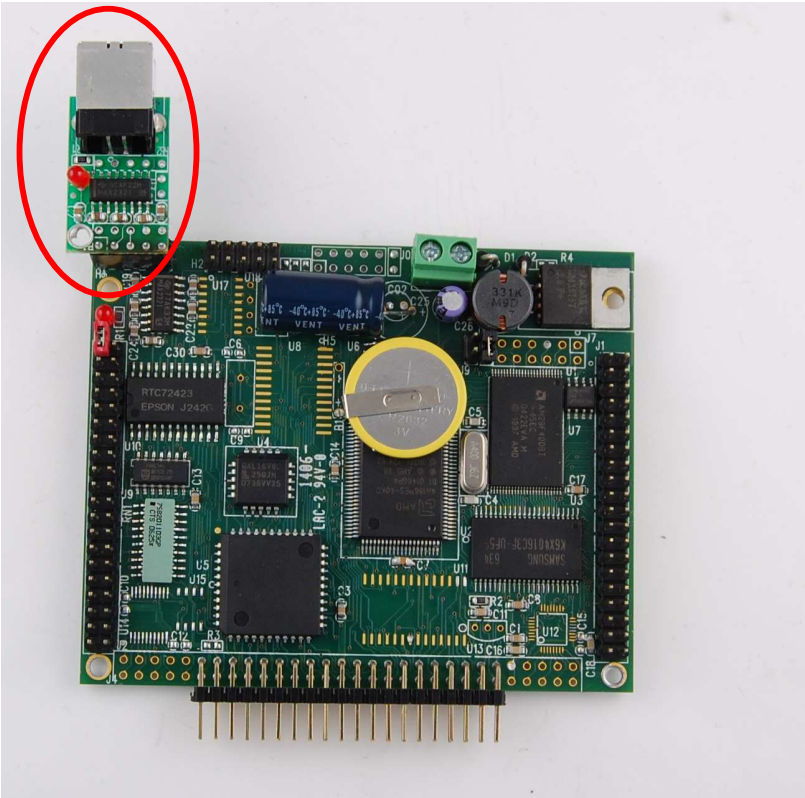


Figure 1.1 USB Adaptor on an A-Engine86P

1.2 USB Adaptor Configurations: USB232A, USB232B and USB-TTL

The USB Adaptor comes in one of three configurations: USB232A, USB232B and USB-TTL. The required configuration will depend on the type of TERN controller being interfaced. The USB-TTL configuration interfaces with 5V TTL UARTS. TERN controllers ***without*** RS232 drivers can use the USB-TTL to communicate over USB. USB232A and USB232B configurations both interface with TERN controllers that have on-board RS232 drivers. USB232A and USB232B are oriented 180 degree from each other. This prevents the USB Adaptor from blocking other headers and connectors on the controller. The images below show the different configurations of the USB Adaptor. TERN sales support can help select the correct USB Adaptor for each TERN Controller.

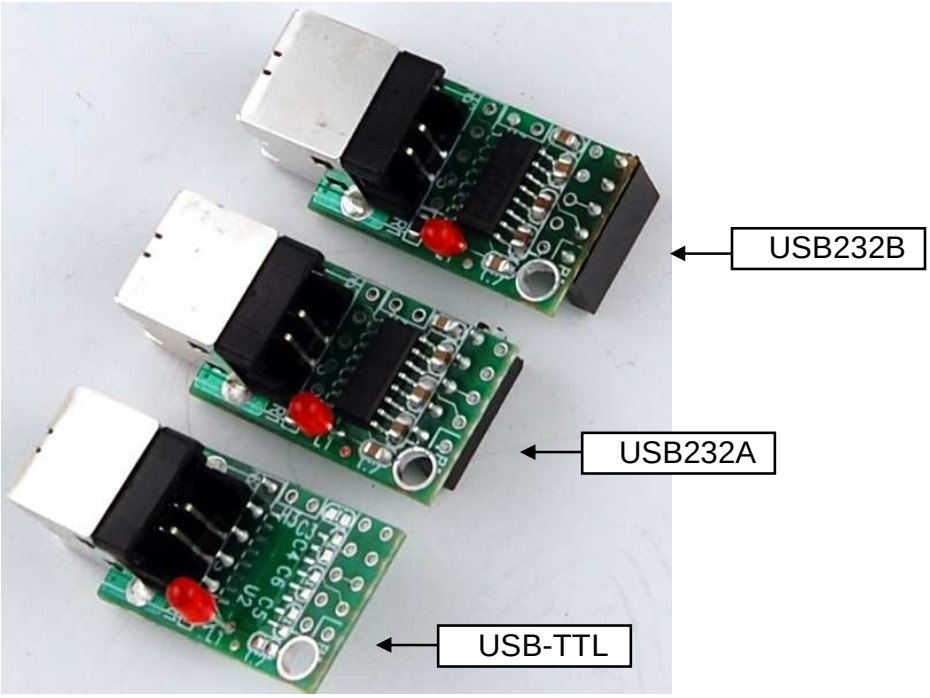


Figure 1.2 Three USB Adaptor Configurations (TOP View)

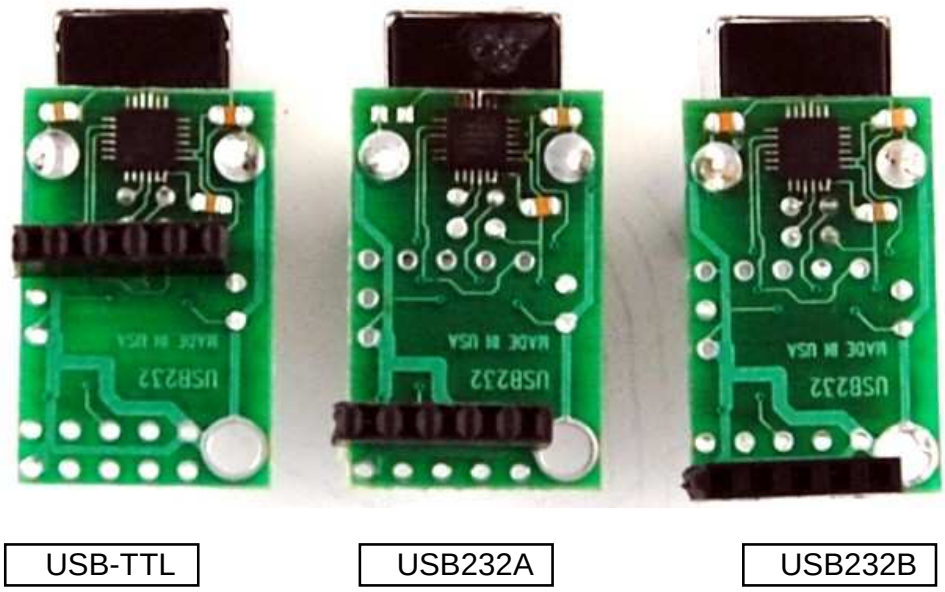


Figure 1.3 Three USB Adaptor Configurations (Bottom View)

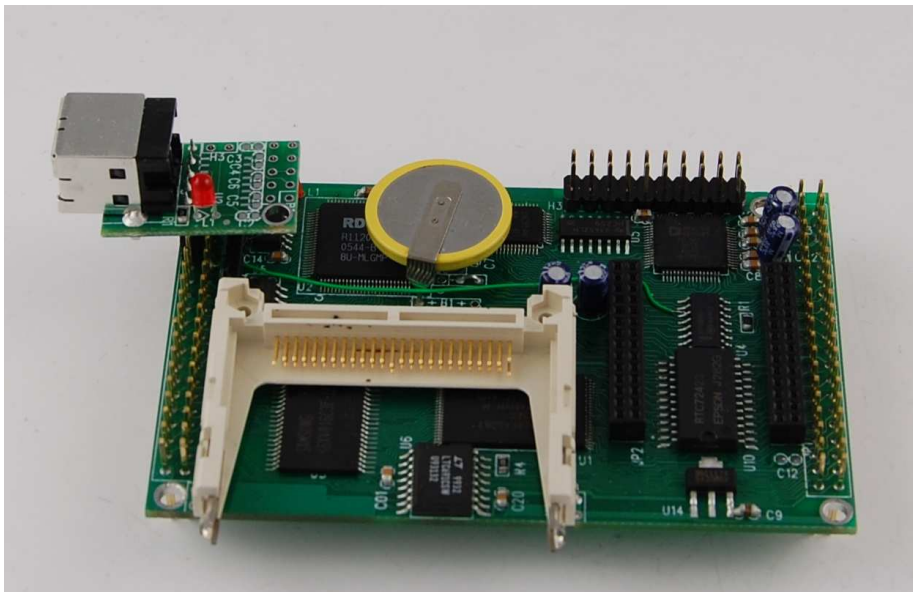


Figure 1.4 USB-TTL Connected to a B-Engine

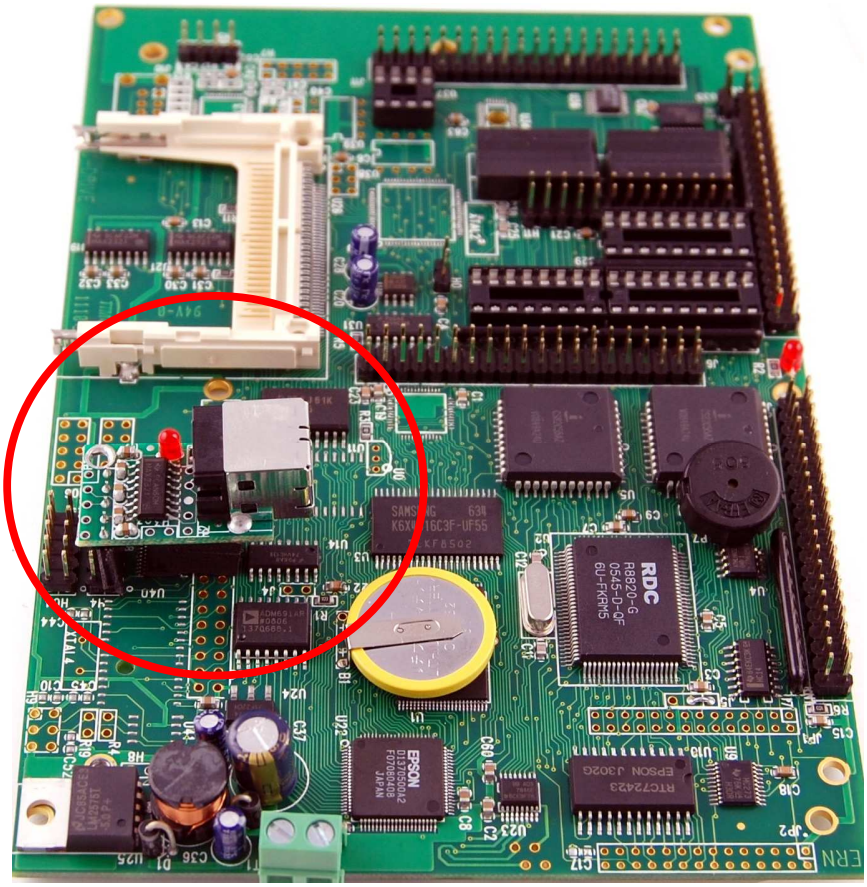


Figure 1.5 USB232A Connected to a U-Drive

Figure 1.6 USB232B Connected to an A-Engine86

1.3 Software Installation

TERN Evaluation and Development Kits come with all the software drivers to enable the USB Adaptor. Use a standard USB cable to plug the USB Adaptor into an available USB port on the computer (note: the USB Adaptor does not need to be connected to a TERN controller). If the USB Adaptor is properly connected, the red LED should illuminate.

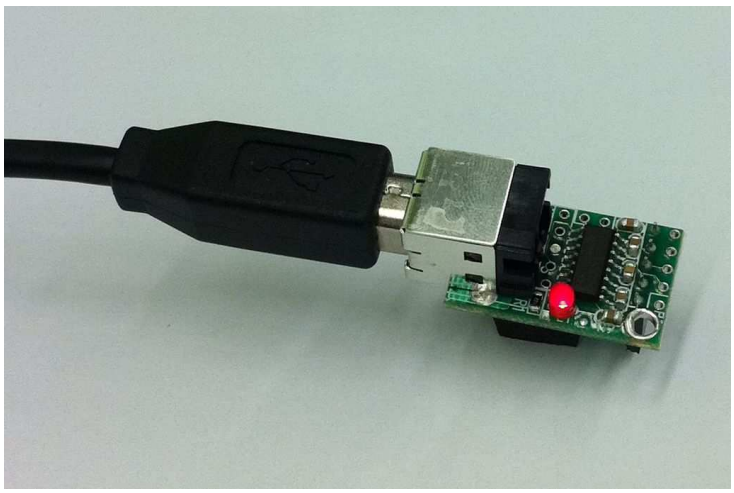


Figure 1.7 Connection USB Adaptor

Upon connecting the USB Adaptor to the computer, Windows should detect the device.

Figure 1.8 Windows detects USB Adaptor

After detection, Windows will begin the New Hardware Wizard. Since the TERN Evaluation/Development kits have the driver software, it is not necessary for Windows to search the web. Select "No, not this time" as shown below.

Figure 1.9 Windows detects USB Adaptor

Windows New Hardware Wizard will prompt to insert the installation CD. Insert the Development/Evaluation Kit CD. Prevent Windows AutoPlay from installing the Development/Evaluation Kit software at this time. With the CD inserted, select "Install the software automatically" from the wizard.

Figure 1.10 Insert CD and automatically install software

Windows will search for the USB Adaptor drivers on the CD.

Figure 1.11 Windows searches for drivers

Once found, Windows will install the drivers.

Figure 1.12 Windows installs drivers

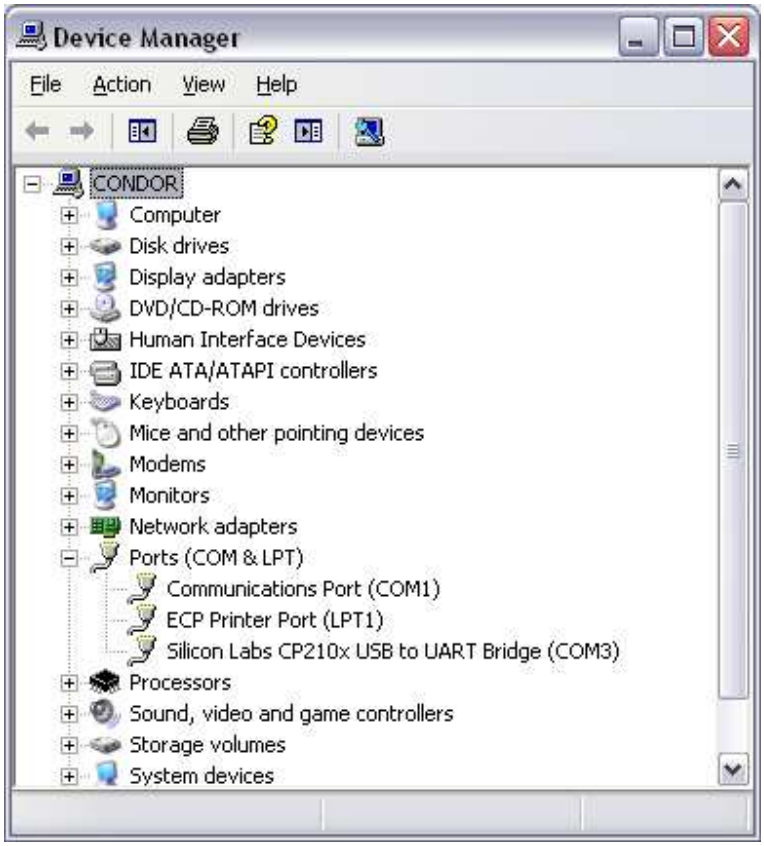
The New Hardware Wizard will prompt completion of installation. Click “Finish”.

Figure 1.13 Driver installation is complete

The USB Adaptor is installed.

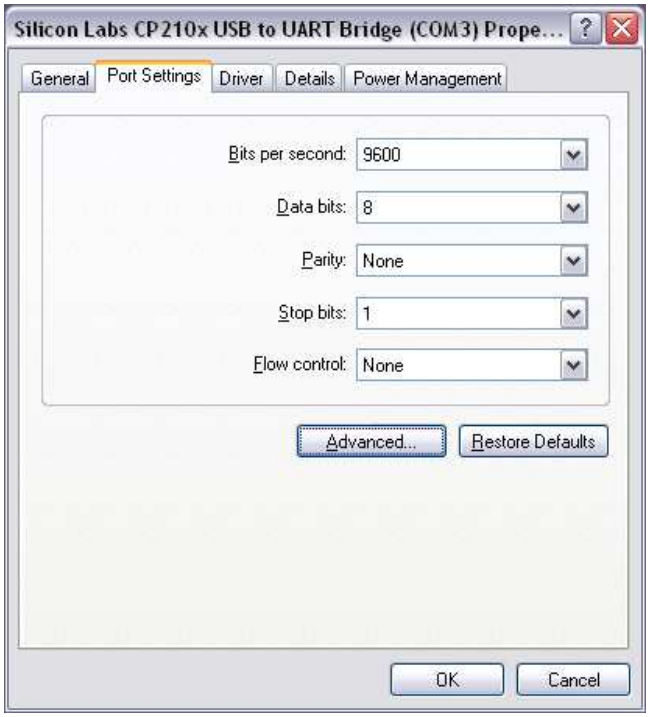
Figure 1.14 New hardware is installed

Verify installation through the Windows Device Manager. Right-click on the “My Computer” icon and select “Properties”. Click the “Hardware” tab and select “Device Manager”. Expand the “Ports” node on the device tree and verify the COM Port “Silicon Labs CP210x USB to UART Bridge”.

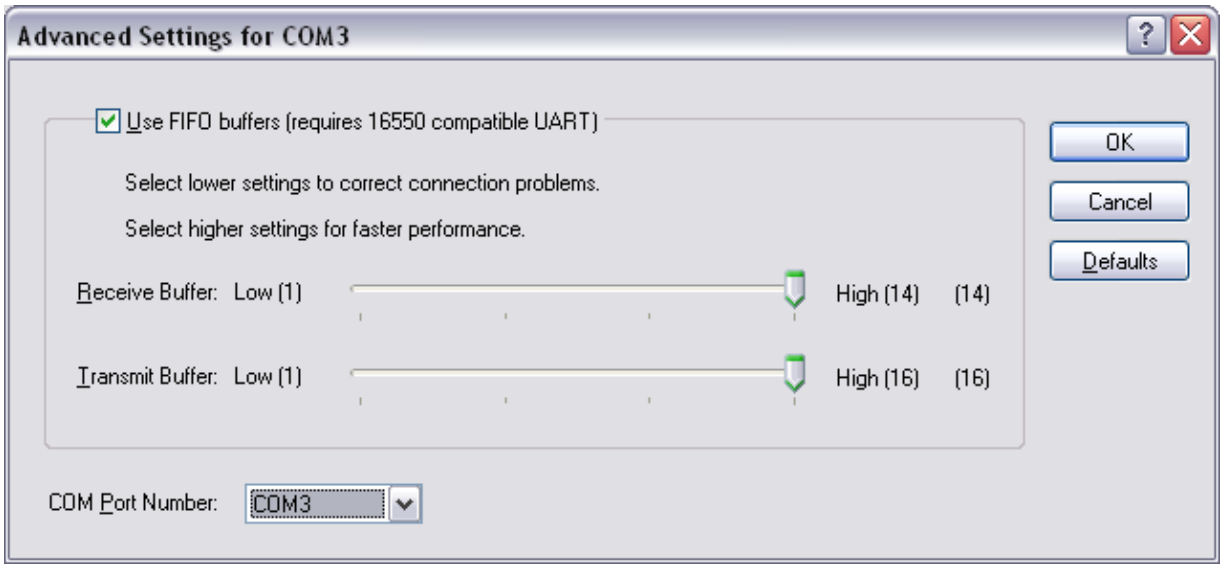


1.4 Modifying the COM Port Number

To change the COM Port associated with the USB Adaptor, double click the "Silicon Labs CP210x USB to UART Bridge" node in the "Ports" section of the Device Manager. Select the "Port Settings" tab and click the "Advanced" button.

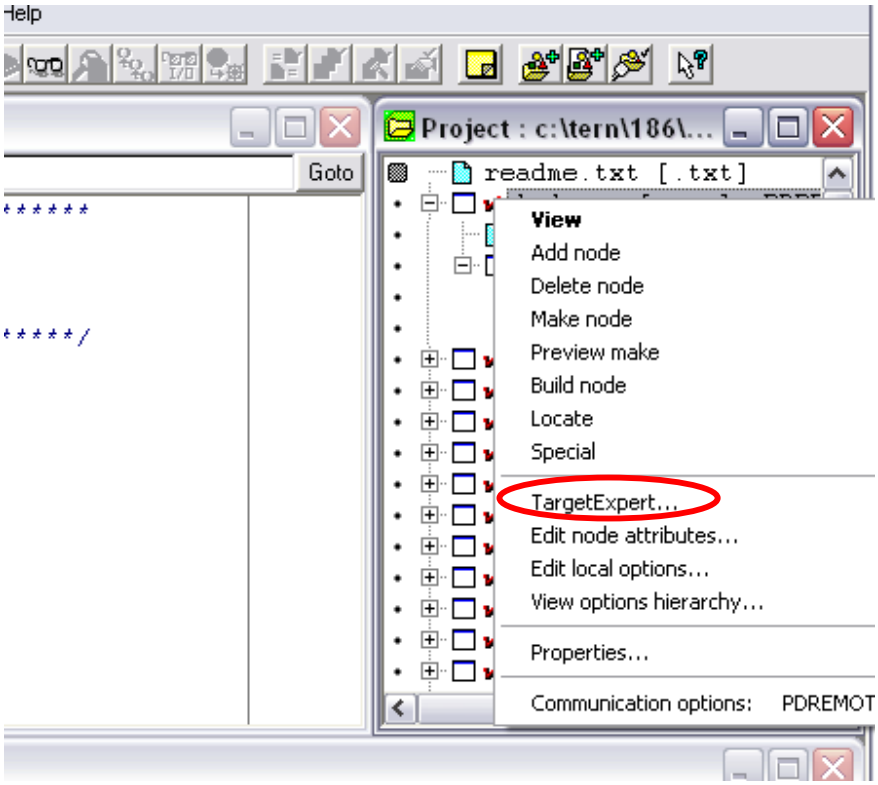


Select the desired COM Port Number on the Advanced Settings window. Using a COM Port that is labeled "In Use" may cause conflicts with other devices in the future. *Do not attempt to use an "In Use" port without advanced knowledge of the COM Port settings.*

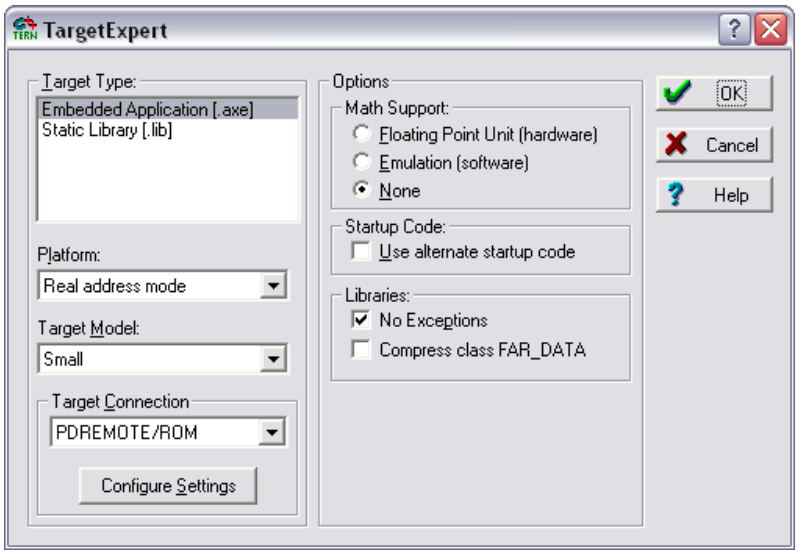


1.5 Debugging with a USB Adaptor

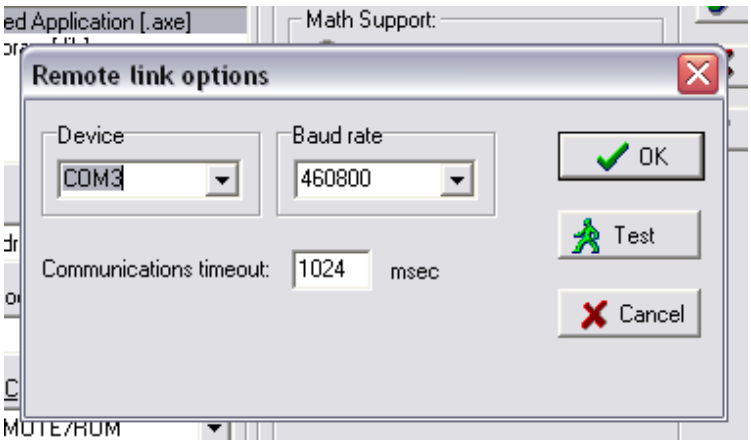
Use the TargetExpert in Paradigm C++ to select the USB Adaptor COM port. In Paradigm C++, right-click on the project node you wish to debug and select TargetExpert.



In TargetExpert, click the “Configure Settings” button.



Select the COM Port number for the USB Adaptor under “Device”.



Be sure to set the correct Baud rate for your controller. Paradigm C++ should now be able to download and debug software on the TERN controller using the USB Adaptor.