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Installing USB Drivers for Pumpkin's CubeSat Kit

Introduction

The Pumpkin CubeSat Kit uses FTDI's (http://www.ftdichip.com/) FT232BM USB-to-serial converter. Pumpkin supplies custom USB drivers for connections Windows 98 / ME / NT / 2000 / XP and Mac OS X. This Application Note illustrates the step-by-step procedure drivers so as to be able to communicate via a simple terminal program to one or more CubeSat Kits.

Part 1: Windows 98 / ME / NT / 2000 / XP Installations

This section illustrates the step-by-step procedure for installing the Virtual COM Port (VCP) drivers on a Windows XP PC.

Placing the Driver Files on your PC

Obtain the Pumpkin CubeSat Kit PC USB drivers from http://www.cubesatkit.com/. Copy them to a temporary directory, e.g. `c:\temp`.

Installing the CubeSat Kit USB Drivers

Apply power to the CubeSat Kit, and connect a USB cable between your PC and the CubeSat Kit's USB connector. After a few seconds, the PC detects the new hardware and presents the following screen as part of the Found New Hardware Wizard:

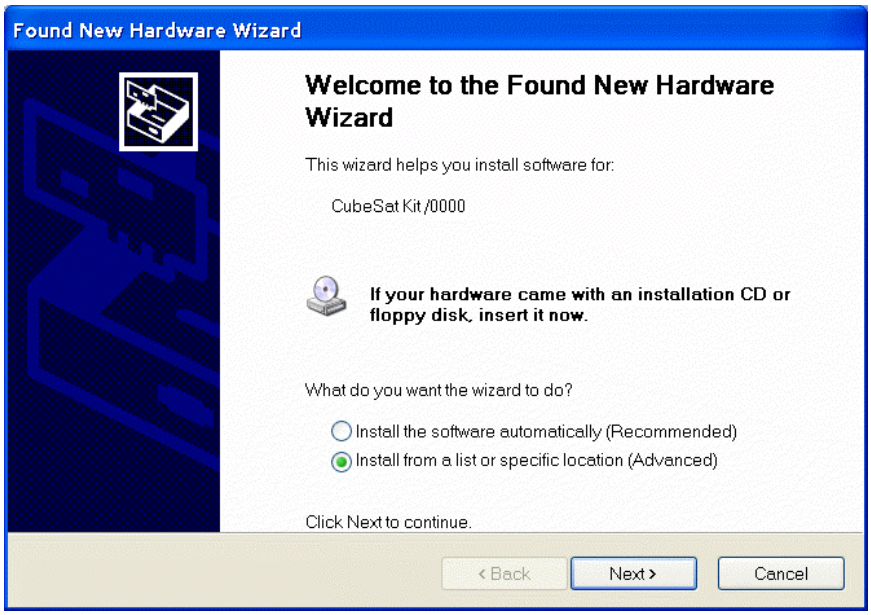

Figure 1: The CubeSat Kit is Detected over USB

Select Install from a list or specific location (Advanced), and click on Next. The following screen will be presented:

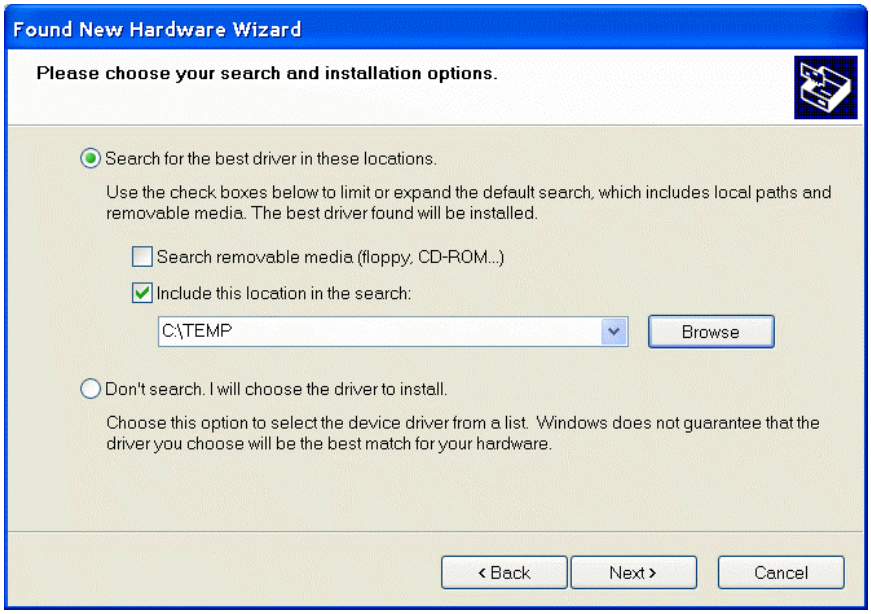

Figure 2: Including a Location in the Driver Search

Browse to the location of the Pumpkin CubeSat Kit drivers (from *Placing the Driver Files on your PC*, above) or enter it manually in the location field. Then click on Next. The Wizard will search for the appropriate drivers. You may be presented with the following screen:

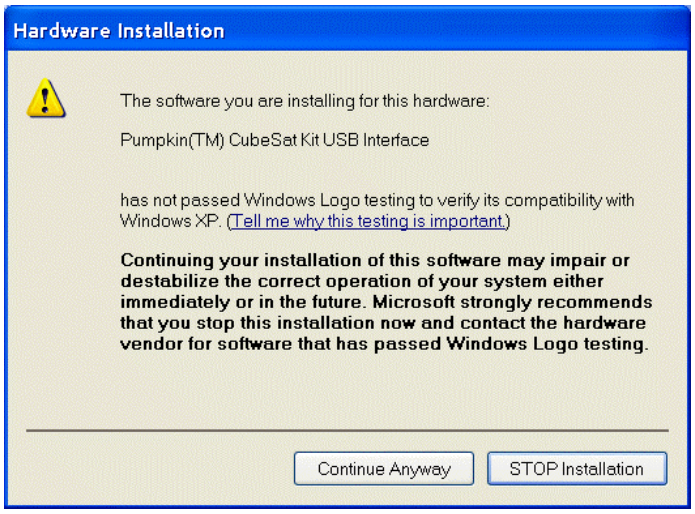

Figure 3: Windows XP Compatibility Warning

This is an issue with the FTDI drivers upon which the Pumpkin CubeSat Kit drivers are based, and can be safely ignored. Click on Continue Anyway to continue. When the Wizard is finished, you will be presented with a screen like this:

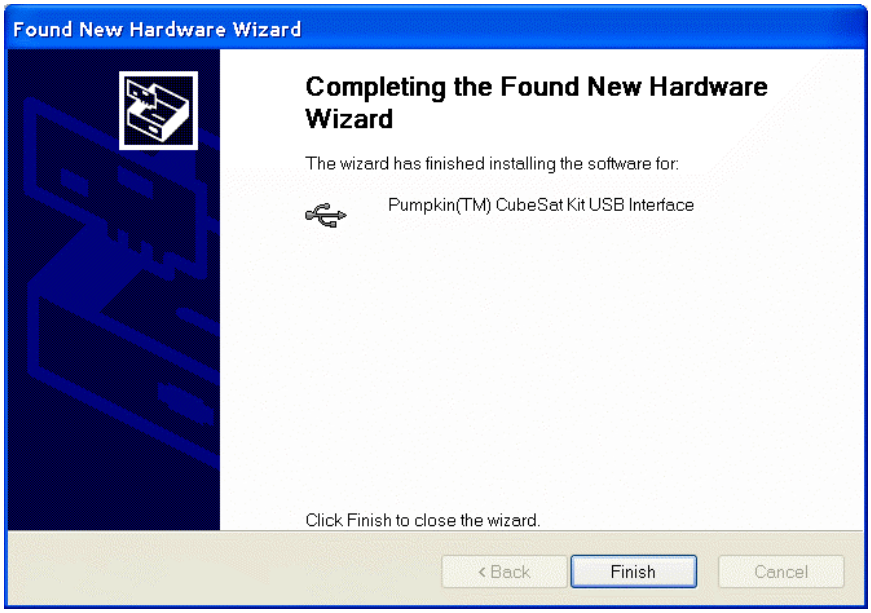

Figure 4: Successful Installation of the Pumpkin CubeSat Kit USB Drivers

With this screen, the drivers for detecting and connecting to the Pumpkin CubeSat Kit via USB are now successfully installed on your PC. Click on Finish to end this part of the installation.

Installing the Virtual COM Port (VCP) Drivers

After the installation of the Pumpkin CubeSat Kit USB drivers is complete, the PC will auto-detect the USB Serial Port and you will be presented with another screen:

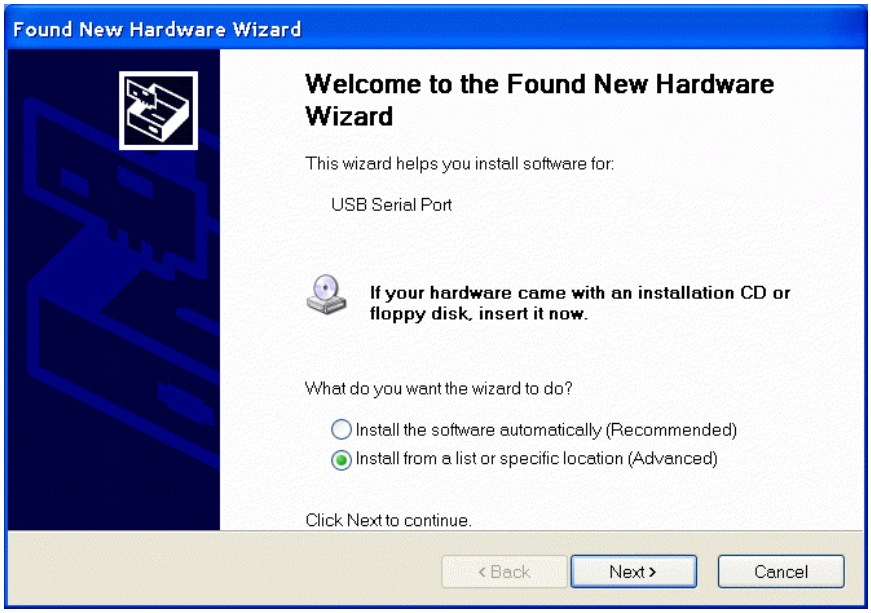

Figure 5: The USB Serial Port is Detected

Select Install from a list or specific location (Advanced), and click on Next. The following screen will be presented:

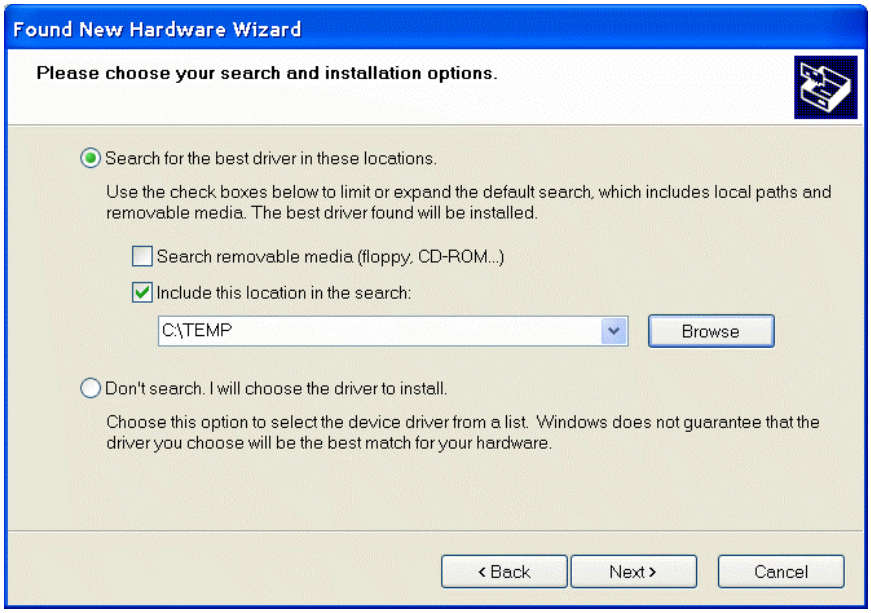

Figure 6: Including a Location in the Driver Search

Browse to the location of the Pumpkin CubeSat Kit drivers (from *Placing the Driver Files on your PC*, above) or enter it manually in the location field. Then click on Next. The Wizard will search for

the appropriate drivers. You may be presented with the following screen:

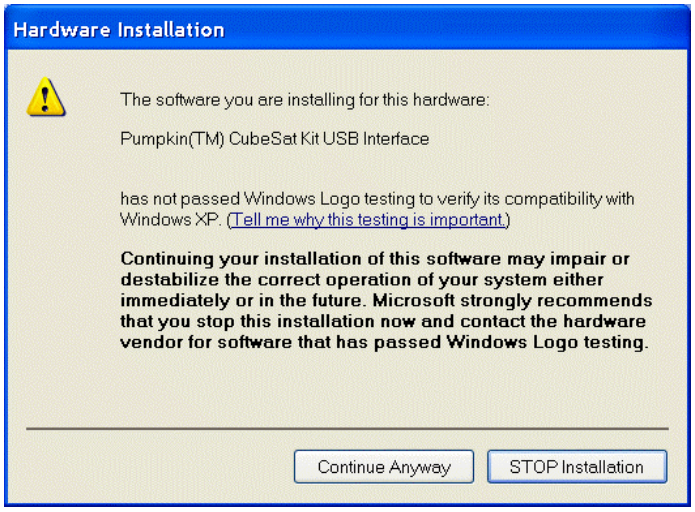

Figure 7: Windows XP Compatibility Warning

This is an issue with the FTDI drivers upon which the Pumpkin CubeSat Kit drivers are based, and can be safely ignored. Click on Continue Anyway to continue. When the Wizard is finished, you will be presented with a screen like this:

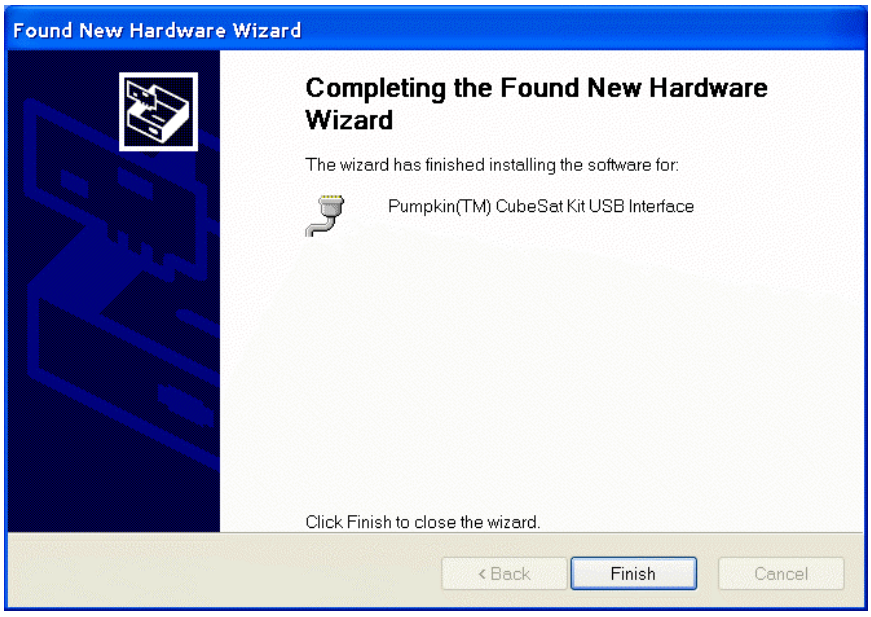

Figure 8: Successful Installation of the Pumpkin CubeSat Kit VCP Drivers

With this screen, the drivers for connecting to the Pumpkin CubeSat Kit via a Virtual COM Port are now successfully installed on your PC. Click on Finish to end the installation.

Verifying the Installation

The proper installation of the drivers can be verified through the Device Manager:

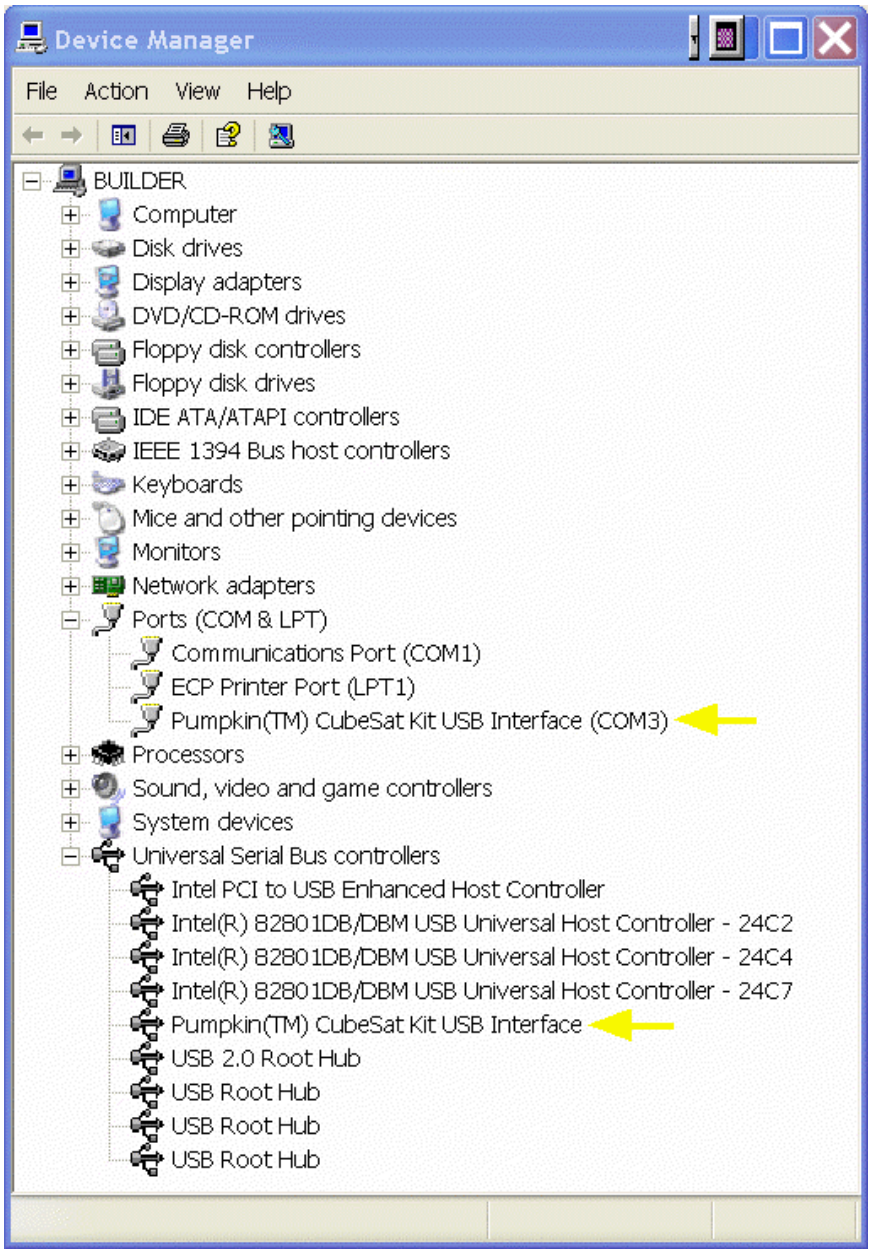

Figure 9: Verifying the Installation in the Device Manager

When the USB driver is properly installed, the Pumpkin™ CubeSat Kit USB Interface entry will appear under the Universal Serial Bus controllers group. Similarly, when the VCP driver is properly installed, the Pumpkin™ CubeSat Kit USB Interface (COMn) will appear under the Ports (COM & LPT) group.

Connecting to the CubeSat Kit over USB

Once the drivers are properly installed, you can connect to the CubeSat Kit over USB via a Virtual COM Port (VCP). A VCP mimics a traditional serial port, with configurable baud rate, handshaking, etc. Windows' built-in HyperTerminal program can be used with VCPs:

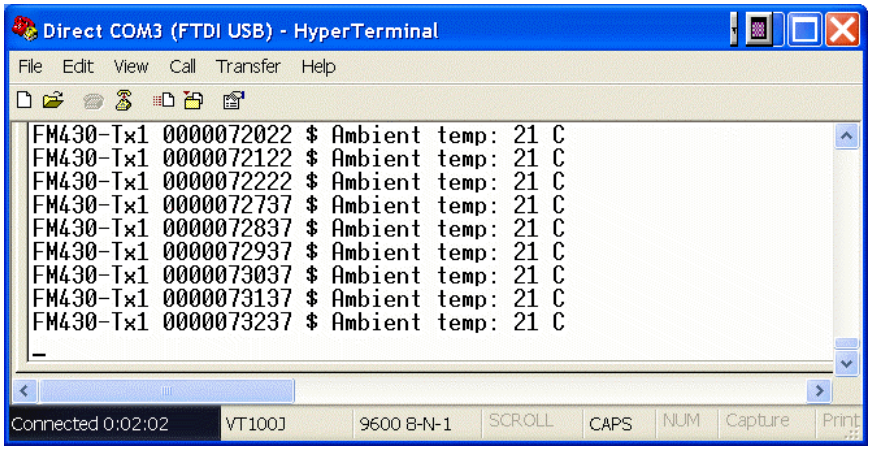

Figure 10: A CubeSat Kit Connected over USB via VCP COM3

Multiple VCPs

The VCP driver supports multiple VCPs. Therefore any number of CubeSat Kits can be connected to a single PC via USB. Each VCP will have its own COM port (e.g. COM3, COM4, …). These will be reported in the Ports (COM & LPT) group of the Device Manager.

Removing the Drivers

To remove the drivers, use the Windows Add or Remove Programs Control Panel, and select the FTDI USB Serial Converter Drivers:

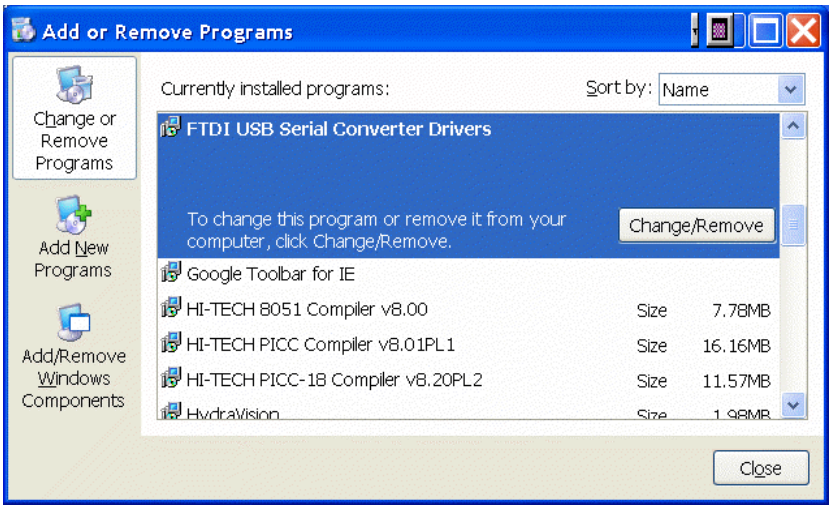

Figure 11: Removing the Drivers

Part 2: Mac OS X Installations

This section illustrates the step-by-step procedure for installing the FTDI drivers on a Mac G5 running OS X 10.3.

Placing the Driver Files on your Mac

Obtain the Pumpkin CubeSat Kit Mac USB drivers from http://www.cubesatkit.com/. The FTDI installer is provided in a self-extracting package (`.pkg.sit`) file. Some additional files are also provided. Copy all the files to a temporary location, e.g. the Users/Shared folder.

Running the Driver Installer

With your CubeSat Kit(s) *disconnected* from your Mac, launch the FTDI installer by double-clicking on it:

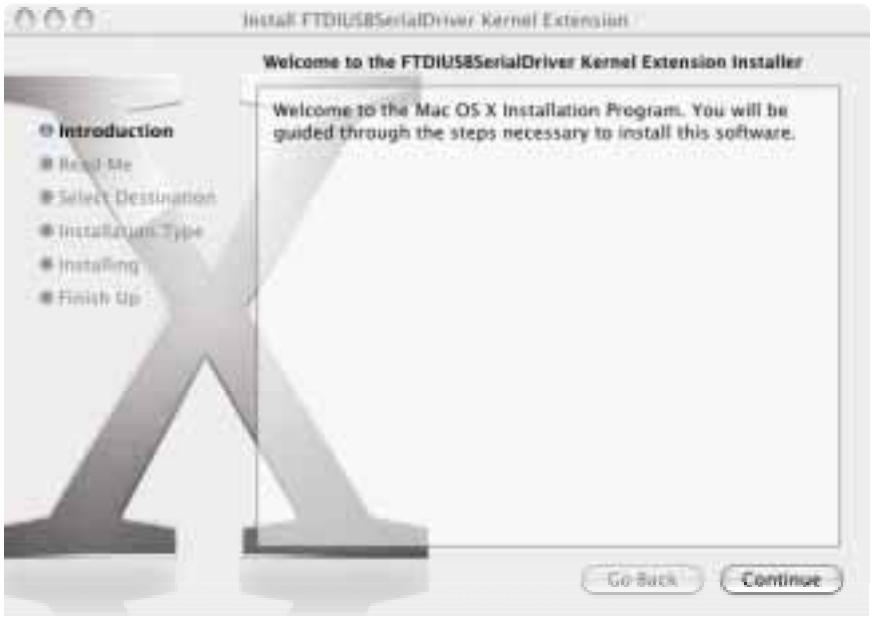

Figure 12: FTDI USB Serial Driver Kernel Extension Installer

Follow the on-screen instructions to install the driver onto your Mac.

Restart your Mac when finished.

Replacing the FTDIReEnumerate File

The CubeSat Kit-specific `FTDIReEnumerate` file that is supplied as part of the CubeSat Kit Mac OS X drivers enables the FTDI driver to recognize the unique vendorID and productID of the CubeSat Kit.

Log out of your Mac, and log back in as root.[1]

Tip To enable root access under Mac OS X, run Applications/Utilities/NetInfo Manager, and select Security → Enable Root User.

It is generally recommended that you leave root access disabled once you're finished with this procedure. Root access can be disabled by selecting Security → Disable Root User.

Replace the existing `FTDIReEnumerate` file in the `/Library/StartupItems/FTDIReEnumerate` folder with the CubeSat Kit-specific `FTDIReEnumerate` file. Your `/Library/StartupItems/FTDIReEnumerate` folder will look something like this:

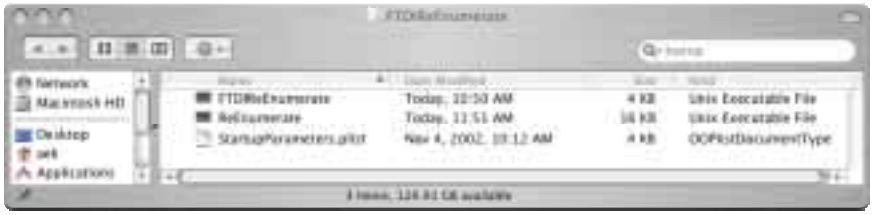

Figure 13: /Library/StarupItems/FTDIEnumerate Folder

Note You can open and thereby view the `FTDIReEnumerate` file by using a simple text editor like TextEdit. The entry for the CubeSat Kit lists a vendorID of `0403` and a productID of `F020`.

If these entries are not present, then you have not successfully copied the CubeSat Kit-specific `FTDIReEnumerate` file over the generic one installed by the FTDI installer.

Detecting and Configuring the Network Port

Connect the CubeSat Kit to your Mac via USB, and reboot the Mac. Select System Preferences → Network and you should be presented with the following screen once the CubeSat Kit's USB interface is detected:

Figure 14: New Port Detected

Select OK. In the Show pull-down, select Network Port Configurations:

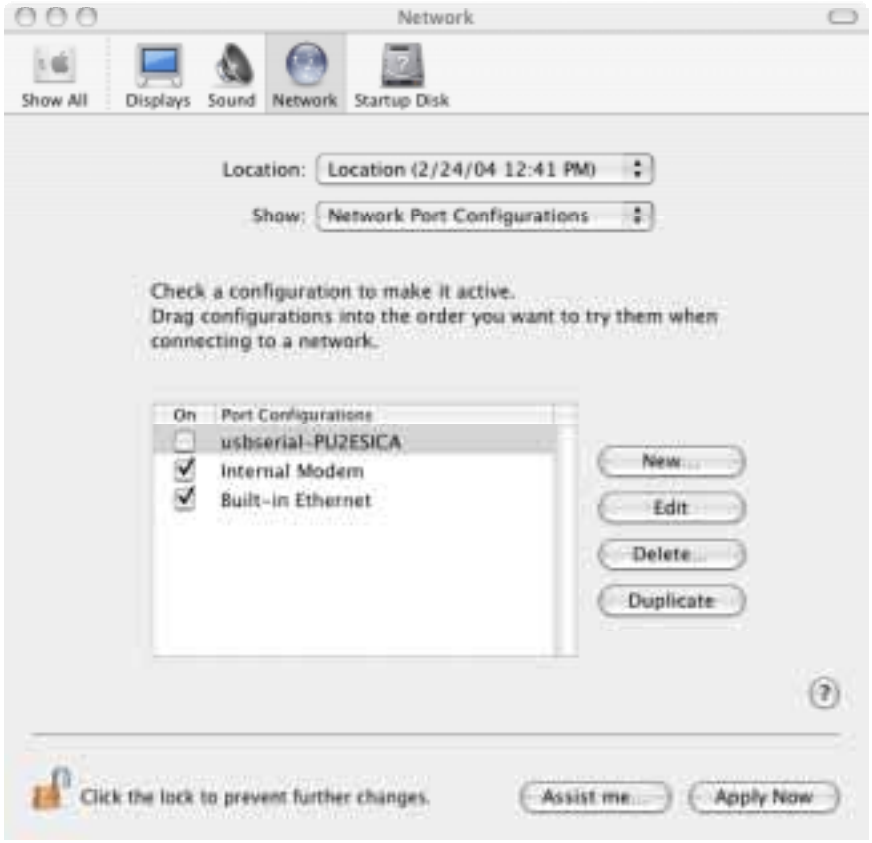

Figure 15: USB Network Port, Inactive

Note The suffix after usbserial represents the device's unique serial number, in this case it's PU2ESICA. Every CubeSat Kit will have a unique serial number.

Click in the On box to make this particular network port active. Then, in the Show pull-down, select usbserial-XXXXXXXX and select the modem tab:

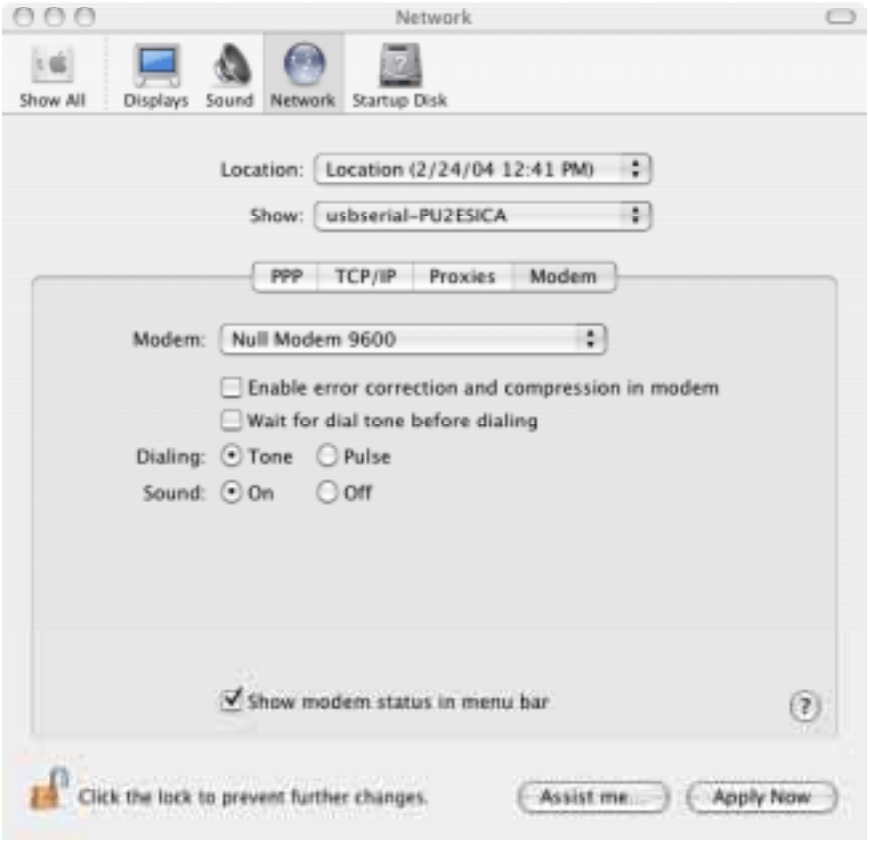

Figure 16: USB Network Port, Modem Attributes

In the Modem pull-down, select Null Modem 9600. Deselect Enable error correction and compression in modem and Wait for dial tone before dialing. Click on Apply Now to complete the configuration.

In the Show pull-down, select Network Status to confirm that the network port has been configured:

Figure 17: USB Network Port, Configured

Verifying the Installation

The proper installation of the drivers can be verified through the System Profiler, available via About This Mac → More Info …:

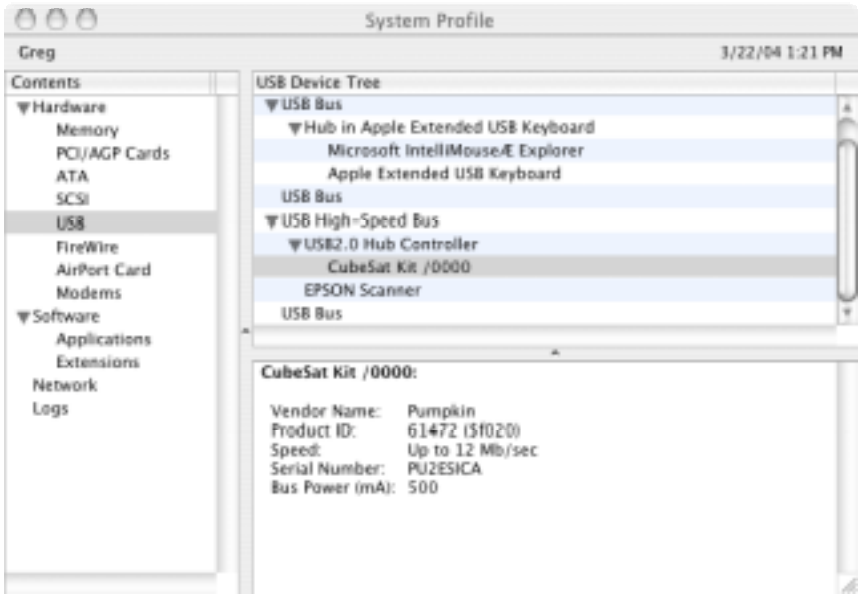

Figure 18: System Profiler, USB Devices

Connecting to the CubeSat Kit over USB

Once the driver is properly installed, you can connect to the CubeSat Kit over USB via a network-port-aware terminal program like ZTerm:[2]

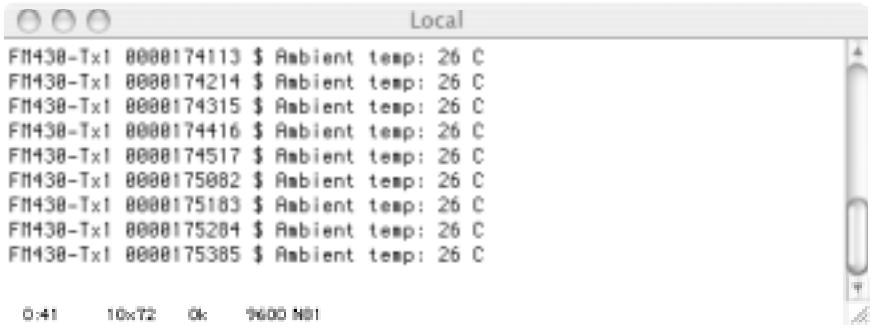

Figure 19: A CubeSat Kit Connected over USB using Zterm

Note The terminal program's connection parameters (e.g. data rate, stop bits, parity, etc.) must be appropriately configured.

A network-port-aware terminal program will usually present the user with a choice of ports to connect to – in the case of the CubeSat Kit, the network port will be named usbserial-XXXXXXXX.

Tip In ZTerm, the modem port is selected via Settings → Modem Preferences. You can select any modem network port that was already configured when Zterm was launched.

Multiple CubeSat Kits over USB

Any number of CubeSat Kits can be connected to a single Mac via USB. Each CubeSat Kit will have its own unique network port and serial number:

Figure 20: Two CubeSat Kits Connected over USB

Removing the Drivers

Individual network port configurations can be deleted in the network control panel by listing the Network Port Configurations and using the Delete function:

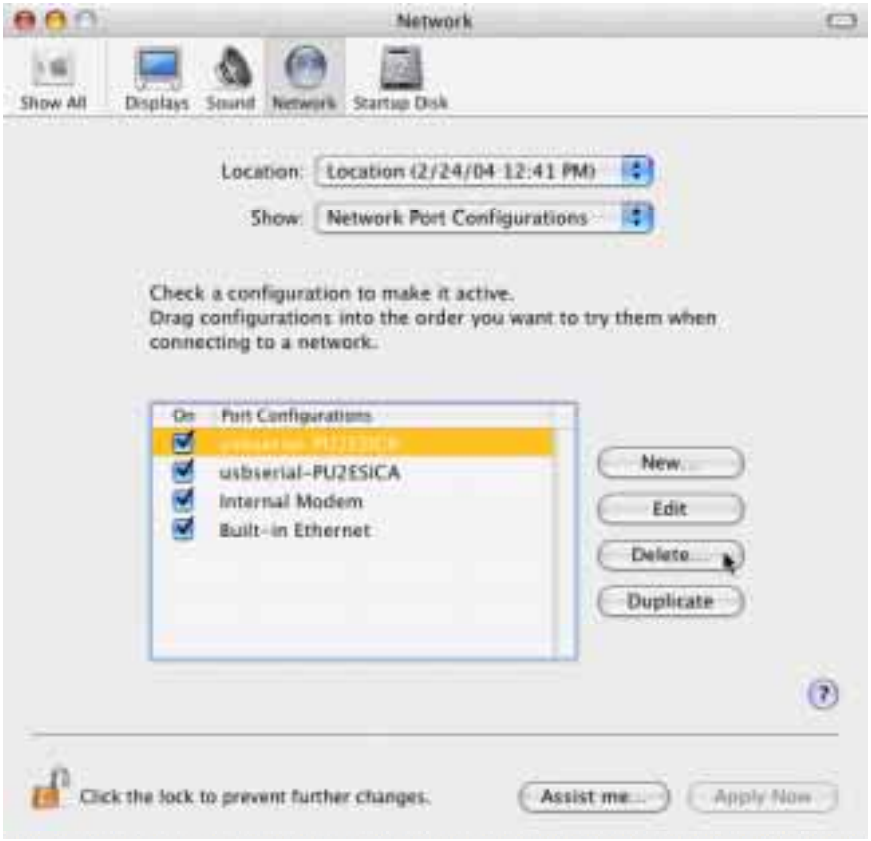

Figure 21: Removing the Drivers

[1] Also called System Administrator.
[2] ZTerm is a shareware program – http://homepage.mac.com/dalverson/zterm/