Future Technology Devices International Ltd.

Mac OS X Installation Guide

Table of Contents

1   Welcome to the Mac OS X Installation Guide

This document describes the procedure for installing the Mac OS X FTDIUSBSerial driver for FTDI's FT2232C, FT232BM, FT245BM, FT8U232AM and FT8U245AM devices. The driver is available for free download from the Drivers section of the FTDI web site.

2   VCP Drivers

2.1   Installing VCP Drivers

Download the driver from the VCP Drivers section of the FTDI web site and save it to the hard disk. The driver is now available in disk image (.dmg) format. Run the installer by double clicking on the FTDIUSBSerialDriver.dmg icon.

Click Continue to proceed with the installation and follow the instructions on screen.

When the installation is complete, reboot the computer.
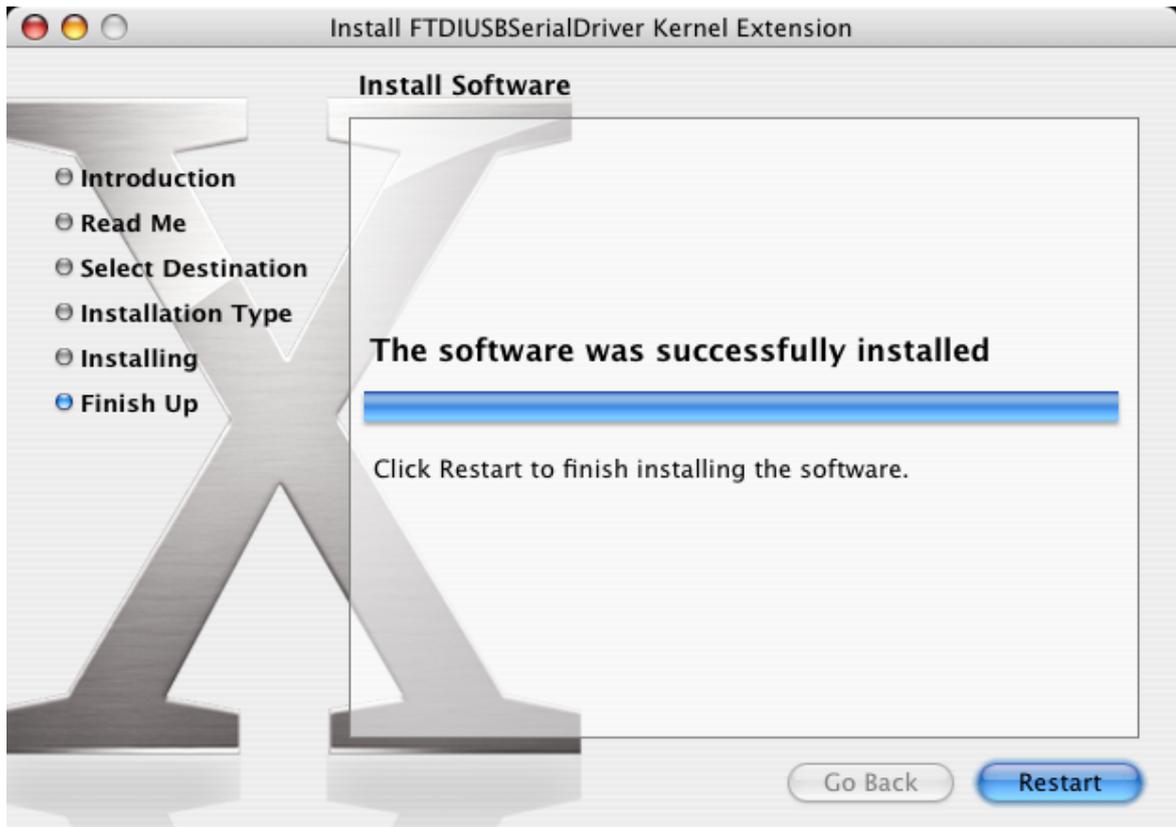
When the computer has rebooted, plug in the device. If the device is installed properly, you will see entries in the /dev directory:

> /dev/cu.usbserial-xxxxxxxx
> /dev/tty.usbserial-xxxxxxxx

where xxxxxxxx is either the device's serial number or, for unserialized devices, a location string that depends on which USB port your device is connected to. Note that for FT2232C devices port A is denoted by the serial number appended with "A" and port B is designated by the serial number appended with "B".

/dev can be accessed through the Terminal application. The Terminal application can be launched by selecting Go > Applications > Utilities > Terminal. Type the following lines in the Terminal window to produce the file list:

> cd /dev
> ls-l

If you run the application System Preferences and select Network (Go > Applications > System Preferences > Network), you should see the text "New Port Detected".

New Port Detected

A new network port has been detected:

usbserial-1B22

Please verify that it is configured correctly, then press Apply Now to activate it.

OK
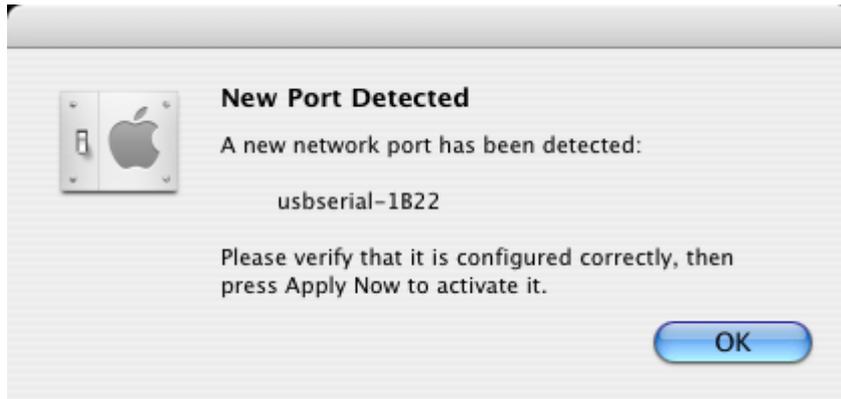
Click OK and select Network Port Configurations from the Show list. The new port can be enabled from this screen by checking the On box and clicking Apply Now.
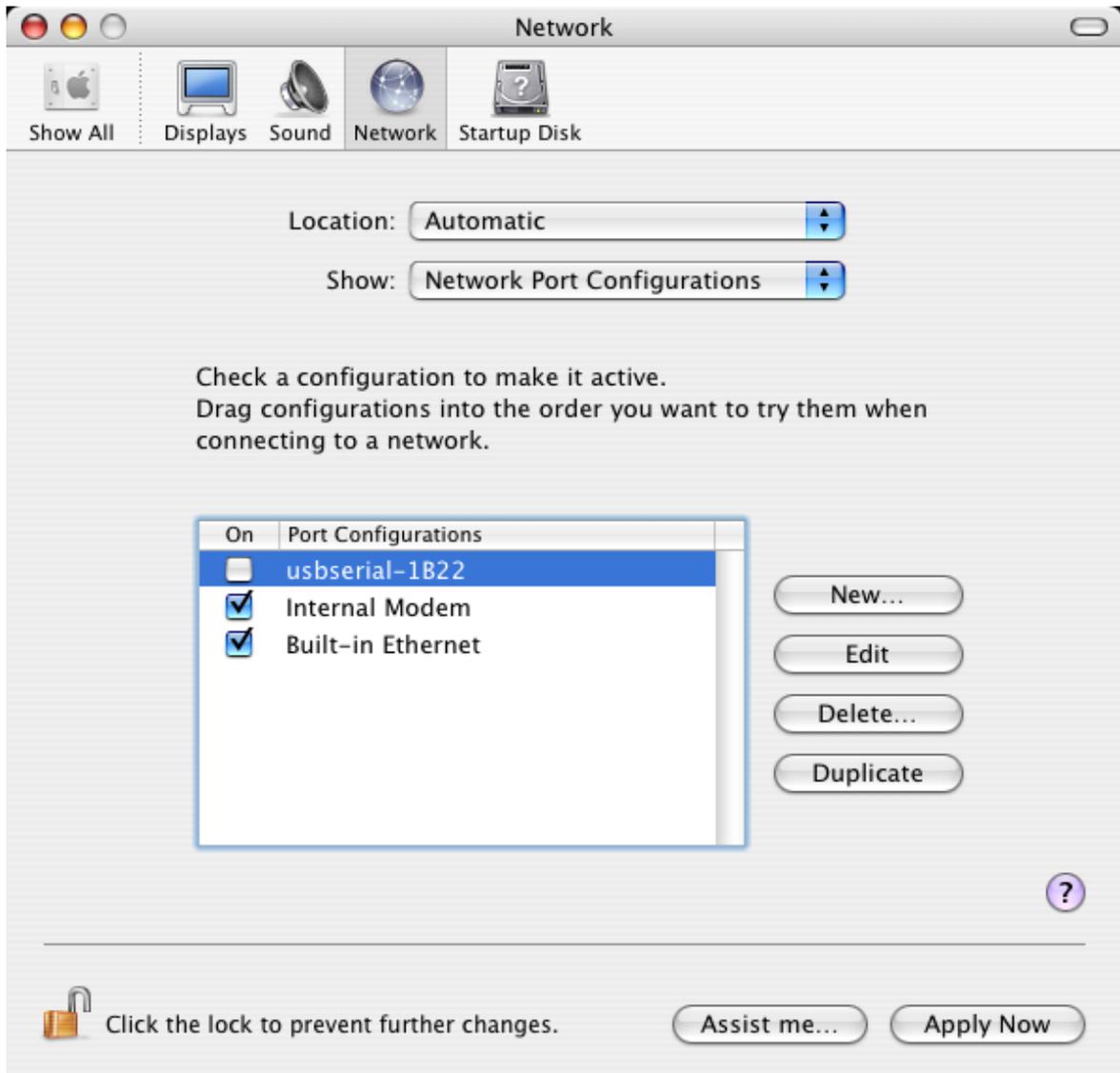
At this point, it is possible to exit Network and use the device as a COM port. If you wish to set the device up a a modem for an Internet connection, select the new port from the Show list to display the window below. Please note that the FT2232C device has two ports available and these must be configured separately.
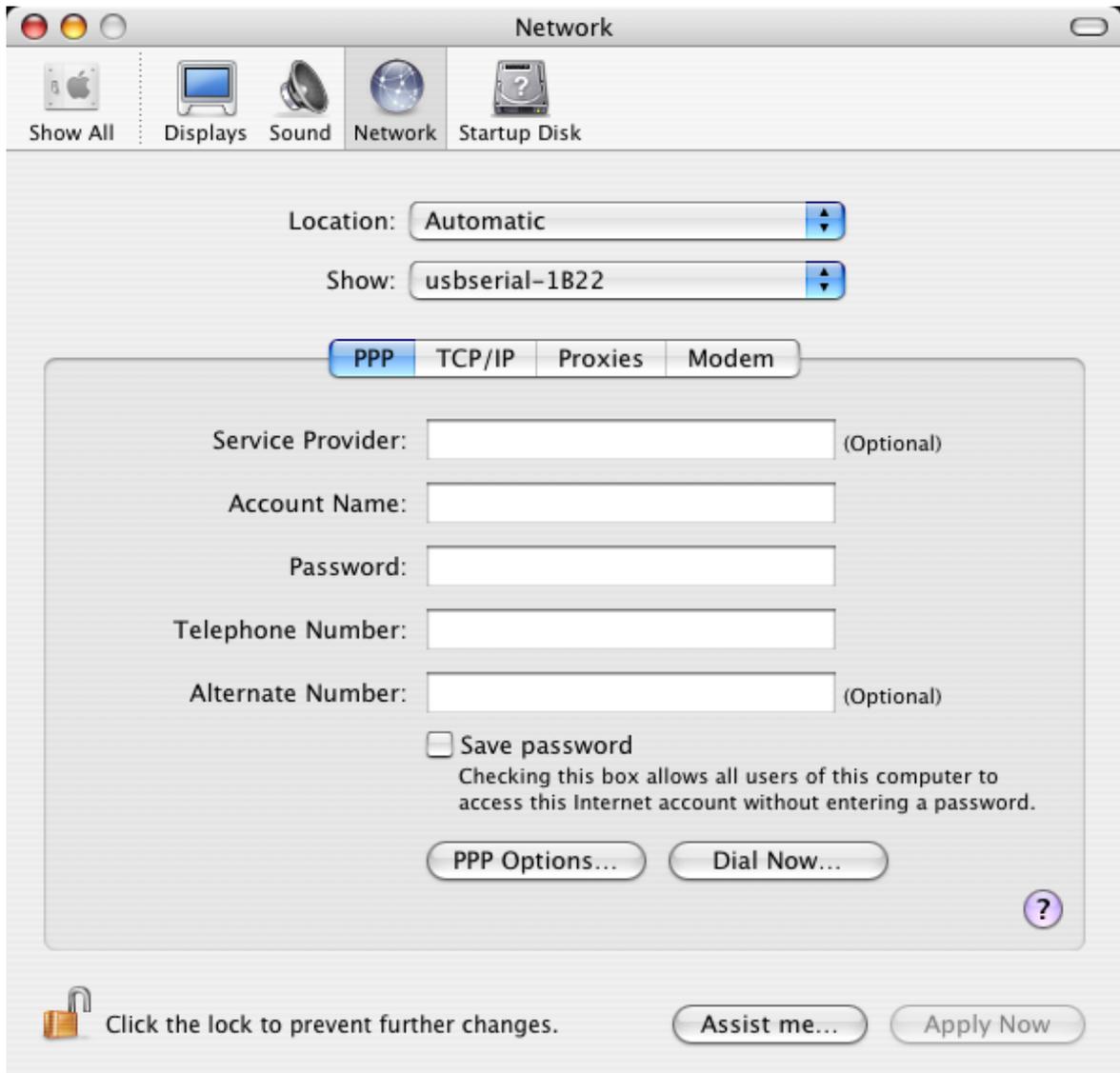
Entries for this screen are specific to the Internet account for each user. If you do not know the required details, contact your Internet service provider.

2.2   Uninstalling VCP Drivers

To remove the drivers from Mac OS X, the user must be logged on as root. Root is a reserved username that has the privileges required to access all files.

Start a Terminal session (Go > Applications > Utilities > Terminal) and enter the following commands at the command prompt:

        cd /System/Library/Extensions
        rm -r FTDIUSBSerialDriver.kext

The driver will then be removed from the system.

To remove the port from the system, run the application SystemPreferences and select Network. Selecting Network Port Configurations from the Show menu will display the port as greyed out. Select the uninstalled port and click Delete. Confirm the deletion to remove the port.
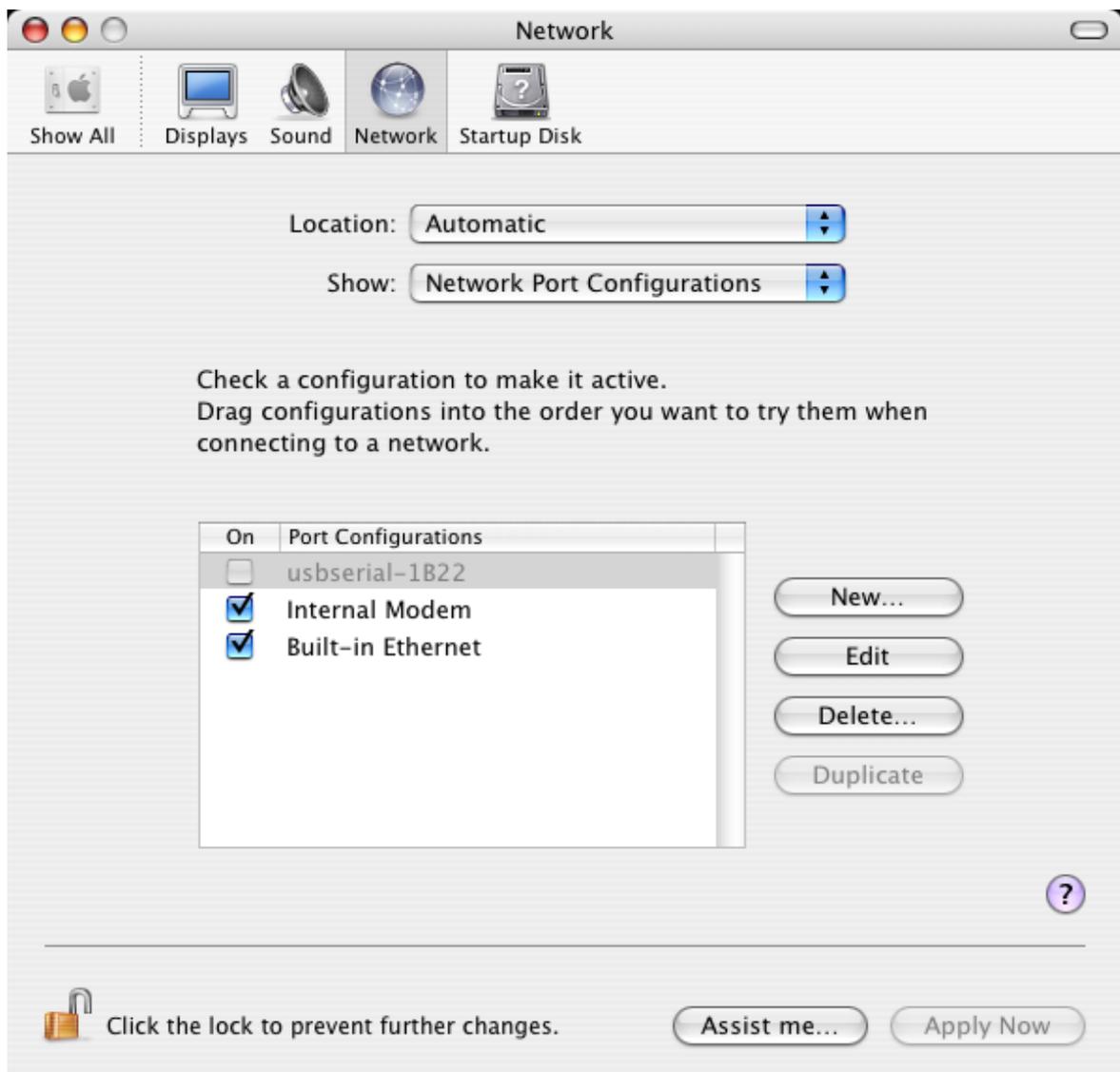
3   D2XX Drivers

3.1   Installing D2XX Drivers

Download the driver from the <u>D2XX Drivers</u> section of the <u>FTDI web site</u> and save it to the hard disk. The driver is provided in disk image (.dmg) format. Mount the disk image by double clicking on the PPC D2XX0.1.0.dmg icon for Power PC users or the Universal D2XX0.1.0.dmg icon for Intel Mac users.

- Start a Terminal session (Go > Applications > Utilities > Terminal)

- Copy libftd2xx.0.1.0.dylib to the /usr/local/lib directory (cp Desktop/D2XX/bin/libftd2xx.0.1.0 /usr/local/lib)

- Change directory to the /usr/local/lib (cd /usr/local/lib)

- Create a symbolic link to the library (ln -sf libftd2xx.0.1.0.dylib libftd2xx.dylib)

Samples written in C are provided to show how to use the library and verify the installation. These are command line based applications that must be executed from the Terminal window. To compile and run the samples perform the following steps (these assume you have copied all of the distribution files to the desktop and installed the library as per the Installation section above):

- Open a Terminal window (Go > Applications > Utilities > Terminal).

- Change directory to the root samples directory (cd Desktop/D2XX/Samples).

- Build the samples by typing "make" then return. If you have issues at this stage revisit the installation section above to ensure the library is correctly installed. Read the error messages and try to determine the source of the problem. If you still have issues then contact support detailing your issue with as much information as possible.

- To run an application, have a suitable FTDI device with default VID (0x0403) and PID (0x6001) and change to the Simple directory (cd Simple) then type "./simple" followed by return (make sure the dot and the forward slash precede the simple command).

- If you have issues at this stage then consult the troubleshooting section later in this document. If the troubleshooting section doesn't help then contact support with your problem details.

3.2   Uninstalling D2XX Drivers

To uninstall the D2XX driver, simply delete the library and the symbolic link:

- Start a Terminal session (Go > Applications > Utilities > Terminal)

- Change directory to the /usr/local/lib (cd /usr/local/lib)

- Delete the library (rm libftd2xx.0.1.0.dylib)

- Delete the symbolic link (rm libftd2xx.dylib)

3.3   Multiple VIDs/PIDs

The current library has a default VID/PID table embedded within to determine if a particular device will be opened/accessed by the library. This table contains FTDI's own VID and PIDs, therefore if you use FTDI default VID and PIDs this will not concern your application.

There may be a situation when this is not suitable for a particular application such as custom VIDs and/or PIDs. The FT_SetVIDPID API call can cater for single instances of VID/PID variations, however there is a method to include your own range of VID/PIDs with a custom table.

- Using xcode, open the LibTable.xcodeproj in the LibTable folder

- Edit the ftdi_table.c file to include your own VIDs/PIDs

- Recompile the library

- Copy the resultant binary to the /usr/local/lib directory

If you have trouble with the above procedure (don't know what xcode is or can't compile the library) then contact support with your VID/PID requests and we will provide you with a binary to use. Current workload will ultimately impact on the time we can provide you with a library therefore it is advised to provided us with the details at your earliest possible convenience.

3.4   Configuration Settings

Configuration settings are considered advanced features and are only needed in certain rare situations. Only alter these settings if it has been suggested by FTDI support or you know exactly what you are doing.

The D2XX configuration file **MUST** be called ftd2xx.cfg. This is a simple text file containing various settings and allows for expansion in the future. The file is read on an FT_Open/FT_OpenEx only. 3 sections are available for settings:

- Global
- VID/PID
- Unique

An example of the ftd2xx.cfg file is included in the package and each section should be self explanatory. The [Globals] section applies to all devices, the [VID_0403&PID_6001] applies to devices of only VID and PID 0x0403 and 0x6001. The unique settings apply to only those devices of a particular serial number - in the case of the supplied example, [FT000001].

The configuration file must reside in /usr/local/lib or the /usr/lib folder.

Multithreaded Write
It has been noted during beta testing that some multithreaded applications can lock up during write communication with the devices. This is due to a conflict in the application run loop and the write run loop. To prevent lockup with a multithreaded application use the 31st bit (ConfigFlags=0x40000000) in the configuration file. This will enable an alternative FT_Write that has its own thread and will not conflict with the current thread run loop operation.

USB Reset After Open
It is always recommended that you close a file handle obtained by FT_Open/FT_OpenEx before exiting an application. Side effects of not closing the handle with the multithreaded setting (as illustrated above) can be future communication with the device fails (always test this prior to enabling this setting). The Sample applications demonstrate a method of trapping an abnormal exit (control C operation) and closing each handle in turn. If this is not possible then you may require the reset after open bit set in the configuration file. This is bit 32 (ConfigFlags=0x80000000).
Warning - USB reset after open forces USB reset which in turn re-enumerates devices on the USB bus which can result in loss of data and a break in communication. In most cases it is recommended this is **NOT** used and is only included to cater for the very rare instances that require it. Even though this can be set as a device specific option it is essentially a global operation. Thorough testing is strongly recommended before using this setting as it may affect other USB non-FTDI devices on the USB bus.

4   VCP Troubleshooting

4.1   How do I know what my deviceID is?

Launch the System Profiler utility, or Apple System Profiler for earlier versions of OS X. This can be accessed by going to the Finder and selecting Applications from the Go menu, then open the Utilities folder.

Select USB under Hardware in the pane to the left and then select the appropriate device from the USB Device Tree. In the screen shot below (from OS 10.3), the device has a deviceID given by:

        Vendor Name: FTDI
        Prioduct ID: 24577 ($6001)

A Vendor Name of FTDI is equivalent to a Vendor ID of 1027 ($0403).
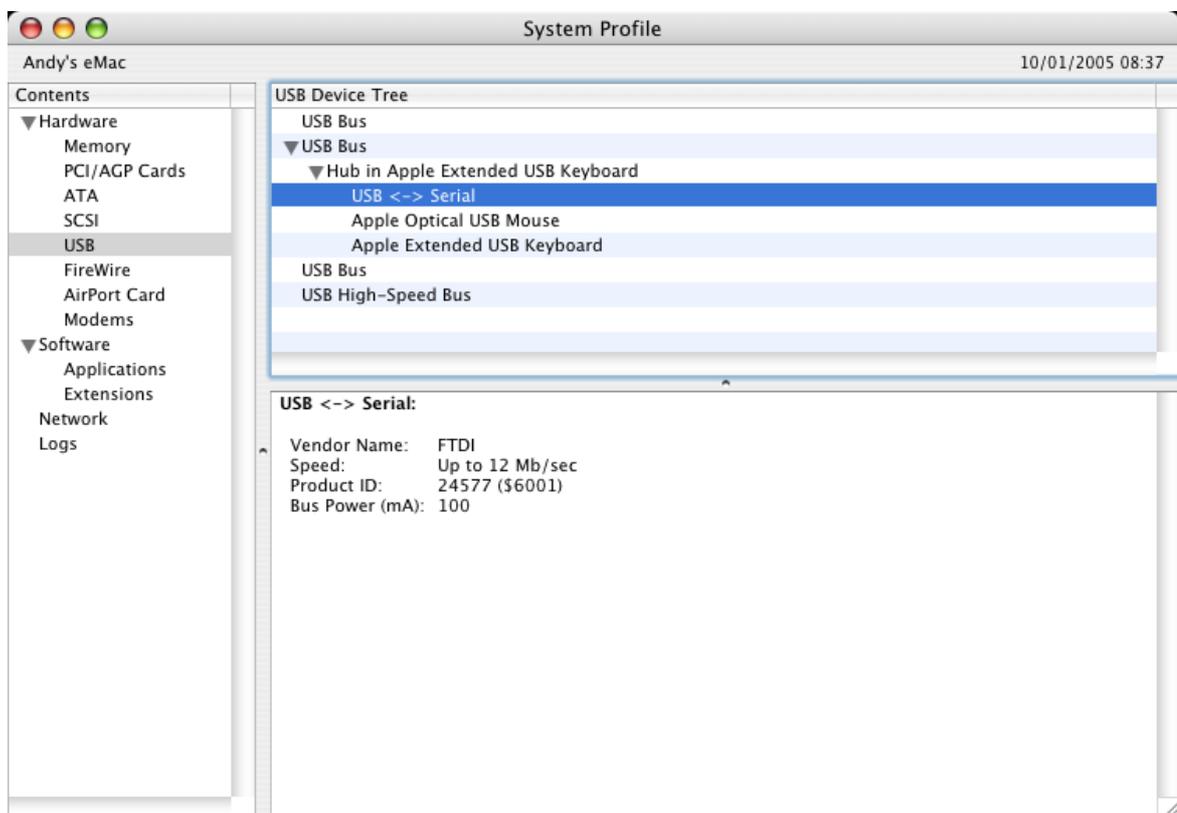
If the device does not work after installing the driver, it is likely to be because the PID is not supported by the driver. If this is the case, contact FTDI Support with the PID that needs to be added to the driver. If the VID is not 0x0403, it is likely that the device is not an FTDI device and we cannot support it.

4.2   The device does not appear in the /dev directory or the text "New Port Detected" is not displayed in SystemPreferences-Network

FTDIUSBSerialDriver does not support your deviceID (VID and PID). Disable the EEPROM so that the device reverts to its default deviceID, then replug.

To get support for your deviceID built into FTDIUSBSerialDriver, contact FTDI quoting your deviceID and a description of your device.

4.3   The device cannot be accessed even though the deviceID is supported in FTDIUSBSerialDriver

An ownership or permissions problem is preventing the system from making the device accessible.

Check that the driver is owned by root and wheel. The most common symptom is the group for FTDIUSBSerialDriver is not wheel. To change the group, login as root and perform the following script in a Terminal window (Go > Applications > Utilities > Terminal):

        cd /system/library/extensions
        chgrp -R wheel FTDIUSBSerialDriver.kext

Reboot for the change to take effect.

4.4   How do I open a Terminal window?

A Terminal window can be started by selecting

Go > Applications > Utilities > Terminal

The terminal window is equivalent to a DOS prompt in Windows.

5   D2XX Troubleshooting

5.1   I can't open a port even though the installation has been successful

This is possibly due to the FTDI serial driver holding the port with your VID and PID. Solution is to uninstall the serial driver 8 . To completely eradicate the possibility of this occurring in future, it is recommended a new VID and PID is used to distinguish between devices.

Another possibility is an incorrect VID/PID. Try changing your application to use the FT_SetVIDPID API call to quickly determine if this is the case.

5.2   After running an application two or three times, communication stops

It is always recommended that you close a file handle obtained by FT_Open/FT_OpenEx before exiting an application. Side effects of not closing the handle with the multithreaded setting (as illustrated above) can be future communication with the device fails (always test this prior to enabling this setting). The Sample applications demonstrate a method of trapping an abnormal exit (control C operation) and closing each handle in turn.

If you cannot find a work around then try setting the USB Reset After Open 12 bit in the ftd2xx.cfg file but only as a last resort.

5.3   Problems upgrading to the latest D2XX driver

Upgrading the D2XX library can cause problems, such as a reported bug fix does not appear to be fixed. This is most likely related to the application executable pointing to a previous version of the library.

To determine which D2XX library your application is using perform the following steps (examples in brackets assume you have copied all of the files to the desktop and successfully compiled the samples as described in the Samples section):

- Open a Terminal window (Go > Applications > Utilities > Terminal).

- Change directory to the application executable folder (cd Desktop/D2XX/Samples/Simple)

- Use otool to determine the library path (otool -L simple). The following text is an example of what is displayed
  simple:
        /usr/local/lib/libftd2xx.0.1.0.dylib (compatibility version 0.1.0, current version 0.1.0)
        /usr/lib/libSystem.B.dylib (compatibility version 1.0.0, current version 88.1.6)

- As illustrated the, simple application is pointing to libftd2xx.0.1.0.dylib.

- To alter the library so that the simple sample points to use the install_name_tool (e.g install_name_tool -change /usr/local/lib/libftd2xx.0.1.0.dylib /usr/local/lib/libftd2xx.dylib simple). Please note you may need to change user mode to perform this function depending on the file permissions set on the executable.

- Run the otool (illustrated in step 3 above) to confirm that the library pointed to by the application has changed and is correct.

6   Revision History

Version	Release Date	Comments
1.0	December 2004	Initial release
1.1	January 2005	Screen shots added Root username explained Expander information added Uninstallation section added FT2232C device driver added DeviceID topic added under Troubleshooting
1.2	March 2005	Additional explanations included for Terminal application and port configuration Terminal topic added in Troubleshooting
2.0	October 2005	Updated to describe installation of version 2 driver References to FT2232CUSBSerialDriver removed as FTDIUSBSerialDriver now supports all devices Re-enumeration script references removed as no longer required
2.1	October 2006	Included instructions for the new D2XX driver

Index

- D -

DeviceID   13, 14

- I -

Installation   2
Introduction   2

- M -

Mac OS X   2, 3, 8, 9, 10, 12, 13, 14, 15, 16, 19

- P -

PID   14

- V -

VID   14

- W -

Welcome   2