Introduction

FTD2XXST.exe is an application for configuring, serialising and testing communication functionality in FT8U232AM, FT8U245AM, FT232BM, and FT245BM designs. The application maintains data which describes USB devices and formats it so that it can be programmed into the EEPROM over USB. Configurable parameters include the Vendor ID (VID), Product ID (PID), device description, and manufacturer name. User's of FTDI devices can use their own VID and PID, FTDI's VID with their own unique PID, or the default FTDI values. If you would like a block of unique PID's for use with FTDI's VID please contact support@ftdichip.com.

The default values are **VID_0403, PID_6001**. These default values will be used by the FTDI device if there is no EEPROM attached, or the EEPROM connected is unprogrammed. You can program the default values into the EEPROM if you wish.

Please note that if you use a VID or PID other than the default vales mentioned above you will need to include them in the driver .inf files for your device. See Appendix 2.

Getting Started

To start with you must have an EEPROM connected to your FTDI chip. For FT8U232AM and FT8U245AM devices this must be a 93C46. For FT232BM and FT245BM devices the EEPROM can be a 93C46, 93C56, or 93C66. In all cases the EEPROM must be configured for words (x16 bits) rather than bytes (x8 bits). Some EEPROM's have an ORG pin (usually pin 6) which must be pulled high to select word (x16) operation. Once you have downloaded FTD2XXST onto your system and extracted the .exe from the zipped archive you should see the following icon:-

To run the application simply double click on the icon. When FTD2XXST is run for the first time, it's display will appear as follows:-
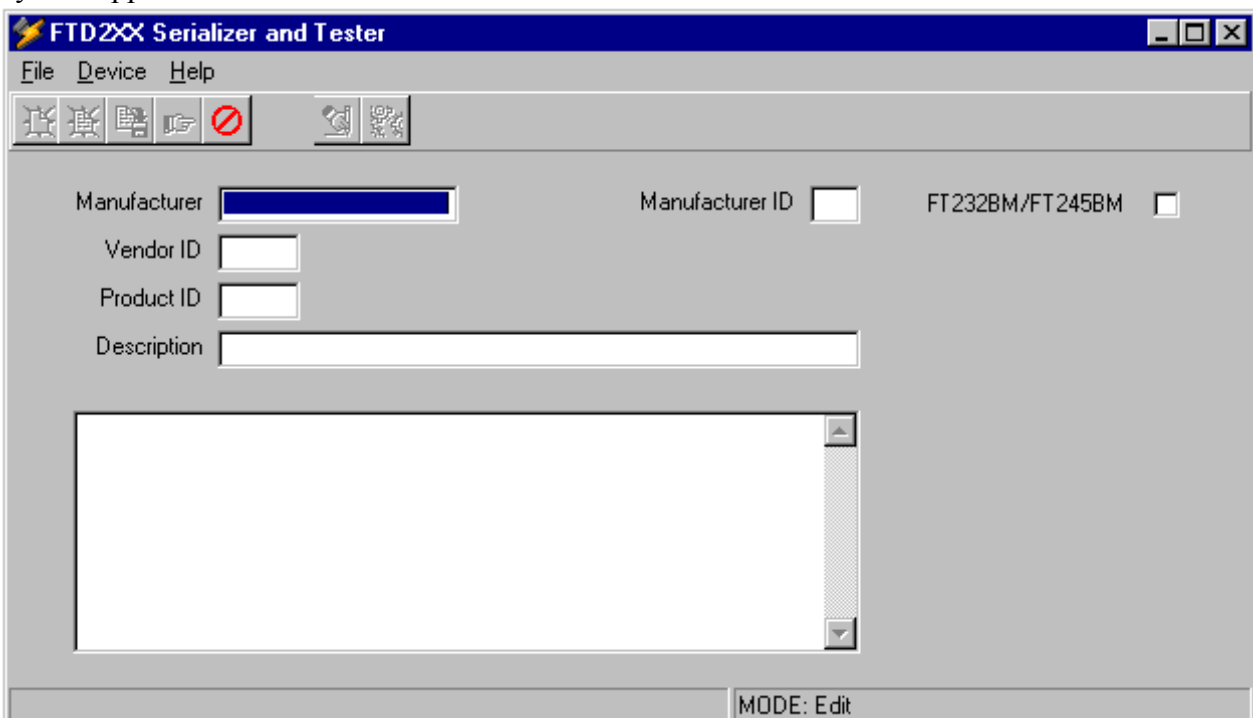
Please note that you must have FTDI's D2XX direct drivers installed to run this application. If you do not have D2XX installed you will see the following error message:-
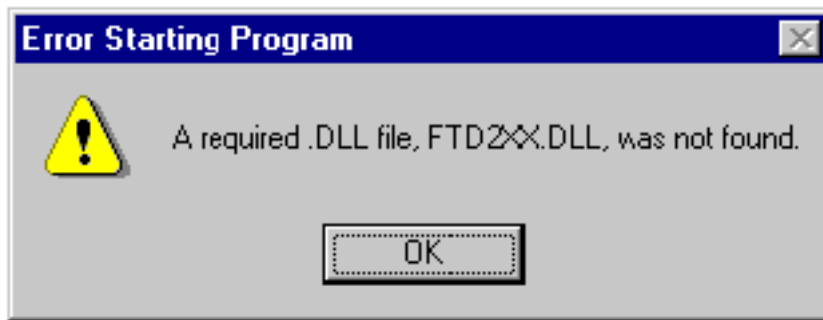
Solution :- You need to install FTDI's D2XX drivers. Go to the drivers and utilities section of the FTDI web site and download D2XX. Unzip the downloaded driver files into a directory on your system. If you have VCP drivers installed Unplug your FTDI USB device and use ''add / remove programs'' from the control panel to uninstall VCP drivers. Then replug your FTDI USB device and install D2XX using the add new hardware wizard. When prompted point the wizard to the location of the unzipped D2XX drivers on your system. This will install D2XX, which will then allow you to run FTD2XXST.

The first time you run FTD2XXST it will be in edit mode and all of the buttons will be disabled. Edit mode means that the user must enter data into each of the fields. Fill in the each of the fields with the data that you require, using Tab to move between them. When complete, it should look something like this:-
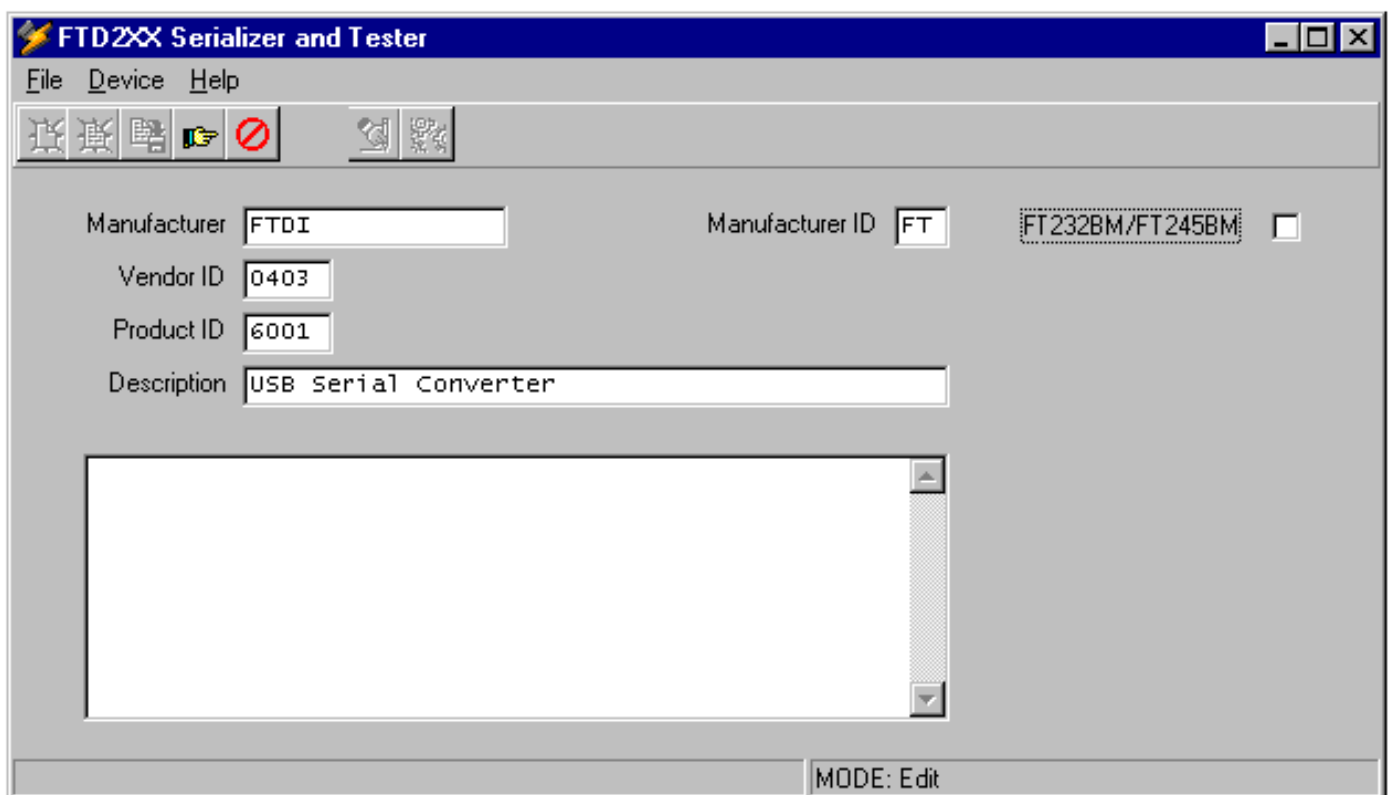
The current mode of FTD2XXST is indicated on the status bar at the bottom right corner of the main window. There are two modes : Edit Mode and Program Mode.

Click on the advanced setup button (the pointing hand icon) which should now be enabled, or select Advanced Setup from the Device menu. This will run the Advanced Setup dialogue window:-

- Advanced Setup Button

The advanced options are:-

     • Plug and Play - This bit is set by default. If this bit is set Plug and Play enumeration under Win 98 / ME is enabled. If this bit is not set, Plug and Play enumeration is disabled. This setting is overridden by the Plug and Play configuration setting in the driver. If in doubt use the default setting.

     • Fixed Serial Number - This option can be used to program a fixed serial number. Care should be taken when using this option, and it should not be used if multiple devices with the same serial number are to be used on the same machine.

     • Self Powered - Enable this bit if your device is self powered. If this bit is not set the device will enumerate as a bus powered device

     • Remote Wakup - This bit is set by default. This must be enabled if you want your device to support remote wakeup using the RI pin on the FT232BM or FT8U232AM chips.

     • Max Power - Default setting 44 mA. This option determines the maximum current which can be drawn from the USB bus, in a bus powered design. For a standard low powered design 100 mA is the maximum allowable value. If your design is a High Power Self powered USB device (I>100mA) you should follow the high current bus powered device design rules detailed in application note AN232-10. The maximum current a high power USB device can take from the USB bus is 500 mA, but don't specify this. In this case use 490 mA instead.

Once you have selected the options that you require click "OK".
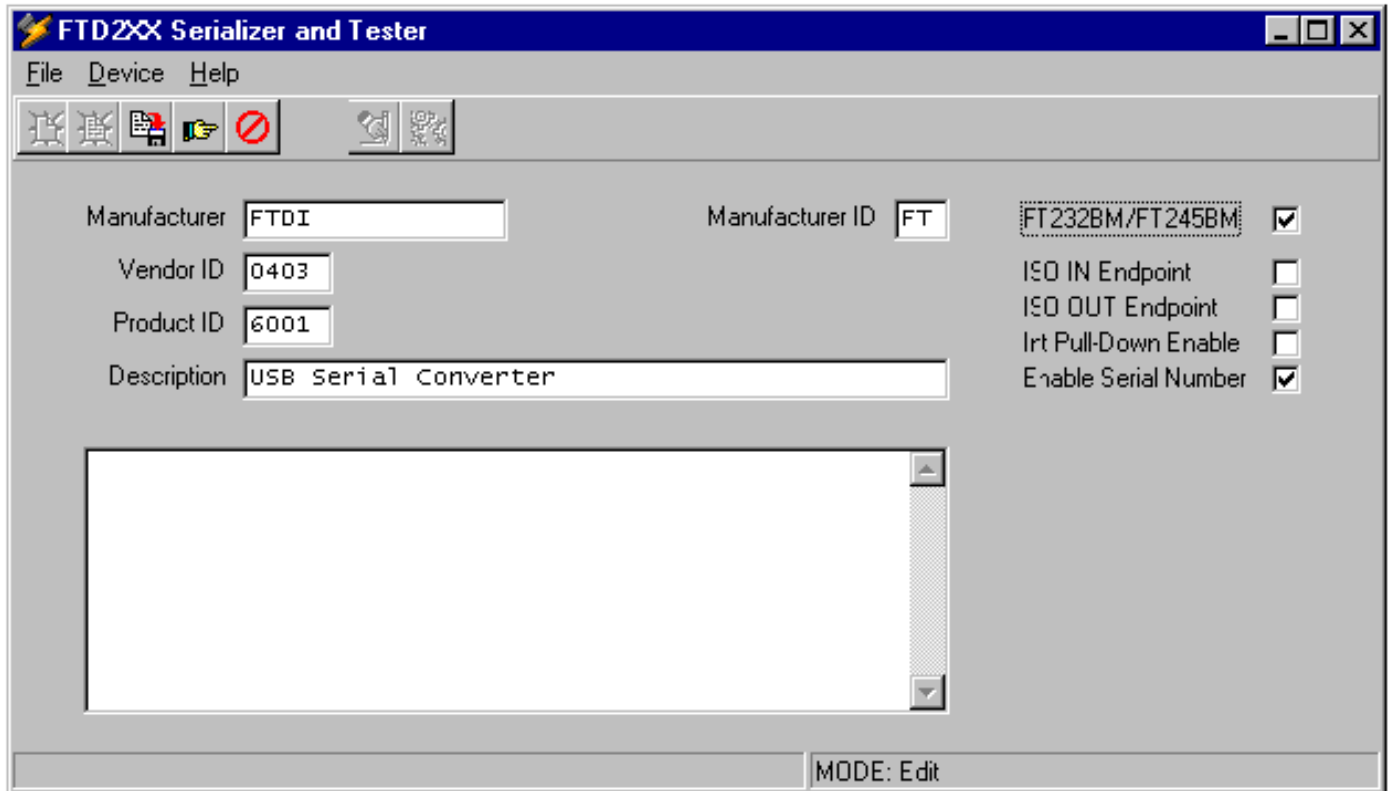
If you are using a BM device you should check the box marked ''FT232BM / FT245BM''. Some additional options will now appear:-

• **ISO IN Endpoint / ISO Out Endpoint** - This will enable Isochronous endpoints for the device. This option does not work with standard FTDI drivers. Isochronous drivers are available from FTDI on request. Isochronous mode does not guarantee integrity of data since it has no error correction. It is designed for streaming audio applications and will only do 64 bytes per millisecond.

• **Int Pull-Down Enable** - Setting this bit enables the Internal Pull down option mentioned under the pin descriptions on the device datasheets. See AN232BM-02_PinMode.

• **Enable serial number** - Enabling this bit programs a serial number for the device into the EEP-ROM. This bit is set by default.

FTD2XXST will now have accepted the device data. The save button on the toolbar will be enabled, as will the Save option in the Device menu. Review the data (it can still be changed at this stage), then save your data. FTD2XXST will save the device data, and change to Program mode. Several new options will now be enabled on the toolbar.

Click on the Program button (or select Program from the Device menu) to write the data into the EEPROM. The serial number generated by FTD2XXST for the device will be displayed in the log window:-
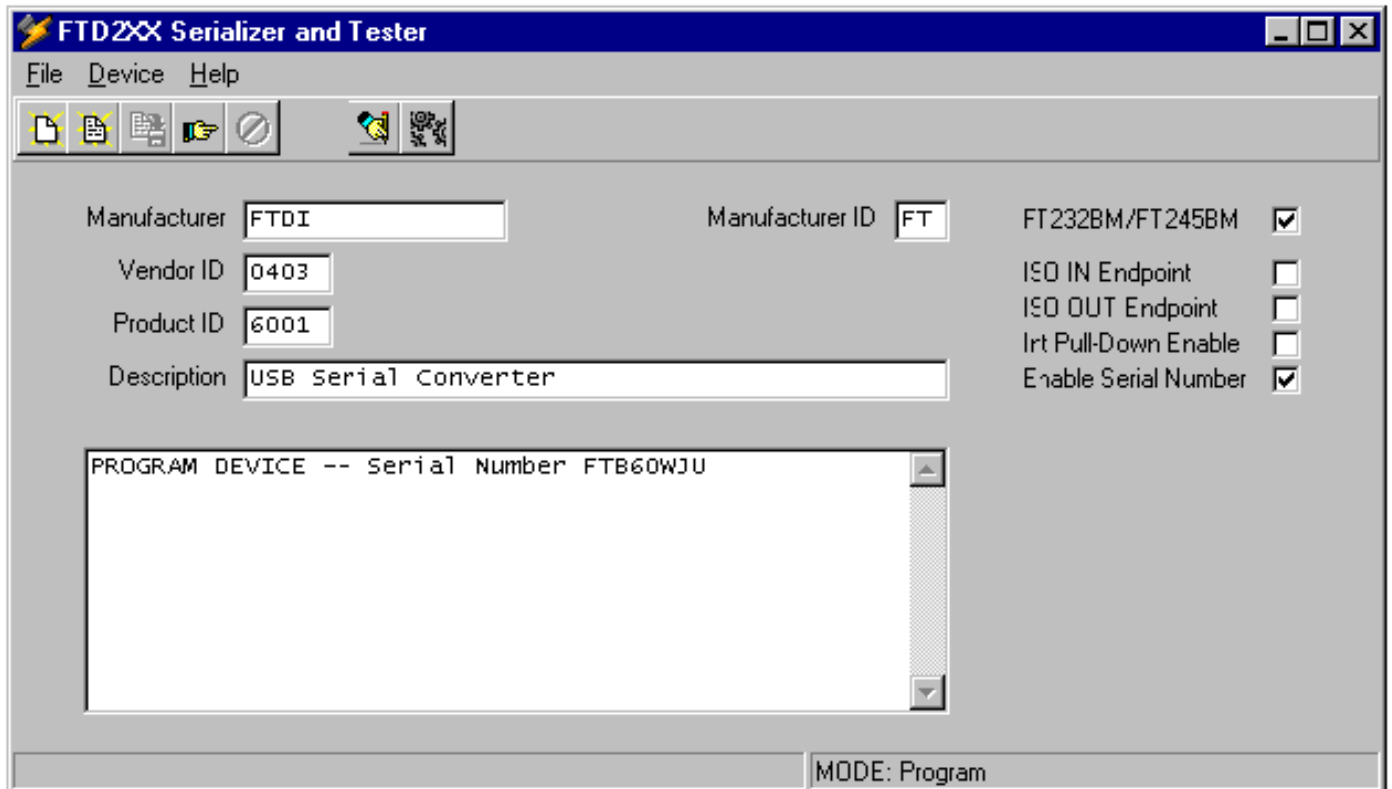
Your device has now been programmed.

Edit Fields

This section describes the data format of each field.

Manufacturer

This is an alphanumeric field whose length should be >= 2. The combined length of the Manufacturer and Description fields must be <= 38 characters.

Manufacturer ID

This is an alphanumeric field of length = 2. The value can be any 2 characters, and will be used for the first two characters of the device serial number.

Vendor ID

The manufacturers USB Vendor ID. Hexadecimal field of length = 4.

Product ID

USB Product ID allocated by the manufacturer. Hexadecimal field of length = 4.

Description

Alphanumeric field. In Windows the text used here will be displayed by the add new hardware wizard when the device is first connected to the system.

Toolbar Function Buttons

New

Input new device data. Selecting new will clear all of the fields, and switch FTD2XXST into Edit Mode. All functions on the toolbar will be disabled. The user must complete the Manufacturer, Manufacturer ID, Vendor ID, Product ID, and description fields, run the advanced setup dialogue window, then save the device data. Once new data has been saved FTD2XXST will return to Program Mode.
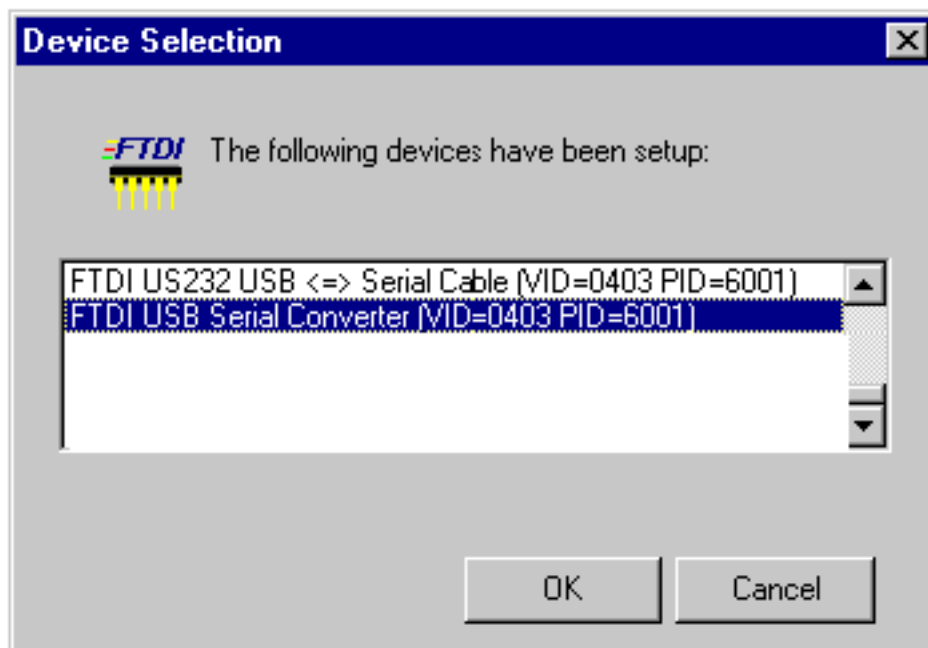
Cancel Edit

At Any Time before new device data has been saved, the user can cancel by selecting the Cancel Edit button on the toolbar. The current data will be lost, and FTD2XXST will return to program mode and the previous device data will be loaded.

Open

This will retrieve previously saved device data. A device selection dialogue window will open:-

To retrieve the device data, select the required device, and click OK. The fields will now contain the retrieved data. FTD2XXST will still be in program mode, and is ready to write the retrieved data to the device.

Save

The current device data is saved, and FTD2XXST will switch into Program mode.

Advanced Setup

This will display the advanced setup dialogue window. Allows the user to check and change the advanced device settings before saving the device data.

Program

Program the device. FTD2XXST will generate a serial number, format it together with the current device data, and then write it to the EEPROM.

Test

Test the device. This option is designed for testing a FTDI USB serial port by connecting a special Y-shaped loopback cable to com 1 and com 2 (legacy serial ports) on the host PC. See appendix 1 for the required connections.

The test results are displayed in the following format:-

```
Manufacturer:      FTDI
DeviceID:          VID_0403&PID_8372
Description:       USB Serial Converter
SerialNumber:      FTHXDTGA

CTS Test                    PASS
DSR Test                    PASS
CD Test                     PASS
RI Test                     PASS
Rx/Tx at 300 Baud           PASS
Rx/Tx at 115200 Baud        PASS

DEVICE PASSED
```

Of course a failure is listed with the string ''Fail''.
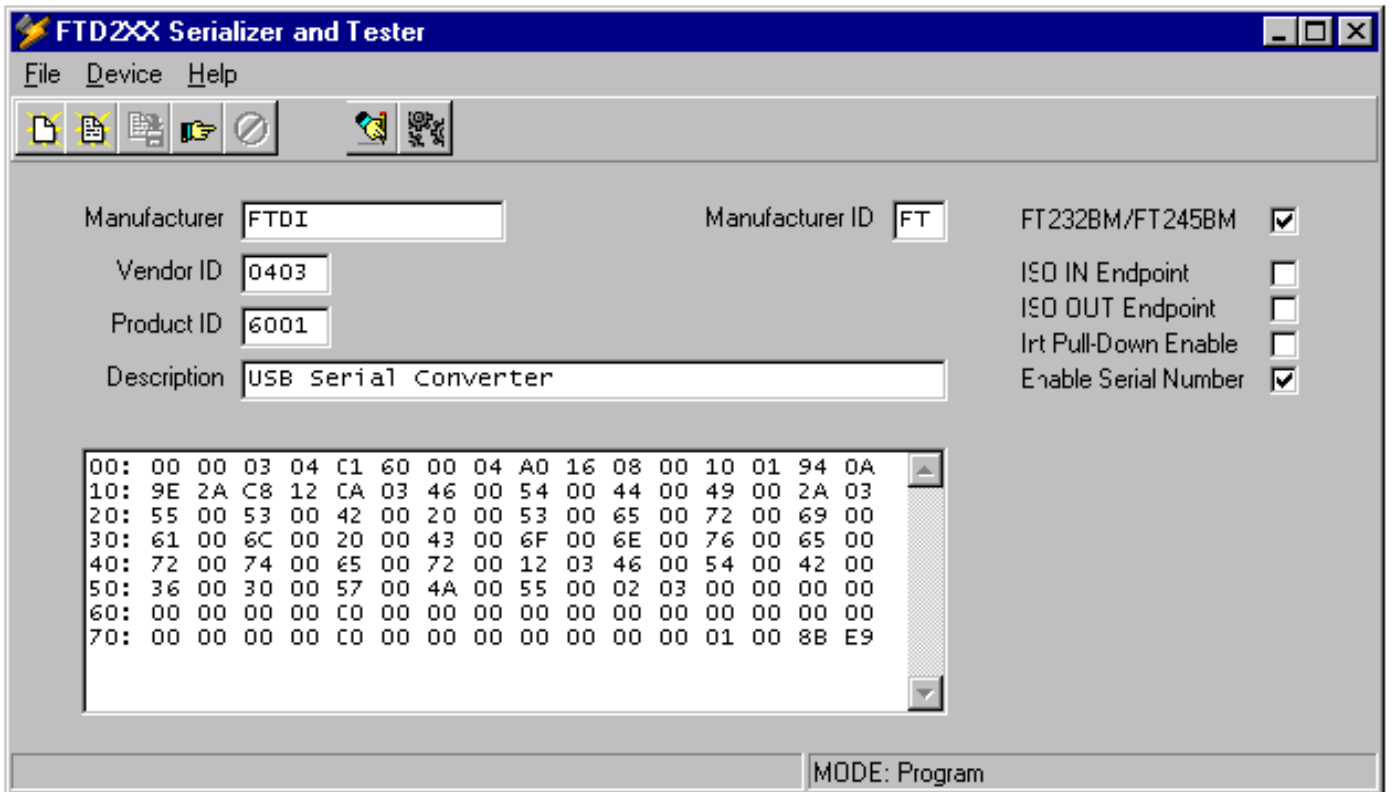
Additional Functions

This section described the additional functions available in the Device menu.

Test Modem

This function must be used by modem developers instead of the toolbar Test option.
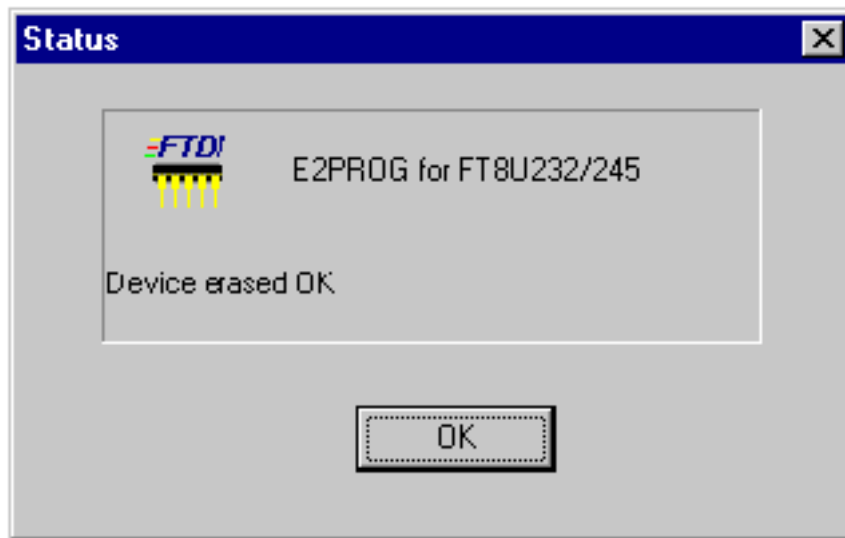
Read

This will read the contents of the EEPROM and display it in hexadecimal format in the log window:-

Erase

Erase the contents of the EEPROM. The following status message will be displayed if successful:-

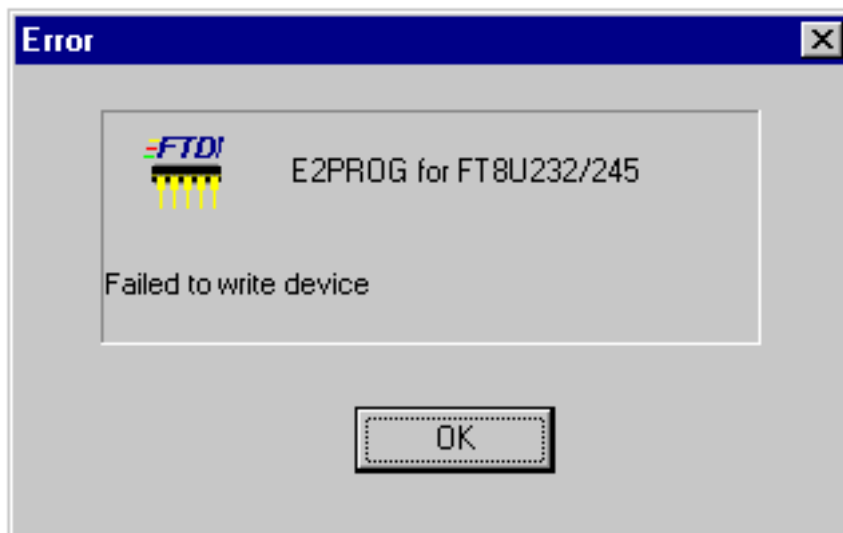If you now do a **Read** the hexadecimal data displayed will be all FF's.

Error Messages

This section describes the error messages generated by FTD2XXST. In all cases click OK to exit the Error dialogue window.

Failed to Open Device

This error will be generated if the FTDI chip cannot be detected by FTD2XXST.

Failed to Write Device

FTD2XXST writes data to the EEPROM, then reads it back to confirm that the EEPROM data has been programmed properly. This error signifies that the confirm check has failed.

This error will be generated if write to the EEPROM has failed for some reason, or the EEPROM cannot be seen by the FTDI chip.

This message will also be generated if the EEPROM is configured for bytes (x8) rather than words (x16).

Appendix 1 - Test Cable

In addition to serialising the EEPROM used in FT232 and FT245 based products FTD2XXST can be used to test serial RS232 operation on products which implement a USB to RS232 link. This requires a special Y-shaped cable, and a PC with two hardware serial ports. Please note that the test feature will fail of this cable is not fitted. The construction of this cable is detailed below:-

25 pin connector

Test cable = 25 pin female to 2 x 9 pin female (COM1 and COM2)

USB ⇔	Serial Pin 2 (TXD)	to	COM2 Pin 2 (RXD)
USB ⇔	Serial Pin 3 (RXD)	to	COM2 Pin 3 (TXD)
USB ⇔	Serial Pin 4 (RTS)	to	COM2 Pin 8 (CTS)
USB ⇔	Serial Pin 5 (CTS)	to	COM2 Pin 7 (RTS)
USB ⇔	Serial Pin 6 (DSR)	to	COM2 Pin 4 (DTR)
USB ⇔	Serial Pin 7 (GND)	to	COM2 Pin 5 (GND)
USB ⇔	Serial Pin 20 (DTR)	to	COM2 Pin 6 (DSR)
USB ⇔	Serial Pin 8 (CDET)	to	COM1 Pin 4 (DTR)
USB ⇔	Serial Pin 22 (RI)	to	COM1 Pin 7 (RTS)

9 pin connector

Test cable = 9 pin female to 2 x 9 pin female (COM1 and COM2)

USB ⇔	Serial Pin 3 (TXD)	to	COM2 Pin 2 (RXD)
USB ⇔	Serial Pin 2 (RXD)	to	COM2 Pin 3 (TXD)
USB ⇔	Serial Pin 7 (RTS)	to	COM2 Pin 8 (CTS)
USB ⇔	Serial Pin 8 (CTS)	to	COM2 Pin 7 (RTS)
USB ⇔	Serial Pin 6 (DSR)	to	COM2 Pin 4 (DTR)
USB ⇔	Serial Pin 5 (GND)	to	COM2 Pin 5 (GND)
USB ⇔	Serial Pin 4 (DTR)	to	COM2 Pin 6 (DSR)
USB ⇔	Serial Pin 1 (CDET)	to	COM1 Pin 4 (DTR)
USB ⇔	Serial Pin 9 (RI)	to	COM1 Pin 7 (RTS)

Appendix 2 - Editing Driver .INF Files

If you change the PID and / or VID used by your device in the EEPROM, you will need to edit the driver .inf files to reflect these changes. Look for any lines which have a reference to VID_0403&PID_6001. A good idea is to use the "Find" option from the "search" menu to look for PID_6001. Change all lines which reference VID_0403&PID_6001 to the appropriate values.

You can also change the text which is used for the FTDI device in the device manager and in "add / remove programs" by editing the driver.inf files.

VCP Drivers

There are two .INF files in the VCP driver, ftdibus.inf and ftdiport.inf.

ftdibus.inf

HKLM,%WINUN%\FTDICOMM , "DisplayName",,"FTDI USB-to-Serial Converter Drivers"
HKLM,%WINUN%\FTDICOMM , "DisplayName",,"FTDI USB Serial Converter Drivers"

These lines contain the text used to describe the FTDI device drivers in Add / Remove Programs, in Windows 98 / ME and Win 2000 / XP respectivly.

USB\VID_0403&PID_6001.DeviceDesc="USB High Speed Serial Converter"

This line contains a reference to the default VID and PID, and the description used for the FTDI bus driver which will appear in the device manager, under Universal Serial Bus Controllers.

ftdiport.inf

VID_0403&PID_6001.DeviceDesc="USB Serial Port"

This line contains a reference to the default VID&PID, and the description used for the FTDI port driver which will appear in the device manager, under the heading Ports (Com & LPT).

ftdiunin.ini and ftdiun2k.ini

The .ini driver files are used by our uninstaller. Both contain a reference to the VID and PID.

Device=VID_0403&PID_6001

D2XX Direct Drivers

The D2XX driver contains one .inf file, **ftd2xx.inf**. Again, all references to VID_0403&PID_6001 should be changed to the appropriate values.

The line:-

HKLM,%WINUN%\FTD2XX , "DisplayName",,"FTDI FTD2XX USB Drivers"

contains the text used to describe the D2XX drivers in Add / Remove Programs.

USB\VID_0403&PID_6001.DeviceDesc="FTDI FT8U2XX Device"

This line contains the description used to describe the device which will appear in the device manager.

Ftd2xxun.ini

This D2XX driver file is used by the uninstaller. It contains a reference to the VID and PID.

Device=VID_0403&PID_6001