

**Future Technology Devices  
International Ltd.**

## **AN232B-10 Advanced Driver Options**

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## 1 Introduction

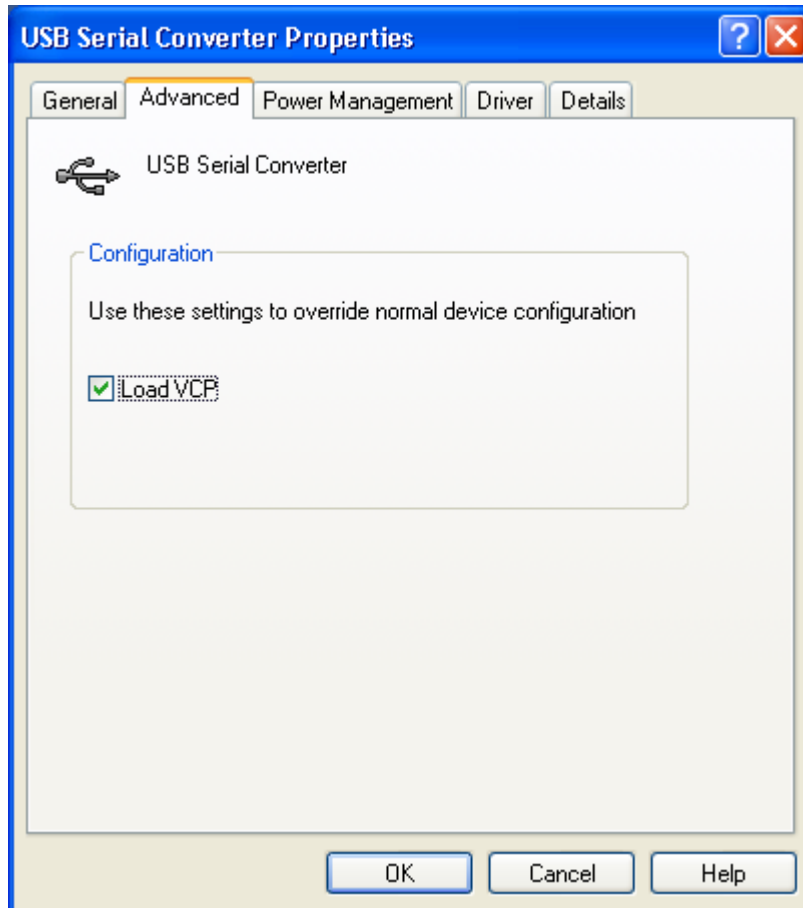
This application note describes advanced driver settings and operations for FTDI's CDM Windows driver. This is intended to be a reference for experienced engineers developing products incorporating FTDI devices and drivers who are experts with FTDI devices.

If you are unsure about any of the features described in this document, please do not change any of your driver files or registry settings and seek assistance from [FTDI Support](#)<sup>47</sup>.

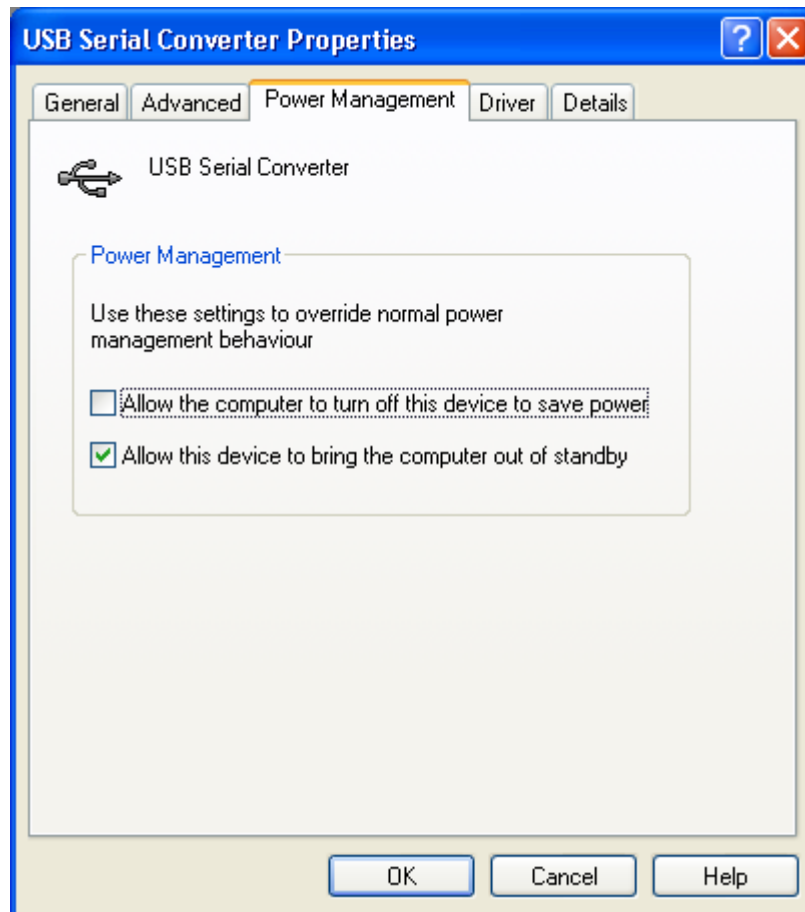
## 2 CDM USB Serial Converter Properties Page

With the CDM driver, a property page is now available for the USB Serial Converter driver. This is at the same level as the original D2XX driver. Two tabs are supported: Advanced and Power Management.

In the case of FT232R, FT245R and FT2232C devices, the driver type is determined by a setting in the device EEPROM. The Advanced tab allows the user to override any EEPROM settings to select the driver type. The EEPROM settings can be overridden using the check box shown below:



The Power Management tab controls remote wake-up and sleep conditions. The Power Management tab appears as shown here:



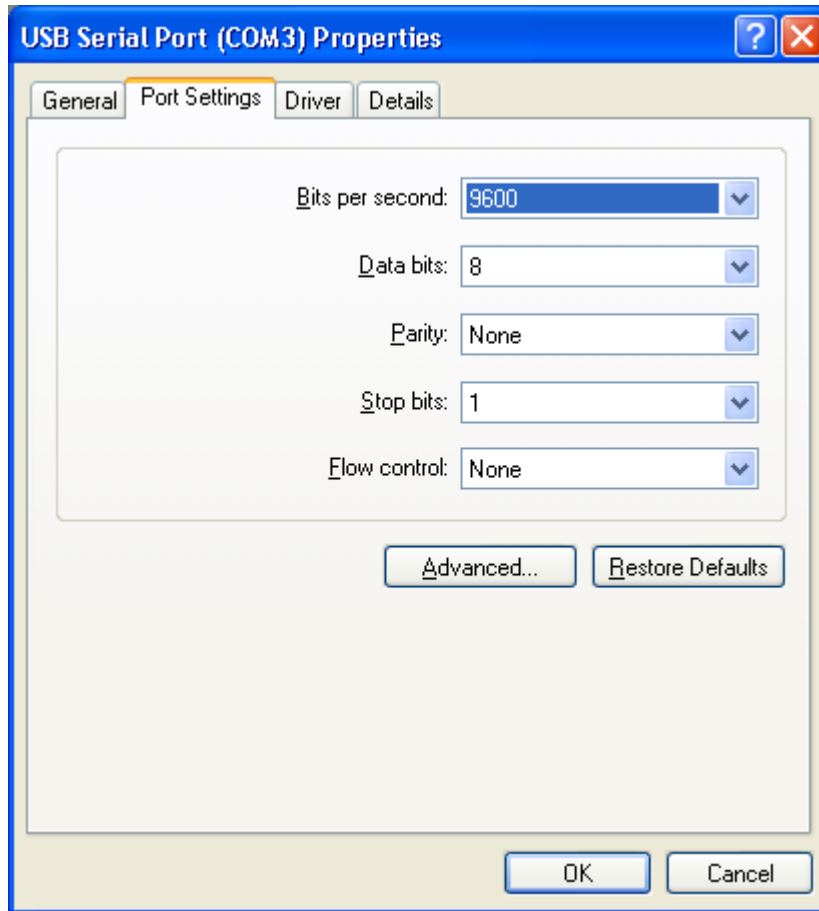
A check box is available to indicate that the device can bring the computer out of standby, but this is only selectable if the device EEPROM is configured to enable the remote wake-up capability.

A second check box is available to allow the computer to turn the device off to save power. In systems where the sleep state is S3, the device will be turned off and remote wake-up will not be available. If this box is not checked, remote wake-up is enabled and the sleep state is S3, the device may prevent the system going into suspend. If both check boxes are checked, remote wake-up will be enabled for sleep state S1 (provided the device EEPROM is configured correctly) but remote wake-up will be overridden for sleep state S3.

These options can also be configured as default values via the FTDIBUS.INF file before installation as indicated in [FTDIBUS.INF Options](#)<sup>[12]</sup>.

### 3 CDM COM Port Advanced Properties Page

An advanced properties page is available for devices using VCP drivers. To access the advanced properties page in Windows 2000 or Windows XP, go to "Control Panel > System" then select the "Hardware" tab and click "Device Manager...". Find the USB serial port you want to change the properties of and right-click on it. Select "Properties" from the menu then select the "Port Settings" tab to get the window below.



This page allows configuration of the basic device parameters (i.e. Baud rate, data bits, parity, stop bits and flow control). To access more advanced settings, click on the "Advanced..." button to display the advanced properties page (shown below).

**Advanced Settings for COM3**

COM Port Number: COM3

**USB Transfer Sizes**

Select lower settings to correct performance problems at low baud rates.  
Select higher settings for faster performance.

Receive (Bytes): 4096

Transmit (Bytes): 4096

**BM Options**

Select lower settings to correct response problems.

Latency Timer (msec): 16

**Timeouts**

Minimum Read Timeout (msec): 0

Minimum Write Timeout (msec): 0

**Miscellaneous Options**

Serial Enumerator ☒

Serial Printer ☐

Cancel If Power Off ☐

Event On Surprise Removal ☐

Set RTS On Close ☐

Disable Modem Ctrl At Startup ☐

OK Cancel Defaults

This page will allow the following parameters to be altered:

- COM port number
- USB buffer sizes
- Latency timer value
- Read and write timeout values
- Miscellaneous options

These options can also be configured as default values via the FTDI\PORT.INF file before installation as indicated in [FTDI\PORT.INF Options](#)<sup>[22]</sup>. The miscellaneous options are covered in [Miscellaneous Options](#)<sup>[28]</sup>.



## **4 Modification of INF/INI Files for Non-Default VID and PID Values**

In order to use FTDI drivers with devices that are identified by a VID and PID combination other than FTDI's VID and the device default PID, the driver INF and INI files must be modified to match the desired VID and PID combination. The following sections indicate which references must be modified for the drivers to function correctly with alternative VIDs and PIDs.

There is also some useful information on the modification of INF/INI files for custom VID and PID values in the MProg user manual which is available from the [FTDI Knowledgebase](#).

## 4.1 FTDIBUS.INF

In order that Windows successfully match a device with the driver, the VID and PID programmed into the device must be listed in the driver INF file. The following sections of FTDIBUS.INF must be amended to match the desired VID and PID combination:

```
[FtdiHw]
%USB\VID_0403&PID_6001.DeviceDesc%=FtdiBus,USB\VID_0403&PID_6001
```

or for x64 drivers:

```
[FtdiHw.NTamd64]
%USB\VID_0403&PID_6001.DeviceDesc%=FtdiBus,USB\VID_0403&PID_6001
```

Also, in the case of the FTDIBUS.INF file FT2232C devices must have each interface listed as follows:

```
[FtdiHw]
%USB\VID_0403&PID_6010&MI_00.DeviceDesc%=FtdiBus,USB\VID_0403&PID_6010&MI_00
%USB\VID_0403&PID_6010&MI_01.DeviceDesc%=FtdiBus,USB\VID_0403&PID_6010&MI_01
```

or for x64 drivers:

```
[FtdiHw.NTamd64]
%USB\VID_0403&PID_6010&MI_00.DeviceDesc%=FtdiBus,USB\VID_0403&PID_6010&MI_00
%USB\VID_0403&PID_6010&MI_01.DeviceDesc%=FtdiBus,USB\VID_0403&PID_6010&MI_01
```

The device description string may be modified to display a custom device port name in the device manager if so desired in the section listed below:

```
[Strings]
USB\VID_0403&PID_6001.DeviceDesc="USB Serial Converter"
```

and for FT2232C devices:

```
[Strings]
USB\VID_0403&PID_6010&MI_00.DeviceDesc="USB Serial Converter A"
USB\VID_0403&PID_6010&MI_01.DeviceDesc="USB Serial Converter B"
```

A sample FTDIBUS.INF file is included in the appendix for [x86 \(32-bit\)](#)<sup>[48]</sup> and [x64 \(64-bit\)](#)<sup>[50]</sup> systems.

## 4.2 FTDIPOINT.INF

In addition to the modifications made to the FTDIBUS.INF file to accommodate driver matching, the following entries in the FTDIPOINT.INF file must be changed to match the VID and PID combination:

```
[FtdiHw]
%VID_0403&PID_6001.DeviceDesc%=FtdiPort232,FTDIBUS\COMPORT&VID_0403&PID_6001
```

or for x64 drivers:

```
[FtdiHw.NTamd64]
%VID_0403&PID_6001.DeviceDesc%=FtdiPort,FTDIBUS\COMPORT&VID_0403&PID_6001
```

In the case of the FTDIPOINT.INF file, separate entries are not needed for each interface of FT2232C devices as each port of the FT2232C is supported by the same entry:

```
[FtdiHw]
%VID_0403&PID_6010.DeviceDesc%=FtdiPort232,FTDIBUS\COMPORT&VID_0403&PID_6010
```

or for x64 drivers:

```
[FtdiHw.NTamd64]
%VID_0403&PID_6010.DeviceDesc%=FtdiPort,FTDIBUS\COMPORT&VID_0403&PID_6010
```

The device description string may be modified to display a custom device port name in the device manager if so desired in the section listed below:

```
[Strings]
VID_0403&PID_6001.DeviceDesc="USB Serial Port"
```

A sample FTDIPOINT.INF file is included in the appendix for [x86 \(32-bit\)](#)<sup>[52]</sup> and [x64 \(64-bit\)](#)<sup>[55]</sup> systems.

## 4.3 FTDIUN2K.INI

The following section of the FTDIUN2K.INI must be amended to allow for uninstalling the new device ID using the FTDI uninstaller via "Control Panel > Add/Remove Programs":

```
[Uninstall]
Device=VID_0403&PID_6001
```

If multiple device are listed in the installation INF, they can be listed sequentially in the uninstallation INI files as follows:

```
[Uninstall]
Device=VID_0403&PID_6001,VID_0403&PID_6010
```

A sample FTDIUN2K.INI file is included in the [appendix](#)<sup>58</sup>.

## 5 FTDIBUS.INF Options

Some default configuration options are configurable through FTDIBUS.INF. This section describes the options available and how to implement them.

## 5.1 Adjusting the Reset Pipe Retry Count

In some rare cases, it may be necessary to increase the number of times the driver tries to reset a USB pipe on which an error has occurred, for example in noisy environments where a lot of USB errors occur.

The default value for the reset pipe request retry count is 50. This default value may be changed in the FTDIBUS.INF file by editing or including the following fragment.

```
[FtdiBus.NT.AddService]
AddReg = FtdiBus.NT.AddService.AddReg

[FtdiBus.NT.AddService.AddReg]
HKR,Parameters,"RetryResetCount",0x00010001,100
```

or for x64 drivers:

```
[FtdiBus.NTamd64.AddService]
AddReg = FtdiBus.NT.AddService.AddReg

[FtdiBus.NTamd64.AddService.AddReg]
HKR,Parameters,"RetryResetCount",0x00010001,100
```

In this example fragment, the reset pipe request is set to 100.

This value is held in the registry key located at

HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\FTDIBUS\Parameters\RetryReset  
Count

## 5.2 Using Location IDs

In some application areas it may be desirable to install devices by physical location rather than serial number. In these instances, this may be accomplished by using the LocIds entry in the driver INF file.

The driver uses LocIds to define the set of USB ports supported. It can be used in systems that require only certain USB ports to be available, perhaps in conjunction with [MaxDevices](#)<sup>[16]</sup>. The default behaviour is that all USB ports are supported. The default can be overridden by including LocIds in the FTDIBUS.INF service key section.

```
[FtdiBus.NT.AddService]
AddReg = FtdiBus.NT.AddService.AddReg

[FtdiBus.NT.AddService.AddReg]
HKR,Parameters,"LocIds",1,21,00,00,00,32,00,00,00,11,00,00,00,00
```

or for x64 drivers:

```
[FtdiBus.NTamd64.AddService]
AddReg = FtdiBus.NT.AddService.AddReg

[FtdiBus.NTamd64.AddService.AddReg]
HKR,Parameters,"LocIds",1,21,00,00,00,32,00,00,00,11,00,00,00,00
```

In this example INF file fragment, three USB ports are supported. Location ID 0x00000021 represents host controller 1 port 1. Location ID 0x00000032 represents host controller 2 port 2. Location ID 0x00000011 represents host controller 0 port 1.

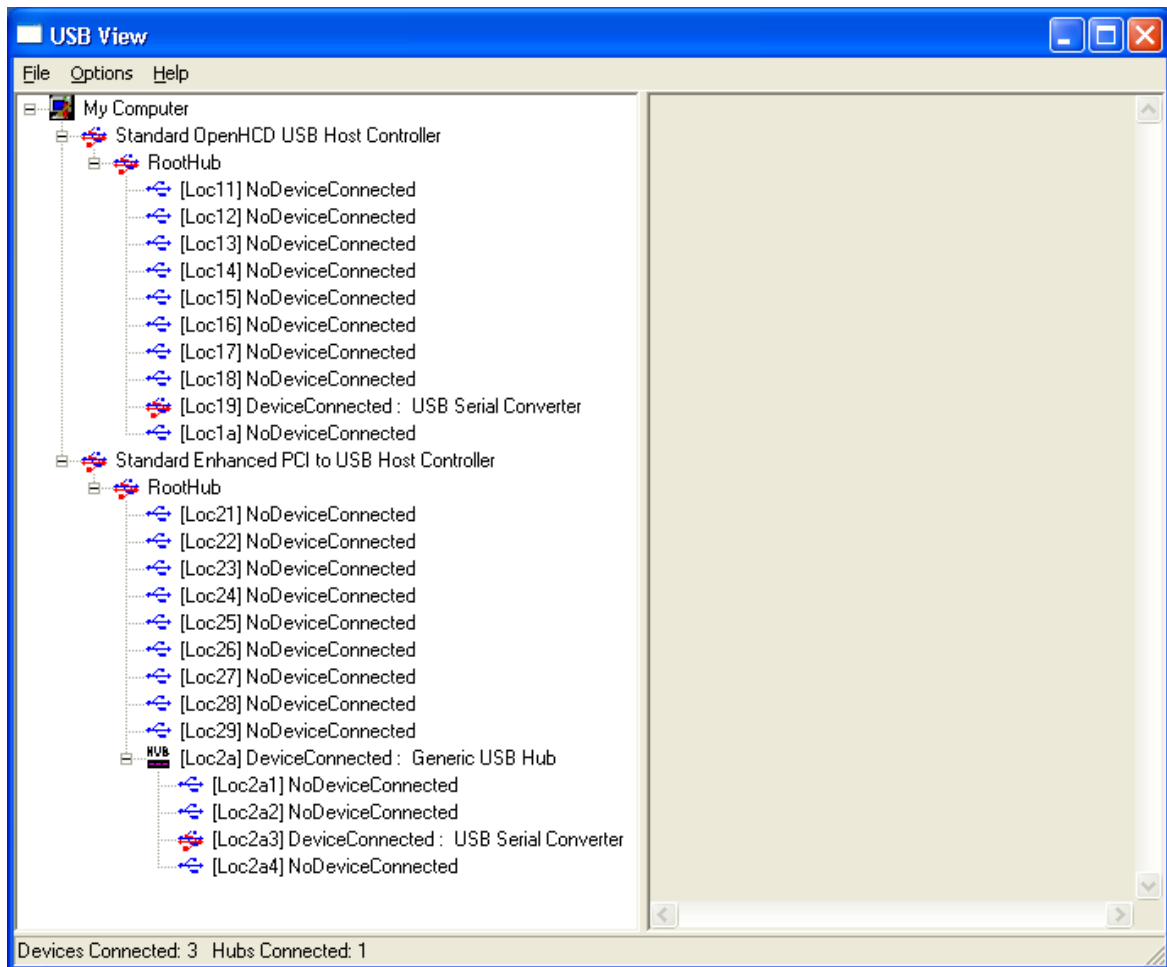
This value is held in the registry key located at

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\FTDIBUS\Parameters\LocIds
```

**Note that setting LocIds will radically alter the behaviour of the driver; please contact FTDI if you think you have to change LocIds.**

Location IDs can be obtained using the latest version of the USBView utility available from the [Utilities](#) section of the [FTDI website](#). An application note on location IDs [AN232B-07 Configuring FTDI's VCP Drivers to use Location ID's](#) is also available.

USBView can be configured to show location IDs by selecting Options > Location IDs. The screen shot below shows a PC with a hub connected to location 0x0000002A and devices connected at locations 0x00000019 and 0x00002A3.



The INF entries for the devices connected to these ports would be

```
[FtdiBus.NT.AddService.AddReg]
HKR,Parameters,"LocIds",1,19,00,00,00,2A,03,00,00,00
```

or for x64 drivers:

```
[FtdiBus.NTamd64.AddService.AddReg]
HKR,Parameters,"LocIds",1,19,00,00,00,2A,03,00,00,00
```

Please note that the INF entry must end with an additional 00 entry to terminate the location ID list.

If an attempt is made to install a device at a location that is not supported, a Code 10 error ("This device cannot start") is generated for the new device.



### 5.3 Limiting the Number of COM Ports That Can Be Installed

The number of FTDI virtual COM ports that may be installed in a system can be limited by setting the MaxDevs parameter. MaxDevs defaults to 0, meaning that the feature is disabled and the driver will always attempt to create a COM port. The default can be overridden by including a non-zero MaxDevs value in the FTDIBUS.INF service key section.

```
[FtdiBus.NT.AddService]
AddReg = FtdiBus.NT.AddService.AddReg
```

```
[FtdiBus.NT.AddService.AddReg]
HKR,Parameters,"MaxDevs",0x00010001,3
```

or for x64 drivers:

```
[FtdiBus.NTamd64.AddService]
AddReg = FtdiBus.NT.AddService.AddReg
```

```
[FtdiBus.NTamd64.AddService.AddReg]
HKR,Parameters,"MaxDevs",0x00010001,3
```

In this example INF file fragment, the maximum number of devices is set to 3.

This value is held in the registry key located at

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\FTDIBUS\Parameters\MaxDevs
```

If an attempt is made to install more than MaxDevs devices, a Code 10 error ("This device cannot start") is generated for the new device.

**Note that setting MaxDevs to a value other than zero will radically alter the behaviour of the driver; please contact FTDI if you think you have to change MaxDevs.**

## 5.4 Override EEPROM Driver Setting

In the case of FT232R, FT245R and FT2232C devices, the driver will read the device EEPROM to determine whether to expose a COM port or not. The earlier BM and AM series devices do not have an EEPROM setting for driver type, so will default to installing a COM port. This feature can be turned off and the choice of driver to load can be made through a setting in the installation file.

For a standard installation, the following sections can be added to FTDIBUS.INF to override the EEPROM configuration and load the VCP driver:

```
[FtdiBus.NT.HW]
AddReg=FtdiBus.NT.HW.AddReg

[FtdiBus.NT.HW.AddReg]
HKR,, "ConfigData", 0x00010001, 4
```

or for x64 drivers:

```
[FtdiBus.NTamd64.HW]
AddReg=FtdiBus.NTamd64.HW.AddReg

[FtdiBus.NTamd64.HW.AddReg]
HKR,, "ConfigData", 0x00010001, 4
```

Bit 2 of the ConfigData parameter determines the driver to be loaded: if it is set to 1, the VCP driver is loaded (as in the above example); otherwise, only the D2XX driver is loaded. Therefore, adding the above sections to the installation file, and in particular setting the value of ConfigData to 4, will cause the VCP driver to be loaded regardless of the EEPROM settings.

This method can be extended for the dual channel FT2232C device. In this case, new sections have to be created for each channel to allow the channels to be configured and installed separately. The following fragments show the additional changes that are necessary to configure channel A to load the D2XX driver only, and channel B to load the VCP driver.

```
[FtdiHw]
%USB\VID_0403&PID_6010&MI_00.DeviceDesc%=FtdiBusA,USB\VID_0403&PID_6010&MI_00
%USB\VID_0403&PID_6010&MI_01.DeviceDesc%=FtdiBusB,USB\VID_0403&PID_6010&MI_01

[FtdiBusA.NT]
CopyFiles=FtdiBus.NT.Copy,FtdiBus.NT.Copy2
AddReg=FtdiBus.NT.AddReg,FtdiBusUnInst.NT.Reg

[FtdiBusA.NT.HW]
AddReg=FtdiBusA.NT.HW.AddReg

[FtdiBusA.NT.HW.AddReg]
HKR,, "ConfigData", 0x00010001, 0

[FtdiBusA.NT.Services]
AddService = FTDIBUS, 0x00000002, FtdiBus.NT.AddService

[FtdiBusB.NT]
CopyFiles=FtdiBus.NT.Copy,FtdiBus.NT.Copy2
AddReg=FtdiBus.NT.AddReg,FtdiBusUnInst.NT.Reg

[FtdiBusB.NT.HW]
AddReg=FtdiBusB.NT.HW.AddReg

[FtdiBusB.NT.HW.AddReg]
HKR,, "ConfigData", 0x00010001, 4
```

```
[FtdiBusB.NT.Services]
AddService = FTDIBUS, 0x00000002, FtdiBus.NT.AddService
```

or for x64 drivers:

```
[FtdiHw.NTamd64]
%USB\VID_0403&PID_6010&MI_00.DeviceDesc%=FtdiBusA,USB\VID_0403&PID_6010&MI_00
%USB\VID_0403&PID_6010&MI_01.DeviceDesc%=FtdiBusB,USB\VID_0403&PID_6010&MI_01
```

```
[FtdiBusA.NTamd64]
CopyFiles=FtdiBus.NTamd64.Copy,FtdiBus.NTamd64.Copy2
AddReg=FtdiBus.NTamd64.AddReg,FtdiBusUnInst.NTamd64.Reg
```

```
[FtdiBusA.NTamd64.HW]
AddReg=FtdiBusA.NTamd64.HW.AddReg
```

```
[FtdiBusA.NTamd64.HW.AddReg]
HKR,, "ConfigData", 0x00010001, 0
```

```
[FtdiBusA.NTamd64.Services]
AddService = FTDIBUS, 0x00000002, FtdiBus.NTamd64.AddService
```

```
[FtdiBusB.NTamd64]
CopyFiles=FtdiBus.NTamd64.Copy,FtdiBus.NTamd64.Copy2
AddReg=FtdiBus.NTamd64.AddReg,FtdiBusUnInst.NTamd64.Reg
```

```
[FtdiBusB.NTamd64.HW]
AddReg=FtdiBusB.NTamd64.HW.AddReg
```

```
[FtdiBusB.NTamd64.HW.AddReg]
HKR,, "ConfigData", 0x00010001, 4
```

```
[FtdiBusB.NTamd64.Services]
AddService = FTDIBUS, 0x00000002, FtdiBus.NTamd64.AddService
```

Note that the value of ConfigData is set to 0 for channel A (D2XX) and the value of ConfigData is set to 4 for channel B (VCP) to achieve the required configuration. Of course, if ConfigData is not included in the installation file, the EEPROM settings will determine which driver is loaded.

The ConfigData parameter is held in the registry under the key

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\USB\{Device VID, PID and
interface}\{Serial number}\DeviceParameters\ConfigData
```

The COM port can also be suppressed after installation through the Advanced tab of the [USB Serial Converter properties page](#)<sup>4</sup> which is available through the device manager.

## 5.5 Power Management Options

FTDI devices can support remote wake-up as long as the feature is enabled in the device EEPROM. The driver can be made to ignore any EEPROM settings for remote wake-up by setting bit 4 of the ConfigData field in FTDIBUS.INF as shown below:

```
[FtdiBus.NT.HW]
AddReg=FtdiBus.NT.HW.AddReg

[FtdiBus.NT.HW.AddReg]
HKR,, "ConfigData", 0x00010001, 16
```

or for x64 drivers:

```
[FtdiBus.NTamd64.HW]
AddReg=FtdiBus.NTamd64.HW.AddReg

[FtdiBus.NTamd64.HW.AddReg]
HKR,, "ConfigData", 0x00010001, 16
```

which corresponds to the registry entry

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\USB\{Device VID, PID and
interface}\{Serial number}\DeviceParameters\ConfigData
```

In addition, it is possible to specify that the system should be able to turn the device off to save power. This can be enabled by setting bit 3 of the ConfigData field in FTDIBUS.INF as follows:

```
[FtdiBus.NT.HW]
AddReg=FtdiBus.NT.HW.AddReg

[FtdiBus.NT.HW.AddReg]
HKR,, "ConfigData", 0x00010001, 8
```

or for x64 drivers:

```
[FtdiBus.NTamd64.HW]
AddReg=FtdiBus.NTamd64.HW.AddReg

[FtdiBus.NTamd64.HW.AddReg]
HKR,, "ConfigData", 0x00010001, 8
```

which corresponds to the registry entry

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\USB\{Device VID, PID and
interface}\{Serial number}\DeviceParameters\ConfigData
```

These options are also configurable after installation through the Power Management tab of the [USB Serial Converter properties page](#)<sup>[4]</sup> which is available through the device manager.

## 5.6 USB Timeout

The USB timeout is the maximum time in milliseconds that a USB request can remain outstanding. It is unlikely that this will ever need to be changed from the 5000ms default value.

This USB timeout (in milliseconds) is configurable through the FTDIBUS INF file in the INF fragments shown below:

```
[FtdiBus.NT.HW]
AddReg=FtdiBus.NT.HW.AddReg

[FtdiBus.NT.HW.AddReg]
HKR,, "USBTimeout", 0x00010001, 5000
```

or for x64 drivers:

```
[FtdiBus.NTamd64.HW]
AddReg=FtdiBus.NTamd64.HW.AddReg

[FtdiBus.NTamd64.HW.AddReg]
HKR,, "USBTimeout", 0x00010001, 5000
```

which corresponds to the registry entry

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\USB\{Device VID, PID and
interface}\{Serial number}\DeviceParameters\USBTimeout
```

The default value for the USB Timeout is 5 seconds (5000ms).

## 5.7 Disable EEPROM Writes

In some cases, it may be desirable to disable the ability to write to the device EEPROM. This can be accomplished through a ConfigData bit in the FTDIBUS INF file.

The driver can be made to ignore any EEPROM write requests by setting bit 0 of the ConfigData field as shown in the INF fragment below:

```
[FtdiBus.NT.HW]
AddReg=FtdiBus.NT.HW.AddReg
```

```
[FtdiBus.NT.HW.AddReg]
HKR,, "ConfigData", 0x00010001, 1
```

or for x64 drivers:

```
[FtdiBus.NTamd64.HW]
AddReg=FtdiBus.NTamd64.HW.AddReg
```

```
[FtdiBus.NTamd64.HW.AddReg]
HKR,, "ConfigData", 0x00010001, 1
```

which corresponds to the registry key

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\USB\{Device VID, PID and
interface}\{Serial number}\DeviceParameters\ConfigData
```

## 6 FTDIPORT.INF Options

There are many configuration options available through FTDIPORT.INF. This section describes these options and how to configure them.

## 6.1 Aliasing Baud Rates

FTDI devices can support non-standard Baud rates. It is not necessary to alias Baud rates to achieve this, but in cases where the application software tries to set a standard Baud rate and a non-standard Baud rate is desired, this can be achieved by aliasing non-standard baud rates.

Baud rates are calculated using a Baud rate divisor. The file FTDIPIPORT.INF contains entries that are used as the divisors for standard baud rates. By changing these it is possible to alias standard baud rates with non-standard values - for instance replacing 115k Baud with 512k Baud. Users would then set up the device to operate at 512k Baud by selecting 115k Baud for the USB serial port.

The procedure for calculating Baud rate divisors is described fully in application note [AN232B-05 Configuring FT232R, FT2232C and FT232BM Baud Rates](#).

The FT8U232AM device supports sub-integer divisors of 0, 0.5, 0.25 and 0.125 only. These values can be configured through a Baud rate divisor table with two elements to define a Baud rate. The extract below from FTDIPIPORT.INF gives an example of the Baud rate table for standard Baud rates for the FT8U232AM device. Note that the Baud rate table is one line in the INF.

```
[FtdiPort232.NT.HW.AddReg]
HKR,, "ConfigData", 1, 01, 00, 3F, 3F, 10, 27, 88, 13, C4, 09, E2, 04, 71, 02, 38, 41, 9C, 80, 4E, C0, 34, 00, 1A, 00, 0D, 00, 06, 40, 03, 80, 00, 00, D0, 80
```

or for x64 drivers:

```
[FtdiPort232.NTamd64.HW.AddReg]
HKR,, "ConfigData", 1, 01, 00, 3F, 3F, 10, 27, 88, 13, C4, 09, E2, 04, 71, 02, 38, 41, 9C, 80, 4E, C0, 34, 00, 1A, 00, 0D, 00, 06, 40, 03, 80, 00, 00, D0, 80
```

In the case of the FT232R, FT2232C and FT232BM devices, sub-integer divisors of 0, 0.5, 0.25, 0.125, 0.375, 0.625, 0.75 and 0.875 are supported. This requires that the Baud rate table be extended to four elements per Baud rate as indicated below. This example extract shows the four-element Baud rate table for standard Baud rates. As with the original divisors, note that the Baud rate table is one line in the INF.

```
[FtdiPort232.NT.HW.AddReg]
HKR,, "ConfigData", 1, 11, 00, 3F, 3F, 10, 27, 00, 00, 88, 13, 00, 00, C4, 09, 00, 00, E2, 04, 00, 00, 71, 02, 00, 00, 38, 41, 00, 00, 9C, 80, 00, 00, 4E, C0, 00, 00, 34, 00, 00, 00, 1A, 00, 00, 00, 0D, 00, 00, 00, 06, 40, 00, 00, 03, 80, 00, 00, 00, 00, 00, 00, D0, 80, 00, 00
```

or for x64 drivers:

```
[FtdiPort232.NTamd64.HW.AddReg]
HKR,, "ConfigData", 1, 11, 00, 3F, 3F, 10, 27, 00, 00, 88, 13, 00, 00, C4, 09, 00, 00, E2, 04, 00, 00, 71, 02, 00, 00, 38, 41, 00, 00, 9C, 80, 00, 00, 4E, C0, 00, 00, 34, 00, 00, 00, 1A, 00, 00, 00, 0D, 00, 00, 00, 06, 40, 00, 00, 03, 80, 00, 00, 00, 00, 00, 00, D0, 80, 00, 00
```

The Baud rate table used by each device is located in the registry under

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\FTDIBUS\{Device VID, PID and serial number}\0000\Device Parameters\ConfigData
```

Please note that the four-element table will not allow the use of the additional sub-integer divisors with FT8U232AM devices. The two-element table will work with all devices.

For a full explanation of calculating non-standard Baud rate divisors and how to arrange them in the Baud rate table, see application note [AN232B-05 Configuring FT232R, FT2232C and FT232BM Baud Rates](#).



## 6.2 Changing the Default USB Transfer Size

The default USB transfer size may be set up at installation through the ConfigData entry in the FTDIPORT.INF file. This is the same entry that contains the Baud rate table.

The options can be set through the first DWORD of the table (shown in bold below)

```
[FtdiPort232.NT.HW.AddReg]
HKR,, "ConfigData", 1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9C,80,4E,C0,34,00,1A,00,
0D,00,06,40,03,80,00,00,D0,80
```

or for x64 drivers:

```
[FtdiPort232.NTamd64.HW.AddReg]
HKR,, "ConfigData", 1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9C,80,4E,C0,34,00,1A,00,
0D,00,06,40,03,80,00,00,D0,80
```

This entry is byte-reversed, so MSB the DWORD reads 3F 3F 00 01 and the least significant bit is Bit 0. The values are given as follows:

Bits 16 - 23:	Receive transfer size
Bits 24 - 31:	Transmit transfer size

The maximum value permitted in each case is 3F this is the standard default value.

The transfer size in bytes may be calculated as

$$\text{Transfer size in bytes} = (\text{Transfer size entry} + 1) * 0x40$$

The USB transfer sizes used by a device are located in the registry under

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\FTDIBUS\{Device VID, PID and serial
number}\0000\Device Parameters\ConfigData
```

## 6.3 Setting a Custom Default Latency Timer Value

The latency timer is a form of time-out mechanism for the read buffer of FTDI devices. When a FT\_Read instruction is sent to the device, data will not be sent back to the host PC until the requested number of bytes has been read. If the requested number of bytes never comes, the device would not send data back.

The latency timer counts from the last time data was sent back to the PC. If the latency timer expires, the device will send what data it has available to the PC regardless of how many bytes it is waiting on. The latency timer will then reset and begin counting again.

The default value for the latency timer is 16ms. This value may be customised by adding or changing the following entries in the FTDI\PORT.INF file of the driver before installation.

```
[FtdiPort232.NT.HW.AddReg]
HKR,, "LatencyTimer", 0x00010001, 50
```

or for x64 drivers:

```
[FtdiPort232.NTamd64.HW.AddReg]
HKR,, "LatencyTimer", 0x00010001, 50
```

This example will set the default latency timer value to 50ms. The valid range for the latency timer is 1ms - 255ms, although 1ms is not recommended as this is the same as the USB frame length.

The latency timer value is held in the registry under

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\FTDIBUS\{Device VID, PID and serial number}\0000\Device Parameters\LatencyTimer
```

Please see [AN232B-04 Data Throughput, Latency and Handshaking](#) for additional information on the latency timer.

## 6.4 Enabling Modem Emulation Mode

Modem emulation mode allows binary data to be transmitted over a two (or more) wire interface with full handshaking and modem control signalling, thus allowing PPP connections to be made. Possible applications include mobile phone data cables, and radio links.

Including the following entries in the FTDI<sup>®</sup>PORT.INF file for the VCP driver before installation enables modem emulation mode:

```
[FtdiPort232.NT.HW.AddReg]
HKR,, "EmulationMode", 0x00010001, 0x0000nnnn
```

or for x64 drivers:

```
[FtdiPort232.NTamd64.HW.AddReg]
HKR,, "EmulationMode", 0x00010001, 0x0000nnnn
```

This creates a registry entry under

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\FTDIBUS\{Device VID, PID and serial
number}\0000\Device Parameters\EmulationMode
```

Please see [AN232B-09 Using the Modem Emulation Mode in FTDI's VCP Driver](#) for additional information on modem emulation mode.

## 6.5 Buffered Writes

In some cases, it is possible that the hardware developer does not have control over the application software. This can cause problems when migrating from RS232 to USB, as applications written for RS232 typically write bytes to the port one at a time and this will have a detrimental effect on the USB performance. Due to the packetised nature of USB, it is far more efficient to transfer data in large chunks. This can be achieved by buffering the data within the application.

If the developer does not have control over the application software to allow for buffering the data there, the FTDI driver provides an option to buffer the data from the application in the driver before sending the data out over USB to the device.

The Buffered Writes option is enabled through bit 10 of the first DWORD of the ConfigData entry in the FTDI\PORT.INF file. This is the same entry that contains the Baud rate table.

The first DWORD is shown in bold in the INF fragment below.

```
[FtdiPort232.NT.HW.AddReg]
HKR,, "ConfigData", 1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9C,80,4E,C0,34,00,1A,00,
0D,00,06,40,03,80,00,00,D0,80
```

or for x64 drivers:

```
[FtdiPort232.NTamd64.HW.AddReg]
HKR,, "ConfigData", 1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9C,80,4E,C0,34,00,1A,00,
0D,00,06,40,03,80,00,00,D0,80
```

Please note that the ConfigData entry is byte-reversed, so MSB the DWORD reads **3F 3F 00 01** and the least significant bit is Bit 0. With Buffered Writes disabled, the DWORD would read **3F 3F 00 01**. With Buffered Writes enabled, the DWORD would read **3F 3F 04 01**.

In addition to enabling buffered writes in the Config Data entry, some parameters must be set up to control the behaviour. These parameters can also be set up in FTDI\PORT.INF as follows:

```
[FtdiPort232.NT.HW.AddReg]
HKR,, "WriteBufferSize", 0x00010001, 4096
HKR,, "WriteBufferThreshold", 0x00010001, 20
HKR,, "WriteLatency", 0x00010001, 6
```

or for x64 drivers:

```
[FtdiPort232.NTamd64.HW.AddReg]
HKR,, "WriteBufferSize", 0x00010001, 4096
HKR,, "WriteBufferThreshold", 0x00010001, 20
HKR,, "WriteLatency", 0x00010001, 6
```

These values are held in the registry under this key:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\FTDIBUS\{Device VID, PID and serial
number}\0000\Device Parameters
```

These parameters are specific to the application. As such, they will require to be "tuned" to provide best performance.

## 6.6 Miscellaneous Options

Miscellaneous options available on the [COM port advanced properties page](#)<sup>[6]</sup> may be set up at installation through the INF sections covered in this section.

- [Timeouts](#)<sup>[29]</sup>
- [Serial Enumerator](#)<sup>[30]</sup>
- [Serial Printer](#)<sup>[31]</sup>
- [Cancel If Power Off](#)<sup>[32]</sup>
- [Event On Surprise Removal](#)<sup>[33]</sup>
- [Set RTS On Close](#)<sup>[34]</sup>
- [Disable Modem Ctrl At Startup](#)<sup>[35]</sup>

### 6.6.1 Timeouts

The read and write timeout values may be set through the FTDI<sub>PORT</sub>.INF file.

```
[FtdiPort232.NT.HW.AddReg]
HKR,, "MinReadTimeout", 0x00010001, 0
HKR,, "MinWriteTimeout", 0x00010001, 0
```

or for x64 drivers:

```
[FtdiPort232.NTamd64.HW.AddReg]
HKR,, "MinReadTimeout", 0x00010001, 0
HKR,, "MinWriteTimeout", 0x00010001, 0
```

This INF file fragment shows the minimum read and minimum write timeout values set to 0ms.

These values are held in the registry under this key:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\FTDIBUS\{Device VID, PID and serial
number}\0000\Device Parameters
```

### 6.6.2 Serial Enumerator

The function of the serial enumerator is to detect a Plug-and-Play enabled device (such as a serial mouse or serial modem) that is attached to the USB serial port.

The Serial Enumerator option is controlled through the following entry in FTDIPORT.INF:

```
[FtdiPort232.NT.HW.AddReg]
HKR,,"UpperFilters",0x00010000,"serenum"
```

or for x64 drivers:

```
[FtdiPort232.NTamd64.HW.AddReg]
HKR,,"UpperFilters",0x00010000,"serenum"
```

### 6.6.3 Serial Printer

If enabled, serial printer will disable timeouts to allow for long delays associated with paper loading.

The Serial Printer option is controlled through bit 7 of byte 0 of the first DWORD of the ConfigData entry in the FTDI\PORT.INF file. This is the same entry that contains the Baud rate table.

The first DWORD is shown in bold in the INF fragment below.

```
[FtdiPort232.NT.HW.AddReg]
HKR,, "ConfigData", 1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9C,80,4E,C0,34,00,1A,00,
0D,00,06,40,03,80,00,00,D0,80
```

or for x64 drivers:

```
[FtdiPort232.NTamd64.HW.AddReg]
HKR,, "ConfigData", 1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9C,80,4E,C0,34,00,1A,00,
0D,00,06,40,03,80,00,00,D0,80
```

Please note that this entry is byte-reversed, so MSB the DWORD reads **3F 3F 00 01** and the least significant bit is Bit 0. When disabled (serial printer disabled), the DWORD would read **3F 3F 00 01**. When enabled (serial printer enabled), the DWORD would read **3F 3F 00 81**.

These values are held in the registry under this key:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\FTDIBUS\{Device VID, PID and serial
number}\0000\Device Parameters\ConfigData
```



#### 6.6.4 Cancel If Power Off

The Cancel If Power Off option can be used to assist with problems encountered when going into a hibernate or suspend condition. This will cancel any requests received by the driver when going into hibernate or suspend.

The Cancel If Power Off option is controlled through bit 6 of byte 0 of the first DWORD of the ConfigData entry in the FTDI PORT.INF file. This is the same entry that contains the Baud rate table.

The first DWORD is shown in bold in the INF fragment below.

```
[FtdiPort232.NT.HW.AddReg]
HKR,, "ConfigData", 1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9C,80,4E,C0,34,00,1A,00,
0D,00,06,40,03,80,00,00,D0,80
```

or for x64 drivers:

```
[FtdiPort232.NTamd64.HW.AddReg]
HKR,, "ConfigData", 1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9C,80,4E,C0,34,00,1A,00,
0D,00,06,40,03,80,00,00,D0,80
```

Please note that this entry is byte-reversed, so MSB the DWORD reads **3F 3F 00 01** and the least significant bit is Bit 0. When disabled (no cancel on power off), the DWORD would read **3F 3F 00 01**. When enabled (cancel on power off), the DWORD would read **3F 3F 00 41**.

These values are held in the registry under this key:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\FTDIBUS\{Device VID, PID and serial
number}\0000\Device Parameters\ConfigData
```

### 6.6.5 Event On Surprise Removal

The Event On Surprise Removal option is generally left unselected. If an application sets SERIAL\_EV\_EVENT2 (see NTDDSER.H) in its event bitmask and this feature is enabled, the driver will signal this event on surprise removal.

The Event On Surprise Removal option is controlled through bit 5 of byte 0 of the first DWORD of the ConfigData entry in the FTDI\PORT.INF file. This is the same entry that contains the Baud rate table.

The first DWORD is shown in bold in the INF fragment below.

```
[FtdiPort232.NT.HW.AddReg]
HKR,, "ConfigData", 1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9C,80,4E,C0,34,00,1A,00,
0D,00,06,40,03,80,00,00,D0,80
```

or for x64 drivers:

```
[FtdiPort232.NTamd64.HW.AddReg]
HKR,, "ConfigData", 1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9C,80,4E,C0,34,00,1A,00,
0D,00,06,40,03,80,00,00,D0,80
```

Please note that this entry is byte-reversed, so MSB the DWORD reads **3F 3F 00 01** and the least significant bit is Bit 0. When disabled (no event on surprise removal), the DWORD would read **3F 3F 00 01**. When enabled (event on surprise removal), the DWORD would read **3F 3F 00 21**.

These values are held in the registry under this key:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\FTDIBUS\{Device VID, PID and serial
number}\0000\Device Parameters\ConfigData
```

## 6.6.6 Set RTS On Close

Selecting the Set RTS On Close option will set the RTS signal on closing the port.

The Set RTS On Close option is controlled through bit 3 of byte 0 of the first DWORD of the ConfigData entry in the FTDIPORT.INF file. This is the same entry that contains the Baud rate table.

The first DWORD is shown in bold in the INF fragment below.

```
[FtdiPort232.NT.HW.AddReg]
HKR,, "ConfigData", 1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9C,80,4E,C0,34,00,1A,00,
0D,00,06,40,03,80,00,00,D0,80
```

or for x64 drivers:

```
[FtdiPort232.NTamd64.HW.AddReg]
HKR,, "ConfigData", 1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9C,80,4E,C0,34,00,1A,00,
0D,00,06,40,03,80,00,00,D0,80
```

Please note that this entry is byte-reversed, so MSB the DWORD reads **3F 3F 00 01** and the least significant bit is Bit 0. When disabled (RTS not set on close), the DWORD would read **3F 3F 00 01**. When enabled (RTS set on close), the DWORD would read **3F 3F 00 09**.

These values are held in the registry under this key:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\FTDIBUS\{Device VID, PID and serial
number}\0000\Device Parameters\ConfigData
```

### 6.6.7 Disable Modem Ctrl At Startup

This option is used to control the modem control signals DTR and RTS at startup. In normal operation, the modem control signals at startup follow the behaviour of the legacy port. However, due to timing differences between a legacy COM port and a virtual COM port, a "spike" on one of these signals in the legacy port can appear as an assertion of the signal in the virtual COM port. Devices that monitor these signals can enter the wrong state after an unplug-replug cycle on USB.

Note that if the "Serial Enumerator" option in the property page is selected, then the enumeration sequence causes the modem control signals to change at startup. So if it is necessary to select "Disable Modem Ctrl At Startup", then it is likely that "Serial Enumerator" should be unchecked in the property page.

The Disable Modem Ctrl At Startup option is controlled through bit 1 of byte 1 of the first DWORD of the ConfigData entry in the FTDI\PORT.INF file. This is the same entry that contains the Baud rate table.

The first DWORD is shown in bold in the INF fragment below.

```
[FtdiPort232.NT.HW.AddReg]
HKR,, "ConfigData", 1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9C,80,4E,C0,34,00,1A,00,
0D,00,06,40,03,80,00,00,D0,80
```

or for x64 drivers:

```
[FtdiPort232.NTamd64.HW.AddReg]
HKR,, "ConfigData", 1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9C,80,4E,C0,34,00,1A,00,
0D,00,06,40,03,80,00,00,D0,80
```

Please note that this entry is byte-reversed, so MSB the DWORD reads **3F 3F 00 01** and the least significant bit is Bit 0. When disabled(modem control at startup enabled), the DWORD would read **3F 3F 00 01**. When enabled (modem control at startup disabled), the DWORD would read **3F 3F 02 01**.

Alternatively, the default can be overridden by directly editing the ConfigData parameter in the virtual COM port's registry entry.

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\FTDIBUS\VID_0403+PID_6001+1234
5678\0000\DeviceParameters\ConfigData
```

Note that if DisableModemControlSignalsAtStartup is set TRUE by editing the installation file or the registry, the same considerations as above apply to "[Serial Enumerator](#)<sup>[30]</sup>". So it may be necessary to remove references to "serenum" in "UpperFilters" in the AddReg sections of the installation file, and in the UpperFilters key in the virtual COM port's registry entry.

## 7 System Options

### 7.1 Ignore Hardware Serial Number

If devices have the same vendor ID and product ID but different serial numbers, the system will normally treat them as different devices. This causes the drivers to be installed for each device and create registry entries for each device.

It is possible to override this behaviour to make the system ignore a device's serial number and treat all devices with matching VID and PID connected to the same USB port as if they were the same device. This is achieved by adding a REG\_BINARY value called *IgnoreHWSerNum* to the registry and setting it to 01.

This value is held in the registry key located at:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\UsbFlags\IgnoreHWSerNum{Device VID, PID and interface}
```

For a default FTDI device ID (VID 0x0403, PID 0x6001), add the following registry REG\_BINARY value set to 01:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\UsbFlags\IgnoreHWSerNum04036001
```

For port A of an FT2232C device with default VID and PID, the IgnoreHWSerNum string would be:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\UsbFlags\IgnoreHWSerNum0403601000
```

and for port B of an FT2232C device the IgnoreHWSerNum string would be:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\UsbFlags\IgnoreHWSerNum0403601001
```

As the FT2232C device also uses the Windows composite device driver, an additional IgnoreHWSerNum entry is required to prevent Windows from creating additional composite driver registry entries:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\UsbFlags\IgnoreHWSerNum04036010
```

Now the system can treat devices with the same vendor ID and product ID but different serial numbers as the same device and drivers are installed for the first device only. As such, only one entry is created in the registry. If the device is connected to another USB port, the driver will have to be reinstalled for that port.

**Note that IgnoreHWSerNum cannot be setup in FTDIBUS.INF or FTDIPORT.INF, it must be setup by editing the registry manually or by an installation utility BEFORE installing the driver.**

## 8 Foreign Language Support

There is a DLL available to display the VCP COM port properties page in languages other than English. To request a new language be made available in the DLL, please contact [FTDI Support](#) who will provide the text from the properties page to be translated into the desired language. Once the translated text is returned to FTDI the new language can be implemented in the DLL.

## 9 Co-Installer

The FT2232C is a composite USB device which is capable of providing two COM ports to a system. To ensure that the ports of the FT2232C device are allocated COM port numbers in the correct order (i.e. port A is allocated before port B) under Windows 2000 and XP, a co-installer is used. The co-installer is specified in the following section of the FTDIPORT.INF file:

```
[FtdiPort2232.NT.CoInstallers]
AddReg=FtdiPort2232.NT.CoInstallers.AddReg
CopyFiles=FtdiPort2232.NT.CopyColnst
```

or for x64 drivers:

```
[FtdiPort2232.NTamd64.CoInstallers]
AddReg=FtdiPort2232.NTamd64.CoInstallers.AddReg
CopyFiles=FtdiPort2232.NTamd64.CopyColnst
```

## 10 Renaming Driver Files

It is possible to rename the driver files to create a unique driver package, but this is not recommended. In order for the renamed driver package to work correctly, all references to file names in the INF and INI files must be updated to use the new file names. FTDI does not currently support users who attempt to rename driver packages.

A WHQL certified driver package that has file names changed will invalidate the certification.


















## 11 Driver Pre-Installation

Traditionally, the Found New Hardware Wizard has been the regular method for installing new hardware on a Windows machine. Microsoft has recognised that this requires some input from the end-user who may know very little about driver installation. Additionally, many manufacturers would prefer to install the device drivers before the end-user connects the hardware to the PC.


















Microsoft has addressed this problem by producing a set of driver installation tools called Driver Install Frameworks (DIFx). The simplest tool provided for driver installation is called the Driver Package Installer (DPInst). FTDI's driver packages from VCP 1.00.2176 onwards are compatible with DPInst.

## 11.1 DPInst Packages

In order to be compatible with [DPInst](#), a driver package **must** be Microsoft WHQL certified and meet certain requirements as outlined in [Microsoft Documentation](#). The standard FTDI CDM driver package meets these requirements if certified (version 2.00.01 is certified). When bundled with DPInst, the driver package for 32-bit systems typically contains the files shown below:

Name ▲	Type
 DPInst.exe	Application
 dpinst.xml	XML Document
 FTBUSUI.dll	Application Extension
 FTCSERCO.DLL	Application Extension
 FTD2XX.dll	Application Extension
 FTD2XX.H	C/C++ Header
 FTD2XX.lib	Object File Library
 FTDIBUS.INF	Setup Information
 FTDIBUS.sys	System file
 FTDIPORT.INF	Setup Information
 FTDIUN2K.INI	Configuration Settings
 FTDIUNIN.exe	Application
 FTLang.dll	Application Extension
 ftser2k.sys	System file
 ftserui2.dll	Application Extension

A typical 64-bit driver package will contain the following files where FTD2XX64.dll and FTD2XX64.lib are 64-bit versions of the D2XX DLL and lib files respectively:

Name ▲	Type
 DPInst.exe	Application
 dpinst.xml	XML Document
 FTBUSUI.dll	Application Extension
 FTCSERCO.DLL	Application Extension
 FTD2XX64.dll	Application Extension
 FTD2XX64.lib	Object File Library
 FTD2XX.dll	Application Extension
 FTD2XX.H	C/C++ Header
 FTD2XX.lib	Object File Library
 FTDIBUS.INF	Setup Information
 FTDIBUS.sys	System file
 FTDIPORT.INF	Setup Information
 FTDIUN2K.INI	Configuration Settings
 FTDIUNIN.exe	Application
 FTLang.dll	Application Extension
 ftser2k.sys	System file
 ftserui2.dll	Application Extension

In order to use DPInst to install the driver, DPInst.exe must be run. By doing this, the driver will be

pre-installed on the PC and any matching devices will be automatically installed.

If a custom VID and PID combination is required, FTDI can grant reseller rights to customers with a WinQual account. This will allow them to modify the INF files and obtain new signature files for them without having to submit HCT test logs. Microsoft charge a small fee for this service. To learn more about using DPLnst with FTDI drivers, please see application note [AN232R-03 FTDI Windows Driver Pre-Installation](#).

## 12 Manual Uninstallation

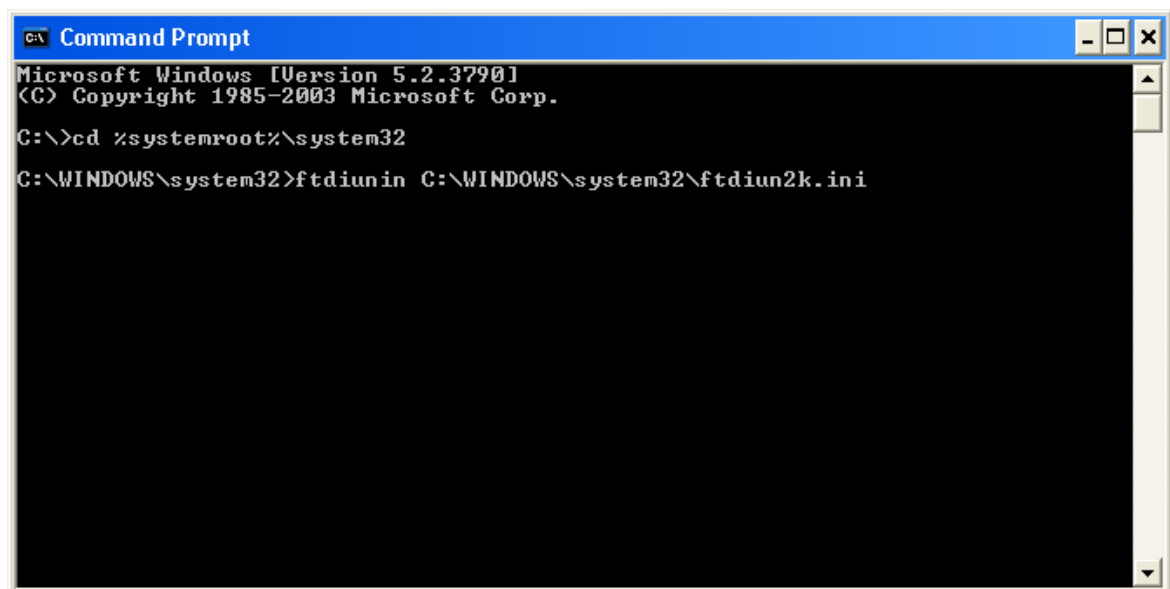
The regular method for uninstalling FTDI drivers is via the Add/Remove Programs utility located in Control Panel. This runs the FTDI uninstaller and specifies the appropriate INI file for the devices to be removed. The uninstaller cannot be used as a standard executable by double-clicking as this does not specify an INI file with device IDs to uninstall.

In some cases, it may be desirable to run the FTDI uninstaller program manually (e.g. to remove all devices with the same VID). This can be achieved by performing the following steps.

- Ensure that the uninstaller program (FTDIUNIN.exe) and the required INI file are both available in the system folder. In the case of Windows 2000, this is "C:\WINNT\System32\", or for XP "C:\WINDOWS\System32\". If the files do not exist there, copy them to the system folder. Please note that the INI file must contain the VID and PID values to be uninstalled. The program can be used to remove a single device, a consecutive range of devices or all devices with the same VID depending on the PID values. Omitting the PID number removes all devices with the same VID, while one, two or three digits of the PID will remove groups of devices with matching digits at the start of their PIDs. A four digit PID will remove only one device type.
- Open a DOS command prompt.
- Make the system directory the current directory. This can be done using the command "cd %SYSTEMROOT%\system32".
- Run the uninstaller using the command syntax

[Uninstaller name] [Full file path of INI file to use]

The example below shows the commands for running the uninstaller from a MS-DOS prompt for Windows XP using the standard ftdiun2k.ini file.



```
C:\ Command Prompt
Microsoft Windows [Version 5.2.3790]
(C) Copyright 1985-2003 Microsoft Corp.

C:\>cd %systemroot%\system32
C:\WINDOWS\system32>ftdiunin C:\WINDOWS\system32\ftdiun2k.ini
```

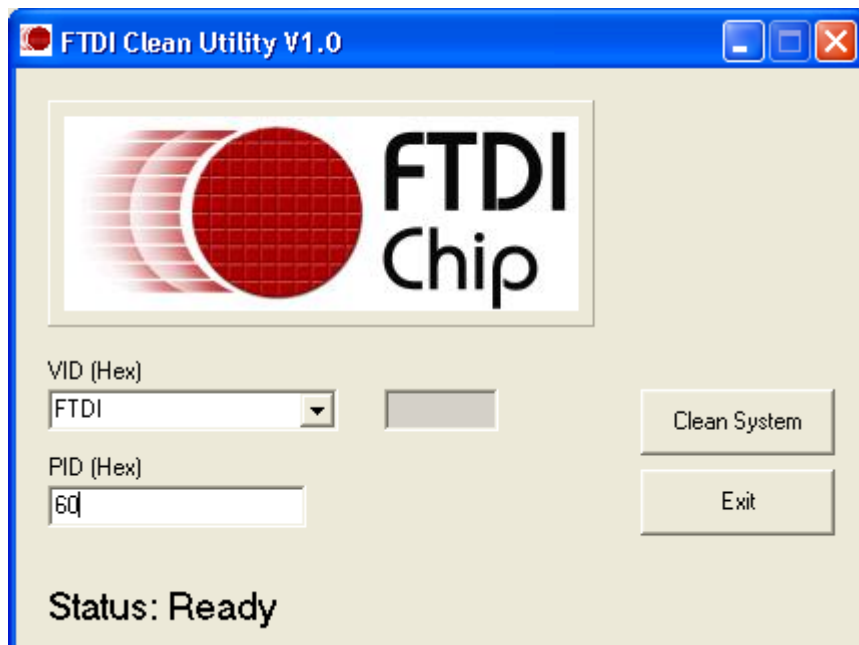
## 13 FTClean Utility

In rare cases when devices have been uninstalled incorrectly (such as by running the uninstaller by double clicking) and the host system has not had the driver removed properly, it is possible that the device cannot be reinstalled until the system has been cleaned up.

A program has been written to remove registry entries and files relating to FTDI device drivers. The FT\_Clean program generates INI files for the uninstaller appropriate to the version of Windows installed and runs the uninstaller for each INI file generated. No user input is required for the uninstaller to run.

The program can be used to remove a single device, a consecutive range of devices or all devices with the same VID. A message box will appear to confirm which VID and PID combinations are going to be removed. A second message box will provide a final chance to cancel the uninstallation. The mouse and keyboard will be disabled for a few seconds while the uninstaller is running.

The example below shows the FT\_Clean program configured to remove all devices with a FTDI VID and PIDs beginning with 60 i.e. all PIDs from 6000 to 60FF inclusive. A four digit PID will remove a single specific device while leaving the PID box blank will remove all devices with the same VID.



Please note that the INI files generated will have the standard file names. As a result, any files that have been renamed will not be removed by the uninstaller but must be deleted manually or by another program.

FTClean can be downloaded from the [Utilities](#) section of the [FTDI website](#).

## 14 Revision History

Version	Release Date	Comments
1.0	January 2005	Initial release
2.0	June 2006	Modified to reflect new driver model Screen shots updated for XP themes DPInst references included
2.1	August 2006	Amended Location IDs to include terminating 00 entry Added System Options section with IgnoreHWSerNum

## 15 Disclaimer

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### **Agents and Sales Representatives**

Please visit the [Sales Network](#) page of the [FTDI Web site](#) for the contact details of our distributor(s) in your country.



## 17 Appendix

### 17.1 FTDIBUS.INF (x86)

```
; FTDIBUS.INF
; Copyright (c) 2000-2006 FTDI Ltd.
;
; USB serial converter driver installation for Windows 2000 and XP.
;

[Version]
Signature="$Windows NT$"
DriverPackageType=PlugAndPlay
DriverPackageDisplayName=%DESC%
Class=USB
ClassGUID={36fc9e60-c465-11cf-8056-444553540000}
Provider=%FTDI%
CatalogFile=ftdibus.cat
DriverVer=05/19/2006,2.00.00

[SourceDisksNames]
1=%DriversDisk%,,,

[SourceDisksFiles]
ftdibus.sys = 1
ftdiunin.exe = 1
ftdiun2k.ini = 1
ftbusui.dll = 1
ftd2xx.dll = 1

[DestinationDirs]
FtdiBus.NT.Copy = 10,system32\drivers
FtdiBus.NT.Copy2 = 10,system32

[Manufacturer]
%Ftdi%=FtdiHw

[FtdiHw]
%USB\VID_0403&PID_6001.DeviceDesc%=FtdiBus,USB\VID_0403&PID_6001
%USB\VID_0403&PID_6010&MI_00.DeviceDesc%=FtdiBus,USB\VID_0403&PID_6010&MI_00
%USB\VID_0403&PID_6010&MI_01.DeviceDesc%=FtdiBus,USB\VID_0403&PID_6010&MI_01

[ControlFlags]
ExcludeFromSelect=*

[FtdiBus.NT]
CopyFiles=FtdiBus.NT.Copy,FtdiBus.NT.Copy2
AddReg=FtdiBus.NT.AddReg,FtdiBusUnInst.NT.Reg

[FtdiBus.NT.Services]
AddService = FTDIBUS, 0x00000002, FtdiBus.NT.AddService

[FtdiBus.NT.AddService]
DisplayName = %SvcDesc%
ServiceType = 1 ; SERVICE_KERNEL_DRIVER
StartType = 3 ; SERVICE_DEMAND_START
ErrorControl = 1 ; SERVICE_ERROR_NORMAL
```

ServiceBinary = %10%\system32\drivers\ftdibus.sys  
LoadOrderGroup = Base

[FtdiBus.NT.AddReg]  
HKR,,DevLoader,,\*ntkern  
HKR,,NTMPDriver,,ftdibus.sys  
HKR,,EnumPropPages32,,ftbusui.dll,FTBUSUIPropPageProvider"

[FtdiBus.NT.Copy]  
ftdibus.sys

[FtdiBus.NT.Copy2]  
ftdiunin.exe  
ftdiun2k.ini  
ftbusui.dll  
ftd2xx.dll

[FtdiBusUnInst.NT.Reg]  
HKLM,%WINUN%, "FTDICOMM"  
HKLM,%WINUN%\FTDICOMM , "UninstallString",,"%11%\ftdiunin.exe %11%\ftdiun2k.ini"  
HKLM,%WINUN%\FTDICOMM , "DisplayName",,"FTDI USB Serial Converter Drivers"  
HKLM,%WINUN%\FTDICOMM , "URLInfoAbout",,"http://www.ftdichip.com"  
HKLM,%WINUN%\FTDICOMM , "Publisher",,"FTDI Ltd"  
HKLM,%WINUN%\FTDICOMM , "DisplayVersion",,"2.00.00"

[Strings]  
Ftdi="FTDI"  
DESC="CDM Driver Package"  
DriversDisk="FTDI USB Drivers Disk"  
USB\VID\_0403&PID\_6001.DeviceDesc="USB Serial Converter"  
USB\VID\_0403&PID\_6010&MI\_00.DeviceDesc="USB Serial Converter A"  
USB\VID\_0403&PID\_6010&MI\_01.DeviceDesc="USB Serial Converter B"  
WINUN="Software\Microsoft\Windows\CurrentVersion\Uninstall"  
SvcDesc="USB Serial Converter Driver"  
ClassName="USB"

## 17.2 FTDIBUS.INF (x64)

```
; FTDIBUS.INF
; Copyright (c) 2000-2006 FTDI Ltd.
;
; USB serial converter driver installation for Windows XP x64.
;

[Version]
Signature="$Windows NT$"
DriverPackageType=PlugAndPlay
DriverPackageDisplayName=%DESC%
Class=USB
ClassGUID={36fc9e60-c465-11cf-8056-444553540000}
Provider=%FTDI%
CatalogFile=ftdibus.cat
DriverVer=05/19/2006,2.00.00

[SourceDisksNames.amd64]
1=%DriversDisk%,,,

[SourceDisksFiles.amd64]
ftdibus.sys = 1
ftdiunin.exe = 1
ftdiun2k.ini = 1
ftbusui.dll = 1
ftd2xx.dll=1
ftd2xx64.dll=1

[DestinationDirs]
FtdiBus.NTamd64.Copy = 10,system32\drivers
FtdiBus.NTamd64.Copy2 = 10,system32
FtdiBus.NTamd64.Copy3 = 10,syswow64

[Manufacturer]
%Ftdi%=FtdiHw,NTamd64

[FtdiHw.NTamd64]
%USB\VID_0403&PID_6001.DeviceDesc%=FtdiBus,USB\VID_0403&PID_6001
%USB\VID_0403&PID_6010&MI_00.DeviceDesc%=FtdiBus,USB\VID_0403&PID_6010&MI_00
%USB\VID_0403&PID_6010&MI_01.DeviceDesc%=FtdiBus,USB\VID_0403&PID_6010&MI_01

[ControlFlags]
ExcludeFromSelect=*

;[ClassInstall32]
;AddReg=FtdiBusClass

;[FtdiBusClass]
;HKR,,,%ClassName%
;HKR,,Icon,,103
;HKR,,EnumPropPages32,,,"nothingproppage.dll,NOTHINGPropPageProvider"

[FtdiBus.NTamd64]
CopyFiles=FtdiBus.NTamd64.Copy,FtdiBus.NTamd64.Copy2,FtdiBus.NTamd64.Copy3
AddReg=FtdiBus.NTamd64.AddReg,FtdiBusUnInst.NTamd64.Reg
```

```
[FtdiBus.NTamd64.Services]
AddService = FTDIBUS, 0x00000002, FtdiBus.NTamd64.AddService
```

```
[FtdiBus.NTamd64.AddService]
DisplayName = %SvcDesc%
ServiceType = 1 ; SERVICE_KERNEL_DRIVER
StartType = 3 ; SERVICE_DEMAND_START
ErrorControl = 1 ; SERVICE_ERROR_NORMAL
ServiceBinary = %10%\system32\drivers\ftdibus.sys
LoadOrderGroup = Base
```

```
[FtdiBus.NTamd64.AddReg]
HKR,,DevLoader,,*ntkern
HKR,,NTMPDriver,,ftdibus.sys
HKR,,EnumPropPages32,,ftbusui.dll,FTBUSUIPropPageProvider"
```

```
[FtdiBus.NTamd64.Copy]
ftdibus.sys
```

```
[FtdiBus.NTamd64.Copy2]
ftdiunin.exe
ftdiun2k.ini
ftbusui.dll
ftd2xx.dll
```

```
[FtdiBus.NTamd64.Copy3]
ftd2xx64.dll
```

```
[FtdiBusUnInst.NTamd64.Reg]
HKLM,%WINUN%, "FTDICOMM"
HKLM,%WINUN%\FTDICOMM , "UninstallString", "%11%\ftdiunin.exe %11%\ftdiun2k.ini"
HKLM,%WINUN%\FTDICOMM , "DisplayName", "FTDI USB Serial Converter Drivers"
HKLM,%WINUN%\FTDICOMM , "URLInfoAbout", "http://www.ftdichip.com"
HKLM,%WINUN%\FTDICOMM , "Publisher", "FTDI Ltd"
HKLM,%WINUN%\FTDICOMM , "DisplayVersion", "2.00.00"
```

```
[Strings]
Ftdi="FTDI"
DESC="CDM Driver Package"
DriversDisk="FTDI USB Drivers Disk"
USB\VID_0403&PID_6001.DeviceDesc="USB Serial Converter"
USB\VID_0403&PID_6010&MI_00.DeviceDesc="USB Serial Converter A"
USB\VID_0403&PID_6010&MI_01.DeviceDesc="USB Serial Converter B"
WINUN="Software\Microsoft\Windows\CurrentVersion\Uninstall"
SvcDesc="USB Serial Converter Driver"
ClassName="USB"
```

## 17.3 FTDIPOINT.INF (x86)

```
; FTDIPOINT.INF
; Copyright (c) 2000-2006 FTDI Ltd.
;
; USB serial port driver installation for Windows 2000 and XP.
;

[Version]
Signature="$Windows NT$"
DriverPackageType=PlugAndPlay
DriverPackageDisplayName=%DESC%
Class=Ports
ClassGUID={4d36e978-e325-11ce-bfc1-08002be10318}
Provider=%FTDI%
CatalogFile=ftdiport.cat
DriverVer=05/19/2006,2.00.00

[SourceDisksNames]
1=%DriversDisk%,,,

[SourceDisksFiles]
ftser2k.sys=1
ftserui2.dll=1
FTLang.Dll = 1
ftcserco.dll = 1

[DestinationDirs]
FtdiPort.NT.Copy=10,system32\drivers
FtdiPort.NT.CopyUI=10,system32
FtdiPort2232.NT.CopyColnst=10,system32

[ControlFlags]
ExcludeFromSelect=*

[Manufacturer]
%FTDI%=FtdiHw

[FtdiHw]
%VID_0403&PID_6001.DeviceDesc%=FtdiPort232,FTDIBUS\COMPORT&VID_0403&PID_6001
%VID_0403&PID_6010.DeviceDesc%=FtdiPort2232,FTDIBUS\COMPORT&VID_0403&PID_6010

[FtdiPort.NT.AddService]
DisplayName = %SvcDesc%
ServiceType = 1 ; SERVICE_KERNEL_DRIVER
StartType = 3 ; SERVICE_DEMAND_START
ErrorControl = 1 ; SERVICE_ERROR_NORMAL
ServiceBinary = %10%\system32\drivers\ftser2k.sys
LoadOrderGroup = Base

; ----- Serenum Driver install section
[SerEnum_AddService]
DisplayName = %SerEnum.SvcDesc%
ServiceType = 1 ; SERVICE_KERNEL_DRIVER
StartType = 3 ; SERVICE_DEMAND_START
ErrorControl = 1 ; SERVICE_ERROR_NORMAL
ServiceBinary = %12%\serenum.sys
```

LoadOrderGroup = PNP Filter

[FtdiPort.NT.AddReg]  
HKR,,EnumPropPages32,,ftserui2.dll,SerialPortPropPageProvider"

[FtdiPort.NT.Copy]  
ftser2k.sys  
;serenum.sys

[FtdiPort.NT.CopyUI]  
ftserui2.dll  
FTLang.dll

[FtdiPort232.NT]  
CopyFiles=FtdiPort.NT.Copy,FtdiPort.NT.CopyUI  
AddReg=FtdiPort.NT.AddReg

[FtdiPort232.NT.HW]  
AddReg=FtdiPort232.NT.HW.AddReg

[FtdiPort232.NT.Services]  
AddService = FTSER2K, 0x00000002, FtdiPort.NT.AddService  
AddService = Serenum,,SerEnum\_AddService  
DelService = FTSERIAL

[FtdiPort232.NT.HW.AddReg]  
HKR,,"UpperFilters",0x00010000,"serenum"  
;HKR,,"ConfigData",1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9c,80,4E,C0,34,00,1A,00,  
0D,00,06,40,03,80,00,00,d0,80  
HKR,,"ConfigData",1,11,00,3F,3F,10,27,00,00,88,13,00,00,C4,09,00,00,E2,04,00,00,71,02,00,00,3  
8,41,00,00,9C,80,00,00,4E,C0,00,00,34,00,00,00,1A,00,00,00,0D,00,00,00,06,40,00,00,03,80,00,0  
0,00,00,00,00,D0,80,00,00  
HKR,,"MinReadTimeout",0x00010001,0  
HKR,,"MinWriteTimeout",0x00010001,0  
HKR,,"LatencyTimer",0x00010001,16

; -----  
; FT2232C  
; -----

[FtdiPort2232.NT]  
CopyFiles=FtdiPort.NT.Copy,FtdiPort.NT.CopyUI  
AddReg=FtdiPort.NT.AddReg

[FtdiPort2232.NT.HW]  
AddReg=FtdiPort232.NT.HW.AddReg

[FtdiPort2232.NT.CoInstallers]  
AddReg=FtdiPort2232.NT.CoInstallers.AddReg  
CopyFiles=FtdiPort2232.NT.CopyCoInst

[FtdiPort2232.NT.Services]  
AddService = FTSER2K, 0x00000002, FtdiPort.NT.AddService  
AddService = Serenum,,SerEnum\_AddService  
DelService = FTSERIAL

[FtdiPort2232.NT.CoInstallers.AddReg]  
HKR,,CoInstallers32,0x00010000,"ftcserco.Dll,FTCSERCoInstaller"

```
[FtdiPort2232.NT.CopyCoInst]
ftcserco.dll
```

```
;-----;
```

```
[Strings]
FTDI="FTDI"
DESC="CDM Driver Package"
DriversDisk="FTDI USB Drivers Disk"
PortsClassName = "Ports (COM & LPT)"
VID_0403&PID_6001.DeviceDesc="USB Serial Port"
VID_0403&PID_6010.DeviceDesc="USB Serial Port"
SvcDesc="USB Serial Port Driver"
SerEnum.SvcDesc="Serenum Filter Driver"
```

## 17.4 FTDIPOINT.INF (x64)

```
; FTDIPOINT.INF
; Copyright (c) 2000-2006 FTDI Ltd.
;
; USB serial port driver installation for Windows XP x64.
;

[Version]
Signature="$Windows NT$"
DriverPackageType=PlugAndPlay
DriverPackageDisplayName=%DESC%
Class=Ports
ClassGUID={4d36e978-e325-11ce-bfc1-08002be10318}
Provider=%FTDI%
CatalogFile=ftdiport.cat
DriverVer=05/19/2006,2.00.00

[SourceDisksNames.amd64]
1=%DriversDisk%,,,

[SourceDisksFiles.amd64]
ftser2k.sys=1
ftserui2.dll=1
FTLang.Dll = 1
ftcserco.dll = 1

[DestinationDirs]
FtdiPort.NTamd64.Copy=10,system32\drivers
FtdiPort.NTamd64.CopyUI=10,system32
FtdiPort2232.NTamd64.CopyColInst=10,system32

[ControlFlags]
ExcludeFromSelect=*

[Manufacturer]
%FTDI%=FtdiHw,NTamd64

[FtdiHw.NTamd64]
%VID_0403&PID_6001.DeviceDesc%=FtdiPort232,FTDIBUS\COMPORT&VID_0403&PID_6001
%VID_0403&PID_6010.DeviceDesc%=FtdiPort2232,FTDIBUS\COMPORT&VID_0403&PID_6010

[FtdiPort.NTamd64.AddService]
DisplayName = %SvcDesc%
ServiceType = 1 ; SERVICE_KERNEL_DRIVER
StartType = 3 ; SERVICE_DEMAND_START
ErrorControl = 1 ; SERVICE_ERROR_NORMAL
ServiceBinary = %10%\system32\drivers\ftser2k.sys
LoadOrderGroup = Base

; ----- Serenum Driver install section
[SerEnum_AddService]
DisplayName = %SerEnum.SvcDesc%
ServiceType = 1 ; SERVICE_KERNEL_DRIVER
StartType = 3 ; SERVICE_DEMAND_START
ErrorControl = 1 ; SERVICE_ERROR_NORMAL
ServiceBinary = %12%\serenum.sys
```



LoadOrderGroup = PNP Filter

[FtdiPort.NTamd64.AddReg]  
HKR,,EnumPropPages32,, "ftserui2.dll,SerialPortPropPageProvider"

[FtdiPort.NTamd64.Copy]  
ftser2k.sys

[FtdiPort.NTamd64.CopyUI]  
ftserui2.dll  
FTLang.dll

[FtdiPort232.NTamd64]  
CopyFiles=FtdiPort.NTamd64.Copy,FtdiPort.NTamd64.CopyUI  
AddReg=FtdiPort.NTamd64.AddReg

[FtdiPort232.NTamd64.HW]  
AddReg=FtdiPort232.NTamd64.HW.AddReg

[FtdiPort232.NTamd64.Services]  
AddService = FTSER2K, 0x00000002, FtdiPort.NTamd64.AddService  
AddService = Serenum,,SerEnum\_AddService  
DelService = FTSERIAL

[FtdiPort232.NTamd64.HW.AddReg]  
HKR,,"UpperFilters",0x00010000,"serenum"  
HKR,,"ConfigData",1,01,00,3F,3F,10,27,88,13,C4,09,E2,04,71,02,38,41,9c,80,4E,C0,34,00,1A,00,  
0D,00,06,40,03,80,00,00,d0,80  
HKR,,"MinReadTimeout",0x00010001,0  
HKR,,"MinWriteTimeout",0x00010001,0  
HKR,,"LatencyTimer",0x00010001,16

; -----  
; FT2232C  
; -----

[FtdiPort2232.NTamd64]  
CopyFiles=FtdiPort.NTamd64.Copy,FtdiPort.NTamd64.CopyUI  
AddReg=FtdiPort.NTamd64.AddReg

[FtdiPort2232.NTamd64.HW]  
AddReg=FtdiPort232.NTamd64.HW.AddReg

[FtdiPort2232.NTamd64.ColInstallers]  
AddReg=FtdiPort2232.NTamd64.ColInstallers.AddReg  
CopyFiles=FtdiPort2232.NTamd64.CopyColInst

[FtdiPort2232.NTamd64.Services]  
AddService = FTSER2K, 0x00000002, FtdiPort.NTamd64.AddService  
AddService = Serenum,,SerEnum\_AddService  
DelService = FTSERIAL

[FtdiPort2232.NTamd64.ColInstallers.AddReg]  
HKR,,ColInstallers32,0x00010000,"ftcserco.Dll,FTCSERColInstaller"

[FtdiPort2232.NTamd64.CopyColInst]  
ftcserco.dll

;-----;

```
[Strings]
FTDI="FTDI"
DESC="CDM Driver Package"
DriversDisk="FTDI USB Drivers Disk"
PortsClassName = "Ports (COM & LPT)"
VID_0403&PID_6001.DeviceDesc="USB Serial Port"
VID_0403&PID_6010.DeviceDesc="USB Serial Port"
SvcDesc="USB Serial Port Driver"
SerEnum.SvcDesc="Serenum Filter Driver"
```

## 17.5 FTDIUN2K.INI

```
[Uninstall]
Device=VID_0403&PID_6001,VID_0403&PID_6010
Converter=FTDIBUS
Serial=FTSER2K
InfFiles=FTDIBUS,FTDIPORT
Key=FTDICOMM
```

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