



**Future Technology Devices  
International Ltd.**

**AN232B-10 Advanced Driver Options**

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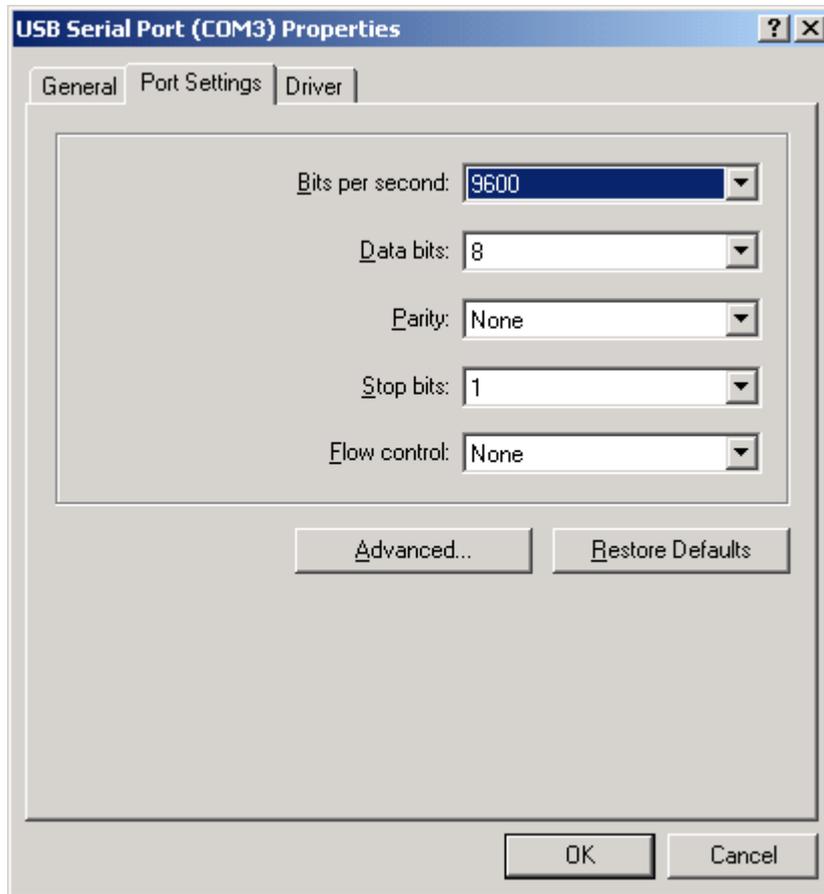
## 1 Introduction

This application note describes advanced driver settings and operations. 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](#).

## 2 VCP 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 FTDIPORT.INF file before installation as indicated in [VCP INF Options](#)<sup>[11]</sup>. The miscellaneous options are covered in [Miscellaneous Options](#)<sup>[20]</sup>.

### **3 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](#).

### 3.1 D2XX Drivers

D2XX drivers for FT232BM, FT245BM, FT8U232AM and FT8U245AM devices use the FTD2XX.INF file.

The following sections of FTD2XX.INF must be amended to match the desired VID and PID combination:

```
[FtdiHw]
%USB\VID_0403&PID_6001.DeviceDesc%=FTD2XX, USB\VID_0403&PID_6001
```

```
[ControlFlags]
ExcludeFromSelect=USB\VID_0403&PID_6001
```

```
[Strings]
USB\VID_0403&PID_6001.DeviceDesc="FTDI FT8U2XX Device"
```

The device description string may be modified to display a custom device name in the device manager if so desired.

The following section of the FTD2XXUN.INI must also be amended for uninstalling the devices via "Control Panel > Add/Remove Programs":

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

## 3.2 VCP Drivers

VCP drivers for FT232BM, FT245BM, FT8U232AM and FT8U245AM devices use the FTDIBUS.INF file and the FTDIPOINT.INF.

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
```

```
[ControlFlags]
ExcludeFromSelect=USB\VID_0403&PID_6001
```

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

The device description string may be modified to display a custom device name in the device manager if so desired.

In addition, 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
```

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

The device description string may be modified to display a custom device port name in the device manager if so desired.

The following section of FTDIUNIN.INI and FTDIUN2K.INI must also be amended for uninstalling the devices via "Control Panel > Add/Remove Programs":

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

### 3.3 FTC Drivers

FTC drivers are for use with FT2232C devices. Under Windows 2000 and Windows XP, the FTC driver will provide D2XX or VCP functionality depending on settings in the EEPROM. Under Windows 98, FTC drivers will only allow VCP access to the device.

The following sections of FTCUSB.INF must be amended to match the desired VID and PID combination:

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

```
[Strings]
USB\VID_0403&PID_6010&MI_00.DeviceDesc="FTCUSB.SYS FTDI Dual 232A USB Test Board"
USB\VID_0403&PID_6010&MI_01.DeviceDesc="FTCUSB.SYS FTDI Dual 232B USB Test Board"
```

The device description strings may be modified to display custom device names in the device manager if so desired.

In addition, the following entries in the FTCSER.INF file must be changed to match the VID and PID combination:

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

```
[Strings]
VID_0403&PID_6010.DeviceDesc="USB Serial Port"
```

The following section of FTCUN98.INI and FTCUN2K.INI must also be amended for uninstalling the devices via "Control Panel > Add/Remove Programs":

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

### 3.4 FTCD2XX Drivers

FTCD2XX drivers are for use with FT2232C devices and will provide D2XX access only under Windows XP, Windows 2000 and Windows 98 depending on the driver settings in the device EEPROM.

The following sections of FT\_6010.INF must be amended to match the desired VID and PID combination:

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

```
[Strings]
USB\VID_0403&PID_6010&MI_00.DeviceDesc="FT2232C Channel A"
USB\VID_0403&PID_6010&MI_01.DeviceDesc="FT2232C Channel B"
```

The device description string may be modified to display a custom device name in the device manager if so desired.

The following section of the FT\_6010.INI must also be amended for uninstalling the devices via "Control Panel > Add/Remove Programs":

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

## 4 VCP INF Options

There are many configuration options available through the VCP driver INF file. This section describes these options and how to configure them.

## 4.1 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 FTDIPOORT.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 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 FTDIPOORT.INF gives an example of the Baud rate table for standard Baud rates for the FT8U232AM device.

```
[FtdiPort232.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
```

```
[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
```

In the case of the FT232BM and FT2232C 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.

```
[FtdiPort232.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
```

```
[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
```

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 FT232BM Baud Rates](#).

## 4.2 Changing the Default USB Transfer Size

The default USB transfer size may be set up at installation through the ConfigData entry in the FTDI\PORT.INF file (or FTCSER.INF if using FTC drivers for FT2232C devices). 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.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*

*[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*

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

*Transfer size in bytes = (Transfer size entry + 1) \* 0x40*

### 4.3 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 VCP driver before installation.

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

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

These example lines will set the default latency timer value to 50ms. The valid range for the latency timer is 1ms – 255ms.

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.

## 4.4 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`PORT`.`INF` file for the VCP driver before installation enables modem emulation mode:

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

```
[FtdiPort232.NT.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.

## 4.5 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_AddService.AddReg]
HKR,Parameters,"RetryResetCount",0x10001,100
```

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

## 4.6 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_AddService.AddReg]
HKR,Parameters,"MaxDevs",0x10001,3
```

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

**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.**

## 4.7 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 `Loclds` entry in the driver INF file.

The driver uses `Loclds` 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`. The default behaviour is that all USB ports are supported. The default can be overridden by including `Loclds` in the `FTDIBUS.INF` service key section.

```
[FtdiBus_AddService.AddReg]
HKR,Parameters,"Loclds",1,21,00,00,00,32,00,00,00,11,00,00,00
```

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.

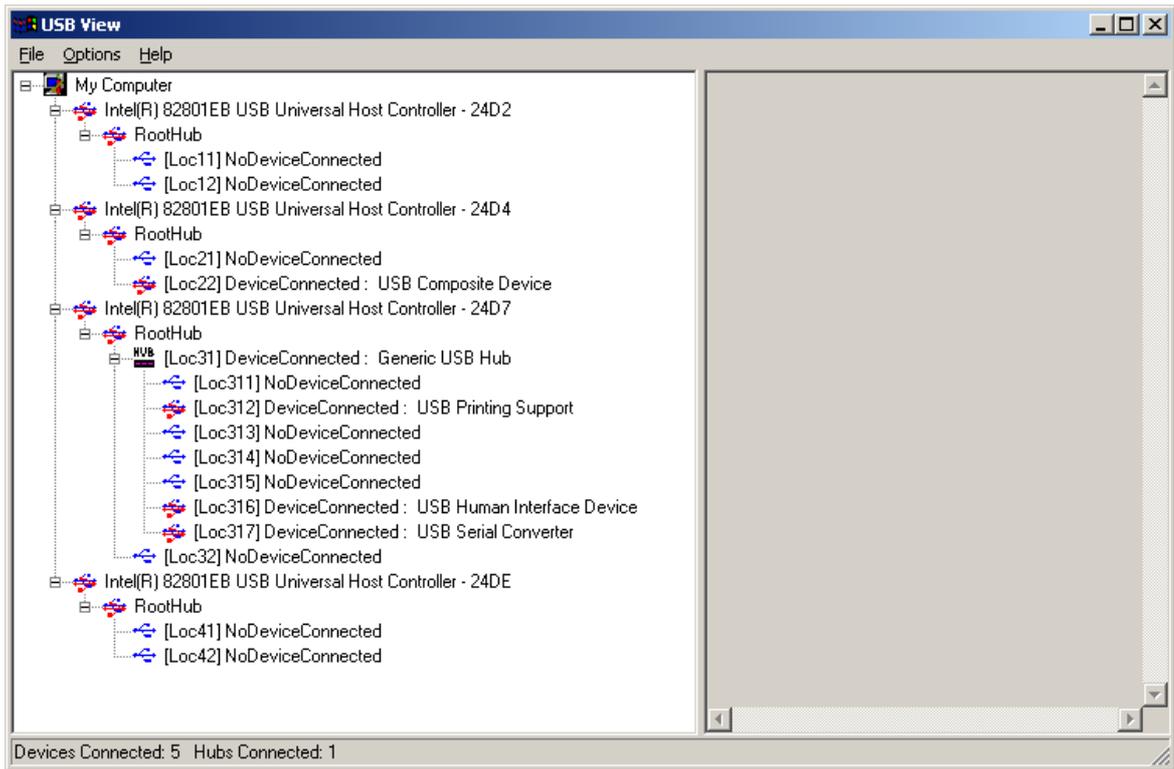
This value is held in the registry key located at

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

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

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 `0x00000031` and devices connected at locations `0x00000022`, `0x000000312`, `0x000000316` and `0x000000317`.



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

```
[FtdiBus_AddService.AddReg]
HKR,Parameters,"LocIds",1,22,00,00,00,12,03,00,00,16,03,00,00,17,03,00,00,00
```

Please note that the INF entry must end with three consecutive 00 entries.

## 4.8 Miscellaneous Options

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

### Timeouts

The read and write timeout values may be set through the FTDIPORT.INF file (or FTCSER.INF file if using FTC drivers for FT2232C devices).

```
[FtdiPort232.NT.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.

### 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 (or FTSER.INF if using FTC drivers for FT2232C devices):

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

### 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 FTDIPORT.INF file (or FTCSER.INF if using FTC drivers for FT2232C devices). This is the same entry that contains the Baud rate table.

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

```
[FtdiPort232.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
```

```
[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
```

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**.

### 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 FTDIPORT.INF file (or FTCSER.INF if using FTC drivers for FT2232C devices). This is the same entry that contains the Baud rate table.

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

*[FtdiPort232.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*

*[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*

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**.

### 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 it's 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 FTDIPORT.INF file (or FTCSER.INF if using FTC drivers for FT2232C devices). This is the same entry that contains the Baud rate table.

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

*[FtdiPort232.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*

*[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*

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**.

### 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 (or FTCSER.INF if using FTC drivers for FT2232C devices). This is the same entry that contains the Baud rate table.

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

*[FtdiPort232.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
```

```
[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
```

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**.

### 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 FTDIPORT.INF file (or FTCSER.INF if using FTC drivers for FT232C devices). This is the same entry that contains the Baud rate table.

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

```
[FtdiPort232.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
```

```
[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
```

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+12345678\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". 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.

## 5 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.

## 6 Co-Installer

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 FTCSER.INF file:

```
[FTCSER.NT.CoInstallers]  
AddReg=FTCSER.NT.CoInstallers.AddReg  
CopyFiles=FTCSER.NT.CopyCoInst
```

## 7 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 do not currently support users who attempt to rename driver packages.

Please note that Windows 98 cannot support filenames longer than 8 characters and the file extension must be no more than 3 characters.

## 8 Driver Pre-Installation

Although installation via the Found New Hardware Wizard is the recognised standard and recommended way of installing FTDI drivers, some users may have a requirement to install device drivers before any devices have been connected. This is not possible in the case of VCP drivers, but may be accomplished with D2XX drivers.

## 8.1 D2XX Driver Pre-Installation

In the case of the D2XX drivers on Windows 2000 and XP, it is possible to install the drivers by right-clicking on the INF file and selecting "Install" from the menu. This can be achieved programmatically using the SetupInstall family of Windows API calls (see [Microsoft's Infnst example](#) using Win32 Setup APIs for details).

Once the drivers have been installed in this way, the operating system will automatically install any new devices with a VID and PID matching those in the INF file.

## 8.2 FTCD2XX Driver Pre-Installation

As with VCP drivers FTC drivers may not be pre-installed, but the FTCD2XX drivers can be pre-installed in the same manner as the D2XX drivers under Windows 2000 and XP due to the default install section of the INF file.

The drivers can be installed by right-clicking on the INF file and selecting "Install" from the menu. This can be achieved programmatically using the SetupInstall family of Windows API calls (see [Microsoft's Infnst example](#) using Win32 Setup APIs for details).

Once the drivers have been installed in this way, the operating system will automatically install any new devices with a VID and PID matching those in the INF file.

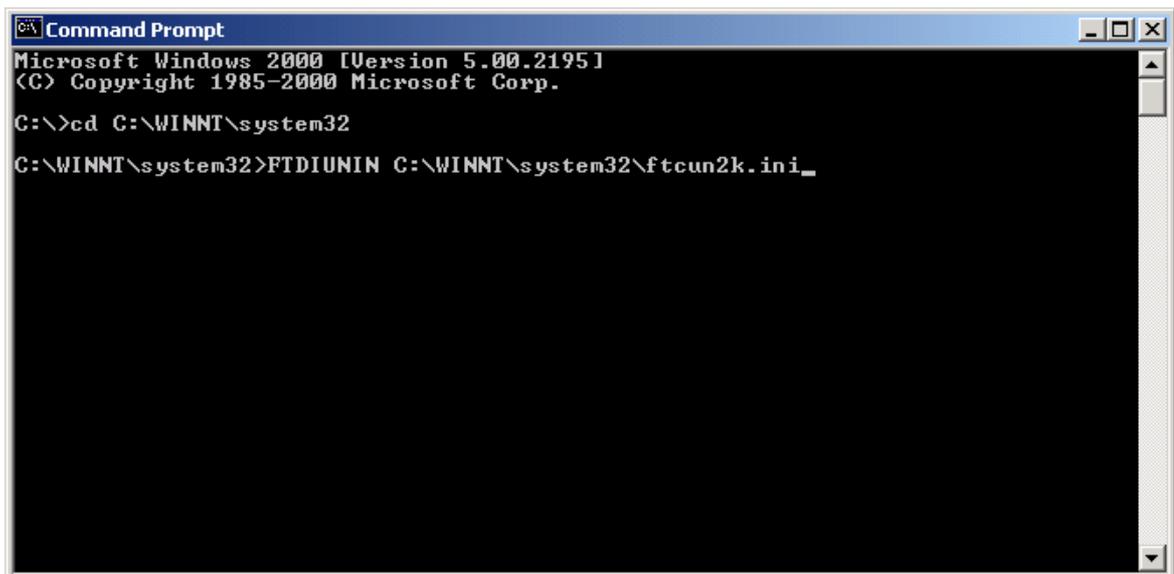
## 9 Manual Uninstallation

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". 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 C:\WINNT\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 2000 using the standard ftcun2k.ini file.



```
Microsoft Windows [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.

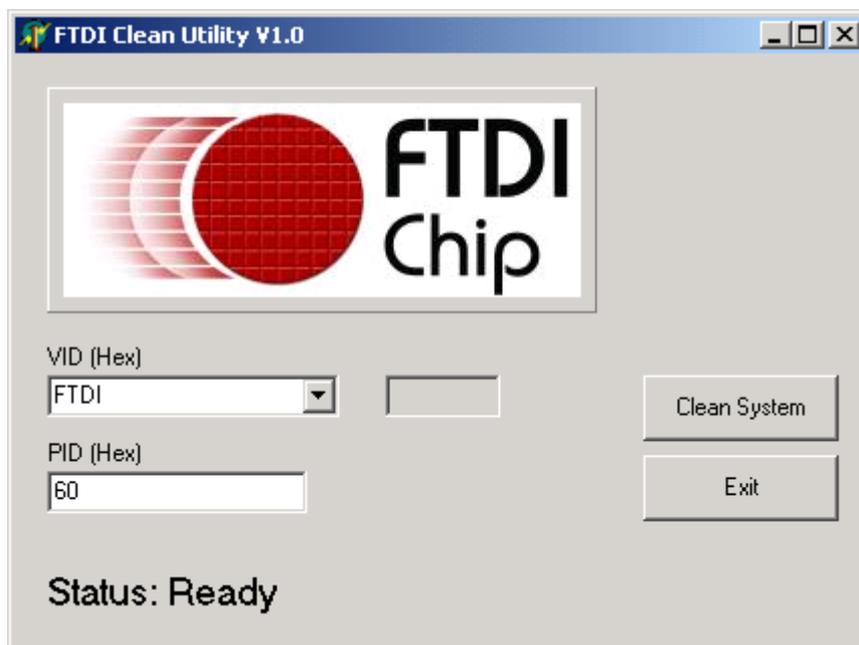
C:\>cd C:\WINNT\system32
C:\WINNT\system32>FTDIUNIN C:\WINNT\system32\ftcun2k.ini_
```

## 10 FTClean Utility

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 PIDs 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](#).

## 11 Revision History

Version	Release Date	Comments
1.0	January 2005	Initial release

## 12 Contact Information

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### **Agents and Sales Representatives**

At the time of writing our Sales Network covers over 40 different countries worldwide. Please visit the [Sales Network page](#) of our Web site for the contact details our distributor(s) in your country.

## 13 Disclaimer

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This document provides preliminary information that may be subject to change without notice.

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