



Future Technology Devices International Ltd.

Application Note AN_123

How COM Ports Are Allocated On Driver Installation

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The purpose of this application note is to clarify how COM ports are assigned when installing the FTDI Virtual COM Port (VCP) driver, and what the user can do to manipulate the assignment.

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1 Introduction

A common request from designers is "how do I force the COM port assignment for a device to allow my application to always connect to the same port".

The purpose of this application note is to clarify how COM ports are assigned when installing the FTDI Virtual COM Port (VCP) driver, and what the user can do to manipulate the assignment.

2 Why does my COM port keep incrementing for new devices?

Any device connected to a Windows PC is identified by its VID, PID and Serial Number.

When the device is connected for the first time, these parameters will be associated with a COM port by the installation wizard on the basis of the next available COM port. This is defined in the registry at:

HKKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\COM Name Arbiter\ComDB

These 3 parameters, VID, PID and Serial Number, are stored in the descriptor EEPROM used with the FTDI devices. With the FTxxxR devices the EEPROM is internal to the chip, while the other devices require an external EEPROM.

If any of these 3 parameters change or a second device is plugged in with different VID, PID or Serial Number then the PC will detect new hardware and associate a different COM port with the device.

2.1 Default FTDI Device States

If a FTxxxB device is being used, then every device is supplied with the same VID, PID and no Serial Number.

VID = 0403, PID = 6001, Serial Number = blank

To change these values it is necessary to interface the FTxxxB to an external EEPROM.

If a FTxxxR is being used, then every device is supplied with the same VID, PID and a unique Serial Number.

VID = 0403, PID = 6001, Serial Number = unique

To change these values it is necessary to edit the internal EEPROM of the FTxxxR.

If a FT2232D device is being used, then every device is supplied with the same VID, PID and no Serial Number.

VID = 0403, PID = 6010, Serial Number = blank

To change these values it is necessary to interface the FT2232D to an external EEPROM.

If a FT2232H device is being used, then every device is supplied with the same VID, PID and no Serial Number.

VID = 0403, PID = 6010, Serial Number = blank

To change these values it is necessary to interface the FT2232H to an external EEPROM.

If a FT4232H device, then every device is supplied with the same VID, PID and no Serial Number.

VID = 0403, PID = 6011, Serial Number = blank

To change these values it is necessary to interface the FT4232H to an external EEPROM.

3 Options for Controlling the COM Port Assignment

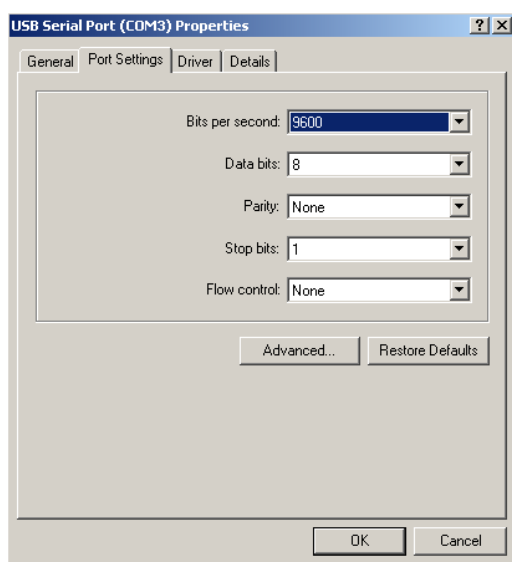
The next sections provide a variety of alternative methods to manipulate the COM port assignment. They also highlight the pro's and con's of a particular approach.

3.1 Re-assign the COM Port After Installation

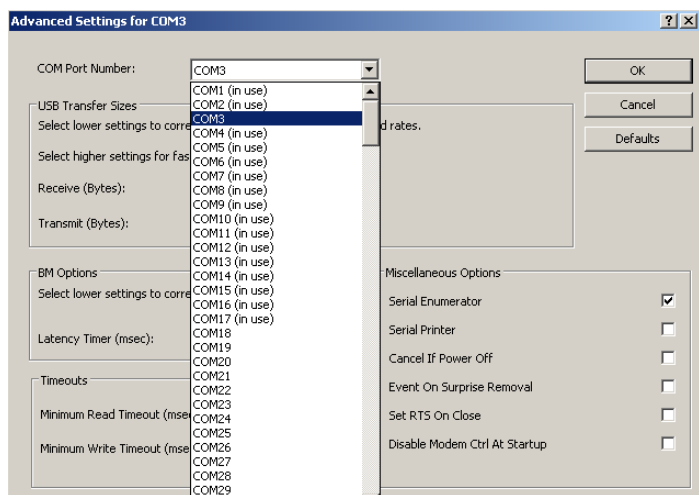
A COM port may be changed to another currently unused COM port after installation.

An advanced properties page is available for devices using VCP drivers. To access the advanced properties page in Windows 200 or XP, go to "Control Panel > System" then select the "Hardware" tab and click "Device Manager...", or "Control Panel > Device Manger" in Vista.

Find the USB serial port which require the properties to be changed and right-click on the port. Select "Properties" from the menu then select the "Port Settings" tab to get the window below.



To access more advanced settings, click on the "Advanced..." button to display the advanced properties page (shown below).



The above screenshot shows COM3 could be changed to COM 18 or above as the other COM Ports are in use.

PROs: No adjustment to hardware.
No adjustment to drivers.

CONs: Can only re-assign to another free port.
Only one device can use a specific port.

3.2 Reprogram all devices to use identical VID, PID, Serial Number.

If the design is fitted with an EEPROM to alter the device descriptors, these can be edited with MPROG.

MPROG is a free FTDI utility at: <http://www.ftdichip.com/Resources/Utilities.htm> .

You can create a template to program the same VID, PID and Serial Number into every device. The other parameters stored in the EEPROM will not have an impact on the COM Port Number assigned.

PROs: All devices have same COM port assigned.

CONs: Can only ever plug one device into a PC at a time.

3.3 Reprogram all devices to use no Serial Number

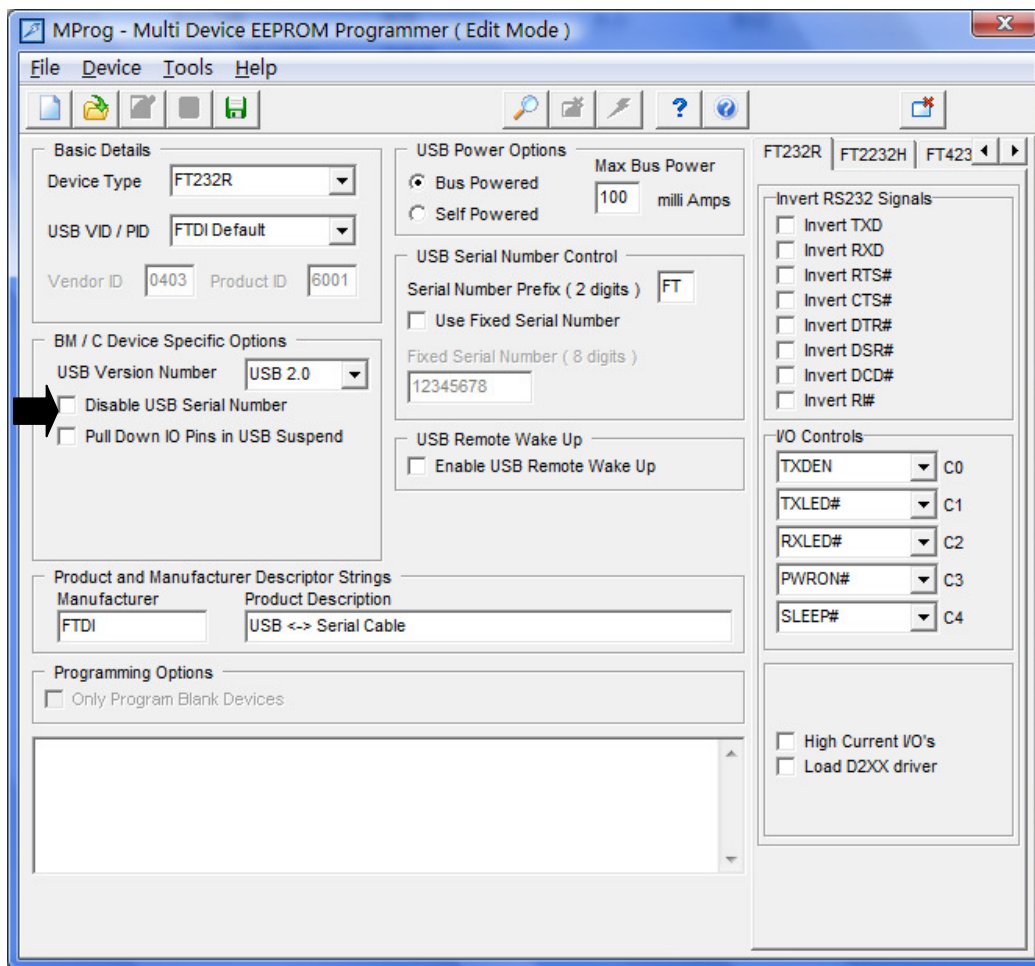
If the design is fitted with an EEPROM to alter the device descriptors, these can be edited with MPROG.

MPROG is a free FTDI utility at: <http://www.ftdichip.com/Resources/Utilities.htm> .

You can create a template to program the same VID, PID and Serial Number into every device. The other parameters stored in the EEPROM will not have an impact on the COM Port Number assigned.

This only affects the FTxxxR devices as the other devices do not have a serial number by default.

The screenshot below indicates the box which should be checked in MPPROG to disable the USB serial number.



PROs: All devices using the same USB port have the same COM port assigned.
Supports multiple devices connected to the PC at any time.

CONs: No serial number to trace the device by.

3.4 Use Location IDs

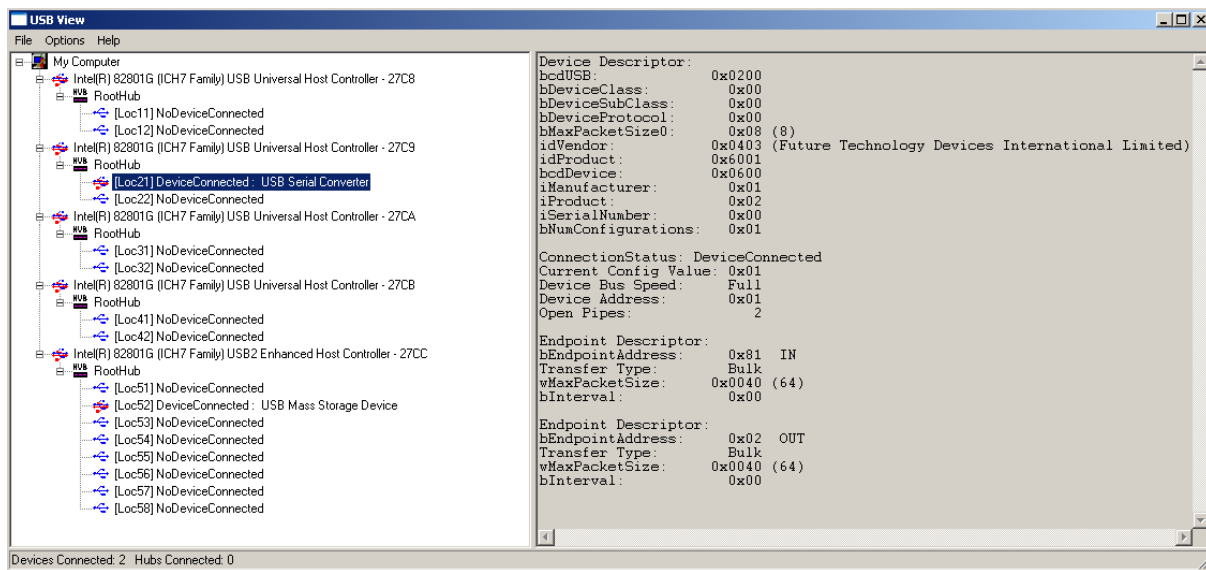
Location IDs are used with the VID and PID to identify the device. Effectively this ignores the serial number if one exists.

This method allows for the device to be untouched, but the driver must be edited before installation, which would invalidate any certification and the settings are likely to be different on every PC.

Location IDs for devices may be found by using another free FTDI utility called USBVIEW.

USBVIEW is downloadable at: <http://www.ftdichip.com/Resources/Utilities/usbview.zip>

The screenshot below shows an example of a device at LocID21



To make the changes to the driver *ftdibus.inf* file for this location it is necessary to add the following text to the file.

[FtdiBus.NT.AddService]

AddReg = FtdiBus.NT.AddService.AddReg

[FtdiBus.NT.AddService.AddReg]

HKR,Parameters,"LocIds",1,21,00,00,00, 00

This value is held in the registry key located at:

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

For further information on driver editing refer to AN_107 Advanced Driver options at:

http://www.ftdichip.com/Documents/AppNotes/AN_107_AdvancedDriverOptions_AN_000073.pdf

PROs: All devices have the same COM port assigned.
Do not need to change the devices EEPROMs

CONs: Different settings may be required on different PCs.
challenging bit more difficult to implement and prone to human error.

3.5 Use IgnoreHardwareSerialNumber Setting in the Registry

It is possible 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 FT2232 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 FT2232 device the IgnoreHWSerNum string would be:

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\UsbFlags\IgnoreHWSerNum0403601001

As the FT2232 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

PROs: All devices have the same COM port assigned.
Do not need to alter the hardware.
Same settings work on all PCs.
Only needs setup once.

CONs: Need to be able to access the registry.

3.6 Adding Intelligence to the Application

Potentially the most flexible solution is to allow any application to automatically detect the COM port being used.

This can be done using the FT_GetComPortNumber function call defined in:

[http://www.ftdichip.com/Documents/ProgramGuides/D2XX_Programmer's_Guide\(FT_000071\).pdf](http://www.ftdichip.com/Documents/ProgramGuides/D2XX_Programmer's_Guide(FT_000071).pdf)

The following code snippet is from a project at:

<http://www.ftdichip.com/Projects/CodeExamples/VC++.htm>

```

/*****
//Find the com port that has been assigned to your device.
*****/

res = FT_Open(0, &fthandle);
if(res != FT_OK){

    printf("opening failed! with error %d\n", res);
    return 1;
}

res = FT_GetComPortNumber(fthandle,&COMPORT);
if(res != FT_OK){

    printf("get com port failed %d\n", res);
    return 1;
}

if (COMPORT == -1){

    printf("no com port installed \n");
}

else{
    printf("com port number is %d\n", COMPORT);
}

FT_Close(fthandle);

/*****
// Open the com port assigned to your device
*****/
n = sprintf(COMx, "COM%d",COMPORT);
    hCommPort = CreateFile(
        COMx,
        GENERIC_READ | GENERIC_WRITE,
        0,
        NULL,
        OPEN_EXISTING,
        FILE_ATTRIBUTE_NORMAL,
        NULL
    );

if (hCommPort == INVALID_HANDLE_VALUE)
{
    printf("Help - failed to open\n");
    return(1);
}

```

PROs: Moves problem to application

CONs: May run out of COM ports.

3.7 Create a co-installer to force the assignment.

In theory a user could create a co-installer to force the assignment of a COM port during installation. However, if the co-installer tried to install to a port already in use (as defined by the registry) the installation would either have to fail or revert to letting the wizard select the next free port, making the co-installer redundant.

This method is not supported by FTDI.

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Appendix A – Abbreviations

Terms	Description
PID	Product ID, a unique product identification issued by the holder of the
VID	Vendor ID, a unique vendor identification number issued by the USB
USB	USB Universal Serial Bus
EEPROM	Electrically Erasable Programmable Read Only Memory



Appendix B – Revision History

Version 1.0 Initial Release

27th August 2009