TEXAS INSTRUMENTS

WINDOWS DRIVER INSTALLATION FLOW

Contents

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This document provides description of the steps involved during installation of a Windows driver.
It also provides an overview of the contents of "usb_dev_serial.inf" INF file provided in C2000Ware package.

Step 1: The New Device is identified

Before a driver is installed for a new device, Windows assigns a hardware identifier (ID) to the device.
A hardware ID is a vendor-defined identification string that Windows uses to match a device to an INF file. The format of the hardware ID typically consists of the following:

- A bus-specific prefix, such as PCI\ or USB\.
- Vendor-specific identifiers for the device, such as a vendor, model, and revision identifier.

For e.g.: usb\vid_1cbe&pid_0002&rev_0100
A device can also have associated with it a list of compatible IDs. A compatible ID is a vendor-defined identification string that Windows uses to match a device to an INF file.
Windows uses hardware IDs and compatible IDS to search for a driver package for the device. It finds a matching driver package for the device by comparing the device's hardware IDs and compatible IDs against those IDs that are specified within the package's INF file.

Step 2: Windows searches for driver packages that match a device.

Windows assigns a rank to a driver that matches a device. The rank indicates how well the driver matches the device. A driver rank is represented by an integer that is equal to or greater than zero. The lower the rank, the better a match the driver is for the device.

If more than one matching driver packages for the device, Windows selects the best driver by selecting the driver with the lowest rank. If Windows has found only one matching driver package, it installs the driver from that package for the device.

Step 3: Installation of the driver

Once the driver package is identified, Windows uses setup information (INF) files to install the following components for a device:

- One or more drivers that support the device.
- Device-specific configuration or settings to bring the device online.

The INF file typically includes the following:

- Driver name and location
- Driver version information
- Registry information

As soon as the driver files are copied, Windows transfers control to the Plug and Play (PnP) manager. The PnP manager loads the drivers and starts the device.

The PnP manager loads the appropriate function driver and any optional filter drivers for the device.
Reference:
https://docs.microsoft.com/en-us/windows-hardware/drivers/install/pnp-manager

Contents/Sections of INF file (usb_dev_serial.inf)

1. {Version]

The Version section appears first in INF files. Every INF file must have this section.

S No	Element & Value	Description
1	Signature="$Windows_NT$"	indicates support for all Windows operating systems
2	Class = Ports	This specifies the name of the device setup class for the type of device that is installed by using this INF file. This class "Ports" includes serial and parallel port devices.
3	ClassGuid = {4d36e978-e325-11ce-bfc1-08002be10318}	specify the corresponding system-defined GUID value for the class
4	Provider=%MFGNAME%	Identifies the provider ""Texas Instruments, Inc." of the INF file
5	CatalogFile=usb_dev_serial.cat	Specifies a catalog (.cat) file included with the driver
6	DriverVer=10/18/2016,2.1.4.0	This entry specifies version information for drivers that are installed by this INF file

2. [Manufacturer]

S No	Element & Value	Description
1	%MFGNAME%=VirComDevice,NT,NTamd64	Uniquely identifies a manufacturer and an INF section (VirComDevice) in the file that contains information that identifies a manufacturer's device models and target OS

3. [VirComDevice.NT]

S No	Element & Value	Description
1	%DESCRIPTION%=DriverInstall,USB\Vid_1CBE&Pid_0002	Specifies "TivaWare USB serial port" to be installed by following the section "DriverInstall" in the INF file for the hardware id "USB\Vid_1CBE&Pid_0002"

4. [DriverInstall.NT]

S No	Element & Value	Description
1	Include=mdmcpq.inf	specifies system-supplied INF file "mdmcpq.inf" file that contain sections needed to install this device driver
2	CopyFiles=FakeModemCopyFileSection	mdmcpq.inf knows the right place where the original usbser.sys exists
3	AddReg=DriverInstall.NT.AddReg	This directive references the section "[DriverInstall.NT.AddReg]" which specifies keys, subkeys to be written into the registry

5. [DriverInstall.NT.AddReg]

S No	Element & Value	Description
1	HKR,,DevLoader,,*ntkern	HKR indicates relative root, subkey "DevLoader" and its value "*ntkern"
2	HKR,,NTMPDriver,,usbser.sys	HKR indicates relative root, subkey "NTMPDiver" and value "usbser.sys"
3	HKR,,EnumPropPages32,,"MsPorts.dll,SerialPortPropPageProvider"	HKR indicates relative root, subkey "EnumPropPages32" and its value "MsPorts.dll,SerialPortPropPageProvider"

Relative root is Class\SetupClassGUID\device-instance-id registry path

6. [DriverInstall.NT.Services]

Section contains AddService directives that reference [DriverServiceInst] sections in an INF file

S No	Element & Value	Description
1	AddService=usbser, 0x00000002, DriverServiceInst	Specifies usbser service to be installed with flag 0x00000002 and DriverServiceInst parameters

7. [DriverServiceInst]

S No	Element & Value	Description
1	DisplayName=%SERVICE%	Specifies a friendly name for the service/driver
2	ServiceType=1	Specifies this driver as a kernel-mode device driver
3	StartType=3	Indicates a driver started on demand, either by the PnP manager when the corresponding device is enumerated
4	ErrorControl=1	If the driver fails to load or initialize its device, system startup should proceed but display a warning to the user.
5	ServiceBinary=%12%\usbser.sys	Specifies the path of the binary for the service, C:\Windows\System32\drivers\usbser.sys