USB DRIVER CUSTOMIZATION

Relevant Devices

This application note applies to the following devices:
CP2101, CP2102, CP2103, C8051F320, C8051F321

1. Introduction

The information in this document and the associated software download is intended for use by developers creating USB products based on the CP210x USB to UART Bridge Controller device family or the C8051F32x USB Microcontroller device family. A Virtual COM Port Driver is available for the CP210x family and is included with the purchase of a CP210x Evaluation Kit. Additionally, drivers can be created using the USBXpress™ development kit for the CP210x and C8051F32x device families. This document describes the steps necessary to customize the Windows® device driver installation using the Custom USB Driver Installation Wizard.

2. Customizing Driver Installations

The driver installation is customizable by modifying certain sections of the hardware installation files (.inf). The strings contained in the .inf files will affect what is displayed in the "Found New Hardware Wizard" dialogs, Device Manager, and the Registry. The changes to the VID and PID in the driver installation should match the VID and PID contained in the EEPROM/FLASH of your product. See "AN144: CP210x Device Customization Guide" for more information on changing the VID and PID for your product.

Note: Any changes to the Windows installation .inf files will require new Windows Hardware Quality Labs (WHQL) tests.

3. Using the Custom USB Driver Installation Wizard

The Custom USB Driver Installation Wizard generates a custom driver installation for distribution to end-users. This customized installation consists of modified .inf files, preinstall and uninstall support files, and driver files for Windows 98SE/2000/XP.

The preinstaller (Preinstaller.exe) can be used to copy driver files and register a device on a PC before the device has been connected. When the device is connected to the PC for the first time, the drivers will be installed with little interaction from the user. At this time, the driver will be listed in the Add/Remove Programs list and the corresponding uninstaller can be used to remove the driver.

Note: This installation does not contain certified drivers for Windows XP/2000. Certification must be performed by Microsoft for the new driver installation. An uncertified installation will not cause any other problems other than the warning message displayed by Windows XP when installing uncertified drivers.

To run the Custom USB Driver Installation Wizard, open *CustomUSBDriverWizard.exe* included in the AN220SW.zip download. Figure 1 shows the first screen of the Custom USB Driver Installation Wizard. Choose the type of driver installation desired. For detailed instructions on creating a custom VCOM CP210x based driver installation, see “4. Creating a Custom CP210x Based Driver”. For detailed instructions on creating a custom USBXpress based driver installation, see "5. Creating a Custom USBXpress™ Based Driver" on page 5.

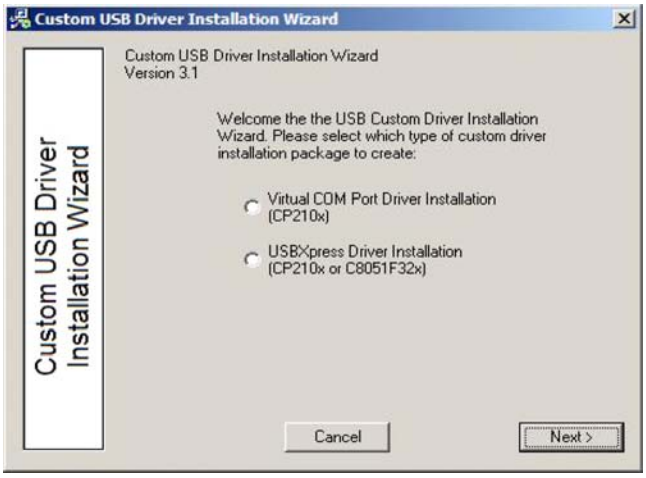

Figure 1. Driver Installation Selection

4. Creating a Custom CP210x Based Driver

This section describes how to create a custom driver based on the CP210x USB to UART Bridge controller. To begin this type of installation, choose “Virtual COM Port Driver Installation” and click Next.

4.1. Driver Certification Warning

The first screen is the warning explaining that the generated driver installation will not be certified. (See Figure 2.) Click Next to begin customizing your driver installation.

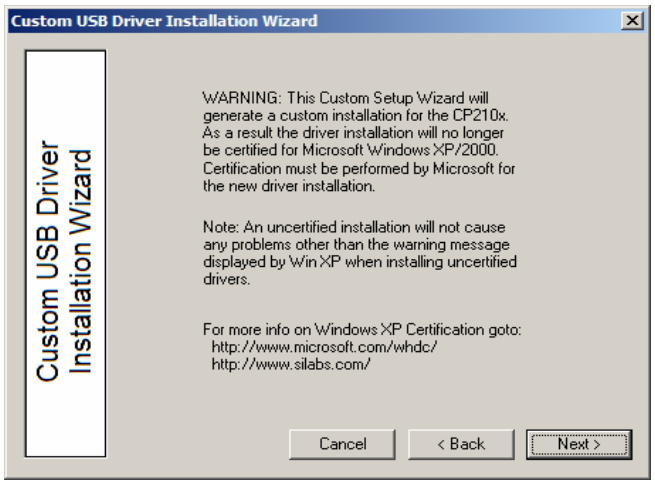

Figure 2. Driver Certification Warning

4.2. File Names and .inf File Entries Customization

The first step in the customization utility (shown in Figure 3) is to specify your preferred filenames and .inf file entries. Each field is described in further detail below.

4.2.1. Name for Uninstall File

This field allows specification of a unique uninstall file name. The maximum length of this string is eight characters. The generated files will be named xxxxxxxx.u98 and xxxxxxxx.u2k containing uninstall information for Windows 98SE and Windows 2000/XP respectively. This name must be unique to your product to avoid the possibility of collision with other installations created by this utility. If a different solution is required, contact Silicon Laboratories for information and pricing regarding our driver branding process.

4.2.2. Prefix for .inf File Names

This field allows for specification of a unique prefix for all .inf files. The maximum length of this string is four characters. The generated files will be named xxxxbus.inf, xxxxvxd.inf, xxxxw2k.inf, and xxxxwdm.inf.

4.2.3. Short Name for .inf File Entries

The short name appears .inf file entries and has a maximum length of 31 characters.

4.2.4. Long Name for .inf File Entries

The long name appears .inf file entries and has a maximum length of 255 characters.

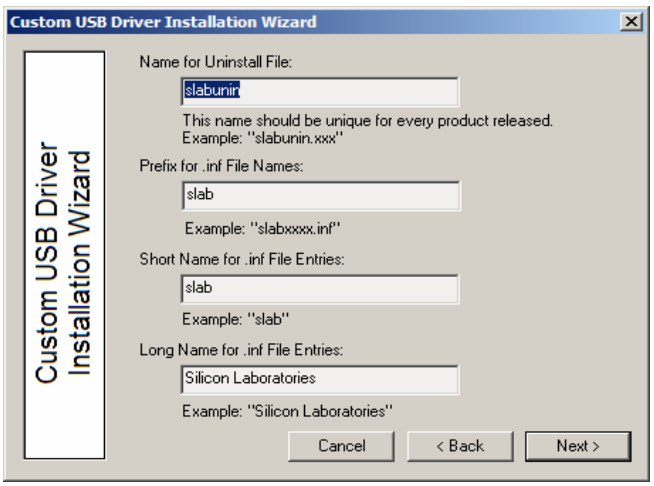

Figure 3. File Names and .inf File Entries Customization

4.3. Device Manager String Customization

The next step in the customization process is to specify the device names that will appear in the Windows Device Manager. This step is shown in Figure 4. An example for Windows XP is shown in Figure 5. Each field is described in further detail below.

4.3.1. COM Device Name

This string will be displayed in Device Manager under the Ports Tab and in the Add/Remove Programs listing.

4.3.2. USB Device Name

This string will be displayed in Device Manager under the USB Tab.

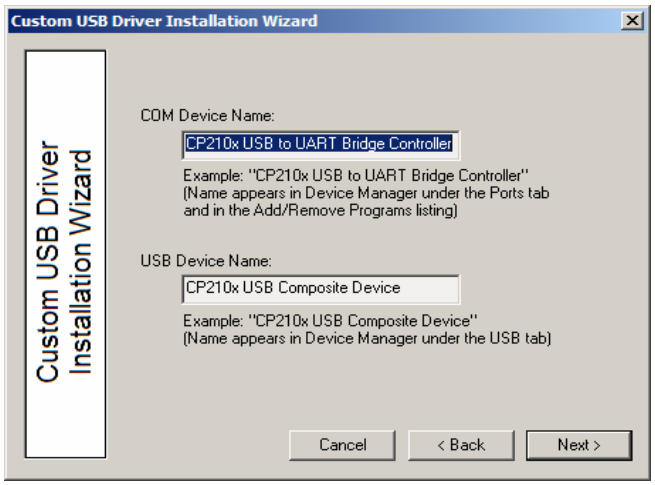

Figure 4. Device Manager String Customization

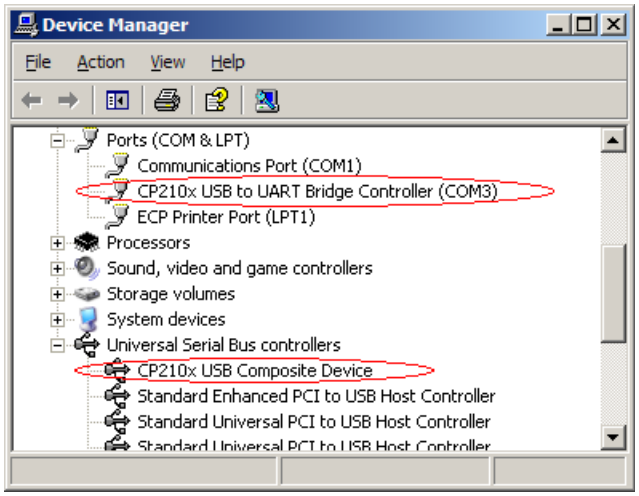

Figure 5. Windows XP Device Manager Example

4.4. VID and PID Customization

The next step in the customization utility is to specify the Vendor ID (VID) and Product ID (PID) for the device. The VID and PID are used by Windows to match the USB device to its associated driver files. This step is shown in Figure 6. Each field is described in further detail below.

4.4.1. VID (Vendor ID)

Allows specification of a new vendor ID (VID).

4.4.2. PID (Product ID)

Allows specification of a new product ID (PID).

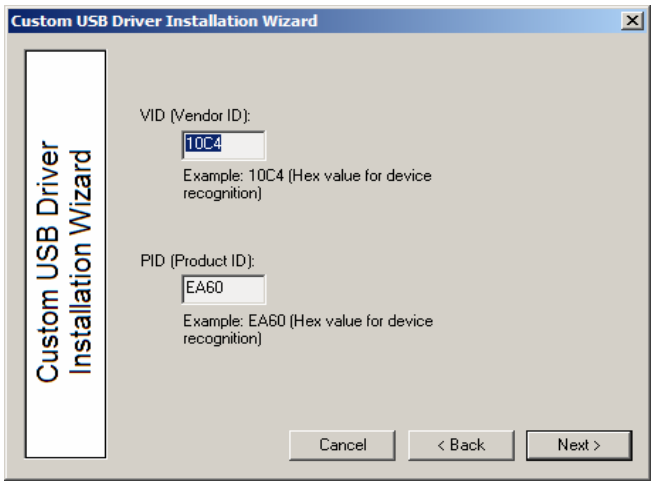

Figure 6. VID and PID Customization

4.5. Preinstaller and Uninstaller Options

The next step in the customization process is to specify options for the driver Preinstaller and Uninstaller. A Preinstaller mimics the behavior of the "Add New Hardware Wizard" in Windows. To use the Preinstaller, run it before the hardware is connected. Once connected, Windows 98SE/2000 will recognize the device, and the "Add New Hardware Wizard" should not be needed. When using Windows XP and uncertified driver files, the "Add New Hardware Wizard" and warning messages will appear, but the path to the driver files will not be requested. Once the driver files have been certified for Windows XP, the "Add New Hardware Wizard" should no longer appear. To create the Preinstaller, select the "Generate a Preinstaller program" option in the Preinstaller and Uninstaller options window shown in Figure 7. Each option is described in further detail below. Additionally, a detailed description of each option will be provided by pressing the "?" button next to the option.

4.5.1. Generate a Preinstaller program

Select this option to generate a Preinstaller. Use the Preinstaller to install the drivers before the hardware is connected. Once connected, Windows 98SE and 2000 will recognize the device and the "Add New Hardware Wizard" should not be needed. When using Windows XP and uncertified driver files, the "Add New Hardware Wizard" and warning messages will appear but the path to the driver files will not be requested. Once the driver files have been certified for Windows XP, the "Add New Hardware Wizard" should no longer appear.

4.5.2. Display GUI window during Setup

Check this option when using the generated Preinstaller as a stand-alone application. The Preinstaller will display several GUI windows during the installation process. Uncheck this option if the Preinstaller will be launched by another application. The Preinstaller will then run in quiet mode. When running in quiet mode, no GUI will be displayed.

4.5.3. Copy Files to Directory during Setup

Check this option if a copy of the drivers is needed on the hard drive. This is useful when installing the drivers from a CD. Uncheck this option if copies of the driver files are not needed on the hard drive. This option is valid only when using Windows 2000/XP.

4.5.4. Target Directory

The Target Directory selects the hard drive location that will contain a copy of the driver files. The default location is *C:\Program Files\Silabs\MCU\CP210x*. If the "Display GUI window during Setup" option is selected, this path can be changed during installation by clicking the Browse button. However, if the "Display GUI window during Setup" option is not selected then the default directory is always used. This option is ignored if the "Copy Files to Directory during Setup" option is not selected. This option is valid only when using Windows 2000/XP.

Note: The Target Directory must be different for each product released.

4.5.5. Display GUI window during Uninstall

Check this option when using the generated Uninstaller as a stand-alone application. The Uninstaller will display several GUI windows during the uninstall process. Uncheck this option if the Uninstaller will be launched by another application. The Uninstaller will then run in quiet mode. When running in quiet mode, no GUI will be displayed.

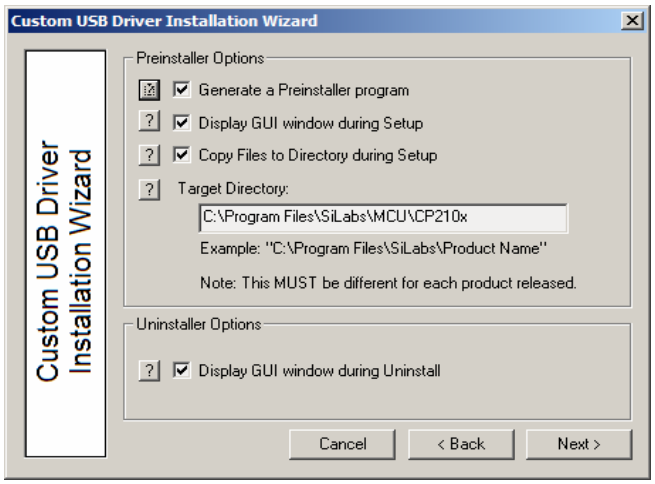

Figure 7. Preinstaller and Uninstaller Options

4.6. Installation Directory

The next step in the customization utility is to specify where the installation files will be generated. The default directory is *C:\Silabs\MCU\CustomCP210xDriverInstall*. However, a different directory can be selected or created. This step is shown in Figure 8.

Note: This is not an actual installation of the drivers. This is simply a directory to output all installation files needed for the installation. These files can be added to a CD or OEM installation for distribution to the end-user.

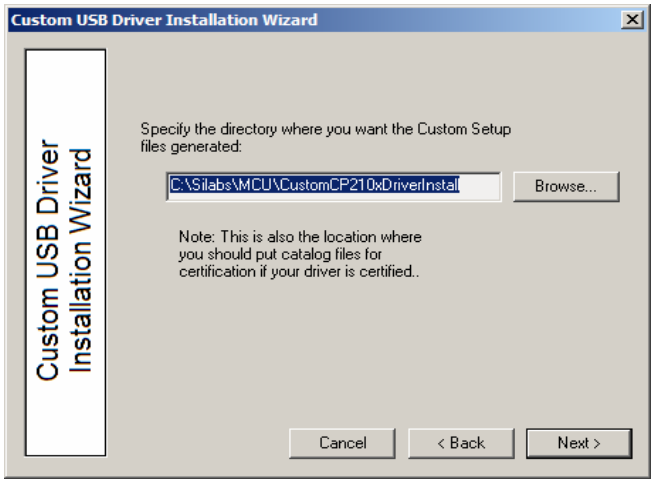

Figure 8. Installation Directory

4.7. Option Verification

The final step in the customization utility is to review all of the selected options. If anything needs to be changed, the Back button can be used to go back to previous pages to change items. Once all options have been verified, press Finish to create the customized driver files. This step is shown in Figure 9.

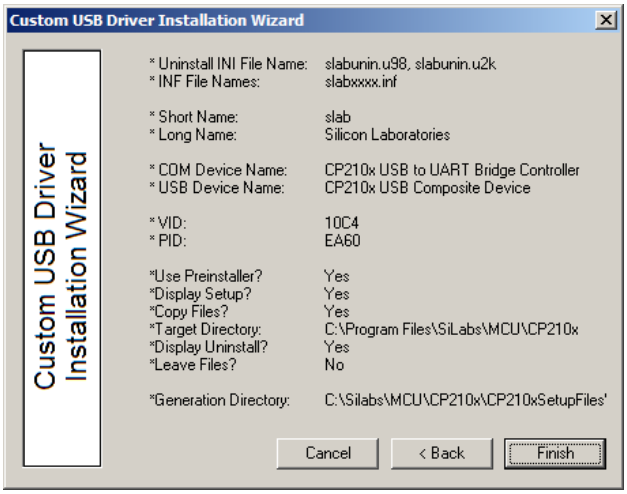

Figure 9. Figure 9. Option Verification

5. Creating a Custom USBXpress™ Based Driver

This section describes how to create a custom driver based on the USBXpress development kit. These drivers can support both the CP210x and C8051F32x device families. To begin this type of installation, choose "USBXpress Driver Installation" and click Next.

5.1. File Names and .inf File Entries Customization

The first step in the customization utility is to specify your preferred filenames and .inf file entries. This step is shown in Figure 10. Each field is described in further detail below.

5.1.1. Name for Uninstall File

This field allows specification of a unique uninstall file name. The maximum length of this string is 8 characters. The generated files will be named xxxxxxxx.u98 and xxxxxxxx.u2k containing uninstall information for Windows 98SE and Windows 2000/XP respectively. This name must be unique to your product to avoid the possibility of collision with other installations created by this utility.

If a different solution is required, please contact Silicon Laboratories for information and pricing regarding our driver branding process.

5.1.2. File Name for .inf File

This field allows for specification of a unique name for the .inf file. The maximum length of this string is eight characters. The generated file will be named xxxxxxx.inf.

5.1.3. File Name for .sys File

This field allows for specification of a unique name for the .sys file. The maximum length of this string is eight characters. The generated file will be named xxxxxxx.sys.

5.1.4. Short Name for .inf File Entries

The short name appears .inf file entries and has a maximum length of 31 characters.

5.1.5. Long Name for .inf File Entries

The long name appears .inf file entries and has a maximum length of 255 characters.

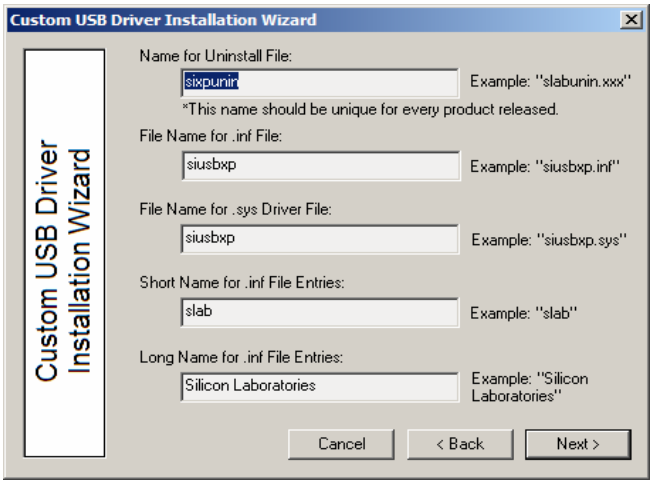

Figure 10. File Names and .inf File Entries Customization

5.2. Device Manager String Customization

The next step in the customization process is to specify the device names that will appear in the Windows Device Manager. This step is shown in Figure 11. An example for Windows XP is shown in Figure 12. Each field is described in further detail below.

5.2.1. USB Device Name

This string will be displayed in Device Manager under the USB Tab.

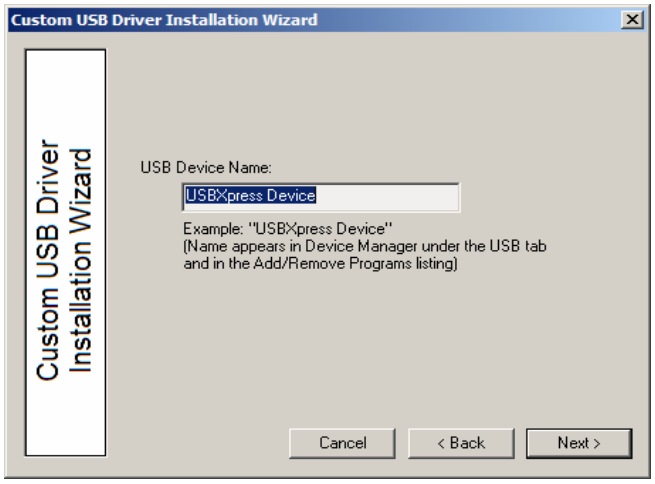

Figure 11. Device Manager String Customization

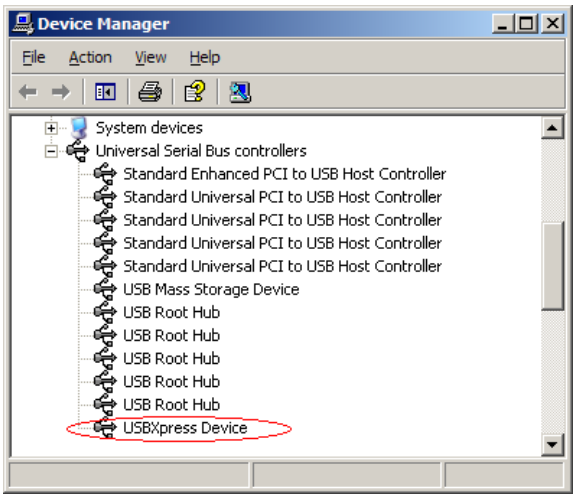

Figure 12. Windows XP Device Manager Example

5.3. VID and PID Customization

The next step in the customization utility is to specify the VID and PID for the device. The VID and PID are used by Windows to match the USB device to its associated driver files. This step is shown in Figure 13. Each field is described in further detail below.

5.3.1. VID (Vendor ID)

Allows specification of a new vendor ID (VID).

5.3.2. PID (Product ID)

Allows specification of a new product ID (PID).

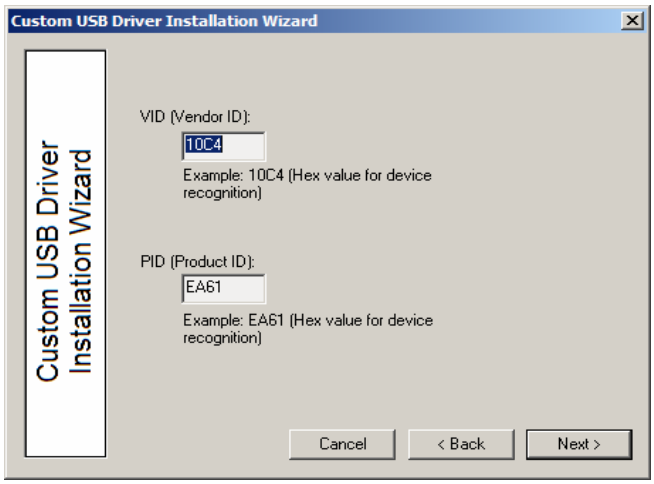

Figure 13. Figure 13. VID and PID Customization

5.4. Preinstaller and Uninstaller Options

The next step in the customization process is to specify options for the driver Preinstaller and Uninstaller. A Preinstaller mimics the behavior of the "Add New Hardware Wizard" in Windows. To use the Preinstaller, run it before the hardware is connected. Once connected, Windows 98SE/2000 will recognize the device and the "Add New Hardware Wizard" should not be needed. When using Windows XP and uncertified driver files, the "Add New Hardware Wizard" and warning messages will appear but the path to the driver files will not be requested. Once the driver files have been certified for Windows XP, the "Add New Hardware Wizard" should no longer appear. To create the Preinstaller, select the "Generate a Preinstaller program" option in the Preinstaller and Uninstaller options window shown in Figure 14. Each option is described in further detail below. Additionally, a detailed description of each option will be provided by pressing the "?" button next to the option.

5.4.1. Generate a Preinstaller program

Select this option to generate a Preinstaller. Use the Preinstaller to install the drivers before the hardware is connected. Once connected, Windows 98SE and 2000 will recognize the device, and the "Add New Hardware Wizard" should not be needed. When using Windows XP and uncertified driver files, the "Add New Hardware Wizard" and warning messages will appear, but the path to the driver files will not be requested. Once the driver files have been certified for Windows XP, the "Add New Hardware Wizard" should no longer appear.

5.4.2. Display GUI window during Setup

Check this option when using the generated Preinstaller as a stand-alone application. The Preinstaller will display several GUI windows during the installation process. Uncheck this option if the Preinstaller will be launched by another application. The Preinstaller will then run in quiet mode. When running in quiet mode, no GUI will be displayed.

5.4.3. Copy Files to Directory during Setup

Check this option if a copy of the drivers will be needed on the hard drive. This is useful when installing the drivers from a CD. Uncheck this option if a copies of the driver files are not needed on the hard drive. This option is valid only when using Windows 2000/XP.

5.4.4. Target Directory

The Target Directory selects the hard drive location that will contain a copy of the driver files. The default location is *C:\Program Files\Silabs\MCU\CP210x*. If the "Display GUI window during Setup" option is selected, this path can be changed during installation by clicking the Browse button. However, if the "Display GUI window during Setup" option is not selected then the default directory is always used. This option is ignored if the "Copy Files to Directory during Setup" option is not selected. This option is valid only when using Windows 2000/XP.

Note: The Target Directory must be different for each product released.

5.4.5. Display GUI window during Uninstall

Check this option when using the generated Uninstaller as a stand-alone application. The Uninstaller will display several GUI windows during the uninstall process. Uncheck this option if the Uninstaller will be launched by another application. The Uninstaller will then run in quiet mode. When running in quiet mode, no GUI will be displayed.

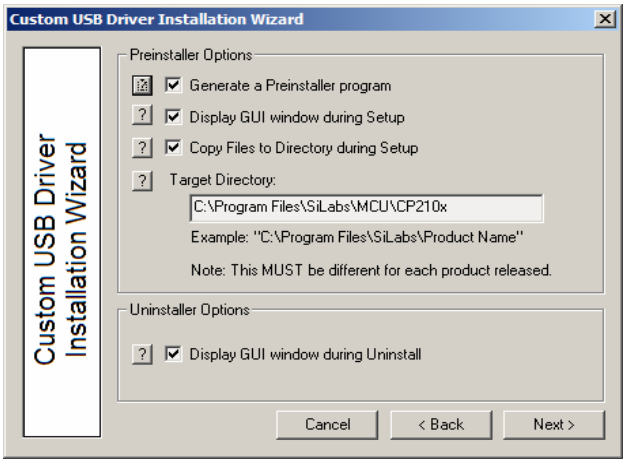

Figure 14. Preinstaller and Uninstaller Options

5.5. Installation Directory

The next step in the customization utility is to specify where the installation files will be generated. The default directory is *C:\Silabs\MCU\CustomUSBXpressDriverInstall*. However, a different directory can be selected or created. This step is shown in Figure 15.

Note: This is not an actual installation of the drivers. This is simply a directory to output all installation files needed for the installation. These files can be added to a CD or OEM installation for distribution to the end-user.

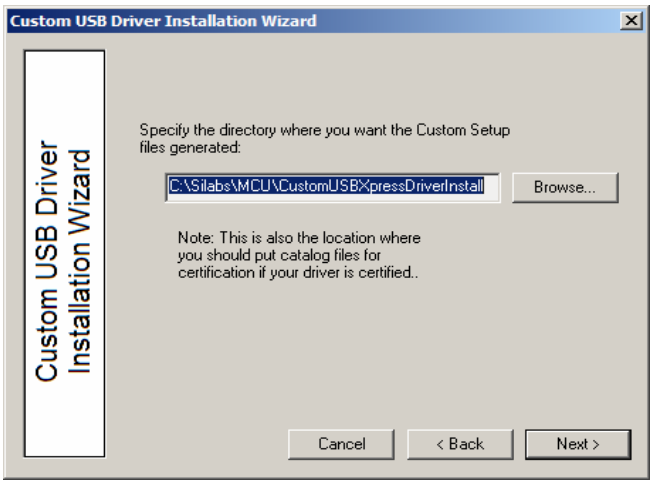

Figure 15. Installation Directory

5.6. Option Verification

The final step in the customization utility is to review all of the selected options. If anything needs to be changed, the Back button can be used to go back to previous pages to change items. Once all options have been verified press Finish to create the customized driver files. This step is shown in Figure 16.

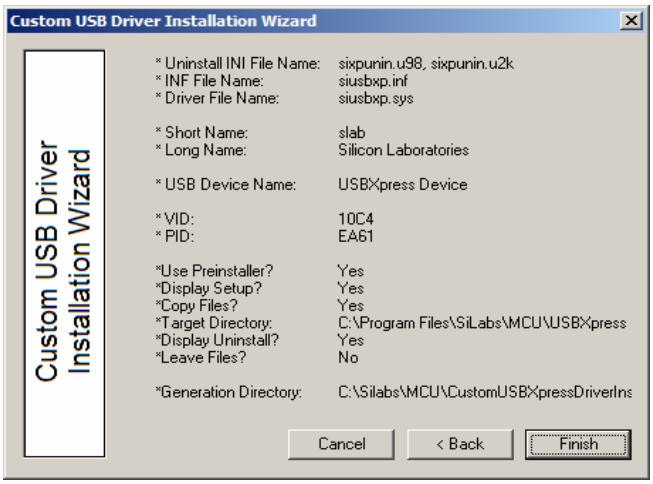

Figure 16. Option Verification

6. Customizing Driver Installations, Macintosh OS9 and OSX

If the VID or PID is changed from the default factory settings, contact Silicon Laboratories to obtain drivers that incorporate the new values. Macintosh requires that the drivers be compiled with the values that will be used by the production CP210x device.

DOCUMENT CHANGE LIST

Revision 0.1 to Revision 0.2

- Added CP2103 to Relevant Devices on page 1.

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