TUSB3x10 EEPROM Burner

The TUSB3x10 EEPROM Burner is a Windows-based application allowing the external I2C EEPROM on TUSB3x10-based boards to be programmed via USB.

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1 Introduction

1.1 Definitions

The following are required to use the EEPROM Burner software:

- GUI – Graphical user interface
- HID – Human interface device
- VID – Vendor ID
- PID – Product ID
- EVM – Evaluation module / board
- PC – Personal computer
- USB – Universal Serial Bus
- VCP – Virtual COM port

1.2 Required Equipment

The following is required in order to use the EEPROM Burner software.

- TUSB3x10 EVM board
- USB cable (Type A connector to Type B connector)
- PC running Microsoft® Windows® XP or above (32-bits or 64-bits OS)

2 Installing the EEPROM Burner Software

The TUSB3x10 EEPROM Burner requires the installation of a device driver linked to the default VID and PID specified by the boot code of the device. The same VID and PID are also used by other TUSB3x10 device drivers, such as the TUSB3410 (USB to serial) VCP driver. To avoid software conflicts, install the application on a system with no previously-installed TUSB3x10 drivers and avoid installing other device drivers using the same VID and PID.

2.1 Running the Setup Program

Extract the setup program by running the setup.exe file. The wizard guides through the installation process.

The EEPROM Burner GUI requires Microsoft's .NET® Framework 3.5 connection software; the installer guides through this prerequisite installation in case the .NET framework version is not present on the system. An internet connection is required, as the framework is downloaded from the Microsoft website.

Figure 1. NET Framework 3.5 Installation

After the .NET framework validation has finished, the installer copies the necessary files to the local disk and executes a driver co-installer, which installs the Aploader driver in the system. Depending on the system settings, a warning message or security window may occur during the driver installation process. When prompted, accept the driver installation.

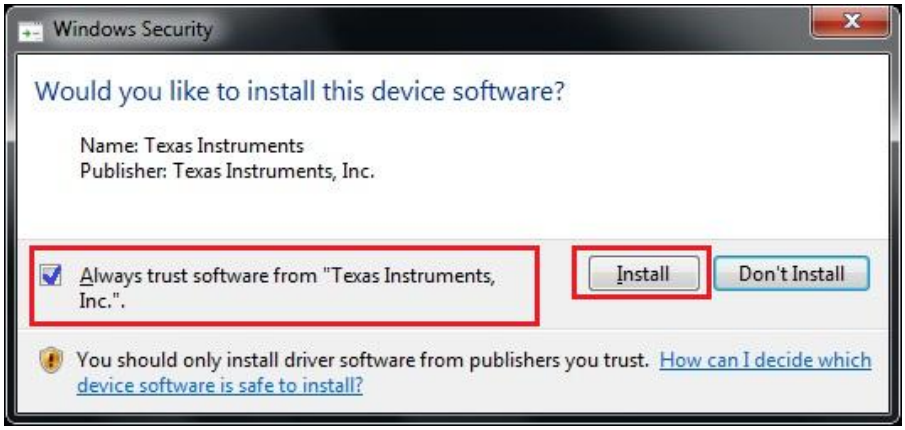

Figure 2. Security Window for Vista/Win7/Win8

After all the necessary files have been copied into the system, the installer prompts to restart the system to update the file dependencies.

Choose Reboot Now, then click Finish when the wizard indicates that the EEPROM Burner software installation is completed.

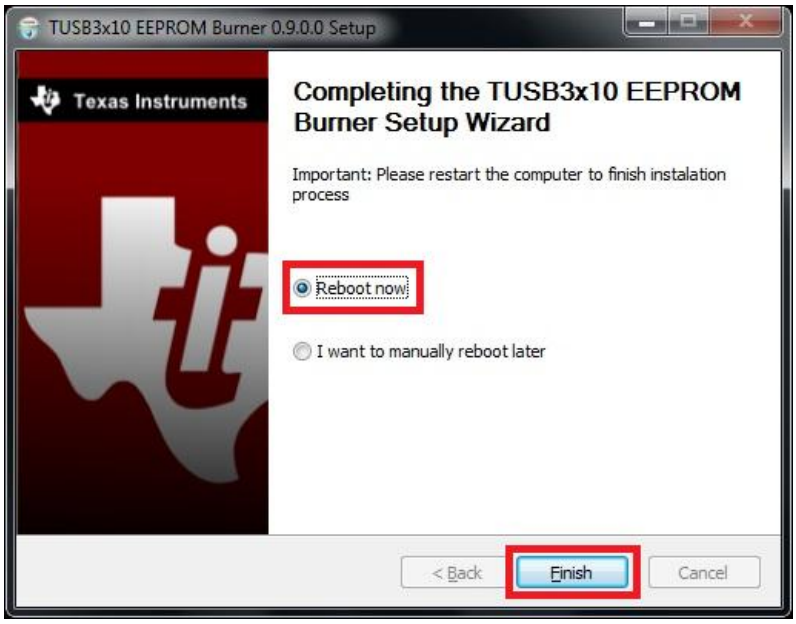

Figure 3. Software Installation Completed

2.2 Connecting the TUSB3x10 Based Hardware

The user can now connect the TUSB3x10 EVM board to any USB port available on the PC.

Upon connection, the Aploader driver installed with the application sends a special firmware to the device to make it HID compliant with a new VID and PID.

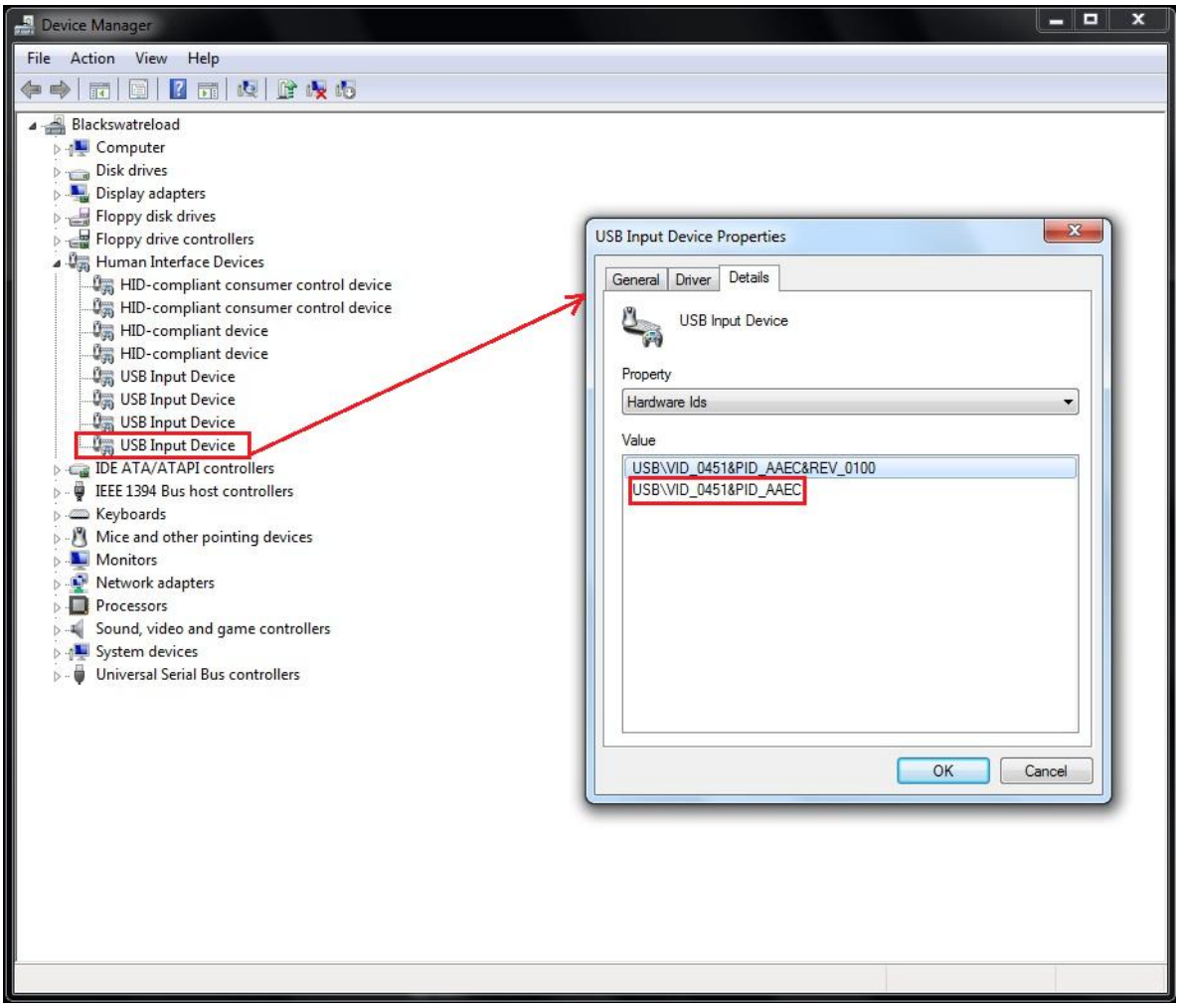

Figure 4. HID Compliant Device Instance

3 Using the EEPROM Burner Software

3.1 Opening the EEPROM Burner Software

After verifying that the HID compliant device instance is present in the device manager, access the EEPROM Burner utility by clicking on the TUSB3x10 EEPROM Burner shortcut on the desktop or by going to Start → Texas Instruments Inc → TUSB3x10 EEPROM Burner → TUSB3x10 EEPROM Burner.

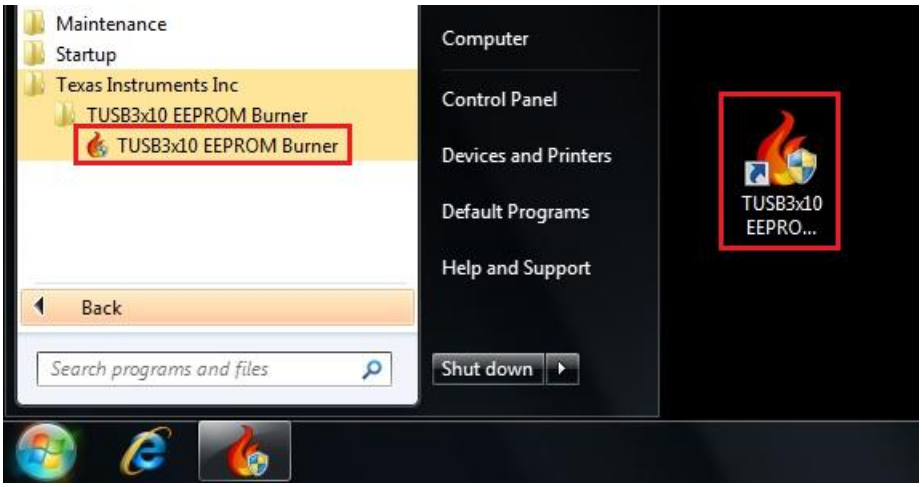

Figure 5. EEPROM Burner Software Locations

NOTE: Administrator rights are required to execute this application.

After executing the TUSB3x10 EEPROM Burner application, the user interface in Figure 6 appears:

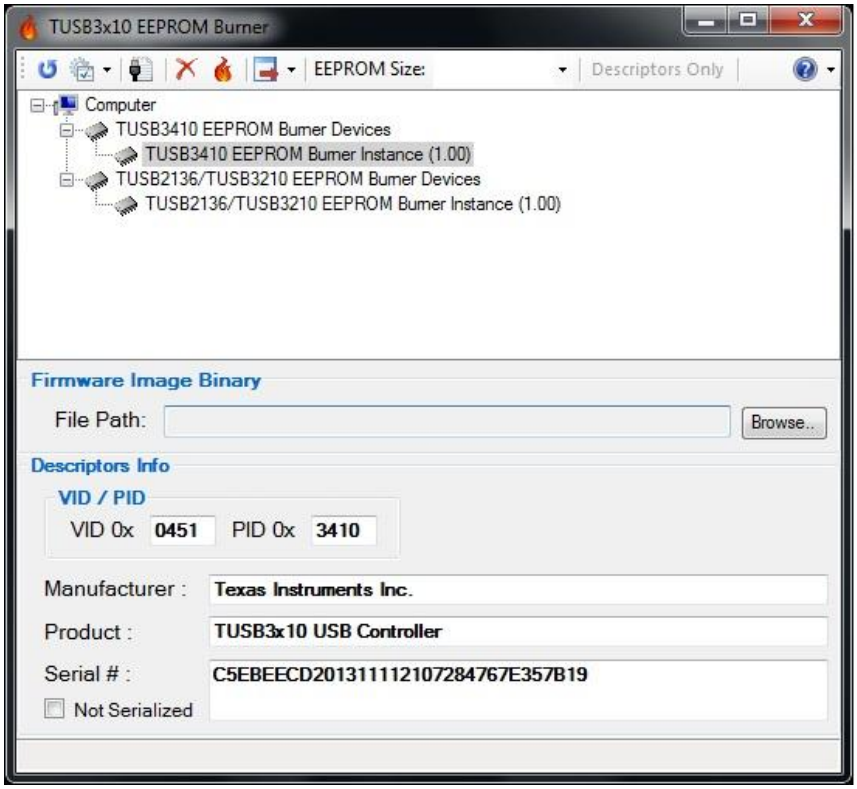

Figure 6. EEPROM Burner GUI

To check for the GUI version, click on the Help drop down menu ( ) and choose About to display the application information:

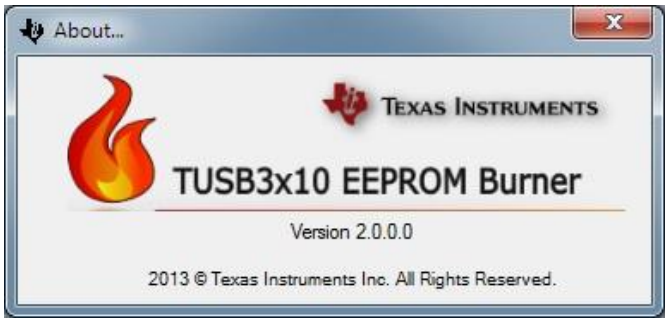

Figure 7. EEPROM Burner Software Version

3.2 EEPROM Burner GUI Options

The Options menu enables the user to change different aspects of the EEPROM Burner GUI configuration.

To access the options menu items, click on the Options button ( ):

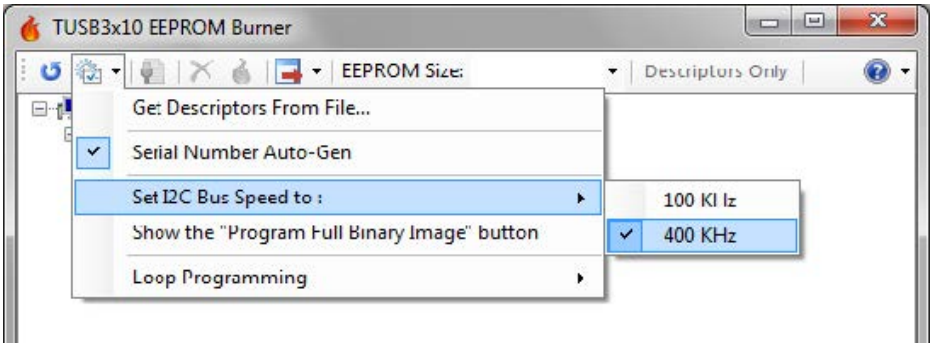

Figure 8. Selecting Options on the EEPROM Burner GUI

The following configuration aspects can be changed from the Options menu:

1. **Get Descriptors from File:** Set this option to get a collection of descriptor settings from a descriptors file (***.desc**) previously generated with the *Advance Descriptors Editor*. (Refer to Section 3.3 for additional details).

   Note: By un-checking this option, the application will use the default descriptor's settings.

2. **Serial Number Auto-Gen:** Set this option to have the EEPROM Burner GUI automatically generate a unique serial number for every programmed device.

   The auto-generated serial number is made of:

   (a) Random number (*8 chars*).

   (b) Date and time (*Year - 4 chars, Month – 2 chars, Day – 2 chars, Hour – 2 chars, Minutes – 2 chars, Seconds – 2 chars, Milliseconds – 3 chars*).

   (c) Serial number of the HDD running Windows (*8 chars*).

   NOTE: Available only for the TUSB3410

3. **Set I2C Bus Speed:** Set the I2C bus speed to either 100 or 400 kHz using the available sub-menu items.

4. **Show the "Program Full Binary Image" button:** This option shows a button on the main tool bar to enable the user to program a binary image without adding any special formatting or USB device descriptors to the selected binary image. This option can be useful if the user already has a bin file with all the required data (generated using the Export function).

5. **Loop Programming:** Set this option to have the EEPROM Burner GUI automatically program all the compatible devices upon connection. The programming process is looped until manually interrupted by the user.

3.3 Editing USB Descriptors

USB descriptors provide the host with all the necessary information to describe the USB device, so any change to these values must be done carefully.

Depending on the device, the user is able to change different USB descriptors.

3.3.1 TUSB3210 / TUSB2136

The TUSB3x10 EEPROM Burner GUI cannot define specific descriptors for general purpose USB controllers. Thus, all the device descriptors are defined within the specific firmware to be programmed.

Since both the TUSB3210 and TUSB2136 report the same VID/PID information when enumerated by their boot-codes, the user is presented with the option to select the device being used. In the case of the TUSB2136, the user can edit some of the parameters on the USB Hub descriptors through the *Advanced Descriptors Editor* and save them for further use.

Figure 9. Device Selection for TUSB3210 / TUSB2136

3.3.2 TUSB3410

When using this device, the user can change some basic descriptor information from the TUSB3x10 EEPROM Burner GUI main form. Within the Descriptors Info group-box there is a series of text box controls that let the user enter customized information about the device such as:

- **VID** – Vendor ID. 4 characters long (Assigned by USB-IF)
- **PID** – Product ID. 4 characters long (Assigned by the Manufacturer)
- **Manufacturer String Descriptor** – Maximum 30 characters long
- **Product String Descriptor** – Maximum 30 characters long
- **Serial Number String Descriptor** – Must be unique for each device. Maximum 40 characters long.

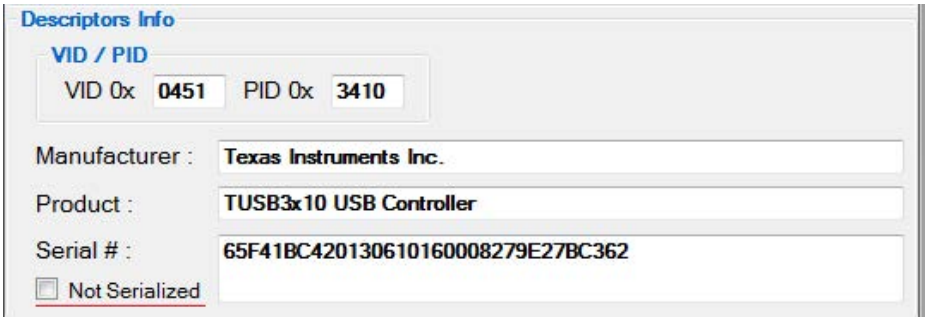

Figure 10. Descriptors Info Group Box

When needed, users can also choose to exclude the use of the serial number string descriptor by clicking on the Not Serialized check box shown in Figure 10.

Additional parameters can be changed through the Advanced Descriptor editor.

3.3.3 Using the Advanced Descriptor's Editor

Depending on the device being used, the EEPROM Burner GUI also lets the user edit additional descriptor information through the Advanced Descriptors editor tool.

To open the Advanced Descriptors editor tool interface, select a device from the list and click on the editor button () located on the tool bar menu at the top of the EEPROM Burner GUI.

Once the editor is open, the user can check the value of each individual descriptor to be used as well as edit some additional descriptor data.

Through this tool, the user can save their descriptor configuration to a descriptors (*.desc) file for future use. That file can later be loaded from the Options menu.

To save the current descriptors to a file, click on the Save As… button, select a file name and location from the resulting dialog and click OK.

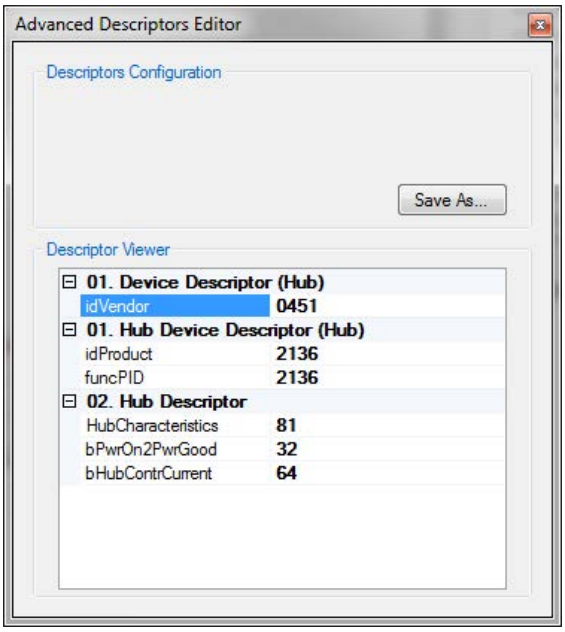

Figure 11. Advanced Descriptor's Editor for the TUSB2136

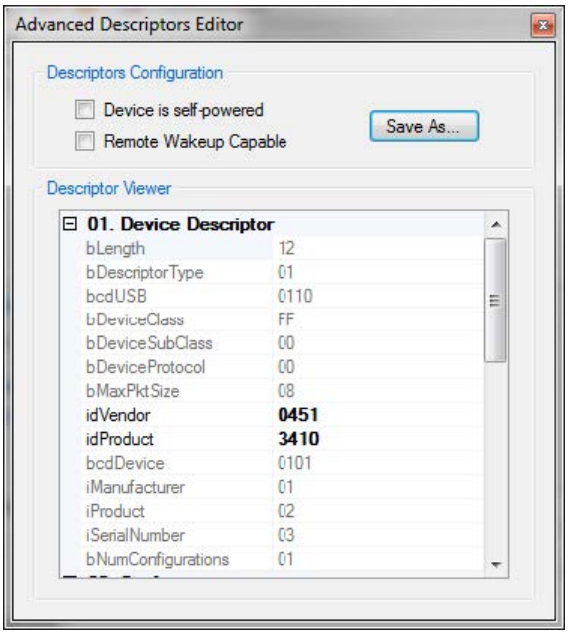

Figure 12. Advanced Descriptor's Editor for the TUSB3410

3.4 Selecting a Compatible Device

The EEPROM Burner GUI automatically identifies and lists all the compatible devices already connected on the system. Through this list, the user can choose among all the TUSB3x10 based devices detected.

Depending on the device selected, the toolbar buttons are enabled to perform any available task.

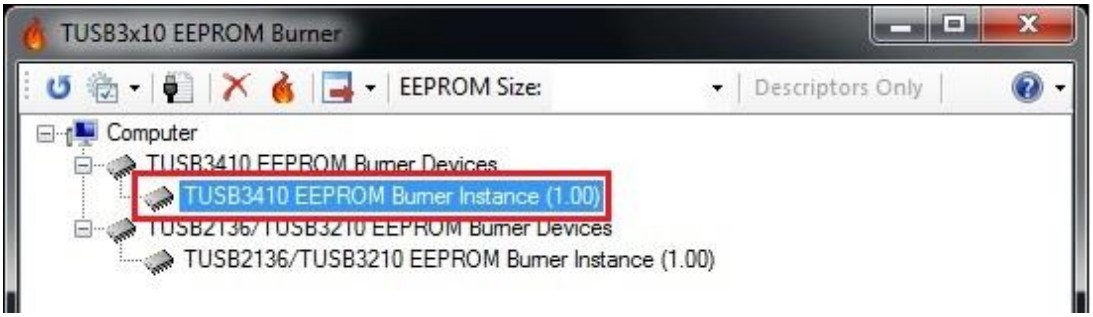

Figure 13. List for Selecting a Compatible TUSB3x10 Device

3.5 Selecting Firmware binary file

There is a group-box in the middle of the EEPROM Burner GUI identified as Firmware Image Binary that has a browse button that lets the user choose the *.i51 or *.bin file to be burned into the external EEPROM. Click on the Browse button and select the appropriate firmware file located in the system, then click on Open.

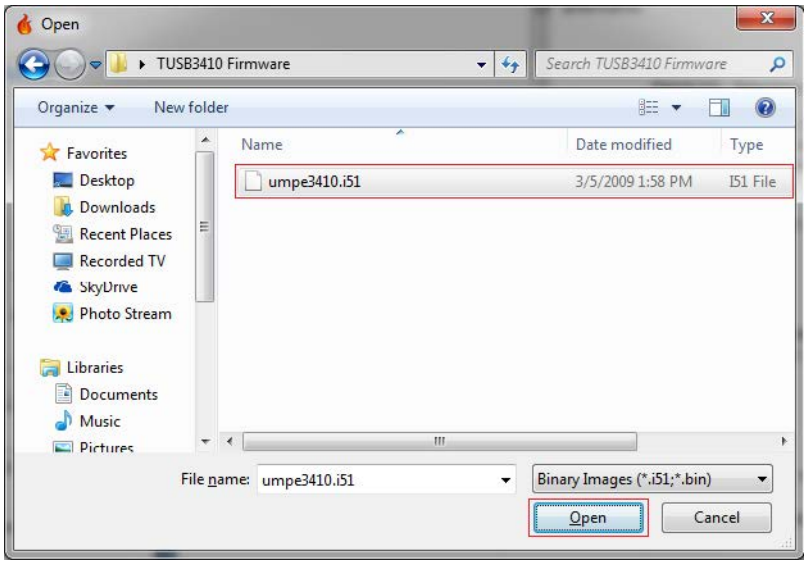

Figure 14. Selecting a Firmware File

NOTE: The user may want to burn only the customized USB descriptors into the EEPROM and will have the device driver to load the required firmware. Users willing to use this configuration can use the Descriptors Only button located on the main toolbar. With this option, the Firmware Image Binary group box is disabled, so the user will not need to specify a firmware file.

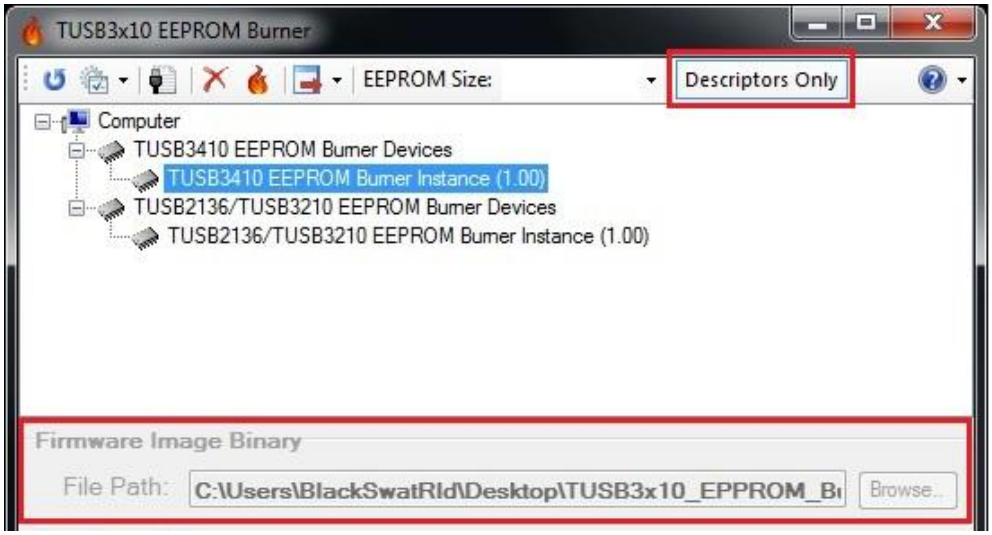

Figure 15. Descriptors Only Button

3.6 Selecting the Target EEPROM Size

To validate that the data to be burned will fit into the external EEPROM, select the capacity of the EEPROM model being used by using the drop-down menu located on the main tool bar.

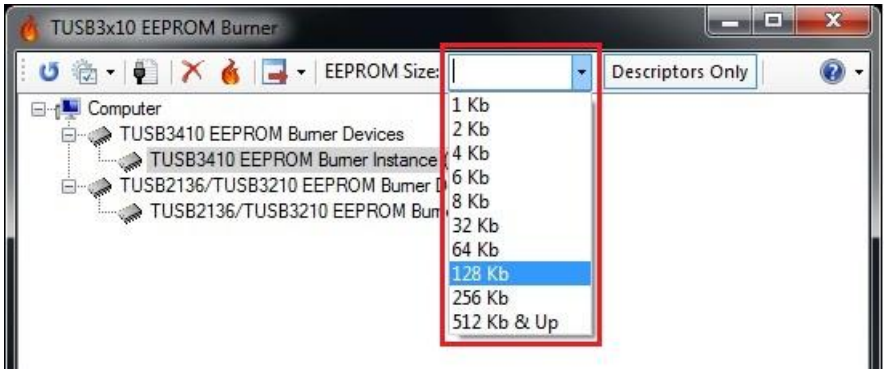

Figure 16. EEPROM Size Drop-down Menu

3.7 Burning the External EEPROM

After all the required options have been selected, click on the Program ( ) button.

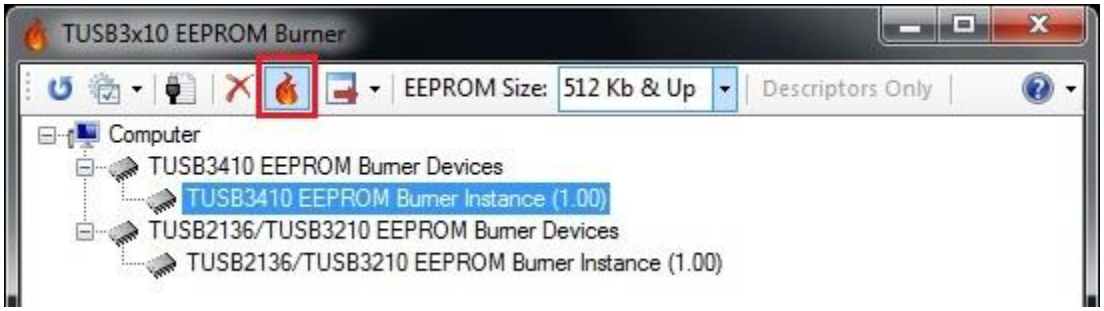

Figure 17. Burning the External EEPROM

During the programming process, all of the controls on the main window are disabled and a new window pops up to show the current progress.

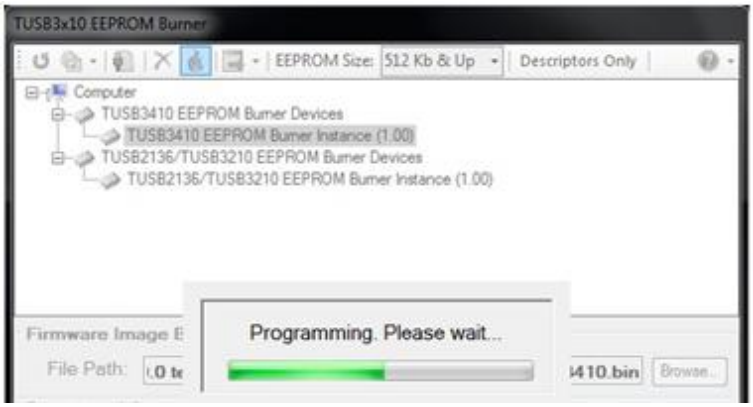

Figure 18. Burning Progress

When the EEPROM programming process is completed, a message box indicates if any errors were found. Click on OK to continue.

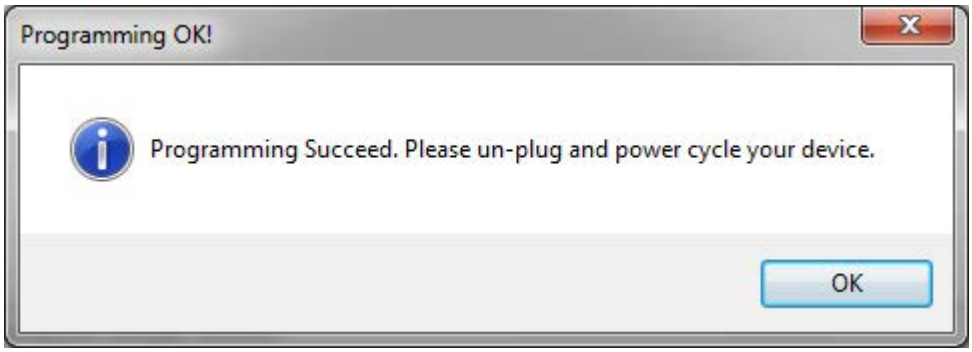

Figure 19. EEPROM Programming Succeeded

3.7.1 Loop Programming

The TUSB3x10 EEPROM Burner GUI provides an option to loop the programming process when it is required to program multiple devices with the same firmware file or descriptor settings. To enable this feature, enable the Loop Programming item from the Options menu.

NOTE: When this feature is enabled, the main tool bar adds the Stop button to exit the programming loop when required.

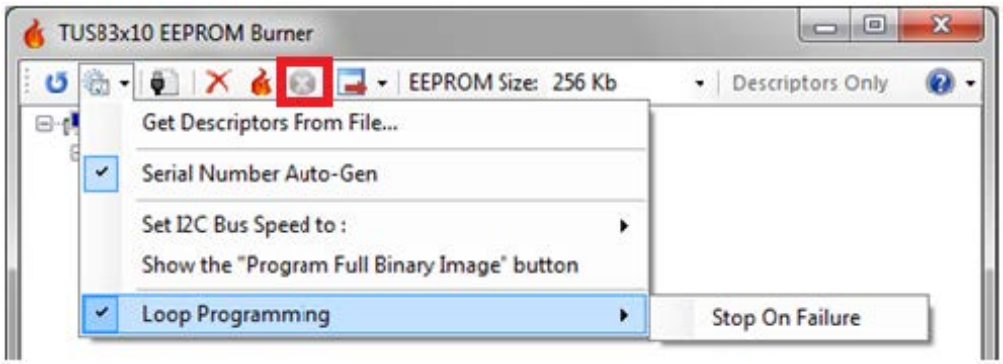

Figure 20. Loop Programming Option

The user can choose to abort the programming cycle when a programming failure occurs by enabling the Stop On Failure menu item beneath the Loop Programming option.

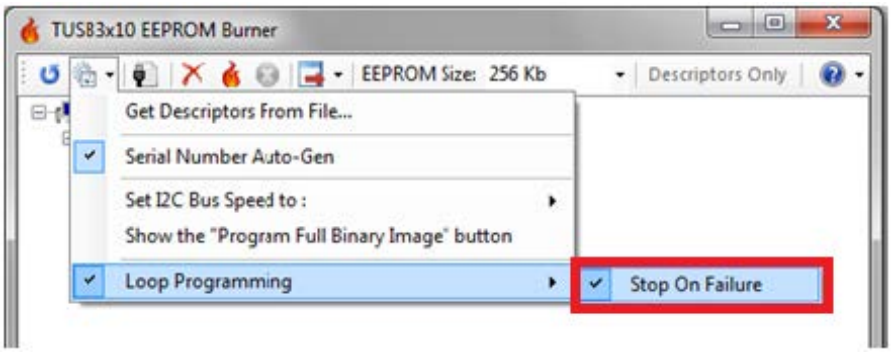

Figure 21. Stop On Failure

To start the programming cycle, follow the instructions detailed on Section 3.3 to Section 3.6 and then click on the Program button.

While the programming process is looped, only the Stop button is enabled on the main tool bar and any compatible device is automatically programmed with the selected settings upon device connection and enumeration.

Users can only exit the programming loop by clicking on the Stop ( ) button.

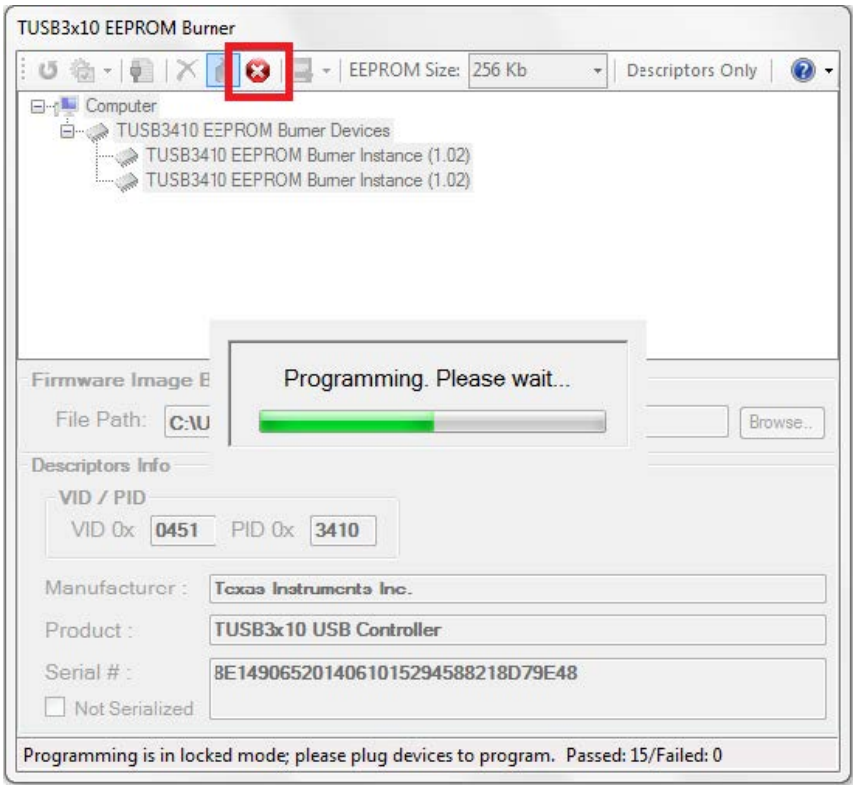

Figure 22. Burning in Process in Loop Programming Mode

3.8 Erasing the External EEPROM

To erase the content of the external EEPROM, click the Erase (X) button to issue the erase command on the device.

NOTE: First specify the EEPROM size.

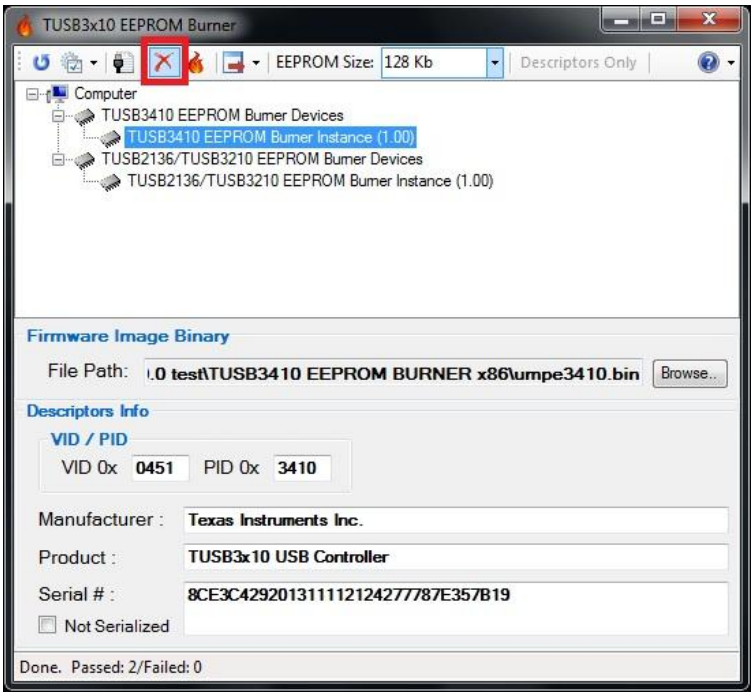

Figure 23. Erasing the External EEPROM

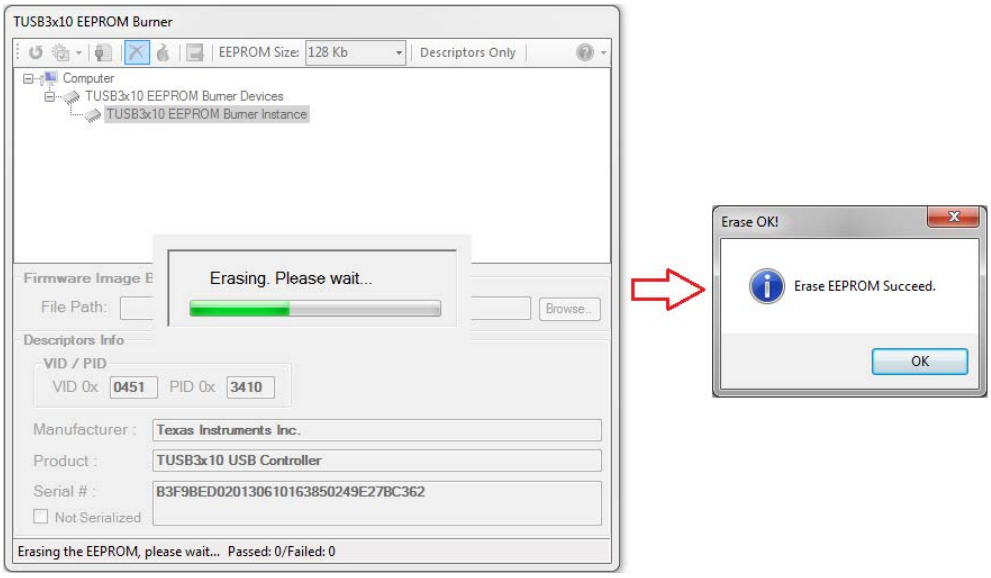

Figure 24. Erasing EEPROM Process

3.9 Export Options

The TUSB3x10 EEPROM Burner GUI also lets the user burn the EEPROM using a method other than the EEPROM Burner GUI, as it exports all the required data such as the USB descriptors, checksums, and firmware in the appropriate data format.

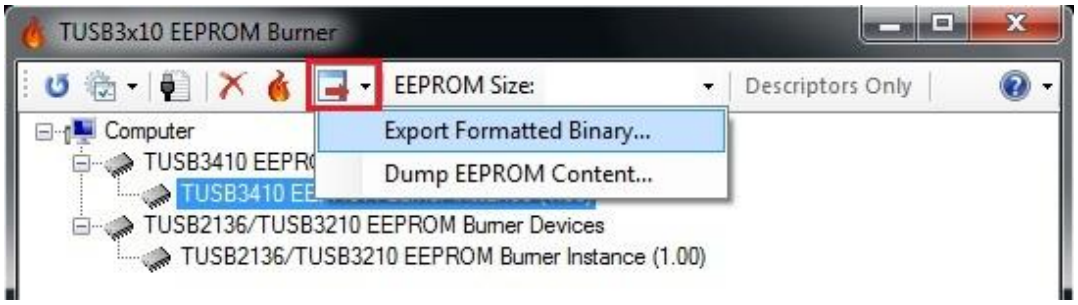

Figure 25. Export Options

There are two different export options available:

- **Export Formatted Binary:**
  - By using this option, the user exports the current descriptors and firmware binary selections to a .bin or .hex file properly formatted and ready to be used by an external programmer.
- **Dump EEPROM Content:**
  - By using this option, the user dumps the content of the EEPROM on the selected device to a .bin file.

4 Troubleshooting

The following section describes the most common problems that may show up when using the EEPROM Burner software.

4.1 Re-Installing EEPROM Burner Driver Instance Manually

If the TUSB3x10 EVM board comes up as an “Unknown device” with a yellow bang icon (see Figure 26), the Aploader was not properly installed or it was removed. The following instructions show how to perform a manual driver installation:

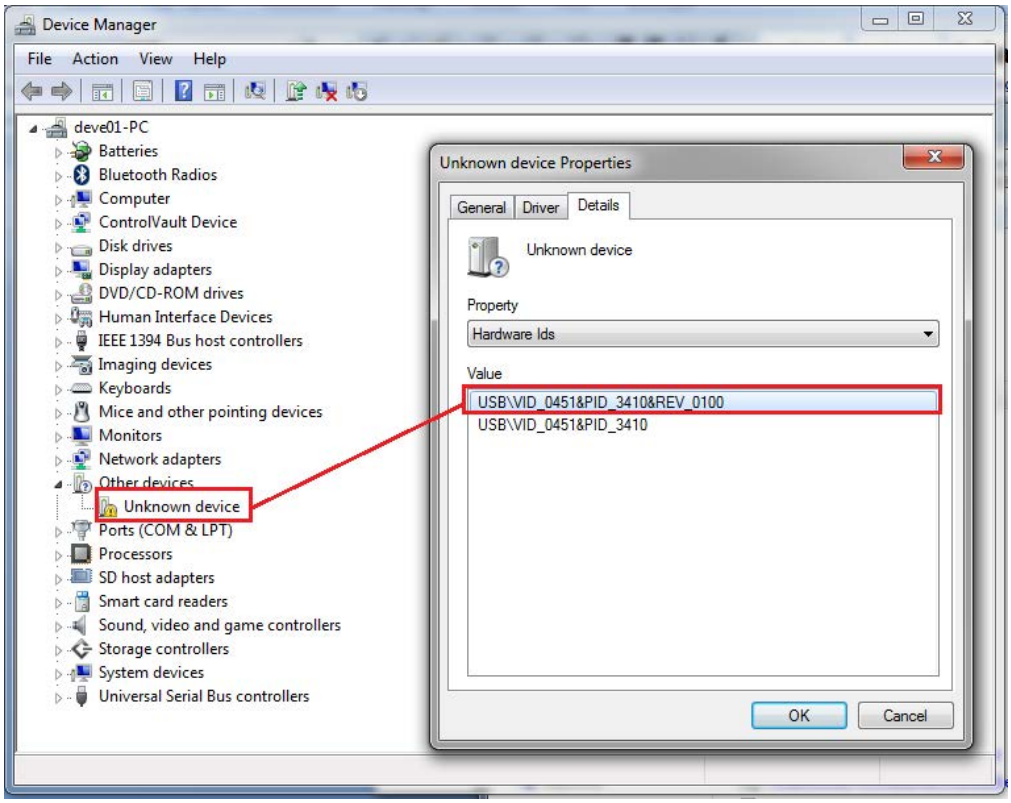

Figure 26. TUSB3x10 Aploader Driver not Properly Installed

Right-click on the “Unknown Device” instance and select the Update Driver Software option (see Figure 27).

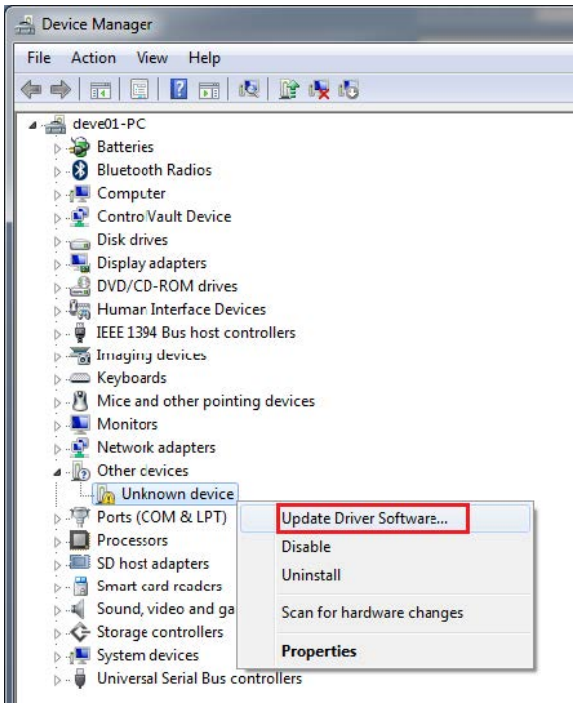

Figure 27. Manual Installation for a the TUSB3x10 Aploader Driver

The Update Driver Software wizard appears. Select Browse my computer for driver software.

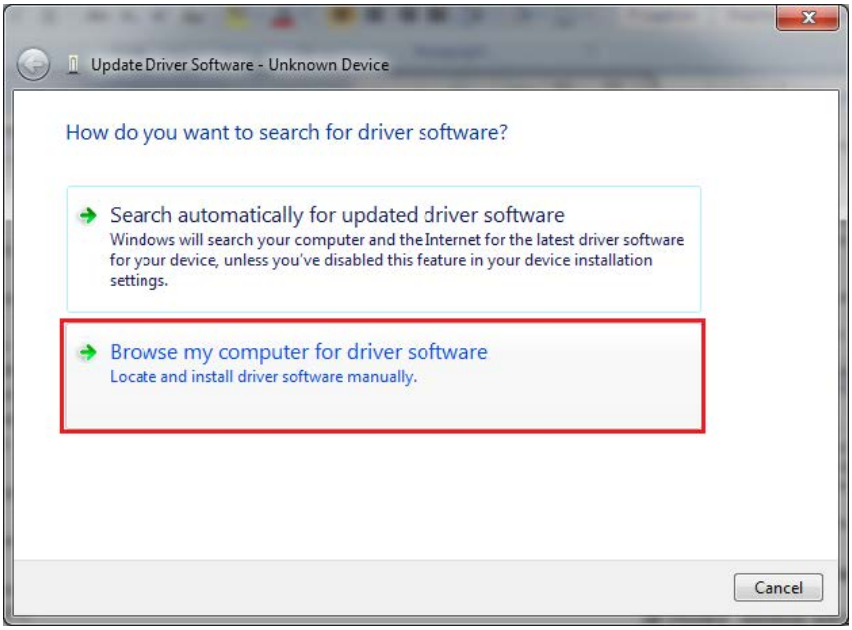

Figure 28. Manual Installation Wizard to Avoid Windows Update Online

Because the EEPROM Burner installer has already copied the proper drivers into the system, browse into the installation folder (by default at: C:\Program Files\Texas Instruments Inc\TUSB3x10 EEPROM Burner\Aploader) and click on Next to search for the proper drivers for the hardware instance. Wait until the yellow bang disappears and the instance is properly enumerated as shown in Section 2.2.

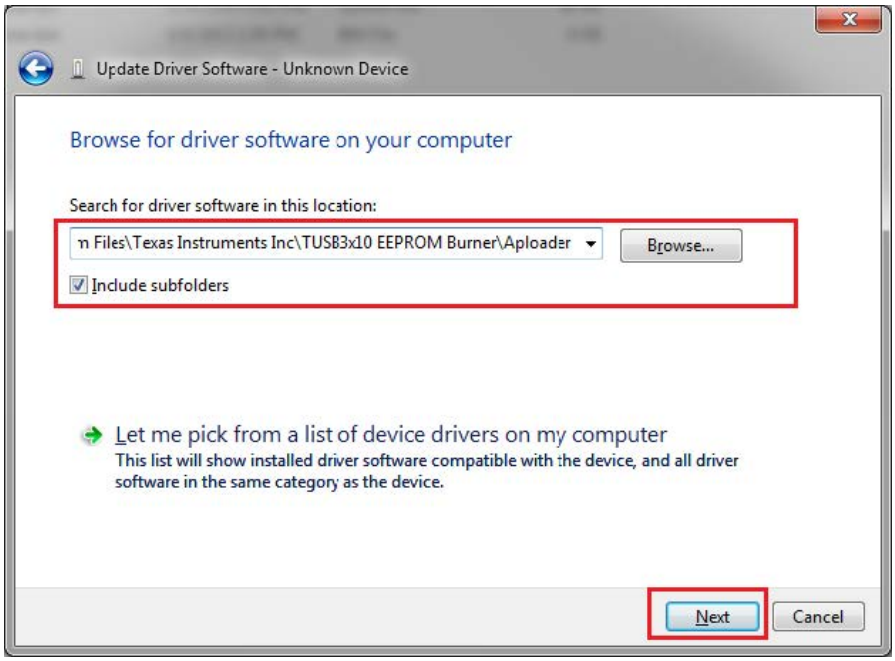

Figure 29. Manual Installation Wizard to Perform an Automatic Search

4.2 The Programming Process Succeeded, but the Device was Not Enumerated

Check that the user is using the correct firmware for the device. If the same firmware file worked with the old Windows GUI, it could be because the old Windows GUI required the use of a second utility called a Header Generator that formatted the firmware binary to be properly loaded by the device. The new version of the tool does not require that extra step, as the firmware binary is automatically formatted before burning the data into the external EEPROM.

Use the firmware file from the compiler. If that binary file is no longer available, burn the binary file using the Program Full Binary Image button.

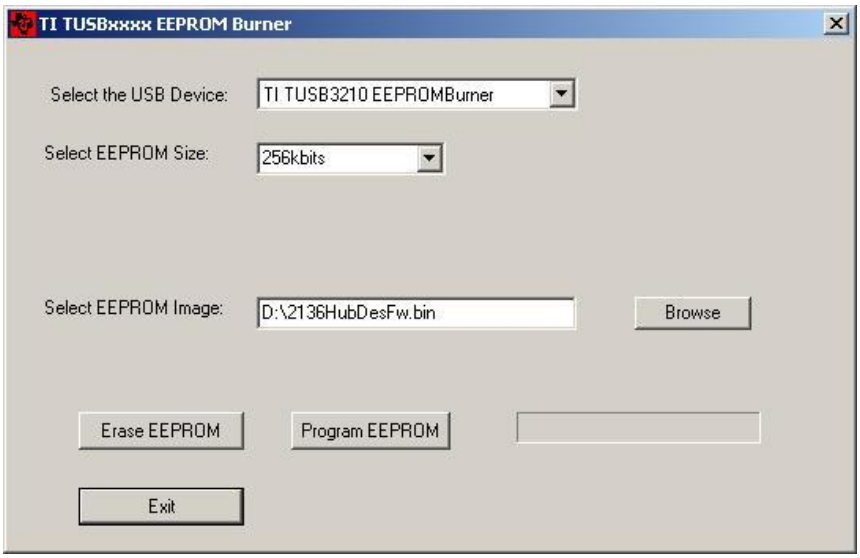

Figure 30. Old Windows GUI

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