TUSB3x10 EEPROM Burner

User's Guide

Revision 1.1
Updated June, 2014

TEXAS INSTRUMENTS

TUSB3x10 EEPROM Burner

User's Guide

Contents

1. Introduction

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

1.1. Definitions

The following is required in order 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 Windows XP™ or above (32-bits or 64-bits OS).

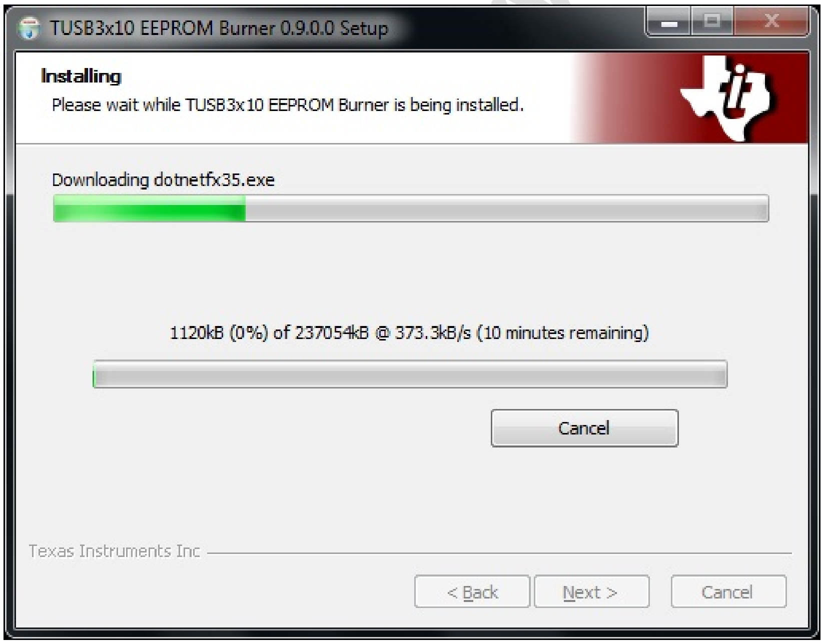
2. Installing the EEPROM Burner Software

The TUSB3x10 EEPROM Burner requires the installation of a device driver that is linked to the default VID and PID specified by the device's Boot-Code. The same VID and PID is also being used by other TUSB3x10 device drivers such as the TUSB3410 (USB to serial) VCP driver. To avoid software conflicts, please install this application on a system where other TUSB3x10 drivers haven't been installed before, and avoid installing other device drivers using the same VID and PID afterwards.

2.1. Running the Setup Program

Extract the setup program on a directory of your choice. Run the "setup.exe" file and let the wizard guide you through the installation process.

The EEPROM Burner GUI requires Microsoft's .NET Framework 3.5; the installer will guide you through this pre-requisite installation in case such .NET framework version is not present on your system. Ensure that you have a proper internet connection since the framework will be downloaded directly from Microsoft's website.



TUSB3x10 EEPROM Burner 0.9.0.0 Setup

Installing

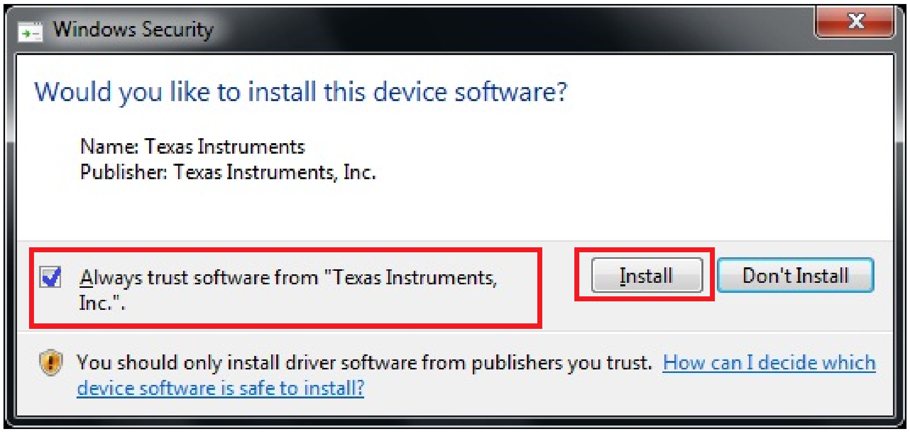
Please wait while TUSB3x10 EEPROM Burner is being installed.

Downloading dotnetfx35.exe

1120kB (0%) of 237054kB @ 373.3kB/s (10 minutes remaining)

Figure 2.1 – NET Framework 3.5 Installation

After the .NET framework validation has finished, the installer will copy the necessary files to your local disk and will execute a driver co-installer, which will install the "Aploader" driver in your system. Depending on your system settings, you may get a warning message or security window during the driver installation process. When prompted, accept the driver installation.



Windows Security

Would you like to install this device software?

Name: Texas Instruments
Publisher: Texas Instruments, Inc.

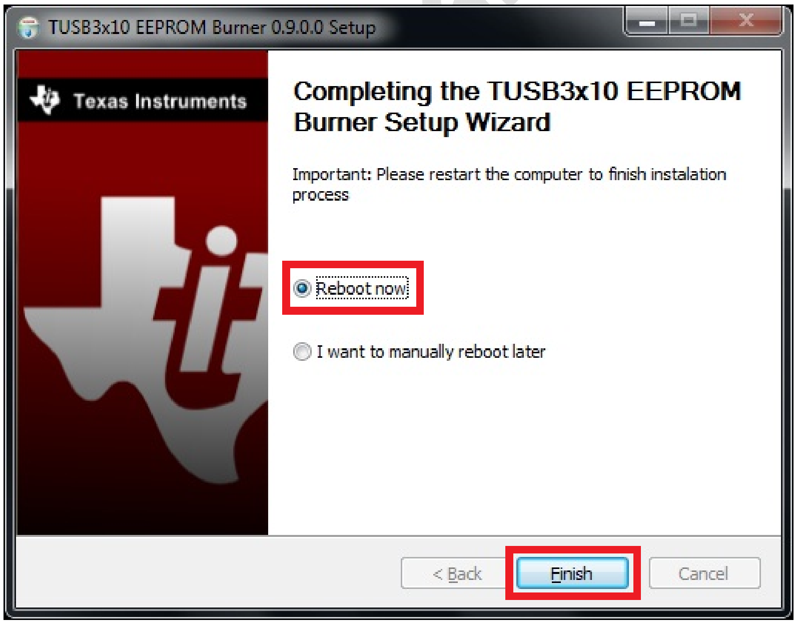
☑ Always trust software from "Texas Instruments, Inc.".

You should only install driver software from publishers you trust. How can I decide which device software is safe to install?

Figure 2.2 – Security window for Vista/Win7/Win8

After all the necessary files have been copied into your system, the installer will prompt you to restart the system in order to properly update the file dependencies.

It is highly recommended to choose "*Reboot Now*" and click "Finish" when the wizard indicates that the EEPROM Burner software installation has been completed.



TUSB3x10 EEPROM Burner 0.9.0.0 Setup

Completing the TUSB3x10 EEPROM Burner Setup Wizard

Important: Please restart the computer to finish instalation process

● Reboot now

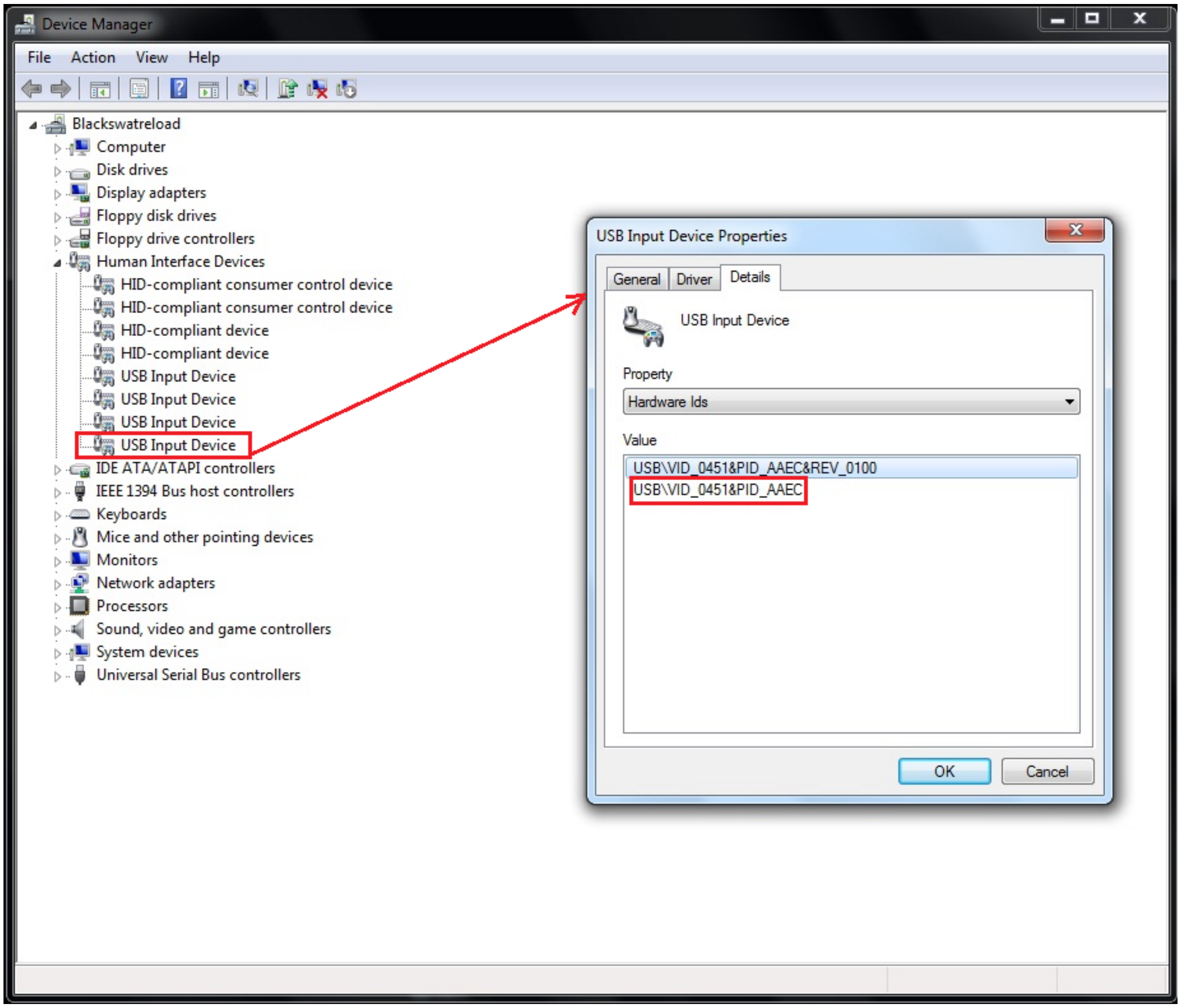
○ I want to manually reboot later

Figure 2.3 – Software Installation completed

2.2. Connecting the TUSB3x10 based hardware

You can now connect your TUSB3x10 EVM board to any USB port available on your PC.

Upon connection, the "Aploader" driver that was installed along with the application will send a special firmware to the device, turning it into a HID compliant device with a new VID and PID.



Property: Hardware Ids

Value:
USB\VID_0451&PID_AAEC&REV_0100
USB\VID_0451&PID_AAEC

Figure 2.4 – 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 on Device Manager, you can access the EEPROM Burner utility by clicking on the "TUSB3x10 EEPROM Burner" shortcut added on your desktop or by going to "Start → Texas Instruments Inc → TUSB3x10 EEPROM Burner → TUSB3x10 EEPROM Burner".

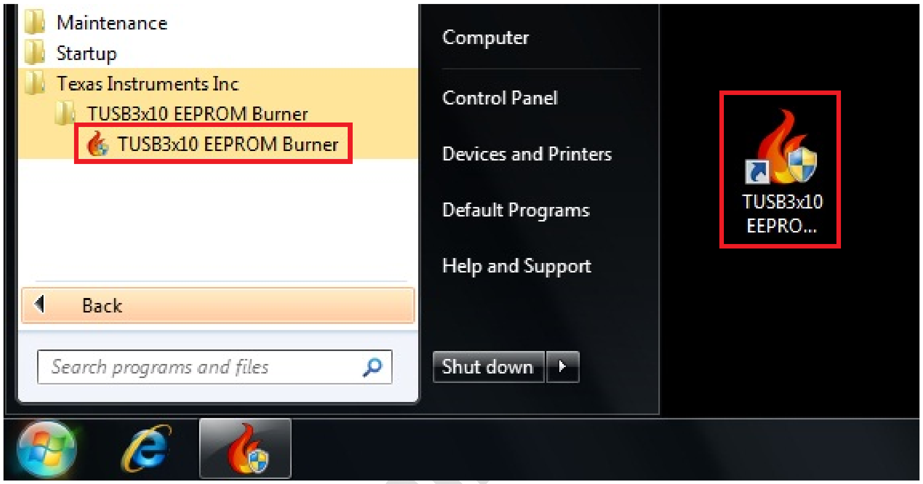
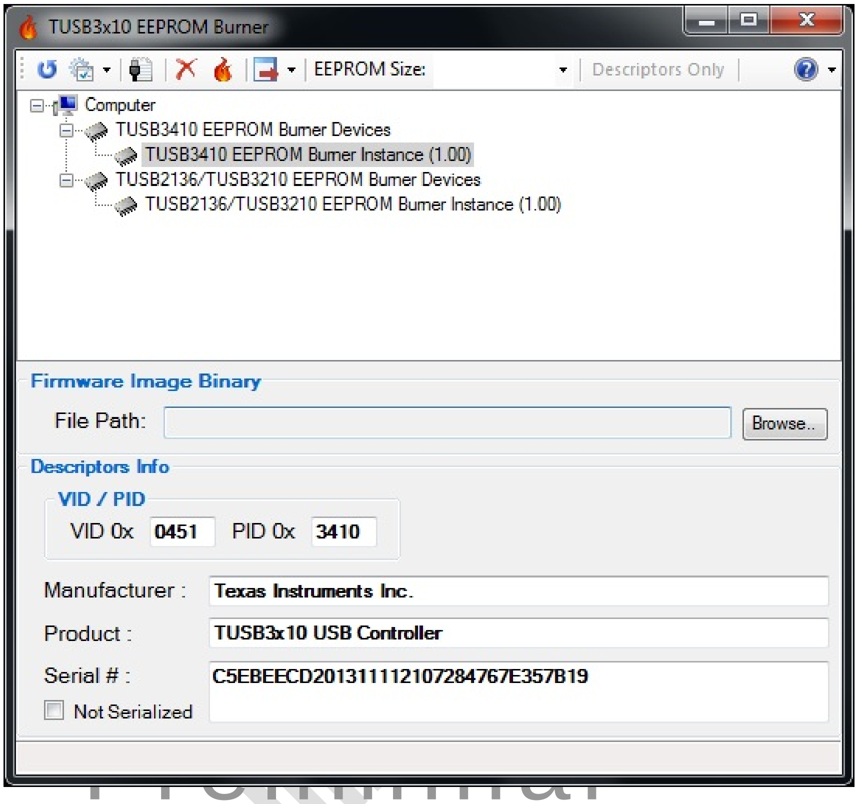


Figure 3.1 – EEPROM Burner software locations

Note: Administrator rights are required to execute this application.

After executing the TUSB3x10 EEPROM Burner application, the following user interface will show up:



TUSB3x10 EEPROM Burner

Computer
- TUSB3410 EEPROM Burner Devices
  - TUSB3410 EEPROM Burner Instance (1.00)
- TUSB2136/TUSB3210 EEPROM Burner Devices
  - TUSB2136/TUSB3210 EEPROM Burner Instance (1.00)

Firmware Image Binary

File Path:

Descriptors Info

VID / PID

VID 0x 0451 PID 0x 3410

Manufacturer : Texas Instruments Inc.

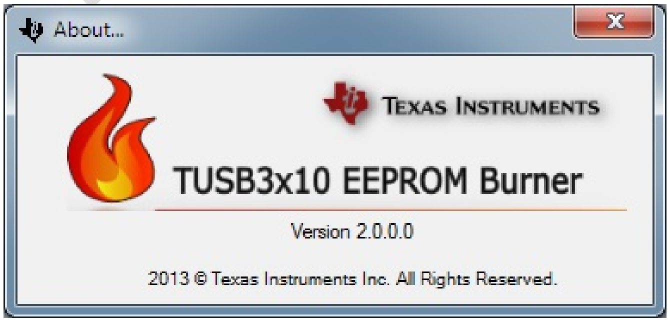
Product : TUSB3x10 USB Controller

Serial # : C5EBEECD201311112107284767E357B19

□ Not Serialized

Figure 3.2 EEPROM Burner GUI

In case you want to check for the GUI version you are using, click on “Help” drop down menu (?) and choose “About” in order to display the application information:



About...

TUSB3x10 EEPROM Burner

Version 2.0.0.0

2013 © Texas Instruments Inc. All Rights Reserved.

Figure 3.3 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.

In order to access the options menu items, simply click on the “Options” button ( )

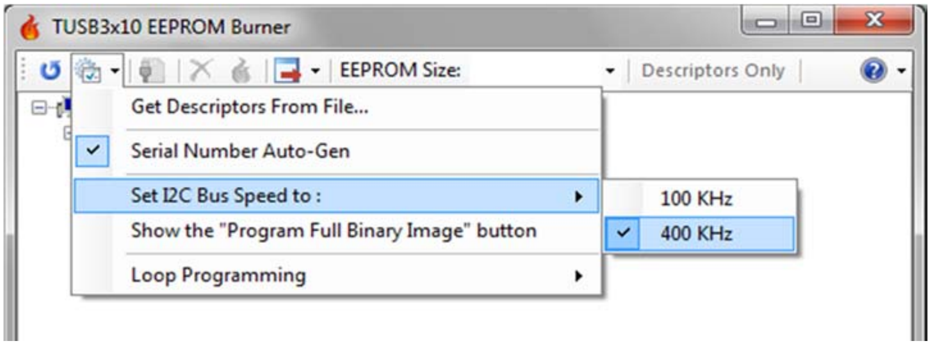


Figure 3.4 Selecting options on the EEPROM Burner GUI

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

a) ***Get Descriptors from File***: By setting this option, the user can get a collection of descriptor’s 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 default descriptor’s settings.*

b) **Serial Number Auto-Gen**: By setting this option, the EEPROM Burner GUI will automatically generate a unique serial number for every programmed device.

   The auto-generated serial number is made of:

   1- Random Number (*8 chars*).
   2- Date and Time (*Year - 4 chars, Month – 2 chars, Day – 2 chars, Hour – 2 chars, Minutes – 2 chars, Seconds – 2 chars, Milliseconds – 3 chars*).
   3- Serial Number of the HDD running Windows (*8 chars*).

   Note: Available only for the TUSB3410

c) **Set I2C Bus Speed:** Using the available sub-menu items you can select to set the I2C Bus Speed to either 100 or 400 kHz.

d) **Show the “Program Full Binary Image” button:** This option will show a new button on the main tool bar to enable the user to program a binary image “As-is”. This is, without adding any special formatting and/or USB device descriptors to the selected binary image. This can be useful if you already have a bin file with all the required data (generated using the “Export” function which is later described).

e) **Loop Programming:** By setting this option, the EEPROM Burner GUI will automatically program all the compatible devices upon connection. The programming process will be looped until manually interrupted by the user.

3.3. Editing USB Descriptors.

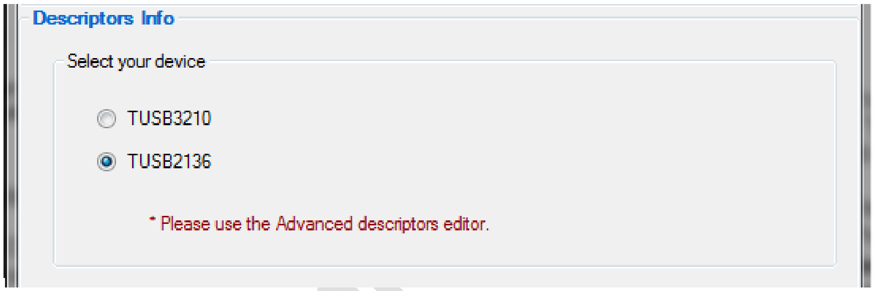
USB descriptors provide the host with all the necessary information to describe your USB device, so it's very important that any change to these values is carefully done.

Depending on the device you are using, users will be able to change different USB descriptors:

- **TUSB3210 / TUSB2136**

  Being general purpose USB controllers, the TUSB3x10 EEPROM Burner GUI can't define specific descriptors for them. In consequence, 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; users will be presented with the option to select the device being used. In the case of the TUSB2136, users will be able to edit some of the parameters on the USB Hub descriptors through the "Advanced Descriptors Editor" and save them for further use.



Descriptors Info

Select your device

○ TUSB3210

● TUSB2136

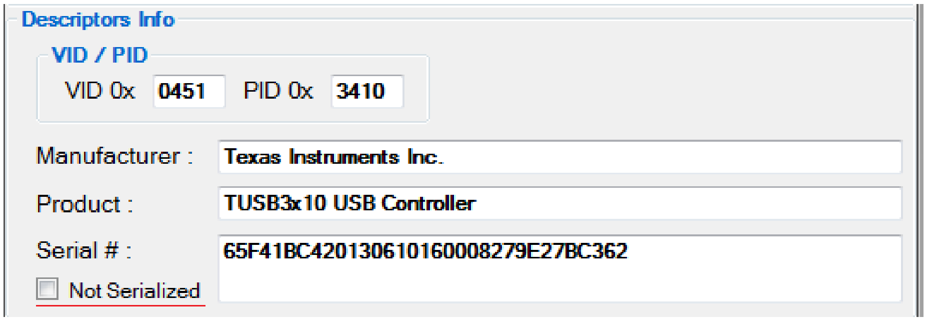
* Please use the Advanced descriptors editor.

Figure 3.5 Device selection for TUSB3210 / TUSB2136

- **TUSB3410**

  When using this device, users will be able to change some basic descriptor's information from the TUSB3x10 EEPROM Burner GUI main's form. Within the "Descriptors Info" group-box there is a series of text box controls that will let you enter customized information about your 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.



Descriptors Info

VID / PID

VID 0x 0451 PID 0x 3410

Manufacturer : Texas Instruments Inc.

Product : TUSB3x10 USB Controller

Serial # : 65F41BC420130610160008279E27BC362

□ Not Serialized

Figure 3.6 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 above.

Additional parameters can be changed through the Advanced Descriptor's Editor.

3.3.1 Using the Advanced Descriptor's Editor

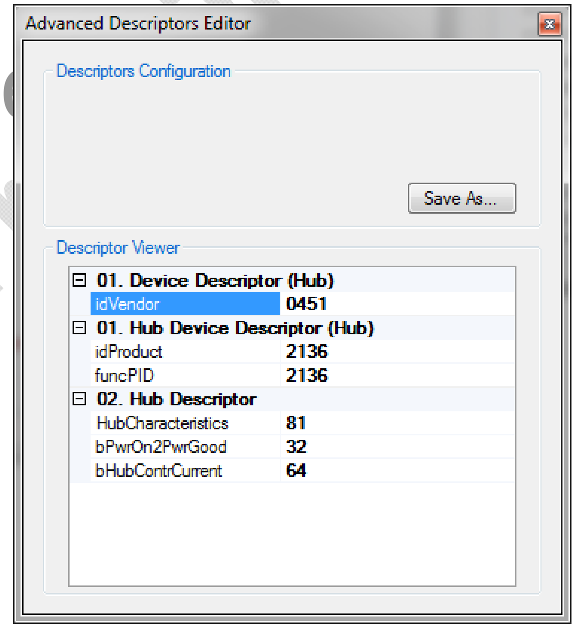
Depending on the device being used, the EEPROM Burner GUI also provides the means to edit additional descriptor's information through the "Advanced Descriptor's Editor" tool.

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

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

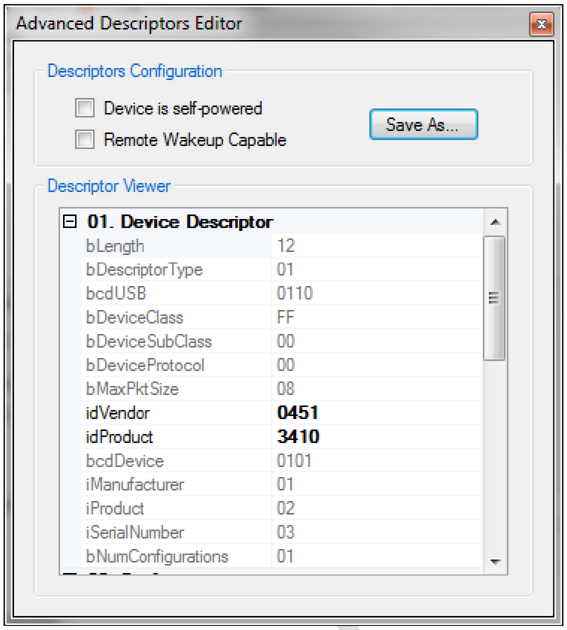
Through this tool, users can also save their descriptor's configuration to a descriptors (*.desc) file for future use. That file can later be loaded from the "Options" menu.

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



⊟ 01. Device Descriptor (Hub)
idVendor 0451
⊟ 01. Hub Device Descriptor (Hub)
idProduct 2136
funcPID 2136
⊟ 02. Hub Descriptor
HubCharacteristics 81
bPwrOn2PwrGood 32
bHubContrCurrent 64

Figure 3.7 "Advanced Descriptor's Editor" for the TUSB2136.



Advanced Descriptors Editor

Descriptors Configuration

☐ Device is self-powered
☐ Remote Wakeup Capable

Save As...

Descriptor Viewer

⊟ 01. Device Descriptor

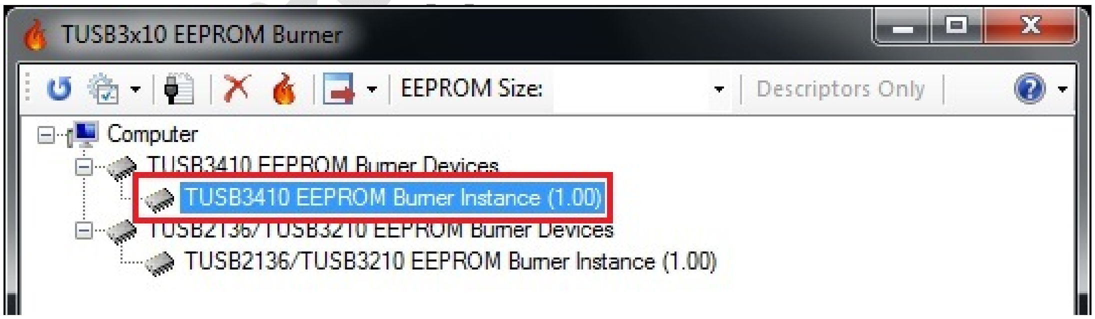
bLength	12
bDescriptorType	01
bcdUSB	0110
bDeviceClass	FF
bDeviceSubClass	00
bDeviceProtocol	00
bMaxPktSize	08
idVendor	**0451**
idProduct	**3410**
bcdDevice	0101
iManufacturer	01
iProduct	02
iSerialNumber	03
bNumConfigurations	01

Figure 3.8 "Advanced Descriptor's Editor" for the TUSB3410.

3.4. Selecting a compatible device

The EEPROM Burner GUI will automatically identify and list all the compatible devices already connected on your system. Through this list, you can choose among all the TUSB3x10 based devices detected.

Depending on the device you select, the toolbar buttons will be enabled so you can perform any of the available tasks.



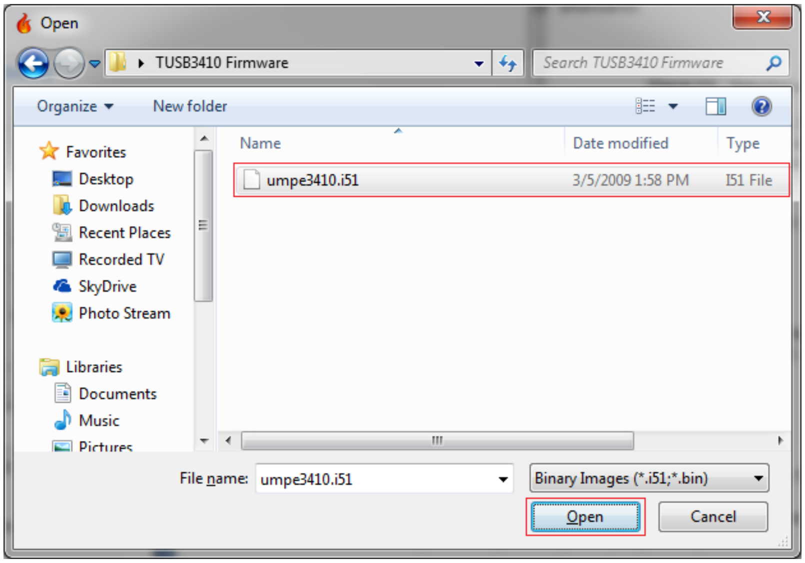
TUSB3x10 EEPROM Burner

⊟ Computer
⊟ TUSB3410 EEPROM Burner Devices
TUSB3410 EEPROM Burner Instance (1.00)
⊟ TUSB2136/TUSB3210 EEPROM Burner Devices
TUSB2136/TUSB3210 EEPROM Burner Instance (1.00)

Figure 3.9 List for selecting a compatible TUSB3x10 device

3.5. Selecting Firmware binary file

In the middle of the EEPROM Burner GUI, there's a group-box identified as "Firmware Image Binary" and it has a browse button that will let you choose the *.i51 or *.bin file to be burned into the external EEPROM. Click on this "Browse" button and select the appropriate FW file located in your system. Click on "Open" afterwards.



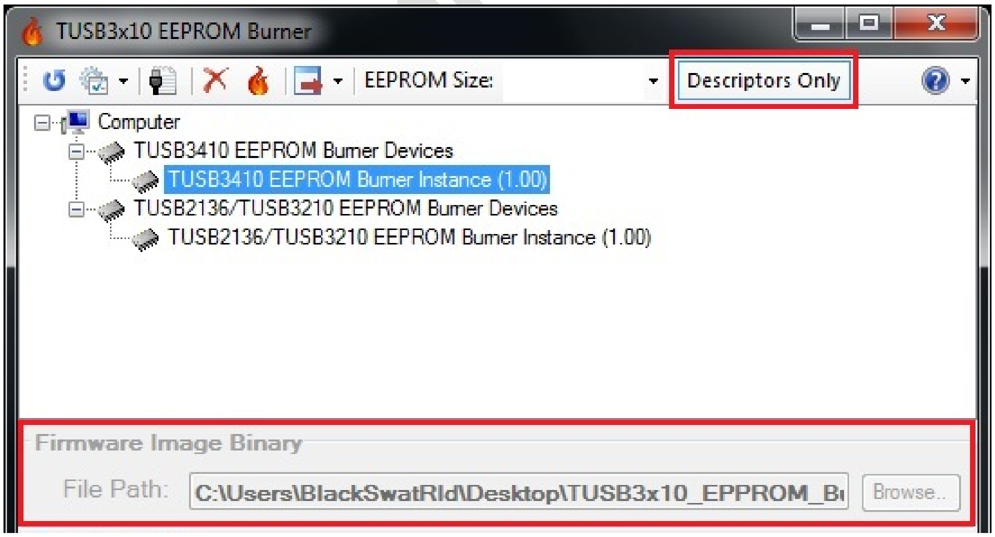
umpe3410.i51 3/5/2009 1:58 PM I51 File

File name: umpe3410.i51

Binary Images (*.i51;*.bin)

Figure 3.10 Selecting a FW file.

Note: In some cases, users may want to burn only their customized USB descriptors into the EEPROM and will have the device driver to load the required firmware. Users willing to use such configuration can use the “Descriptors Only” button located on the main toolbar. When using that option, the “Firmware Image Binary” group box will be disabled, so users won’t have to specify a firmware file.


TUSB3x10 EEPROM Burner
EEPROM Size:
Descriptors Only
Computer
TUSB3410 EEPROM Burner Devices
TUSB3410 EEPROM Burner Instance (1.00)
TUSB2136/TUSB3210 EEPROM Burner Devices
TUSB2136/TUSB3210 EEPROM Burner Instance (1.00)
Firmware Image Binary
Browse..

File Path: C:\Users\BlackSwatRld\Desktop\TUSB3x10_EPPROM_Bı

Figure 3.11 Descriptors Only button

3.6. Selecting the target EEPROM size

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

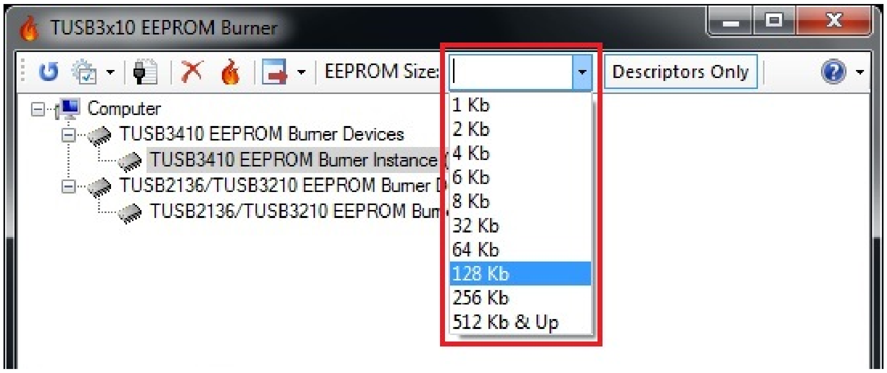
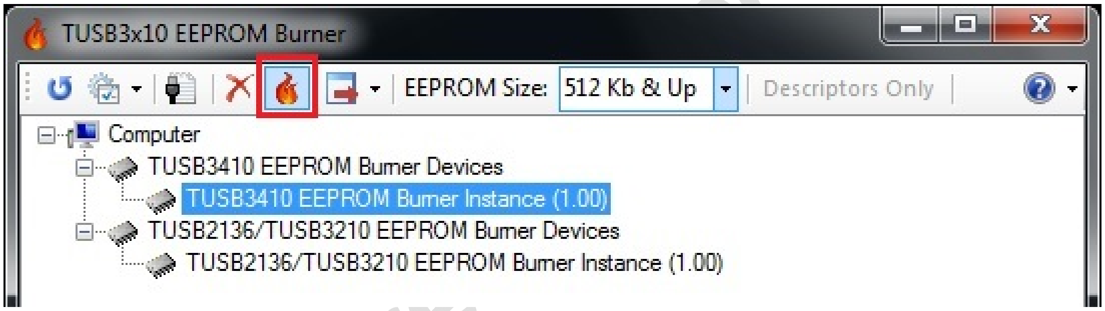

TUSB3x10 EEPROM Burner
EEPROM Size:
Descriptors Only
Computer
TUSB3410 EEPROM Burner Devices
TUSB3410 EEPROM Burner Instance
TUSB2136/TUSB3210 EEPROM Burner D
TUSB2136/TUSB3210 EEPROM Burn
1 Kb
2 Kb
4 Kb
6 Kb
8 Kb
32 Kb
64 Kb
128 Kb
256 Kb
512 Kb & Up

Figure 3.12 EEPROM size drop-down menu

3.7. Burning the external EEPROM

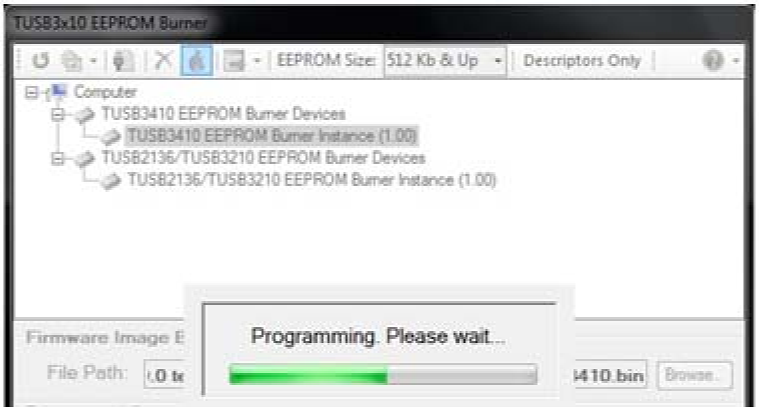
After all the required options have been selected, you can now click on the "Program" (🔥) button.


TUSB3x10 EEPROM Burner
Descriptors Only
Computer
TUSB3410 EEPROM Burner Devices
TUSB3410 EEPROM Burner Instance (1.00)
TUSB2136/TUSB3210 EEPROM Burner Devices
TUSB2136/TUSB3210 EEPROM Burner Instance (1.00)

EEPROM Size: 512 Kb & Up

Figure 3.13 Burning the external EEPROM.

During the programming process, all of the controls on the main window will be disabled and a new window will pop-up showing the current progress.

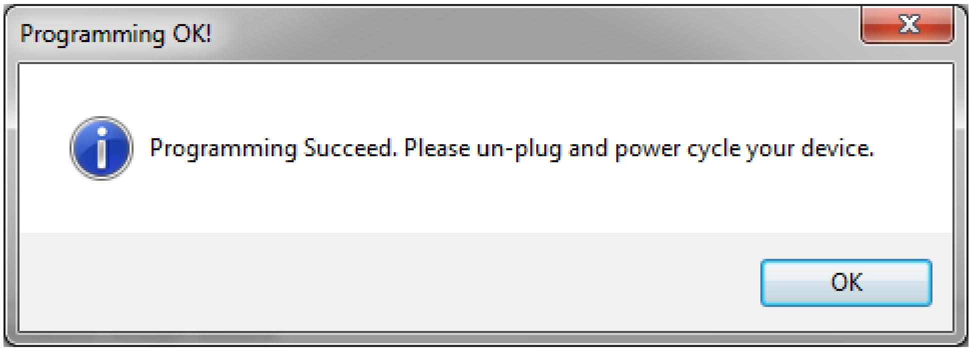

TUSB3x10 EEPROM Burner
Descriptors Only
Computer
TUSB3410 EEPROM Burner Devices
TUSB3410 EEPROM Burner Instance (1.00)
TUSB2136/TUSB3210 EEPROM Burner Devices
TUSB2136/TUSB3210 EEPROM Burner Instance (1.00)
Firmware Image E
File Path:
410.bin
Browse...

EEPROM Size: 512 Kb & Up

Programming. Please wait...

Figure 3.14 Burning progress

When the EEPROM programming process is completed, a message box will show-up indicating if any errors were found. Click on “OK” to continue



Programming Succeed. Please un-plug and power cycle your device.

Figure 3.15 EEPROM programming succeeded

3.7.1 Loop programming

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

Note: When this feature is enabled the main tool bar will add the “Stop” button to exit the programming loop when required.

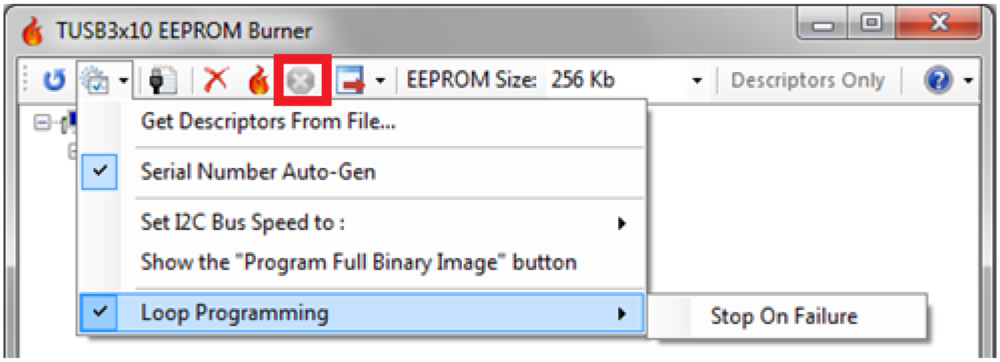
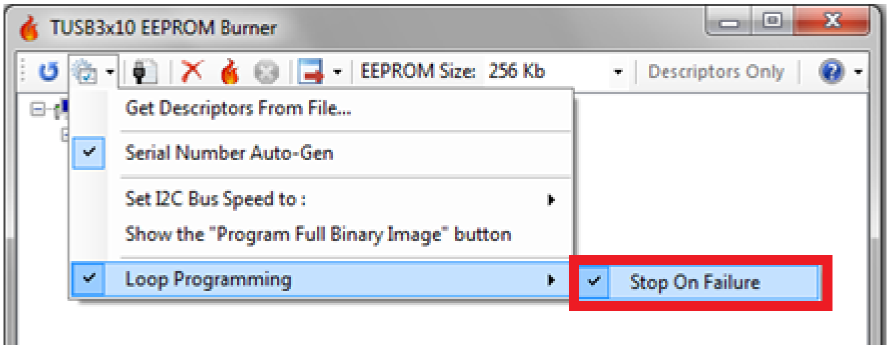


Figure 3.16 Loop programming option

Additionally, users can choose to abort the programming cycle when a programming failure occurs. To do that, just enable the “Stop On Failure” menu item beneath the “Loop Programming” option.



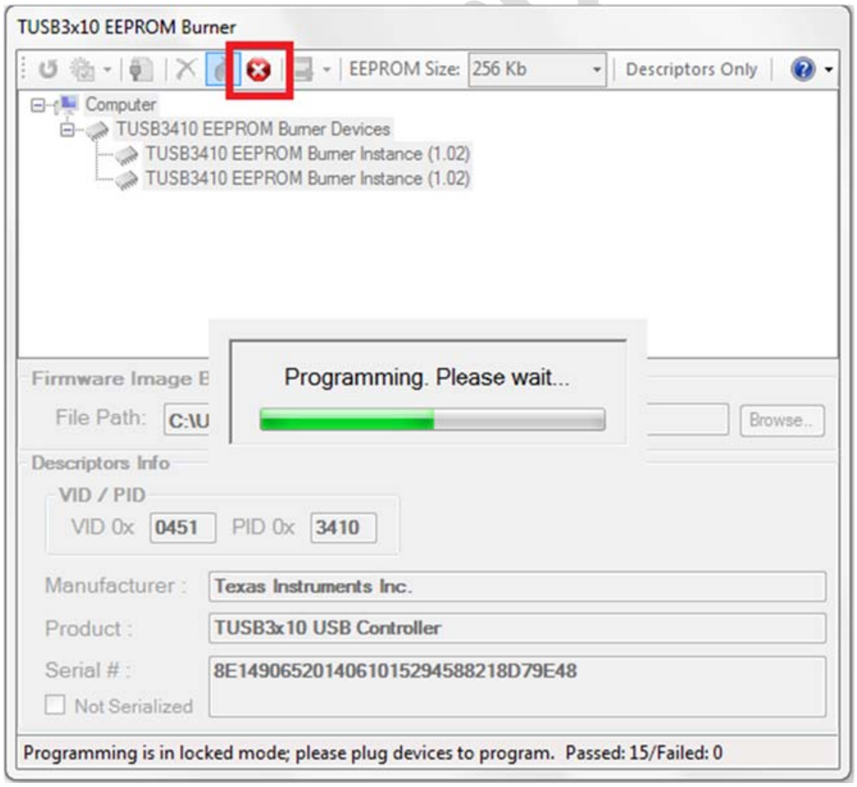
☑ Serial Number Auto-Gen
☑ Loop Programming
☑ Stop On Failure

Figure 3.17 Stop On Failure

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

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

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



Programming. Please wait...

File Path: C:\U

VID 0x 0451 PID 0x 3410

Manufacturer : Texas Instruments Inc.

Product : TUSB3x10 USB Controller

Serial # : 8E1490652014061015294588218D79E48

□ Not Serialized

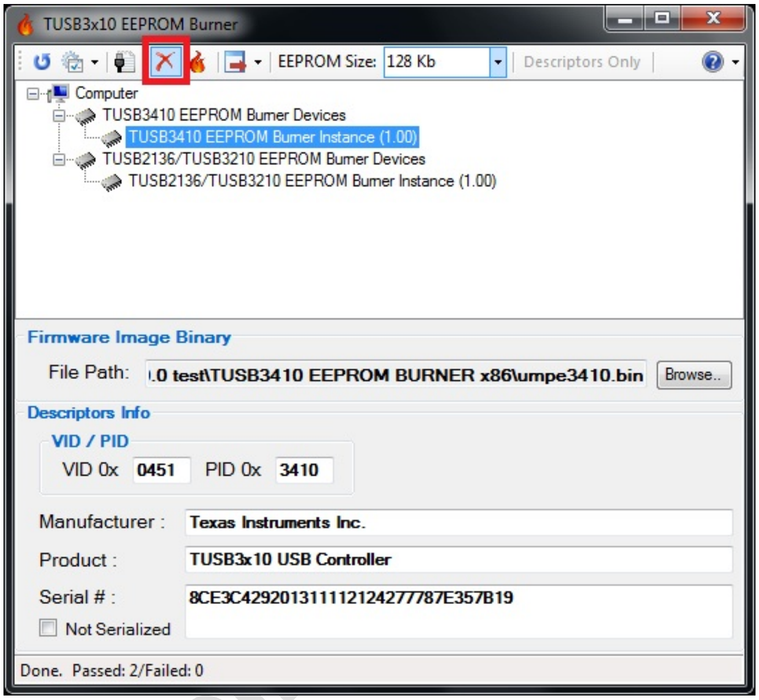
Programming is in locked mode; please plug devices to program. Passed: 15/Failed: 0

Figure 3.18 Burning in process in loop programming mode

3.8. Erasing the external EEPROM

In case you want to erase the content of the external EEPROM, it is just a matter of clicking on the "Erase" (✗) button in order to issue the erase command on your device.

Note: You first need to specify the EEPROM size.



EEPROM Size: 128 Kb

- Computer
  - TUSB3410 EEPROM Burner Devices
    - TUSB3410 EEPROM Burner Instance (1.00)
  - TUSB2136/TUSB3210 EEPROM Burner Devices
    - TUSB2136/TUSB3210 EEPROM Burner Instance (1.00)

File Path: ı.0 test\TUSB3410 EEPROM BURNER x86\umpe3410.bin

VID 0x 0451 PID 0x 3410

Manufacturer : Texas Instruments Inc.

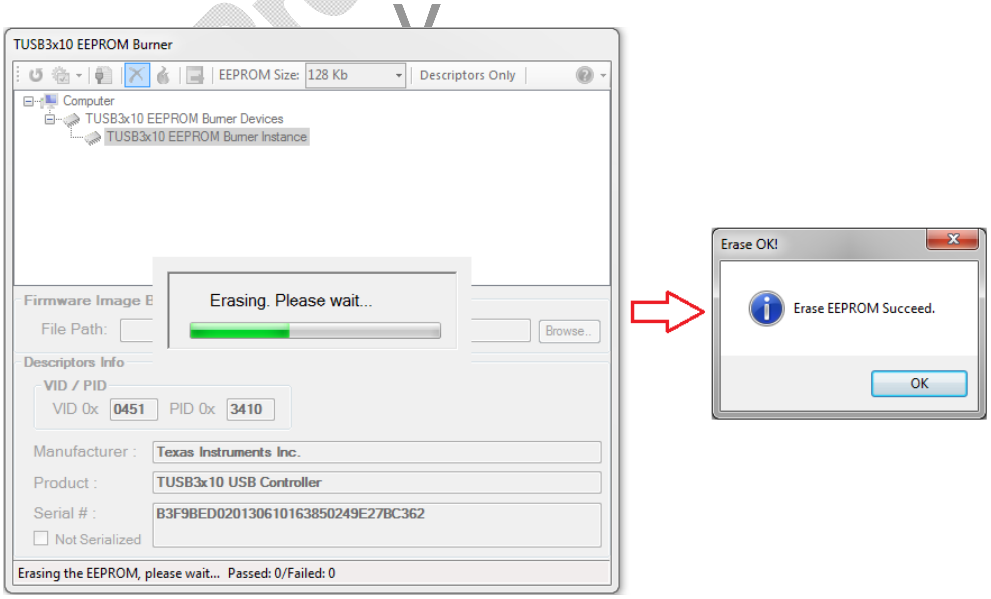
Product : TUSB3x10 USB Controller

Serial # : 8CE3C4292013111121242777787E357B19

□ Not Serialized

Done. Passed: 2/Failed: 0

Figure 3.16 Erasing the external EEPROM



EEPROM Size: 128 Kb

- Computer
  - TUSB3x10 EEPROM Burner Devices
    - TUSB3x10 EEPROM Burner Instance

Erasing. Please wait...

VID 0x 0451 PID 0x 3410

Manufacturer : Texas Instruments Inc.

Product : TUSB3x10 USB Controller

Serial # : B3F9BED020130610163850249E27BC362

□ Not Serialized

Erasing the EEPROM, please wait... Passed: 0/Failed: 0

Erase EEPROM Succeed.

Figure 3.17 Erasing EEPROM process

3.9. Export Options

The TUSB3x10 EEPROM Burner GUI is also helpful whenever a user wants to burn the EEPROM using a method other than the EEPROM Burner GUI as it can export all the required data such as the USB descriptors, checksums and firmware in the appropriate data format.

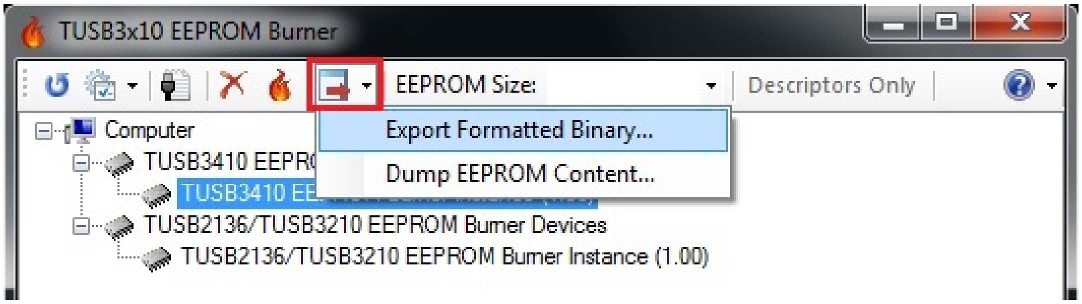

TUSB3x10 EEPROM Burner
EEPROM Size:
Descriptors Only
Export Formatted Binary...
Dump EEPROM Content...
Computer
TUSB3410 EEPR
TUSB3410 EE
TUSB2136/TUSB3210 EEPROM Burner Devices
TUSB2136/TUSB3210 EEPROM Burner Instance (1.00)

Figure 3.15 Export Options

There are two different export options available:

- **Export Formatted Binary:**

  By using this option, users can export their 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:**

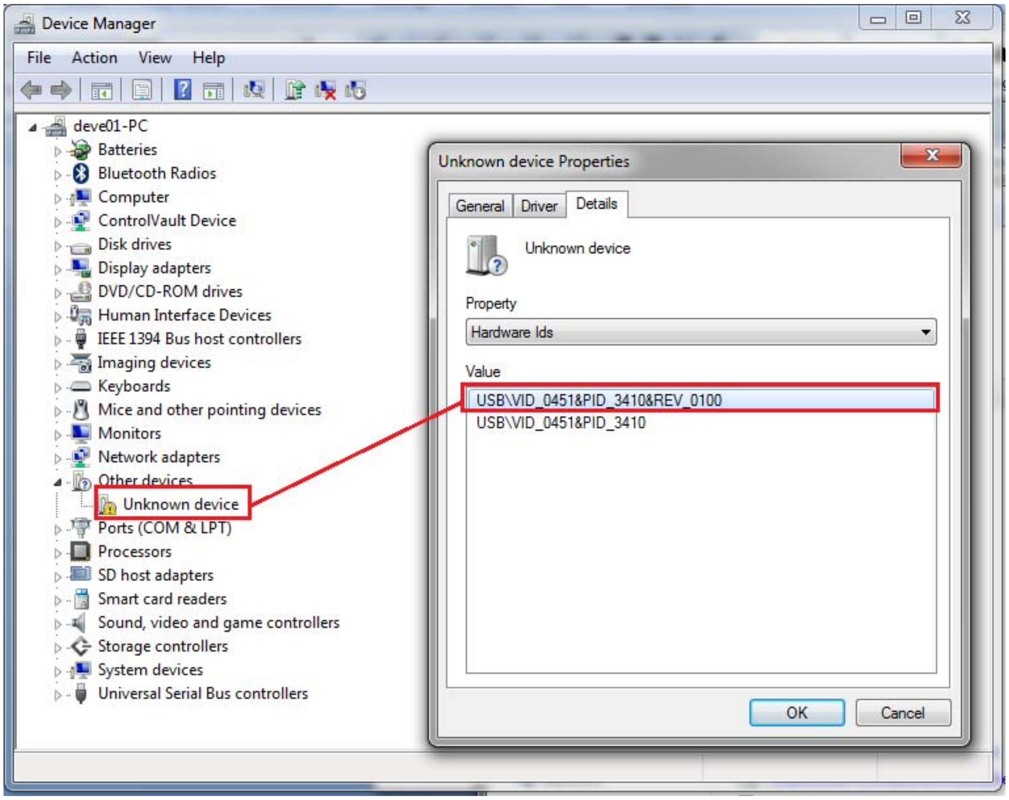
  By using this option, users can dump the content of the EEPROM on the selected device to a .bin file.

4. Troubleshooting

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

4.1. Re-Installing EEPROM Burner driver instance manually

In case the TUSB3x10 EVM board comes up as an “Unknown device” with a yellow bang icon (see figure below); that means the “Aploader” wasn’t properly installed or it was removed by some reason. Please follow the instructions below to perform a manual driver installation:

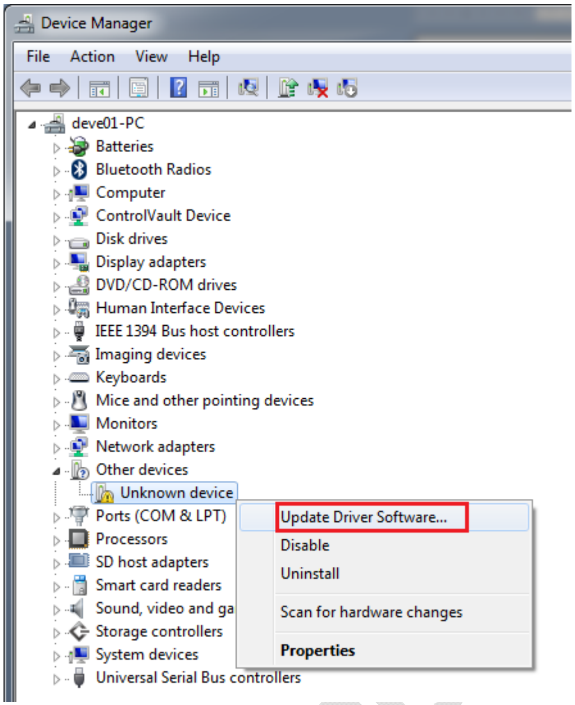


Property: Hardware Ids

Value:
USB\VID_0451&PID_3410&REV_0100
USB\VID_0451&PID_3410

Figure 4.1 TUSB3x10 “Aploader” driver not properly installed.

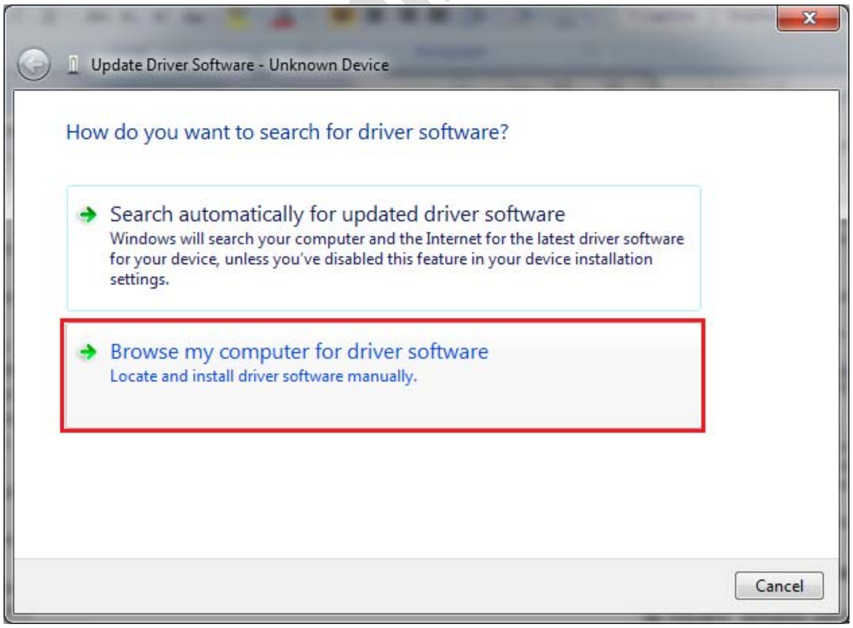
Right-click on the “Unknown Device” instance and select the “Update Driver Software…” option (see figure below).



deve01-PC
- Batteries
- Bluetooth Radios
- Computer
- ControlVault Device
- Disk drives
- Display adapters
- DVD/CD-ROM drives
- Human Interface Devices
- IEEE 1394 Bus host controllers
- Imaging devices
- Keyboards
- Mice and other pointing devices
- Monitors
- Network adapters
- Other devices
  - Unknown device
- Ports (COM & LPT)
- Processors
- SD host adapters
- Smart card readers
- Sound, video and ga
- Storage controllers
- System devices
- Universal Serial Bus controllers

Figure 4.2 Manual Installation for a the TUSB3x10 Aploader driver

The “Update Driver Software” wizard will show up. Select “Browse my computer for driver software”.



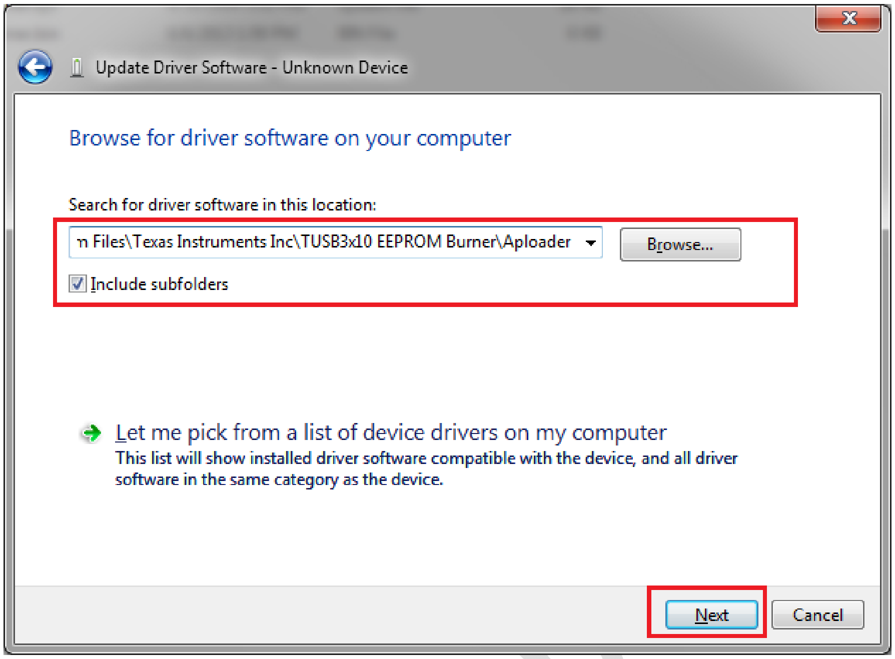
How do you want to search for driver software?

Search automatically for updated driver software
Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.

Browse my computer for driver software
Locate and install driver software manually.

Figure 4.3 Manual installation wizard to avoid windows update online.

Since the EEPROM Burner installer has already copied the proper drivers into the system, you can now browse into the installation folder (By default at: C:\Program Files\Texas Instruments Inc\TUSB3x10 EEPROM Burner\Aploader) and click on “Next” to start searching for the proper drivers for your hardware instance. Wait until the yellow bang disappears and the instance is properly enumerated as shown in section 2.2.



Update Driver Software - Unknown Device

Browse for driver software on your computer

Search for driver software in this location:

n Files\Texas Instruments Inc\TUSB3x10 EEPROM Burner\Aploader

☑ Include subfolders

Let me pick from a list of device drivers on my computer

This list will show installed driver software compatible with the device, and all driver software in the same category as the device.

Figure 4.4 Manual installation wizard to perform an automatic search

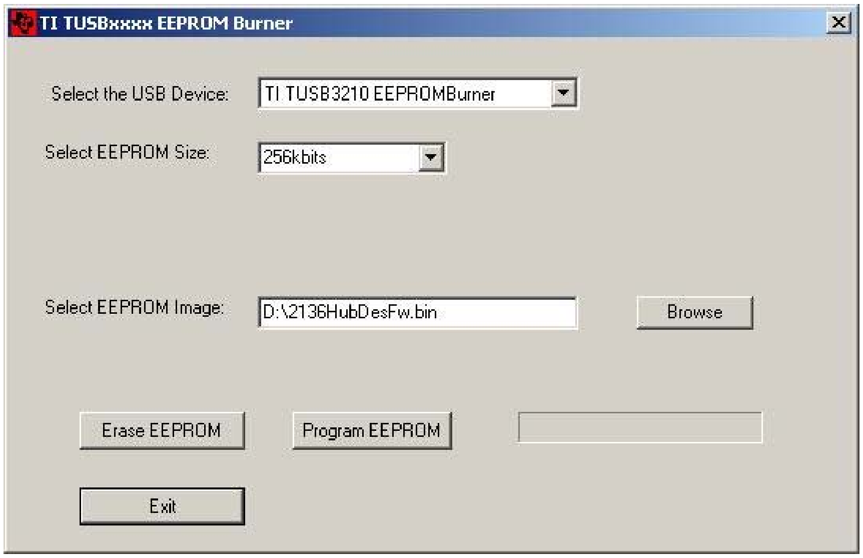
4.2. The programming process succeeded, but my device was not properly enumerated afterwards.

Please make sure you are using the correct firmware for your device.

If you were using the same firmware file along with the old Windows GUI and it was working, you have to consider that the old Windows GUI required the use of a second utility called "Header Generator" which formatted the firmware binary to be properly loaded by your device.

This new version of the tool does not require that extra step, as it automatically formats the firmware binary before burning the data into the external EEPROM.

You must be using the firmware file that is directly coming form the compiler; in case you don't have that binary file any longer, you may want to burn the binary file using the "Program Full Binary Image" button (refer to section **Error! Reference source not found.**), as it has been properly formatted before.



TI TUSBxxxx EEPROM Burner

Select the USB Device: TI TUSB3210 EEPROMBurner

Select EEPROM Size: 256kbits

Select EEPROM Image: D:\2136HubDesFw.bin

Figure 4.5 Old Windows GUI