



HX3 Blaster Plus User Guide

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1. Introduction



Thank you for your interest in the HX3 Blaster Plus tool. This is a Windows-based tool that enables configuring HX3 features on hardware with an I²C EEPROM attached to HX3.

1.1 Getting Started

This user guide describes the features of the HX3 Blaster Plus tool and how to use it. The [HX3 Blaster Plus Tool](#) section explains the procedure to use the tool. The [Troubleshooting](#) section lists the troubleshooting procedure.

1.2 Additional Learning Resources

Visit the HX3 web page at www.cypress.com/hx3 for additional learning resources including datasheets and application notes.

1.3 Technical Support

For assistance, go to www.cypress.com/go/support or contact our live customer support at +1 (800) 858-1810 (in the U.S.) or +1 (408) 943-2600 (international) and follow the voice prompt.

1.4 Document Conventions

Table 1. Document Conventions for Guides

Convention	Usage
Courier New	Displays file locations, user-entered text, and source code: C:\...cd\icc\
<i>Italics</i>	Displays file names and reference documentation: The “Configuration Options” section of the <i>HX3 datasheet</i> gives more details about the use of pin straps
File > Open	Represents menu paths: File > Open > New Project
Bold	Displays commands, menu paths, and icon names in procedures: Click the File icon and then click Open .
Times New Roman	Displays an equation: $2 + 2 = 4$
Text in gray boxes	Describes Cautions or unique functionality of the product.

1.5 Abbreviations

Table 2. List of Abbreviations

Abbreviation	Meaning
BC	Battery charging
CDP	Charging downstream port
DCP	Dedicated charging port
DVK	Development kit
ESD	Electrostatic discharge
GUI	Graphical user interface
I ² C	Inter-integrated circuit
KB	Kilobyte
PC	Personal computer
PID	Product ID
RDK	Reference design kit
ROM	Read-only memory
USB	Universal Serial Bus
USB-IF	Universal Serial Bus Implementers Forum
VID	Vendor ID

2. Software Installation

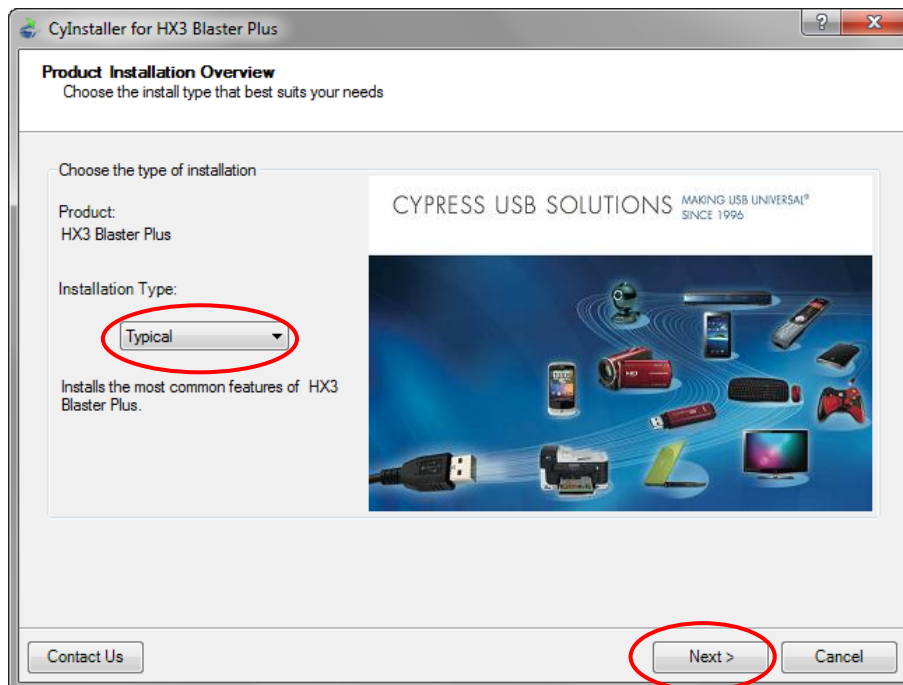


2.1 HX3 Blaster Plus Software

Follow these steps to install the Hx3 Blaster Plus tool on a Windows PC:

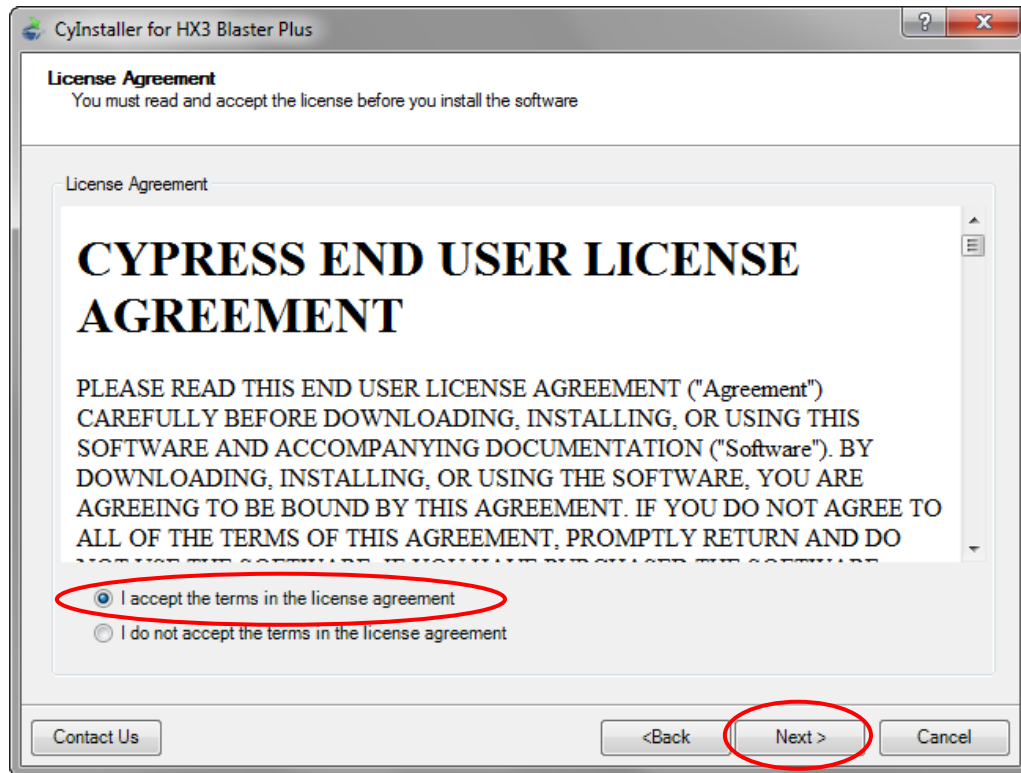
1. Download the tool package from www.cypress.com/go/hx3blasterplus and start the installation. The tool package is available in the following installer formats for download:
 - **HX3 Blaster Plus Setup** (*HX3BlasterPlusSetup.exe*): This installation package contains the files related to the tool. It does not include the Windows installer and Microsoft .NET Framework packages. If these packages are not installed on your computer, the installer automatically redirects to the Internet to download the packages. Run the .exe file after downloading to start the installation.
 - **HX3 Blaster Plus ISO** (*HX3BlasterPlus.iso*): This file is a complete package stored in a CD-ROM image format that you can use to create a CD or extract the file using an ISO extraction program such as WinZip or WinRAR, so that you can run *cyautorun.exe* to start the installation. This file includes the HX3 Blaster Plus tool, *HX3 Blaster Plus User Guide*, and Release Notes.
2. Select **Typical** for **Installation Type** and click **Next**, as shown in [Figure 1](#).

Figure 1. Initiating HX3 Blaster Plus Installation



3. Read and accept the Cypress End-User License Agreement and click **Next** to continue, as shown in [Figure 2](#).

Figure 2. Cypress End-User License Agreement



4. Wait for the installation to complete.
5. After the installation is complete, the contents are available at the following location:

HX3 Blaster Plus : <Install Directory>\HX3 Blaster Plus

Note: On Windows 32-bit platforms, the default <Install Directory> is C:\Program Files\Cypress, and on Windows 64-bit platforms, it is C:\Program Files(x86)\Cypress.

2.2 Install Hardware

The HX3 Blaster Plus tool does not require any hardware installation.

2.3 Uninstall Software

You can uninstall the tool using one of the following methods:

- Go to **Start > All Programs > Cypress > Cypress Update Manager**; click the **Uninstall** button associated with the "HX3 Blaster Plus" entry in the Cypress Update Manager table.
- Go to **Start > Control Panel > Programs and Features**; select the program "HX3 Blaster Plus" from the list and click the **Uninstall/Change** button.

3. HX3 Blaster Plus Tool



This section describes the capabilities of the HX3 Blaster Plus tool and the procedure to run the tool with an HX3-based hardware or kit. It uses CY4609, CY4603, and CY4613 hardware as a reference; however, the same procedure can be used on any HX3-based hardware.

3.1 Overview

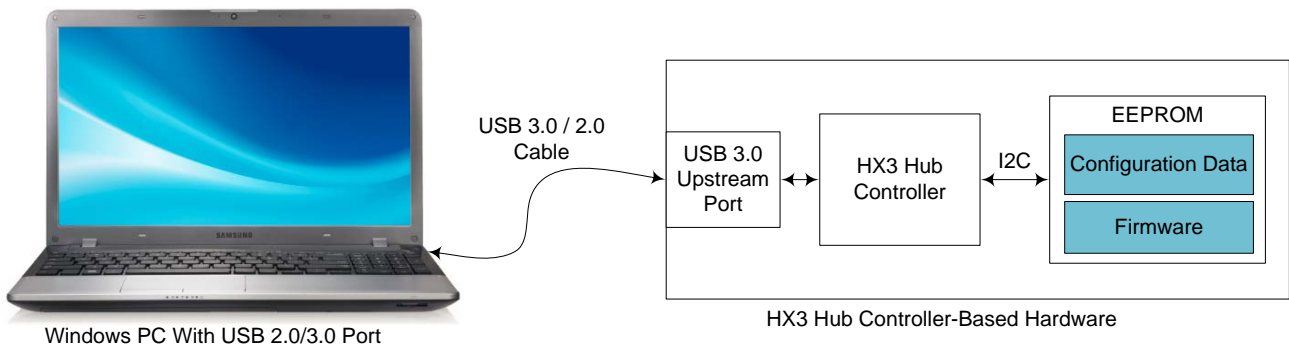
HX3 Blaster Plus is a GUI-based tool to configure the HX3 hub controller. It can be used to configure any HX3-based hardware with a compatible EEPROM connected to HX3 over I²C. This tool allows you to do the following:

- Read configuration data from the EEPROM and display the values.
- Download custom firmware from a PC via HX3 and store it on the EEPROM.
- Download custom firmware and configuration data together and store it on the EEPROM.
- Configure HX3 and download only the configuration data to the EEPROM.
- Erase the firmware and configuration data from the EEPROM.
- Generate HX3 configuration data to be sent over the I²C bus when HX3 is configured as an I²C slave.

3.2 Setup

Figure 3 displays the setup to run the HX3 Blaster Plus tool with the HX3-based hardware.

Figure 3. HX3 Blaster Plus Tool Setup

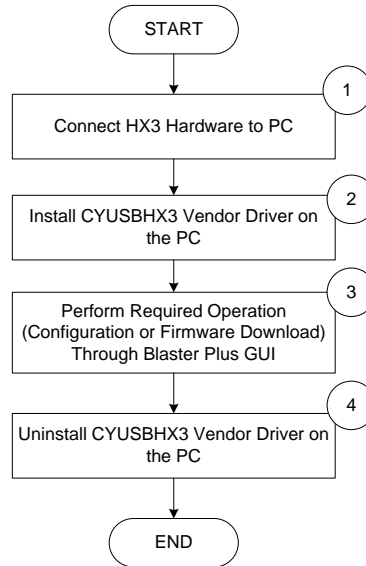


The HX3 Blaster Plus tool is installed on a Windows PC (Windows XP; Windows Vista; Windows 7, 8, or 8.1). The PC needs to have a USB 3.0 or USB 2.0 port. The PC is connected to HX3 using a USB 3.0 or 2.0-certified cable. The HX3-based hardware has an external EEPROM connected to HX3 over I²C.

3.3 Procedure to Run HX3 Blaster Plus

Figure 4 provides the steps to run HX3 Blaster Plus.

Figure 4. Steps to Run HX3 Blaster Plus



3.3.1 Connect HX3-Based Hardware to a PC

Follow these steps to connect the HX3-based hardware to a PC:

1. Configure the firmware boot mode to Custom Firmware on the HX3-based hardware.
2. Power on the HX3-based hardware.
3. Connect the HX3-based hardware to a USB 3.0 or 2.0 port on the PC.

3.3.2 Install CYUSBHX3 Vendor Driver on a PC

To run the HX3 Blaster Plus tool, the default Windows hub class driver that is automatically bound to the USB 2.0 interface of the HX3-based hardware needs to be unbound, and the CYUSBHX3 vendor driver needs to be bound.

To install the device driver on Windows 7, do the following:

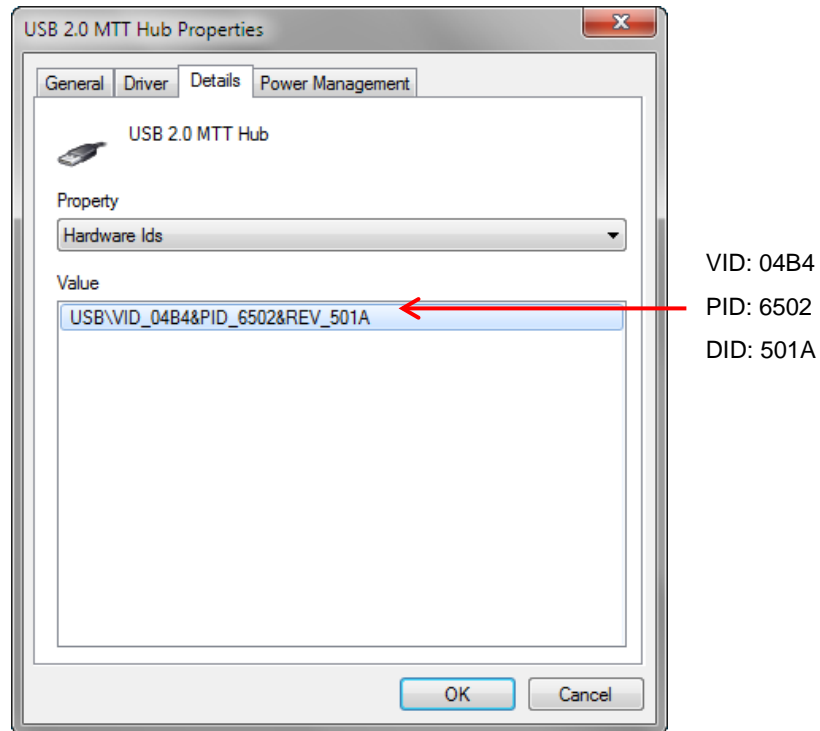
1. Connect the HX3 hardware to one of the USB ports.
 - Invoke the **Device Manager** and search for a USB 2.0 hub device with the properties given in [Table 3](#).

Table 3. Identifying USB 2.0 Hub

Hardware	VID	PID
CY4609	04B4	6502
CY4603	04B4	6506
CY4613	04B4	650A

- Check the VID and PID details in **Properties > Details tab > Hardware Ids**, as shown in [Figure 5](#).

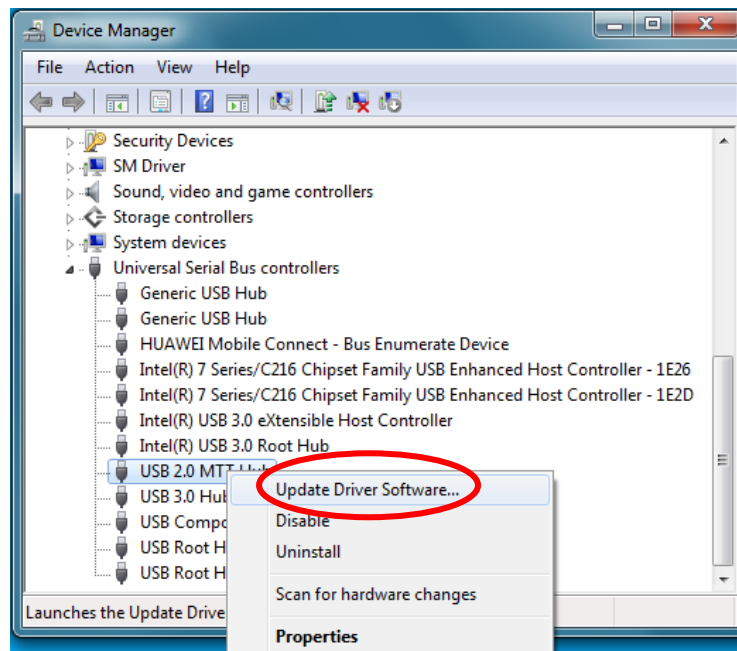
Figure 5. Identifying VID and PID



Note: The DID value displayed above may vary depending on the HX3 firmware version

- Once the device is identified, right-click and select **Update Driver Software**, as shown in [Figure 6](#).

Figure 6. Updating Driver Software



Note: When HX3-based hardware is connected to a PC over a USB 3.0 port, the **Device Manager** lists one hub with USB 2.0 capability and another hub with USB 3.0 capability. Be sure to invoke **Update Driver Software** only on the hub with USB 2.0 capability, as HX3 Blaster Plus can work only with a hub that has UBS 2.0 capability.

3. In the **Update Driver Software** window, click on **Browse my computer for driver software**, as shown in [Figure 7](#). On the next screen, click on **Let me pick from a list of device drivers on my computer** and click **Next**, as shown in [Figure 8](#).

Figure 7. Searching for CYUSBHX3 Driver

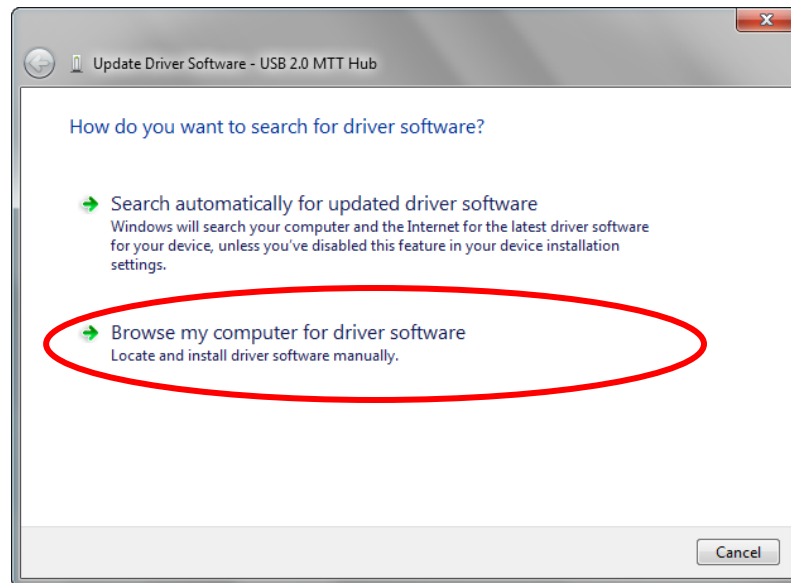
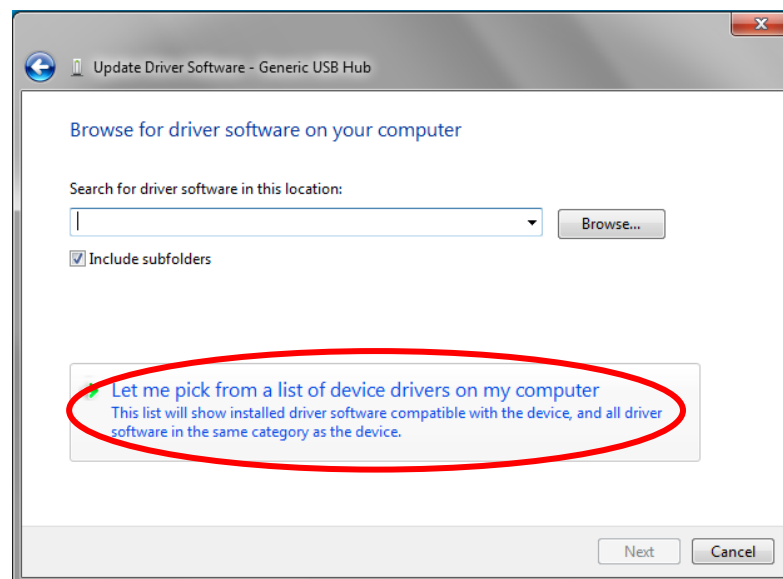
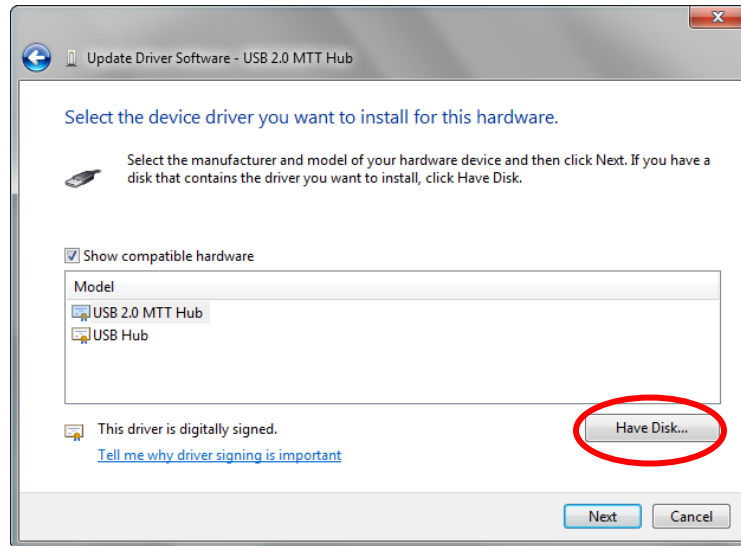


Figure 8. Locating CYUSBHX3 Driver



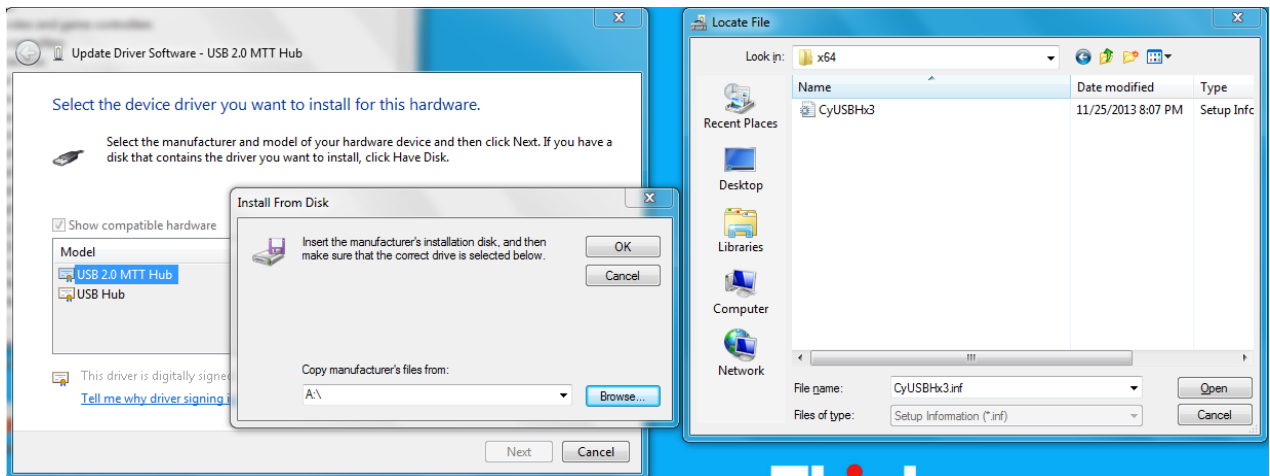
4. Click **Have Disk**, as shown in [Figure 9](#).

Figure 9. Loading CYUSBHX3 Driver Path



5. Select the driver file by navigating to `<Install Directory>\HX3 Blaster Plus\drivers\<operating system>\<x64/x86>` and click **OK**. You can browse for the location using the **Browse** button, as shown in [Figure 10](#).

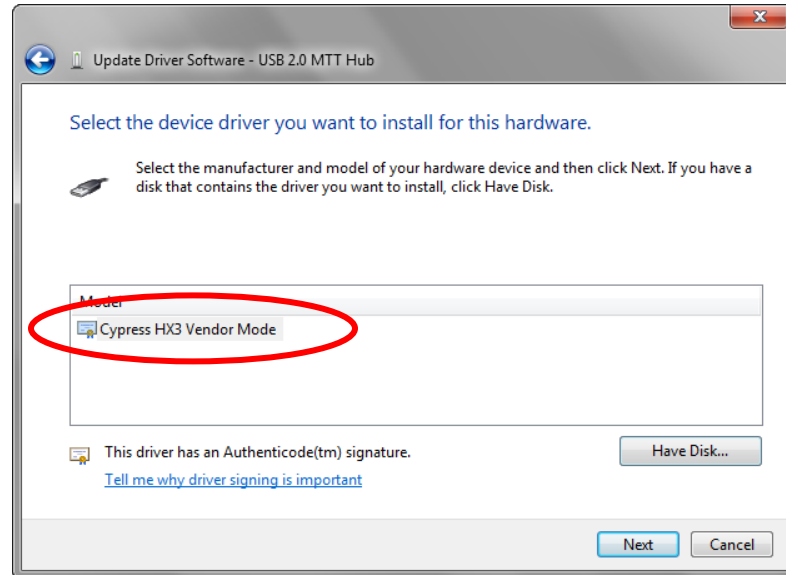
Figure 10. Loading CYUSBHX3 Driver



Note: On Windows 32-bit platforms, the default `<Install Directory>` is `C:\Program Files\Cypress`, and on Windows 64-bit platforms, it is `C:\Program Files(x86)\Cypress`.

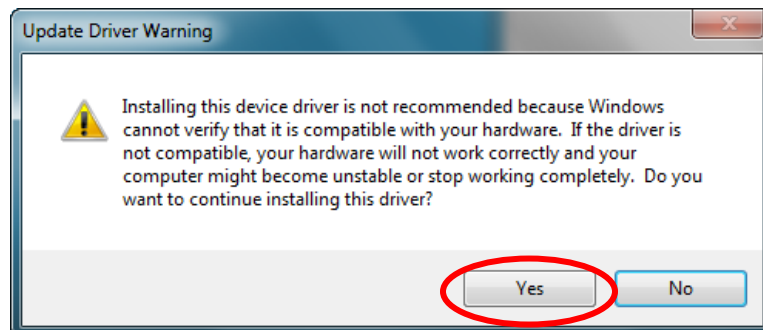
6. Select **Cypress HX3 Vendor Mode**, as shown in [Figure 11](#).

Figure 11. Selecting Driver Type



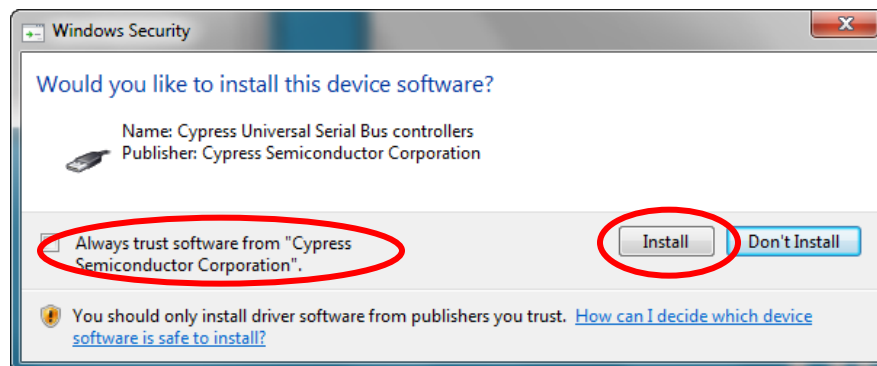
7. Click **Yes** in the **Update Driver Warning** window, as shown in [Figure 12](#).

Figure 12. Confirming Installation of Driver



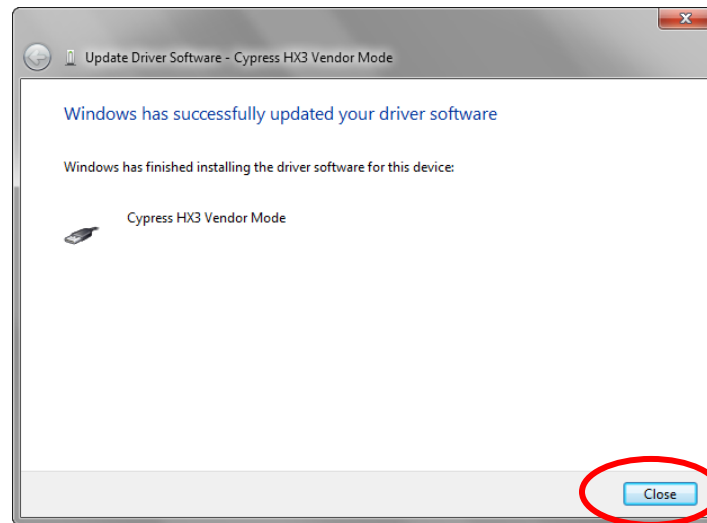
8. Accept the driver signature by selecting the check box **Always trust software from "Cypress Semiconductor Corporation"** and click **Install**, as shown in [Figure 13](#).

Figure 13. Enabling Installation of the Driver



9. Once the installation is successful, click **Close** to close the window, as shown in [Figure 14](#).

Figure 14. Successful Installation of CYUSBX3 Driver

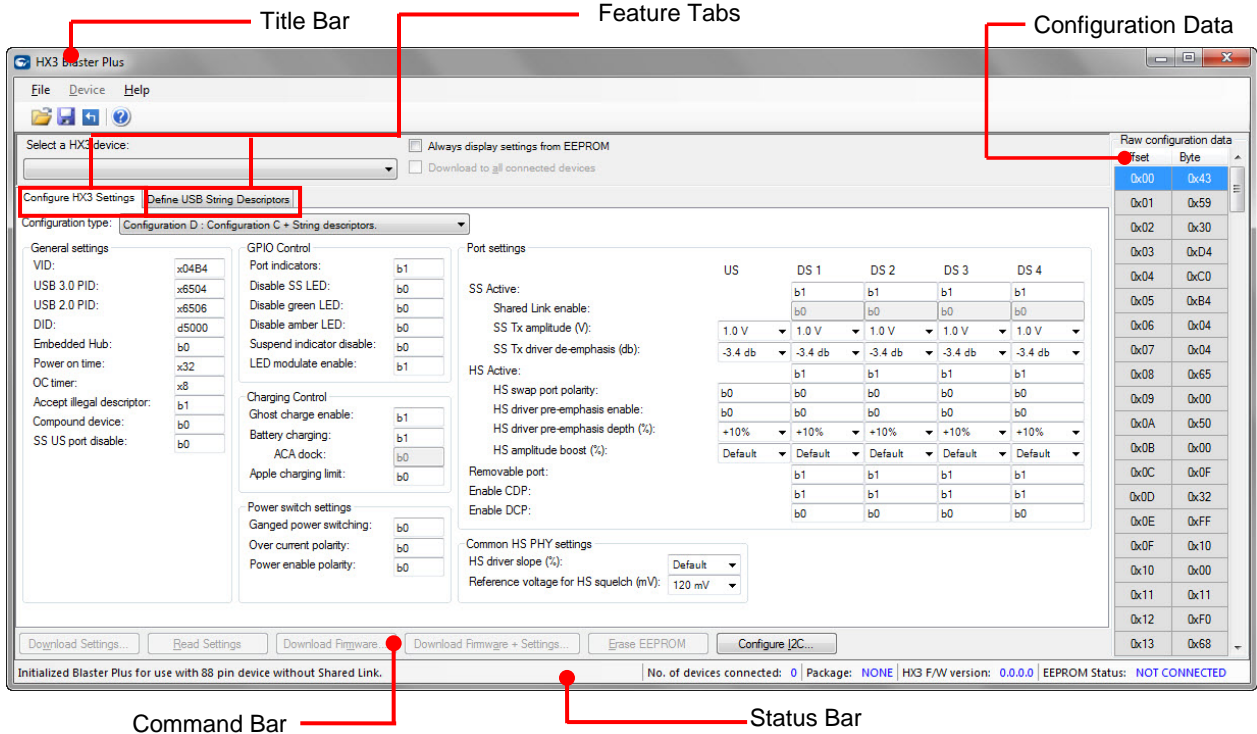


10. Restart the PC if required.

3.3.3 Perform Configuration Using the HX3 Blaster Plus Tool

1. Invoke the HX3 Blaster Plus tool from **Start > All Programs > Cypress > HX3 Blaster Plus > HX3 Blaster Plus**. The Blaster Plus GUI is displayed as shown in [Figure 15](#).

Figure 15. GUI Layout of HX3 Blaster Plus Tool



HX3 Blaster Plus includes two tabs: **Configure HX3 Settings** and **Define USB String Descriptors**. The title bar of the application shows the currently selected device. The status bar displays the following information:

- Error, warning, and status messages
- Package type of HX3 used on the hardware
- Firmware version stored on the hardware
- EEPROM content status: The EEPROM status displays five status values: NOT CONNECTED, BLANK, F/W, F/W+SETTINGS, and SETTINGS.

The Configuration Data section of the GUI displays the flat view of the current configuration data shown in the feature tabs.

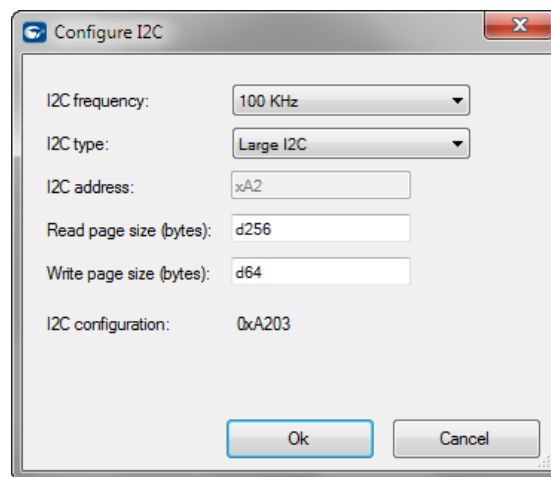
Table 4 provides an overview of the seven groups of configuration settings supported by the HX3 Blaster Plus tool.

Table 4. Configuration Setting Groups

Configuration Setting Group	Description
General Settings	This group of parameters is related to hub descriptor fields that are sent to the host. These controls are per the USB-IF hub specification and change the enumeration details of HX3.
GPIO Control	This group controls the default behavior of GPIO pins and Port Status Indicator LED pins. The HX3 Blaster Plus tool gives you an option to drop the Port Status Indicator LEDs to free up the GPIOs.
Charging Control	This group consists of configurable parameters related to USB Battery Charging, proprietary charging, and Ghost Charging™.
Power Switch Settings	This group consists of configurable parameters related to HX3 power management controls such as Power Enable polarity, overcurrent polarity, and ganged power switching.
Port Settings	This group consists of configurable parameters related to port-specific features such as Shared Link™, dedicated charging port (DCP), charging downstream port (CDP), and port polarity swapping. Also the Physical Layer (PHY) parameters for each port can be tuned per the hardware design.
Common HS PHY Settings	This group consists of configurable parameters related to advanced, high-speed PHY settings common to all the downstream and upstream ports.
USB String Descriptors	This group consists of three configurable string descriptors, including manufacturer string descriptor, product string descriptor, and serial number string descriptor.

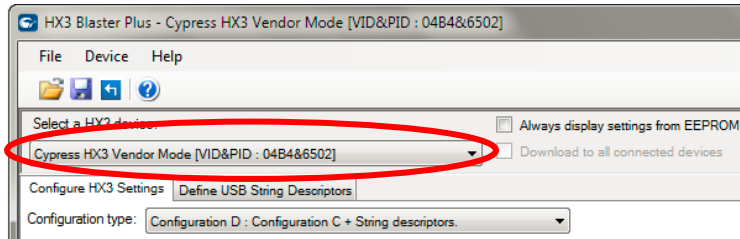
- Click the **Configure I2C** button. Select the appropriate values for the **I2C frequency**, **I2C type**, **Read page size**, and **Write page size** parameters based on the EEPROM used on the HX3 hardware, as shown in [Figure 16](#).

Figure 16. Setting I²C Parameters



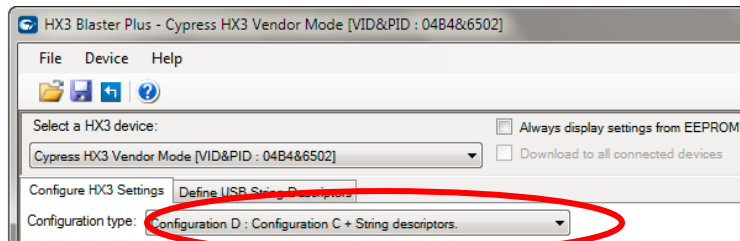
3. Select the HX3 device from the **Select a HX3 device** drop-down list, as shown in [Figure 17](#).

Figure 17. Selecting HX3 device



4. Select the configuration type, as shown in [Figure 18](#).

Figure 18. Selecting Configuration Type



Configuration type (Configuration A to Configuration D) determines the number of parameters that can be configured using the HX3 Blaster Plus tool GUI. Configuration A enables a minimum number of parameters, and Configuration D enables a maximum number of parameters. [Table 5](#) lists the configurable parameters for each configuration type.

Table 5. Configurable Parameters for Each Configuration Type

Configuration Setting Group	Configurable Parameters*	Configuration Type			
		A**	B**	C	D
General Settings	VID	X	X	X	X
	USB 3.0 PID	X	X	X	X
	USB 2.0 PID			X	X
	DID	X	X	X	X
	Embedded hub		X	X	X
	Controller power		X	X	X
	Power-on time		X	X	X
	OC timer		X	X	X
	Accept illegal descriptor		X	X	X
	Compound device		X	X	X
	Legacy host driver support		X	X	X
	SS US port disable		X	X	X

Configuration Setting Group	Configurable Parameters*	Configuration Type			
		A**	B**	C	D
GPIO Control	Port indicators		X	X	X
	Disable SS LED		X	X	X
	Disable green LED		X	X	X
	Disable amber LED		X	X	X
	Suspend indicator disable		X	X	X
	LED modulate enable		X	X	X
Charging Control	Ghost charge enable		X	X	X
	Battery charging		X	X	X
	ACA dock		X	X	X
	Apple charging limit		X	X	X
Power Switch Settings	Ganged power switching		X	X	X
	Overcurrent polarity		X	X	X
	Power enable polarity		X	X	X
Port Settings	SS Active		X	X	X
	Shared Link enable		X	X	X
	SS Tx amplitude (V)			X	X
	SS Tx driver de-emphasis (db)			X	X
	HS Active		X	X	X
	HS swap port polarity		X	X	X
	HS driver pre-emphasis enable			X	X
	HS driver pre-emphasis depth (%)			X	X
	HS amplitude boost (%)			X	X
	Removable port		X	X	X
	Enable CDP		X	X	X
	Enable DCP		X	X	X

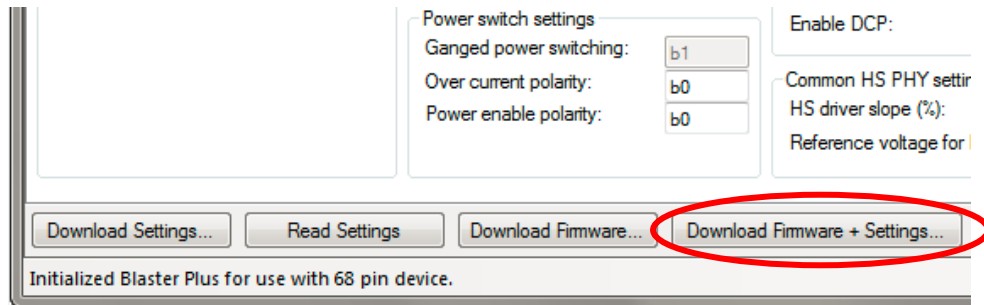
Configuration Setting Group	Configurable Parameters*	Configuration Type			
		A**	B**	C	D
Common HS PHY Settings	HS driver slope (%)			X	X
	Reference voltage for HS squelch (mV)			X	X
USB String Descriptors	Manufacturer string descriptor				X
	Product string descriptor				X
	Serial number string descriptor				X

* Refer to the EEPROM Map table in the *HX3 datasheet* for more details about these configuration parameters. The EEPROM Map table describes the location and default value for the configuration parameters.

** When Configuration types A and B are selected, the firmware assigns USB 2.0 PID by incrementing the value assigned to USB 3.0 PID by 2. For example, if you enter '6550' for USB 3.0 PID, the firmware assigns '6552' for USB 2.0 PID.

5. Now you can perform the following operations:
 - Edit and download configuration settings to the EEPROM.
 - Download firmware to the EEPROM.
 - Erase the contents of the EEPROM.
 - Read the configuration settings from the EEPROM.
6. The following example illustrates the procedure to change VID for the USB 3.0 hub interface and verify the updated parameter.
 - Click **Always display settings from EEPROM** check box located near the menu bar to read the current settings stored on the EEPROM
 - Modify the value of **USB 3.0 PID** under the **General Settings** group to x7500.
 - Click the **Download Firmware + Settings...** button in the command bar to write the modified settings to the EEPROM along with custom firmware, as shown in [Figure 19](#).

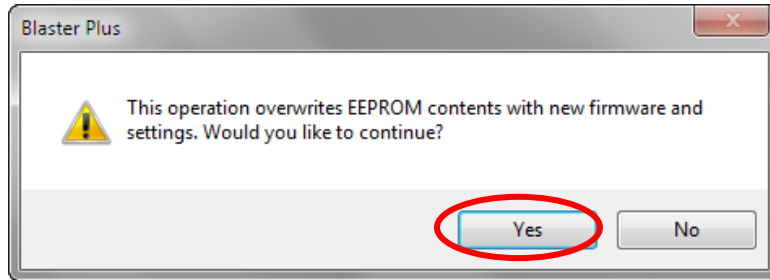
Figure 19. Downloading Custom Firmware and Configuration Settings



Note: Since the HX3 hardware is configured for custom firmware mode by default, always be sure to download the firmware along with the configuration settings. Also ensure that the HX3 hardware is designed with a large I2C EEPROM to accommodate both the firmware and settings.

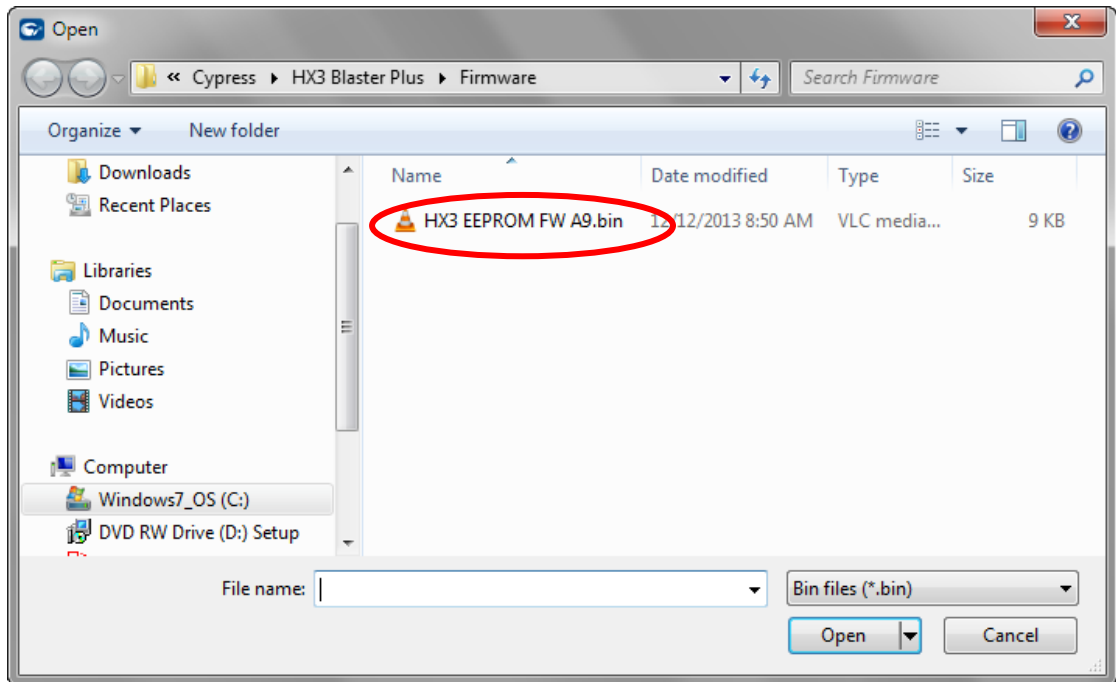
- Click **Yes** to confirm the download operation, as shown in [Figure 20](#).

Figure 20. Confirmation of Firmware and Configuration Settings Download



- Provide the path to the HX3 firmware (*HX3 EEPROM FW.bin*) in the dialog box and click **Open**, as shown in [Figure 21](#). You can find the HX3 firmware at *<Install Directory>HX3 Blaster Plus\Firmware*.

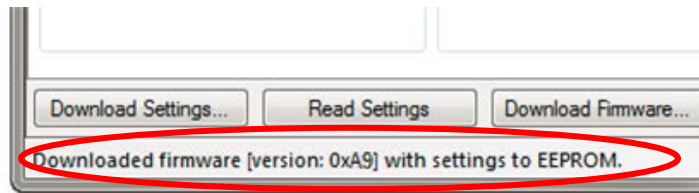
Figure 21. Confirmation of Firmware and Configuration Settings Download



Note: The “version” number shown in [Figure 21](#) may vary depending upon the latest HX3 firmware version. Contact Cypress technical support at cypress.com/go/support for HX3 firmware related queries.

- Wait for the status bar to get updated, as shown in [Figure 22](#), denoting successful downloading of the configuration parameters and firmware to the EEPROM.

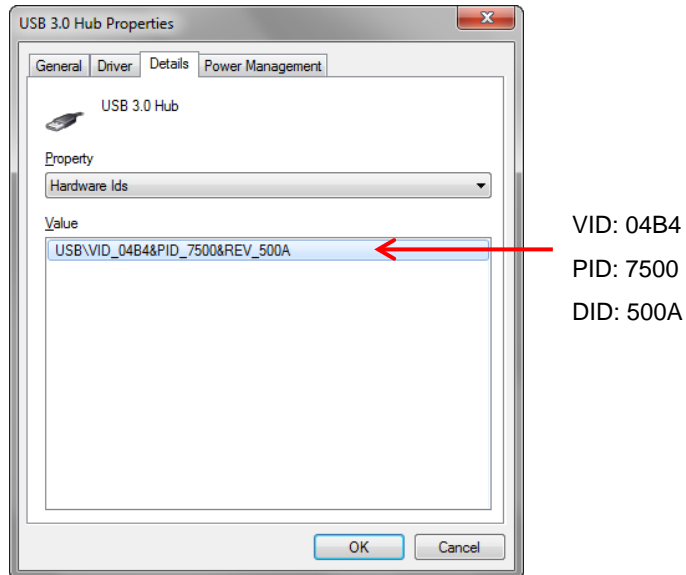
Figure 22. EEPROM Download Confirmation



- Reset the HX3 hardware by pressing the reset switch (SW1 on CY4603, CY4609 and CY4613) for the downloaded firmware to be effective.

- Identify the USB 3.0 hub entry in the **Device Manager** for the HX3 hardware and check the PID, as shown in [Figure 23](#).

Figure 23. Updated PID



Note 1: When the HX3 Blaster Plus tool is invoked, it identifies the configuration parameters that can be modified for the HX3 part used on the given hardware and disables editing of all other parameters.

Note 2: Some configuration parameters include subparameters. In these cases when a configuration parameter is disabled, all the subparameters are disabled as well. For example, disabling “SS Active” for “DS 1” disables all its subparameters. These subparameters are displayed in the GUI under the configuration parameter.

Note 3: Once the configuration data along with the firmware is written to the EEPROM, the pin strap features are disabled, as the configuration data stored in the EEPROM overrides all other settings. To enable the pin strap features again, download only the custom firmware to the EEPROM using the HX3 Blaster Plus tool and power cycle the HX3 hardware.

Note 4: When configuration data is downloaded to multiple HX3 devices by enabling **Download to all connected devices**, the same serial number will be used for all the devices.

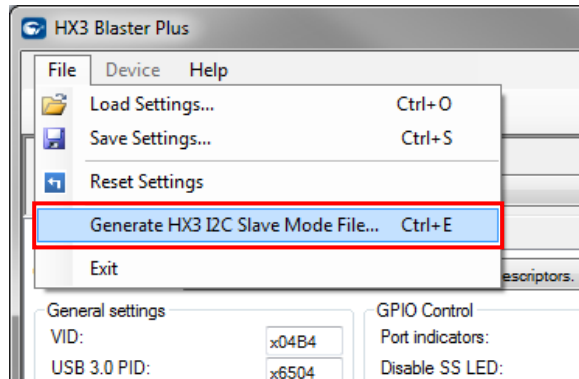
Note 5: While specifying value for the configuration parameters, make sure that the HX3 board design can support the values wherever applicable. For e.g., if the HX3 board design uses 'active low' signal to indicate 'over current' state on downstream port, only 0 can be assigned as the value for 'Over current polarity' parameter in Blaster Plus.

3.3.4 Generate an I²C Slave-Mode File to Configure HX3 Hardware in I²C Slave Mode

HX3 supports I²C slave-mode operation, which enables the configuration of HX3 from an external I²C master. In order to perform this operation, an “HX3 I²C Slave Mode file” needs to be generated using the Blaster Plus tool. This file contains HX3 configuration parameters and the custom firmware. Follow the steps given below to generate this file.

1. Connect the HX3 hardware to a PC running the Blaster Plus tool and specify the required configuration settings on the Blaster Plus GUI.
2. Select **File > Generate HX3 I2C Slave Mode File** as Figure 24 shows.

Figure 24. Generating I²C Slave-Mode File

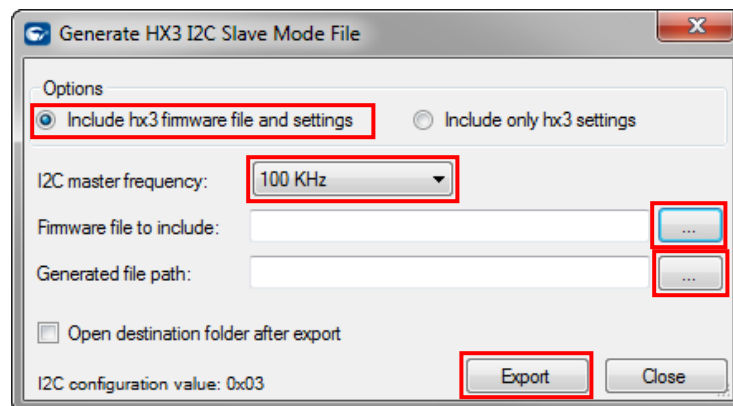


3. On the **Generate HX3 I2C Slave Mode File** dialog box, select the **Include hx3 firmware file and settings** option as Figure 25 shows. Select the **I2C master frequency** based on the frequency to be used by the I²C master device that will be connected to the HX3 hardware.

Note Because the HX3 hardware is configured for custom-firmware mode by default, always select the **Include hx3 firmware file and settings** option.

Provide the path to the HX3 firmware file (*HX3 EEPROM FW.bin*) in the **Firmware file to include** field. The HX3 firmware file is available under *<Install Directory>\HX3 Blaster Plus\Firmware*. Also provide the path to store the output file in the **Generated file path** field and click **Export**.

Figure 25. Dialog box to generate HX3 I2C slave mode file



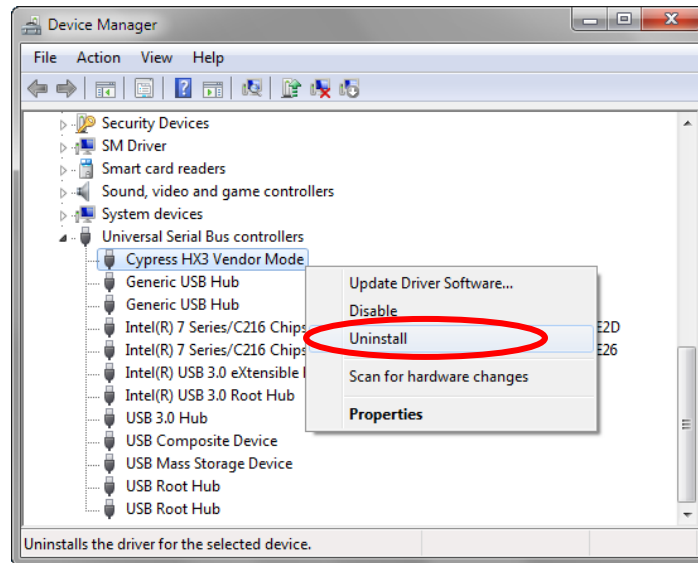
Note: After the HX3 I²C slave-mode file is generated, the HX3 hardware needs to be configured for I²C slave-mode operation and connected to an I²C master to download the HX3 I²C slave-mode file. Refer to the given HX3 hardware implementation details as required.

3.3.5 Uninstall CYUSBHX3 Vendor Driver

Once the CYUSBHX3 driver is installed, the device ceases to function as the HX3 hub, and it can be used with the HX3 Blaster Plus tool only. To bring the device back to hub functionality, you need to uninstall the CYUSBHX3 driver associated with the hardware as follows:

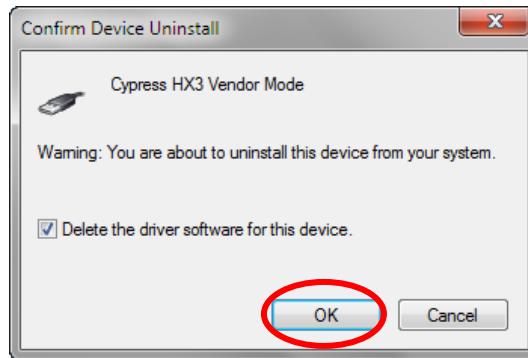
1. Close the HX3 Blaster Plus tool if it is running.
2. Open the **Device Manager** and locate the **Cypress HX3 Vendor Mode** device. Right-click on the device and select **Uninstall**, as shown in [Figure 26](#).

Figure 26. Uninstalling CYUSBHX3 Driver



3. Select **Delete the driver software from this device** and click OK, as shown in [Figure 27](#).

Figure 27. Initiating Uninstall of CYUSBHX3 Driver



4. Restart the PC if required.

This procedure restores the hub driver, and the attached hardware can be used as the normal USB 3.0 hub.

4. Troubleshooting



4.1 Troubleshooting Guide

Problem	Possible Cause	Possible Solution
HX3 Blaster Plus tool does not list the HX3 board that is connected to the PC on the tool's title bar.	The CYUSBHX3 vendor driver may not be bound on the USB port to which the HX3 board is connected.	Ensure that the CYUSBHX3 vendor driver is bound before invoking the HX3 Blaster Plus tool.
Configurations set using the HX3 Blaster Plus tool are not enabled after running the tool.	The configuration mode selection jumpers may not have been set correctly.	<p>Ensure that the hardware is configured for custom firmware mode using the configuration mode selection jumpers.</p> <p>Ensure that the configuration mode selection jumpers are fitted tightly.</p> <p>Restart the hardware either by power cycling the hardware or by pressing the reset switch (SW1) after setting the configuration mode selection jumpers.</p>
Installation of the CYUSBHX3 driver that is required to run the HX3 Blaster Plus tool fails with a "code 10" error.	The USB 3.0 host controller on the PC may not be compatible with the CYUSBHX3 driver (for example, ASMedia USB 3.0 host controller based PC).	Try installing the CYUSBHX3 driver on another PC with a different USB 3.0 host controller (such as Intel or Renesas).
After configuring the kit using the HX3 Blaster Plus tool, the enumeration of the hardware fails.	During configuration using the HX3 Blaster Plus tool, DCP may have been enabled on all the downstream ports. When DCP is enabled, a downstream port will work only as a charging port.	Configure the hardware to use ROM firmware. Invoke the HX3 Blaster Plus tool and disable DCP on the required downstream ports using the HX3 Blaster Plus tool. Configure the hardware to use custom firmware
	During configuration using the HX3 Blaster Plus tool, a setting incompatible with to the hardware may have been enabled.	Configure the hardware to use ROM firmware. Invoke the HX3 Blaster Plus tool, erase the EEPROM, and configure new settings. Configure the hardware to use custom firmware
Unable to install CYUSBHX3 driver on Windows XP after changing the USB 2.0 PID using the HX Blaster Plus tool.	The new USB 2.0 PID value set may not be supported by the CYUSBHX3 driver on Windows XP.	Configure the hardware to use ROM firmware. Invoke the HX3 Blaster Plus tool and restore USB 2.0 PID to the default value.
The HX3 Blaster Plus tool does not list the HX3 board any longer after modifying the configuration settings	The change in configuration settings might have caused the CYUSBHX3 vendor driver binding to be lost	Rebind the CYUSBHX3 vendor driver using the procedure described in section 3.3.2

Revision History



Document Revision History

Document Title: HX3 Blaster Plus User Guide

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Revision	Issue Date	Origin of Change	Description of Change
**	02/25/2014	SELV	Initial version.
*A	05/05/2014	SELV	Updates for CY4613 DVK
*B	07/10/2014	SELV	Updates to revised Blaster Plus GUI interface. Added details about generating 'HX3 I2C Slave Mode File'.