



Protouch2 GUI User Manual


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RE V	DATE	ORIGINATOR	DESCRIPTION OF CHANGE
0.9	30-Dec-2014	Vishnu P	Initial version
1.3	30-Apr-2015	Vishnu P	Offline support added
1.4	30-May-2015	Vishnu P	Changes from version 1.3 to 1.4
1.5	04-August-2015	Vishnu P	Support for USB4604/2534 family added for GUI
1.6	31-March-2016	Mushfira S	Added USB bridging with I2C, SPI, GPIO and UART. Added Flex connect demo in Advanced options
1.7	3-MAY-2016	Santhru N	Support for LAN98XX, USB5742 added for GUI
1.8	20-June-2016	Rathika K	Added Disable Selective USB suspend.
1.9	30-August-2016	Rathika K	Support for HSIC SKUs 3813 and 3613, , LAN7801, Added Super speed feature in USB57X4 family
2.0	30-Sep-2016	Karpagam A	Support for USB58XX/USB59XX family

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1 Introduction

Protouch2 GUI is a Configuration and Programming tool for the following Microchip USB hubs and LAN products.

1.1 Abbreviations

UCH – Universal Hub Controller

HFC – Hub Feature Controller

PT2 – Protouch2

UUID – Universal Unique Identifier

HSIC – High Speed Inter-Chip

2 Legal Information

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3 Drivers

USB Hub Drivers:

WinUSB driver needs to be installed before launching the tool. Hub Class Filter installation can be done by using Command Line Tool.

Note: *VSM Filter driver needs to be installed if the internal HCE device is disabled.*

LAN78XX Drivers:

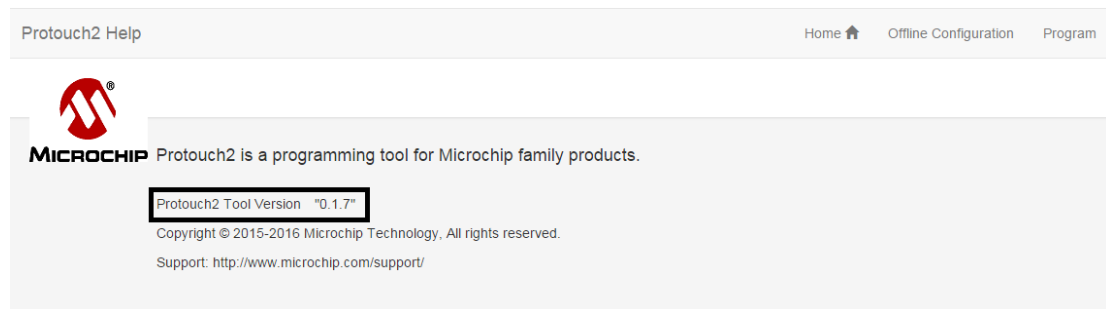
LAN78XX driver needs to be installed before connecting the LAN device to computer. It is available in {PT2 tool folder}\Drivers\LAN78xxDriver\install.exe

4 Logging

Log file with detailed messages will get created in the same path from where the application is running in the name of “PT2.log”.

5 Version

The version number of the tool can be found from the help page. Refer to [Section 9.1](#) for more details.



6 Reference

Please refer to the release notes “Protouch2 release notes.pdf” for more information on OS Supported, SKUs supported, USB controllers supported and known limitations

7 Disable Power Management

Power Management for corresponding hub should be disabled before launching the tool. If Power management is enabled, hub will be put to sleep mode which will result in failure of the tool in accessing the hub. Please refer to [Appendix II](#) on how to disable this field.

Note: If it is a USB 3.1 Gen1 Hub, then power management should be disabled on both USB2.0 Hub and USB 3.1 Gen1 Hub.

8 Configuration File formats

Configuration file holds the data to be programmed to the hub. Configuration file used for programming can be in Binary format (.cfg) or JSON format (.json) for USB hub products and Binary format (.bin) for LAN78XX products. These files are generated when changes are done to the configuration items in the Hub.

8.1 JSON Format

JSON file uses human readable text to program. Json file starts with open brace “{” and end with close brace “}”. Number of properties using "name": "value" pairing, separated by commas can be declared inside these braces. There should not be any empty space or empty line. Use only below mentioned names (case-sensitive) in Json File. Json file should be in the below given format.

Format:

```
{
"name": "value"
}
```

**use comma to separate when there are more entries.*

Example:

```
{
"pid": "0x1234",
"did": "0x5678"
}
```

In this example, pid and did are configuration items and 0x1234 and 0x5678 are the new values.

Refer [Appendix V](#) for list of supported configuration items

8.2 Binary Format

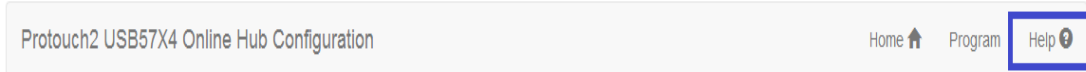
Configuration files in binary format can be also generated and programmed using this tool. This is the format in which data will be stored in the Configuration memory and is not human readable. These files are generated and accepted with extension .cfg for USB hub products and .bin for LAN78XX products

9 Application

The following pages are available in the tool

9.1 Help Page

There is a Help menu on all the PT2 pages on the top right corner as shown below



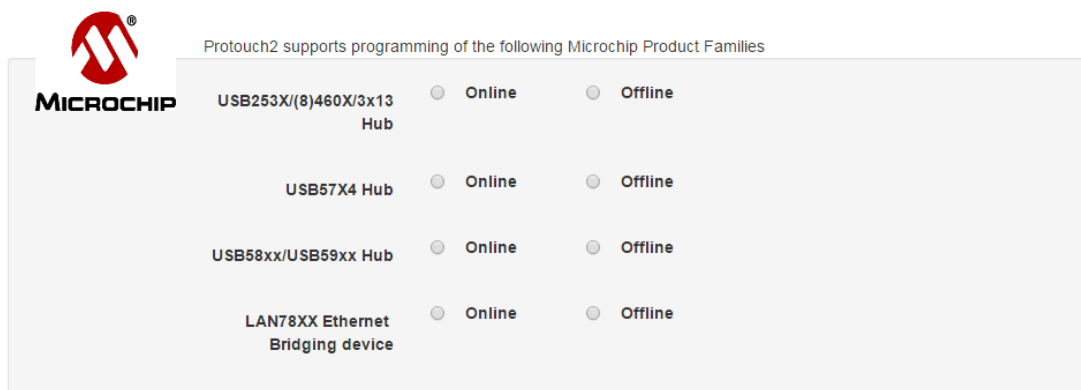
9.2 Landing Page

This is the default screen that will be displayed once Protouch2 is launched. When “**USB 57X4 Hub Online**” is selected in the landing page, it moves to the USB57X4 hub online configuration page and looks for Microchip Hubs in the system, after loading the appropriate drivers.

When “**USB253X/(8)480X/3X13 Hub Online**” is selected in the landing page, it moves to the USB253X/(8)480X/3X13 online hub configuration page and looks for Microchip Hubs in the system, after loading the appropriate drivers.

When “**USB58XX/USB59XX Hub Online**” is selected in the landing page, it moves to the USB58XX/USB59XX online hub configuration page and looks for Microchip Hubs in the system, after loading the appropriate drivers.

When “**LAN78XX Ethernet Bridging device Online**” is selected in the landing page, it moves to the LAN78XX Online configuration page and looks Ethernet Bridging device LAN7800/LAN7850 for in the system, after loading the appropriate drivers.



There are two main use cases for PT2 Hub application in “**Online**” mode.

1. **Configuration File Generation** – User experiments with MCHP hub and selects the features in the hub and provides new values for the configuration items he wants to change.
2. **Mass Programming** – Tool for programming several MCHP Hubs for production.

In **Offline mode**, the Hub need not be connected to the system in which the tool is running. Only configuration generation can be done in this mode. Programming cannot be done in Offline Mode.

10 USB Hub Devices

10.1 Online Hub Configuration Page

MCHP hubs contain several registers that can change the behavior of the hub. It can be changed to a new value through the PT2 application by programming the configuration memory.

MCHP Hub configuration items are divided into the following three categories and are available under 3 different tabs as shown below

- Basic Features (Shown by default)
- Advanced Features
- Special Features

USB253X/USB(8)460X/USB3X13:

Protouch2 USB2530 Online Hub Configuration
Home
Program
Help

Basic Features
Advanced Features
Special Features

Selected USB Hub: Index:0,VID:0424,PID:4504,DID:0128
Preview Changes
Apply changes

Device Management
Device Identification USB 2.0
Downstream Port Configuration

USB57X4:

Protouch2 USB57X4 Online Hub Configuration
Home
Program
Help



Basic Features
Advanced Features
Special Features

Selected USB Hub: Index:0,VID:0424,PID:2734,DID:0121
Preview Changes
Apply changes

Device Management
Device Identification USB 2.0
Device Identification USB 3.0
Downstream Port Configuration

USB58XX/USB59XX:

Protouch2 USB58xx/USB59xx Online Hub Configuration

Home  Program Page Help 


Basic Features

Advanced Features

Special Features

Selected USB Hub:

Index:0,VID:0424,PID:2926,DID:0204

Refresh 

Preview Changes

Apply changes

Device Management

Device Identification USB 2.0

Device Identification USB 3.1 Gen1

Downstream Port Configuration

10.1.1 Basic Features

Features that are widely used and modified by several customers are grouped in the Basic features Tab

10.1.1.1 Device Management

Select USB Hub:

The screenshot shows the 'Device Management' window. It contains the following elements:

- Select USB Hub:** A dropdown menu showing 'Index:0,VID:0424,PID:2734,DID:0187' and a green 'Refresh' button with a circular arrow icon.
- Auto Identified Part Number:** A text box containing 'USB5734'.
- Config Mode:** A text box containing '0'.
- Config Memory:** A dropdown menu showing 'SPI Flash'.
- Firmware Memory:** A dropdown menu showing 'SPI Flash'.
- No of Configurations Programmed:** A text box containing '5'.
- Configuration Memory Usage:** A progress bar showing 8% usage (indicated by a green bar) and a total of 8KB.
- Restore Factory Defaults:** A red button at the bottom left.

This is the screen that will be displayed once the device family is selected in the landing page. Once the Protouch2 is launched all the GUI elements (in all pages) will remain disabled except “Select USB Hub” and the default item selected will be “Hub at index 0.

Note: If multiple families of MCHP hubs are connected to the host, by changing *AUTO_RETRY_USB* option in *Protouch2.ini* to *TRUE*, PT2 tool will try to connect the selected family hub from the landing page of PT2 tool. The default value of *AUTO_RETRY_USB* option is *FALSE*.

Auto Identified Part Number

This will give information about the SKU which is nothing but default PID of the SKU. The Auto-identification is independent of VID/PID changes.

Configuration Memory and Firmware Memory

There can be only two possibilities as follows

1. Firmware is running from ROM, configuration is always loaded from OTP
2. Firmware is running from SPI Flash, configuration is always loaded from SPI

Number of configurations programmed

Number of configurations programmed will be displayed based on the data read from the hub. The tool allows programming as long as there is free space in configuration memory.

Configuration Memory Usage

Configuration space usage progress bar shows the % of configuration memory used.

Colour coding is based on the usage %.

For example,

Green, if usage < 50%,

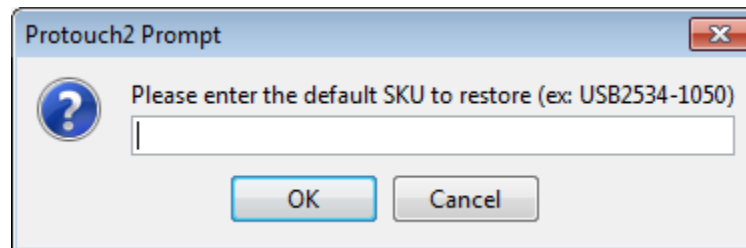
Yellow, if usage is between 50-75% and

Red, if usage > 75%.

Restore Factory Defaults

Restore Factory Defaults is a restoration of a hub to its original system state by erasing all of the information stored on the device in an attempt to restore the device to its original manufacturer settings.

For USB253x SKU, if Number of configuration programmed is 16+ and running from ROM, then Protouch2 will ask for default SKU to restore.



10.1.1.2 Device Identification USB 2.0

USB 2.0 Vendor id, Product id, bcdDevice, bcdUSB and String Descriptors can be customized by writing appropriate values.

Device Identification USB 2.0	
Device Descriptor	
USB Vendor ID (hex)	<input type="text" value="0x424"/>
USB Product ID (hex)	<input type="text" value="0x2744"/>
USB Device ID (hex) (bcdDevice)	<input type="text" value="0x113"/>
USB bcdUSB	<input type="text" value="2.10"/>
String Descriptors	
Language ID (hex)	<input type="text" value="0x409"/>
Manufacturer Name	<input type="text" value="Microchip-SMSC"/>
Product Name	<input type="text" value="USB2734"/>
Serial Number	<input type="text" value="NULL STRING - NOT PROGRAMMED YET"/>

USB 2.0 String can be disabled by programming empty string as shown below. USB 3.1 Gen1 and HCE strings can also be disabled by this method.

String Descriptors

Language ID (hex)	0x 409
Manufacturer Name	Microchip Tech
Product Name	Product name for the USB hub device
Serial Number	NULL STRING - NOT PROGRAMMED YET

10.1.1.3 Device Identification USB 3.1 Gen1

USB 3.1 Gen1 Vendor id, Product id, bcdDevice, USBbcd, String Descriptors and UUID can be customized by writing appropriate values.

Device Identification USB 3.1 Gen1

Device Descriptor

USB 3.1 Gen1 Vendor ID (hex)	0x 424
USB 3.1 Gen1 Product ID (hex)	0x 5744
USB 3.1 Gen1 Device ID (hex) (bcdDevice)	0x 202
USB 3.1 Gen1 bcdUSB	0x 3.00

String Descriptors

Language ID (hex)	0x 409
Manufacturer Name	Microchip Tech
Product Name	USB5734
Serial Number	NULL STRING - NOT PROGRAMMED YET

Other Descriptors

UUID (hex)	0x 100f0e0d0c0b0a090807060504030201
------------	-------------------------------------

10.1.1.4 Downstream Port Configuration

Based on the selected hub, downstream ports will be displayed. For example, USB253X/(8)460X/57X4 have 4 downstream ports.

Downstream Port Configuration

Port 1

Port 2

Port 3

Port 4

The SKUs USB3X13 (USB3613 and USB3813) only have 3 downstream ports. The upstream port and the third downstream port of USB3613 is HSIC enabled. And in USB3813, first downstream port is HSIC enabled.

Downstream Port Configuration

Port 1

Port 2

Port 3

10.1.1.4.1 Port configuration

Downstream Port Configuration

Port 1

Enable Port 1

☒

Non-Removable Port

☐

Battery Charging

☒
☐
☐

USB2.0 Standard USB Port-Max 500mA
 BC 1.2 Compliant Port-Max 1.5A
 Most Devices Supported Mode-Max 2A

10.1.1.4.1.1 Port Enable/Disable

Physical port can be enabled / disabled through GUI. If any one of the physical port is enabled or disabled, GUI will remap appropriate logical ports internally.

Port 1

USB2.0

Enable Port 1

☒

Non-Removable Port

☐

10.1.1.4.1.2 Non Removable ports

USB 2.0 ports can be configured as Non Removable ports. It indicates whether the ports have non- removable devices.

- ‘If check box is not checked’ = port is removable,
- ‘If check box is checked’ = port is non- removable.

This configuration item informs the Host that one of the active ports has a permanent device that is non-detachable from the Hub.

10.1.1.4.1.3 Battery Charging

- USB2.0 Standard USB Port-Max 500mA
- BC 1.2 Compliant Port-Max 1.5A
- Most Devices Supported Mode-Max 2A

USB2.0 Standard USB Port-Max 500mA:

USB2.0 Standard USB Port-Max 500mA is the default battery charging method. This also means battery charging is disabled and the device can draw only 500mA which is the standard for a USB device.

BC 1.2 Compliant Port-Max 1.5A:

When there is no upstream VBUS, and consequently no USB host connected on the upstream port, the downstream battery charging enabled ports will operate as BC 1.2 compliant Port-Max 1.5 A.

Most Devices supported Mode-Max 2A

When there is an upstream VBUS and an upstream connection, the downstream battery charging enabled ports will operate as Most Devices supported Mode-Max 2A.

Battery Charging is supported for disabled port in USB57x4 Hubs and not supported for disabled port USB253x/USB4604 hubs.

In HSIC SKUs (USB3X13), if a downstream port is HSIC enabled, Battery Charging is not supported on that port.

10.1.2 Advanced Features

USB57X4:

Protouch2 USB57X4 Online Hub Configuration
Home
Program
Help

Basic Features
Advanced Features
Special Features

Selected USB Hub:
Index:0,VID:0424,PID:2734,DID:0202
Preview Changes
Apply changes

Downstream Port Configuration (Advanced)
Upstream Port Configuration
Hub Controller (Internal USB Device)
Communication Device Class
Advanced settings
Direct Register Access
Live Update
Dump Memory
Flex Connect Demo

Status Messages

USB253X/USB4604/USB3X13:

Protouch2 USB2530 Online Hub Configuration
Home
Program
Help

Basic Features
Advanced Features
Special Features

Selected USB Hub:
Index:0,VID:0424,PID:4504,DID:0116
Preview Changes
Apply changes

Downstream Port Configuration (Advanced)
Upstream Port Configuration
Hub Controller (Internal USB Device)
Advanced settings
Direct Register Access
Live Update
Dump Memory
Flex Connect Demo

10.1.2.1 Downstream Port Configuration (advanced)

Swap D+/D-:

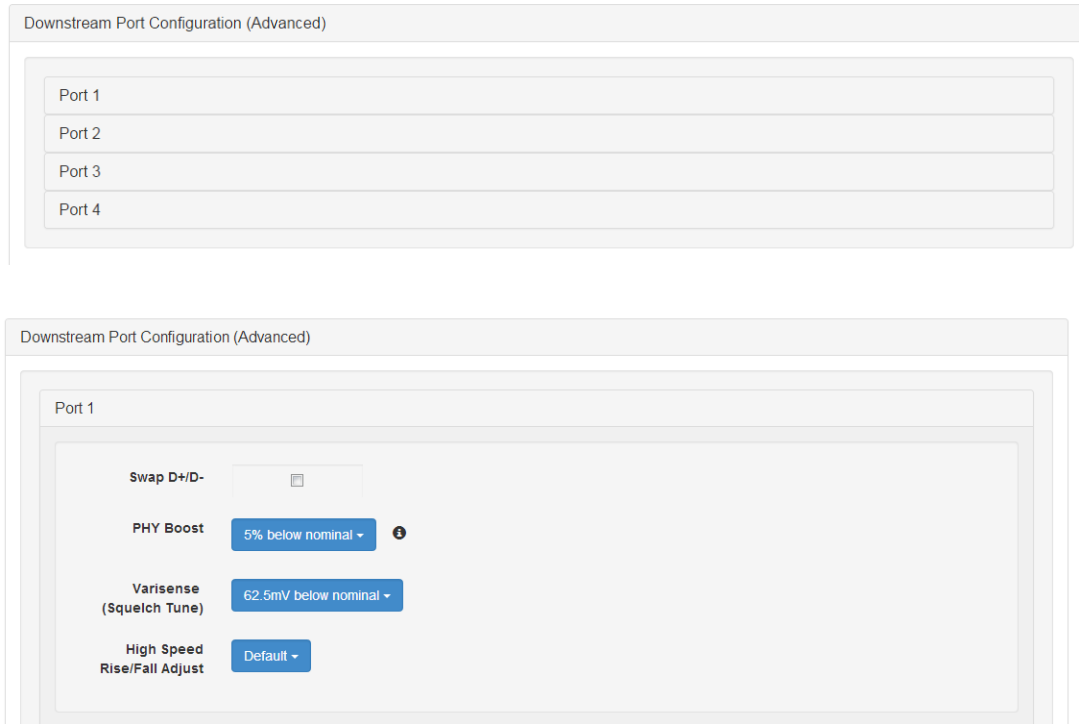
USB2.0 DP and DM Pins can be swapped using GUI.

PHY Boost and Varisense:

USB signal drive strength in upstream and downstream transceivers can be changed using PHY Boost. USB signal receiver sensitivity can be changed by using Varisense. Downstream Ports PHY Boost and Varisense value can be changed by using GUI as shown below

High Speed Rise/Fall Adjust:

Rise/Fall time for High Speed device gets varied based on cable length. This can be changed using High Speed Rise/Fall Adjust.



10.1.2.2 HSIC related configuration

The following are the HSIC related configurations which can be done on HSIC enabled ports.

Swap HSIC DATA/STROBE

HSIC Data and Strobe Pins can be swapped using GUI.

HSIC Driver Output Impedance

HSIC Driver Output Impedance can be configured to one of the options given below using the GUI.

- 40 ohm
- 50 ohm

Slew Tune

Similarly, Slew Tune in HSIC enabled port can be configured as given below.

- Default
- +30%

Downstream port HSIC configuration (Advanced):

Downstream Port Configuration (Advanced)

Port 1

Swap HSIC
DATA/STROBE

☐

HSIC Driver Output
Impedance

50 ohm ▾

Slew Tune

+30% ▾

Upstream port HSIC Configuration:

Upstream Port Configuration

Enable FlexConnect

☐ ⓘ

Swap HSIC
DATA/STROBE

☐

HSIC Driver Output
Impedance

50 ohm ▾

Slew Tune

+30% ▾

10.1.2.3 Upstream Port Configuration

Flex connect

USB 2.0/ USB 3.1 Gen1 downstream port 1 can be configured as Upstream Port.

- ‘If check box is not checked’ = Upstream port is not Flex connected – default behaviour
- ‘If check box is checked’ = Upstream port is Flex connected, meaning the upstream port is downstream port and downstream port1 is the upstream port.

Swap D+/D-

USB 2.0 Upstream DP and DM Pins can be swapped using the GUI.

PHY Boost and Varisense

USB signal drive strength in upstream and downstream transceivers can be changed using PHY Boost. USB signal receiver sensitivity can be changed by using Varisense. Downstream Ports PHY Boost and Varisense value can be changed by using GUI as shown below

High Speed Rise/Fall Adjust:

Rise/Fall time for High Speed device gets varied based on cable length. This can be changed using High Speed Rise/Fall Adjust.

The screenshot shows the 'Upstream Port Configuration' window. It contains the following settings:

- Enable FlexConnect:** A checkbox that is currently unchecked.
- Swap D+/D-:** A checkbox that is currently unchecked.
- PHY Boost:** A dropdown menu set to '5% below nominal'.
- Varisense (Squelch Tune):** A dropdown menu set to '62.5mV below nominal'.
- High Speed Rise/Fall Adjust:** A dropdown menu set to 'Default'.

This screenshot is identical to the one above, but with the 'Varisense (Squelch Tune)' dropdown menu open. The menu shows three options: '5% below nominal', 'Nominal 17.78 mA', and '5% above nominal'.

10.1.2.4 HCE (Internal USB Device)

Enable HCE

HCE (Hub controller Enumeration Device) is used for programming the OTP by communicating with the UCH (Universal controller Hub) device. HCE can be enabled always by using the GUI and programming the configuration memory.

- ‘If check box is not checked’ = UCH not Enabled always,
- ‘If check box is checked’ = UCH Enabled always,

UCH Vendor id, Product id, bcdDevice and String Descriptors can be customized by writing appropriate values. ***If the VID or PID of the HCE device is changed from the default value, the new VID and PID needs to be added into the INI file .PID should be added to HCE_DEV_INFO and VID should be added to "HUB_VID_LIST" in the INI file.***

If the default vendor ID/Product ID is changed for the hub controller, Protouch2 hub controller driver will not be loaded for the hub controller. New WinUSB driver package should be generated for the hub controller

(Note: The automatic & manual WinUSB driver installation will not work, if the hub controller Vendor ID & Product ID is changed)

10.1.2.5 Communication Device Class (CDC)

- ‘If check box is not checked’ = CDC not Enabled always,
- ‘If check box is checked’ = CDC Enabled always. When WinUSB interface is present CDC will enumerate at interface 1, otherwise at interface 0.

Communication Device Class

Enable CDC

☐

Note: CDC is not available for USB253X/USB4604.

10.1.2.6 Advanced Settings

Hub Power Mode

Hub power mode can be configured by using this GUI. If the hub is self-powered, then external power supply is applied to hub. If the hub is bus-powered, then power is obtained from the USB port to which the hub is connected.

USB57X4:

Hub Power Mode ☒ Self Power ☐ Bus Power

Hub Circuit Max Power (Self) 0 mA ⓘ

Hub Max Power 2.0 (Self) 0 mA ⓘ

Hub Max Power 3.0 0 mA ⓘ

SUSP_IND USB 2.0 ☒ Suspend Indicator ☐ Resume Inhibit

Force Hub into Full speed mode ☐

Enable LPM ☒

USB253X/USB4604:

Hub Power Mode ☒ Self Power ☐ Bus Power

Hub Circuit Max Power (Self) 1 mA ⓘ

Hub Max Power 2.0 (Self) 2 mA ⓘ

Upstream Charger Detection ☒ Disabled ☐ All supported Chargers ☐ All SE1 chargers ☐ CDP charger ☐ DCP charger

SUSP_IND USB 2.0 ☒ Disable ☐ Suspend Indicator ☐ Resume Inhibit

Force Hub into Full speed mode ☐

Enable LPM ☐

Hub Max Power and Hub Circuit Max Power

Hub Power mode is configured as a Self-Powered device, then <1mA of upstream VBUS current is consumed and all ports are available, with each port being capable of sourcing 500mA of current. Hub Power mode is configured as a Bus-Powered device, the Hub consumes less than 100mA of current prior to being configured. After configuration, the Bus- Powered Hub (along with all associated hub circuitry, any embedded devices if part of a compound device, and 100mA per externally available downstream port) must consume no more than 500mA of upstream VBUS current. Hub Circuit Max Power field gets input and displays output for USB 2.0 hub. Based on input given to this field Hub Circuit Max Power for USB 3.1 Gen1 hub will be updated.

Hub Circuit Max Power (Self) 0 mA ⓘ

Hub Max Power 2.0 (Self) 0 mA ⓘ

Hub Max Power 3.0 0 mA ⓘ

Upstream Charger Detection

Battery Charger Detection is available USB253x/USB4604 hubs on the upstream facing port. The detection sequence will identify chargers which conform to the Chinese battery charger specification, chargers which conform to the USB-IF Battery Charger Specification 1.2, and single ended 1 charger (SE1).

Upstream Charger Detection ☒ Disabled ☐ All supported Chargers ☐ All SE1 chargers ☐ CDP charger ☐ DCP charger

SUSP_IND USB 2.0

If the Suspend indicator is enabled, then Device is configured and is active (not in suspend). If Resume inhibit is enabled, then if hub detects any wakeup event then suspend indication will be driven for some time. SUSP_IND Pin can be configured by using GUI.

SUSP_IND USB 2.0 ☒ Disable ☐ Suspend Indicator ☐ Resume Inhibit

Note: Disable option is not available for USB57X4 Hubs.

Force hub into Full speed mode

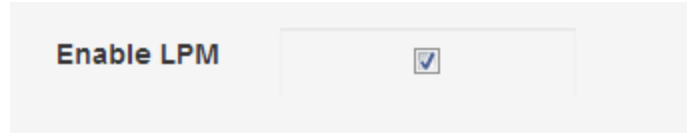
The speed of the device will be 12Mbit/s by configuring USB Full speed device in GUI.

- ‘If check box is not checked’ = USB Full Speed Device Disabled,
- ‘If check box is checked’ = USB Full Speed Device Enabled

Force Hub into Full speed mode ☐

LPM

Low transitional latencies can be offered by enabling LPM (Link Power Management).LPM can be enabled by using GUI.



10.1.2.7 Direct Register Access

XDATA Address can be programmed with desired value directly by using Direct Register Access option. This method follows Big endian.

Example:

Write value 1234 in register 0x3000 as shown below. Here 12 will be written to 0x3000 and 34 will be written to 0x3001

Alternatively, ini file can be given as input. Refer [Section 9.3.2.6.1](#) for ini format.

INI Format

```
[OTPGEN_CONFIG]
; XDATA Write byte. i.e XDATA[address] = yy
; XWRE_ is the identifier to initiate xdata write byte operation.
```

; Example 1: write XDATA[3000]to 1234

XWRE_3000=12

XWRE_3001=34

; Example 2: write XDATA[3000]to 1234

XWRE_3002=12 34

; XDATA Set bits. i.e XDATA[address] |= yy

; XSET_ is the identifier to initiate xdata set bits operation.

; Example 1:

XSET_3000=10 ; sets bit 4 in xdata address 0x3000

XSET_3001=02 ; sets bit 1 in xdata address 0x3001

; Example 2:

XSET_3000=02 14 ; sets bit 1 in xdata address 0x3000 and sets bit 2,4 in xdata address 0x3001

; XDATA Clear bits. i.e XDATA[address] &= (~yy)

; XCLR_ is the identifier to initiate xdata clear bits operation.

; Example 1:

XCLR_3000=13 ; clears bit 0,1,4 in xdata address 0x3000

XCLR_3001=01 ; clears bit 2 in xdata address 0x3001

; Example 2:

XCLR_3000=01 40 ; clears bit 2 in xdata address 0x3000 and clears bit 5 in xdata address 0x3001

Note 1: Follow either one of the example of respective operation

Note 2: No line breaks to be inserted while specifying multi byte values

Note 3: ";" on line start comments that whole line

Note 4: No space to be inserted before and after "="

10.1.2.8 Live Update

Register Read and Write can be done in Live Update by using GUI. Register Value will be reflected for given Register address when Read option is selected. Data can be written to register address by selecting Write option. Number of bytes to be read or written can be mentioned in length field. Selecting Advanced Options allows user to store read values in a file and writes values to registers from given file. File extension is **.regdmp**.

Live Update

Register address(hex)

0x

Length

Register Operation

☒ Read ☐ Write

Register value(hex)

0x

Advanced Options

☐

Live Update

Example:

To read Register value:

Live Update

Register address(hex)

0x

3000

Length

2

Register Operation

☒ Read ☐ Write

Register value(hex)

0x

24 04

Advanced Options

☐

Live Update

Advanced Option:

Live Update

Register address(hex)

0x

3000

Step:1

Length

20

Step:2

Register Operation

☒ Read ☐ Write

Step:3

Register value(hex)

0x

24 04 04 45 28 01 9b 28 08 20 00 00 02 50 01 50 32 00 00 00

Advanced Options

☒

Step:4

Select file (.regdmp)

Choose File

RegRead

Step:5

Live Update

Step:6

Values read are stored in File selected. This file can be used as an input when Write Option is selected.

10.1.2.9 Dump memory

Dump memory allows user to dump OTP memory or SPI memory or SPI with Pseudo OTP memory present in device connected. OTP Memory Dump will be saved in a given file with extension **.dump** and SPI Memory, SPI with Pseudo OTP Dump will be saved in a given file with extension **.bin**.

Dump Memory

Choose Memory

☐ OTP Memory ☐ SPI Memory ☐ SPI with Pseudo OTP

Save Dump file

Choose File

No file chosen

Dump Memory

10.1.2.10 Flexconnect Feature

This page is used to issue Flex Feature Command to the Hub. Both USB2530 as well as USB57x4 Hub will respond to valid Flexconnect command.

10.1.3 Preview Changes

Preview changes allows user to view information such as Number of bytes to be programmed, Configuration memory usage before programming. User can also save configuration file without programming.

Preview Changes

No of bytes that will be Programmed: 7

Configuration Memory Usage: 0.21% 8KB

Choose configuration file(.cfg): Choose File did.cfg

STEP 4: Save Configuration

STEP 5: Close Preview

10.1.4 Special Features

Special feature tab is used for Demo purpose. It helps to explain the concept of Flexconnect, I2C Bridging, SPI Bridging, GPIO Bridging and UART Bridging.

UART Bridging is available only for USB57x4 hub.

Basic Features Advanced Features Special Features

Selected USB Hub: 0:VID:0424 PID:2734 DID:0122

Preview Changes Apply changes

Flex Connect

USB-I2C Bridge Demo

USB-SPI Bridge Demo

USB-GPIO Bridge Demo

USB-UART Bridge Demo

10.1.4.1 Enable Live Flexconnect

USB 2.0/ USB 3.1 Gen1 Downstream Port 1 can be configured as Upstream Port and upstream port can be configured as downstream Port 1.

- 'If check box is not checked' = Upstream port is not Flex connected,
- 'If check box is checked' = Upstream port is Flex connected,

Live flex connect can be disabled by resetting the device. Please note that this is live update wherein the configuration memory is not changed and only the registers are changed. So on resetting the device, the functionality is lost.

Protouch2 USB57X4 Online Hub Configuration
Home
Program
Help

Basic Features
Advanced Features
Special Features

Selected USB Hub: Index:0,VID:0424,PID:2734,DID:0123
Preview Changes
Apply changes

Flex Connect

Enable FlexConnect
Apply Flex

10.1.4.2 USB-I2C Bridge Demo

Microchip USB hubs facilitate USB-I2C bridging through USB control point of the embedded USB device (5th port).

USB-I2C Bridge Demo

Frequency
Select Frequency

Select I2C Operation
Read
Write

Slave Address
0x

Length

Data
0x

Execute

Example: To do I2C write.

Step 1:

USB-I2C Bridge Demo

Frequency
238KHz

Select I2C Operation
Read
Write

Slave Address
0x 50

Length
3

Data
0x 00 11 22

Execute

Rest of the values represent the data to be written.

Start Address to which data is written.

- “0x50” is the I2C Slave address.
- Data field has 3 entries, “00” represents the start address and “11 22” is the data that is to be written.

Step 2:

After this, do a write again for slave address “0x50”, data “00” and length “1”.

Step 3:

Now do an I2C read.

USB-I2C Bridge Demo

Frequency **238KHz**

Select I2C Operation ☒ Read ☐ Write

Slave Address 0x 50 ⓘ

Length 2 ⓘ

Data 0x 11 22 ⓘ

Execute

The values read in Step 1 are read successfully.

10.1.4.3 USB-SPI Bridge Demo

SPI Read

USB-SPI Bridge Demo

Select SPI Operation ☒ Read ☐ Write ☐ Transfer

Start Address 0x 50 ⓘ

Length 2 ⓘ

Data 0x 8a 2d ⓘ

Execute

Here, “0x50” is the start address of the SPI Flash from where read operation starts and “Length” represents the number of bytes to be read

SPI Write

USB-SPI Bridge Demo

Select SPI Operation ☐ Read ☒ Write ☐ Transfer

Select SPI Firmware **Choose File** USB2534_SPI_V128.bin ⓘ

Execute

Binary file to be written in SPI Flash

SPI Transfer

It is a demo for low level SPI pass thru command read/write. All commands to the SPI interface are directed as SPI Pass thru write. SPI pass thru read is nothing but a XDATA read from a specified offset where the response is stored.

SPI transfer demo can be done only when the USB hub boots up from ROM.

SPI Send Operation

USB-SPI Bridge Demo

Select SPI Operation: ☐ Read ☐ Write ☒ Transfer

MOSI Data: 0x 9f ⓘ

Response Count: 4 ⓘ

MISO Data: 0x ⓘ

Buttons: Send Data, Receive Data

Protouch2 Alert!!!
SPI send operation was successful.
OK

SPI Receive Operation

USB-SPI Bridge Demo

Select SPI Operation: ☐ Read ☐ Write ☒ Transfer

MOSI Data: 0x 9f ⓘ

Response Count: 4 ⓘ

MISO Data: 0x 01f462 ⓘ

Buttons: Send Data, Receive Data

Data received

10.1.4.4 USB-GPIO Bridge Demo

It is used for low level control of GPIO pins in Microchip USB hubs. User can configure the direction, pull up /down, read data & write data to any GPIO.

USB-GPIO Bridge Demo

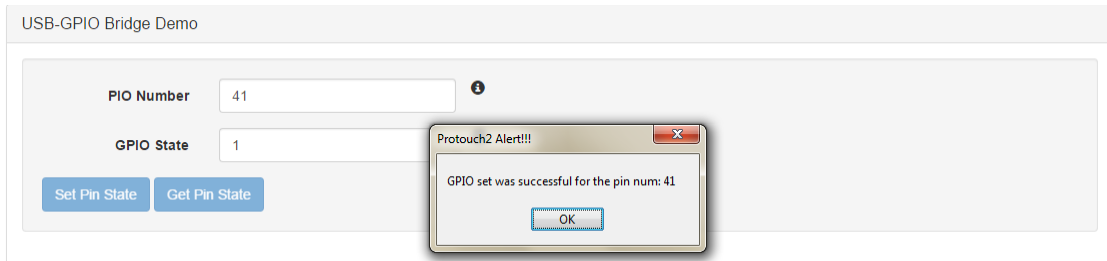
PIO Number: ⓘ

GPIO State: ⓘ

Buttons: Set Pin State, Get Pin State

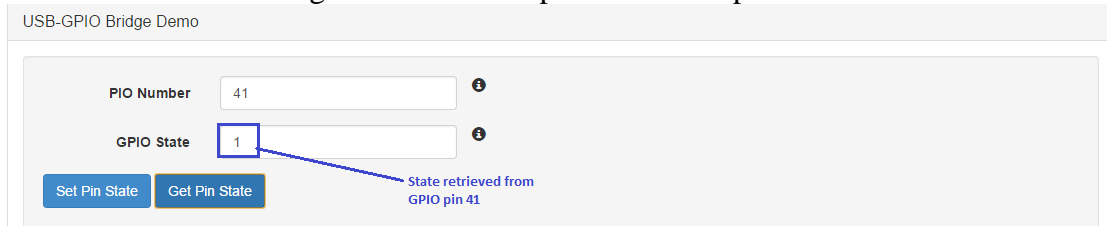
GPIO Set Operation

This demo allows us to set the state of a specified GPIO pin.

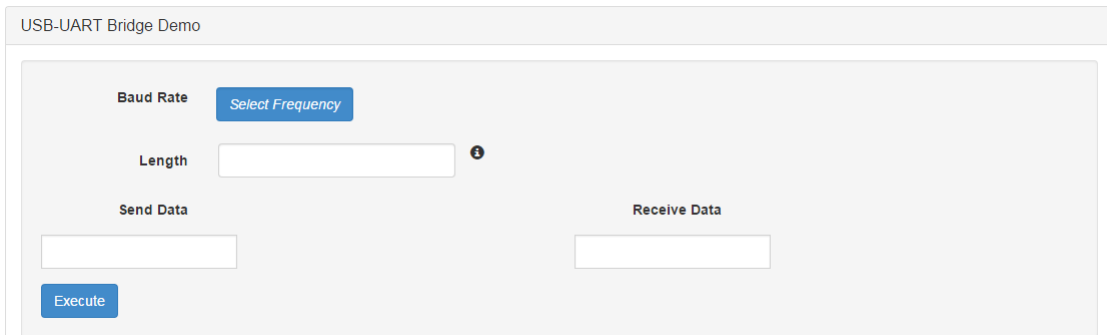


GPIO Get Operation

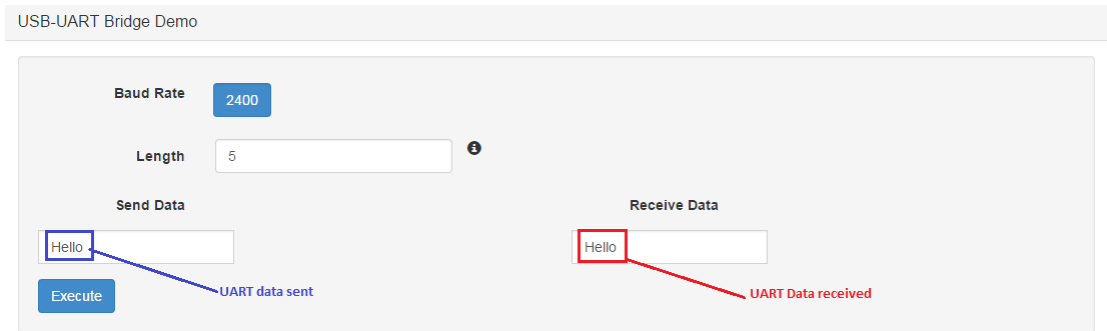
This demo allows us to get the state of a specified GPIO pin.



10.1.4.5 USB-UART Bridge Demo



UART demo



The data is transferred through a serial port to the connected serial peripheral and received there.

10.2 Programming Page

Protouch2 USB hub - Program
Home
Configuration
Help

Program Once
Mass Program

Select USB Hub
Index:0,VID:0424,PID:2532,DID:0182
Refresh

Configuration programming

Select Configuration file
Choose File
No file chosen

SPI Firmware programming

Select Firmware file
Choose File
No file chosen

Erase Pseudo OTP
☐

10.2.1 Device Selection

The hub of interest can be selected from the dropdown.

10.2.2 Configuration programming

Both JSON and binary format configuration files are allowed. The configuration file saved by changing the configuration items of interest and clicking on the “Preview changes” button in Online page or Configuration file generated in Offline Page can be used as input.

Configuration programming

Select Configuration file
Choose File
No file chosen

10.2.3 Firmware programming

Firmware programming is required only if user intends to program the SPI flash. Otherwise this section can be skipped. Please contact Microchip for getting the latest version of the SPI Flash firmware file. Erase Pseudo OTP checkbox should be selected with firmware Programming to erase the SPI-Flash configuration memory along with firmware download. The default behaviour is to append to the configuration memory and firmware programming does not erase the configuration memory. Only binary files are allowed.

SPI Firmware programming

Select Firmware file

No file chosen

Erase Pseudo OTP

☐

10.2.4 Configuration programming along with SPI Flash Firmware programming

Configuration file and Firmware file can be programmed in one shot.

STEP 4 : Click either Program Once or Mass Program

Program Once

Mass Program

Select USB Hub

Refresh

Configuration programming

Select Configuration file

did.cfg

STEP 1

SPI Firmware programming

Select Firmware file

USB5734_SPI_V1.23.bin

STEP 2

Erase Pseudo OTP

☒

STEP 3 (optional)

10.2.5 Types of programming

10.2.5.1 Program Once

Single device can be programmed at a time by using Program Once option. Select the hub of interest. Configuration file and/or Firmware File should be selected before “Program Once” button is clicked.

.

10.2.5.2 Mass Program

Multiple devices can be programmed one after the other by using the Mass Program option. Select the hub of interest. Configuration file and/or Firmware File should be selected one time before programming.

10.2.5.3 Programming time

It takes about 3 to 5 seconds for programming if the internal HCE (Hub Controller Enumeration) device is enabled.

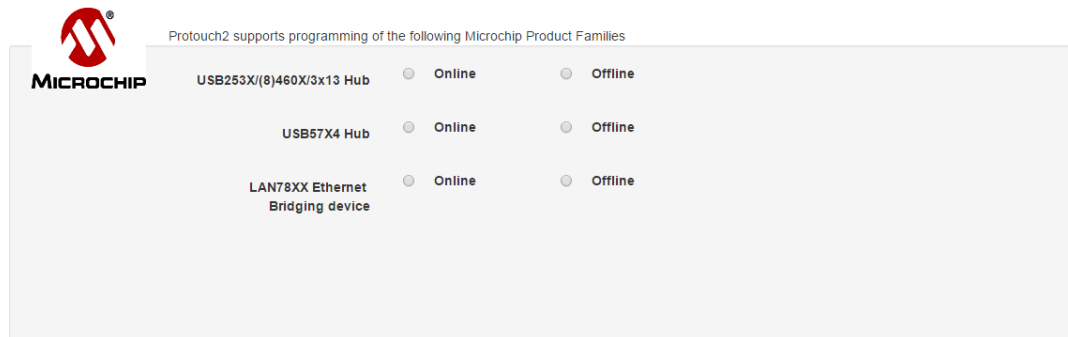
Otherwise it takes about 14 to 20 seconds depending on the OS (Win 7 or 8.1) and architecture (32 or 64 bit)

10.3 Offline Hub Configuration Page

Offline support allows for generation of configuration file even without the hub being connected to the system.

Selecting Offline mode

Select the radio button on the landing page as shown below

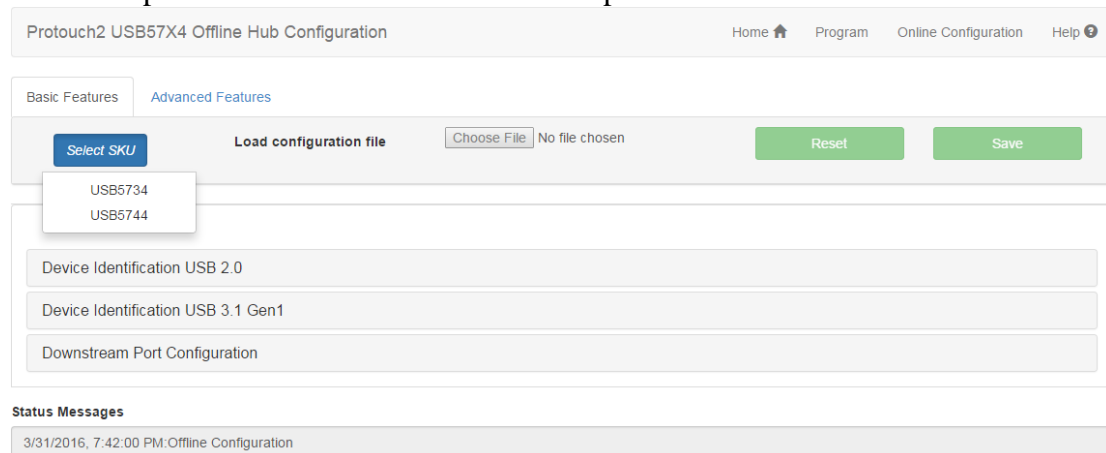


Protouch2 supports programming of the following Microchip Product Families

Product Family	Online	Offline
USB253X(8)460X/3x13 Hub	<input type="radio"/>	<input type="radio"/>
USB57X4 Hub	<input type="radio"/>	<input type="radio"/>
LAN78XX Ethernet Bridging device	<input type="radio"/>	<input type="radio"/>

Selecting the part number

Select the part number of interest from the drop down shown below



Protouch2 USB57X4 Offline Hub Configuration

Home Program Online Configuration Help

Basic Features Advanced Features

Select SKU Load configuration file Choose File No file chosen Reset Save

USB5734
USB5744

Device Identification USB 2.0
Device Identification USB 3.1 Gen1
Downstream Port Configuration

Status Messages
3/31/2016, 7:42:00 PM:Offline Configuration

Loading a configuration file on top of the default SKU settings

If user wants to generate configuration file for a device whose configuration is already modified then that device's dump file should be loaded using "Load Configuration file" option. This should be done before any changes are done to the configuration settings, once changes are made to the default settings; the "Save Configuration File" becomes active instead of the "Load Configuration File"

"SAVE" button is inactive at this time since no changes are made to the configuration settings.

The screenshot shows the 'Protouch2 USB57X4 Offline Hub Configuration' window. At the top, there are navigation links: Home, Program, Online Configuration, and Help. Below this, there are two tabs: 'Basic Features' and 'Advanced Features'. Under 'Basic Features', there is a blue button labeled 'USB5734'. To its right, there is a section titled 'Load configuration file' which contains a 'Choose File' button and the text 'No file chosen'. This entire section is highlighted with a green rectangular box. To the right of this section are two green buttons: 'Reset' and 'Save'. Below the configuration section, there is a grey box labeled 'Device Identification USB 2.0'.

Change configuration settings

Configuration settings of the hub as desired can be changed from the default or default+ Load configuration settings as shown below

The SAVE button becomes active as soon as any changes are done

This screenshot shows the same GUI window, but now the 'Device Identification USB 2.0' section is expanded. It contains a 'Device Descriptor' section with four input fields, each with a label and a value: 'USB Vendor ID (hex)' with value '0x 424', 'USB Product ID (hex)' with value '0x 2731' (this field is highlighted with a red border), 'USB Device ID (hex) (bcdDevice)' with value '0x 185', and 'USB bcdUSB' with value '0x 2.10'. Above these fields, there is a 'Save Configuration file' button and a 'Choose File' button with the text 'No file chosen'. To the right of these are the 'Reset' and 'Save' buttons. The 'Basic Features' tab is still selected, and the 'USB5734' button is visible.

RESET



If the changes are to be reversed, then the RESET button can be used to reset to default settings.

Save the new configuration file

Once the required changes are made, the user can select the File name and click on the SAVE button

Protouch2 GUI User Manual

Protouch2 USB57X4 Offline Hub Configuration

Home  Program Online Configuration Help 

Basic Features

Advanced Features

STEP 2

STEP 3

USB5734

Save Configuration file

Choose File

PID2731.cfg

Reset

Save

Device Identification USB 2.0

Device Descriptor

USB Vendor ID (hex)

0x

424

USB Product ID (hex)

0x

2731

USB Device ID (hex)

(bcdDevice)

0x

185

USB bcdUSB

0x

2.10

STEP 1

11 LAN78XX Devices

11.1 Online LAN78XX Configuration Page

LAN78XX contain several registers that can change the behaviour of the Device. It can be changed to a new value through the PT2 application by programming the EEPROM or OTP Memory.

Note: Tool should be opened with administrator rights to use Online LAN78XX configuration page.

Note: Tool will support only EEPROM or OTP memory.

Note: If device boots up from EEPROM and the user programs the OTP, device boots from EEPROM and not from OTP after programming.

LAN78XX configuration items are divided into the following two categories and are available under 2 different tabs as shown below

- Basic Features (Shown by default)
- Advanced Features

Protouch2 LAN78XX Online Configuration

Home Program Help

Basic Features Advanced Features Special Features

Selected LAN78XX Ethernet Bridging Device: Index:0,VID:0424,PID:7850,Mac:00:80:0F:78:50:00

Preview Changes Apply changes

Device Management

MAC Address

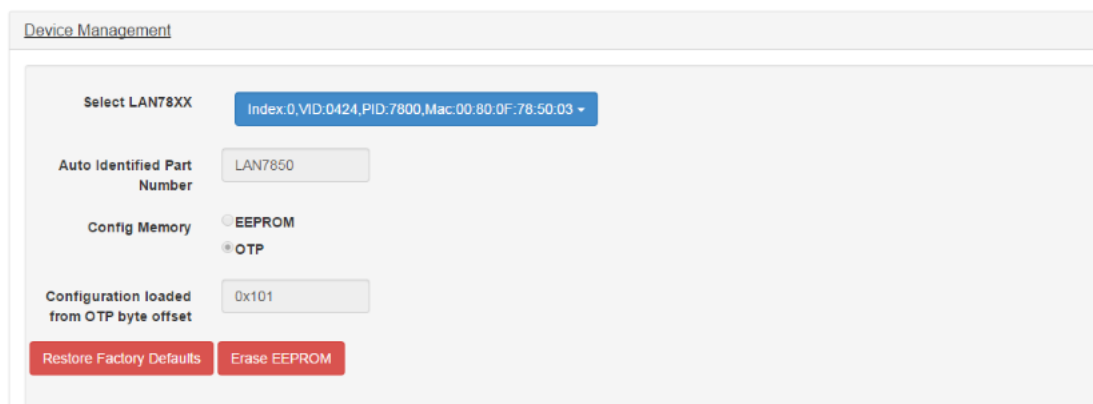
Device Identification

Remote Wakeup and Power

Interrupt Endpoint Interval

11.1.1 Basic Features

11.1.1.1 Device Management



Select LAN78XX

This is the default screen that will be displayed once LAN78XX online page is launched. Once the Protouch2 is launched all the GUI elements (in all pages) will remain disabled except “Select USB Hub” and the default item selected will be “LAN at index 0”.

Auto Identified Part Number

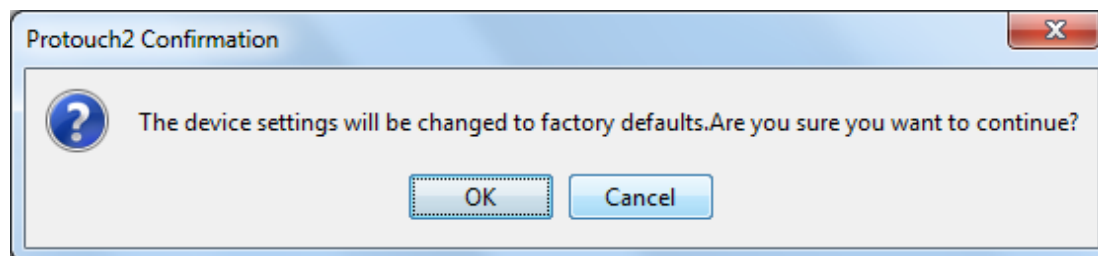
This will give information about the SKU which is nothing but default PID of the SKU. The Auto-identification is independent of VID/PID changes.

Configuration memory

LAN78XX device has two types of configuration memory EEPROM and OTP. If EEPROM memory is enabled in device, all the configuration values are loaded from EEPROM. If OTP memory is enabled in device, all the configuration values are loaded from OTP memory.

Restore Factory Defaults

Restore Factory Defaults is a restoration of a LAN Device to its original system state by erasing all of the information stored on the device in an attempt to restore the device to its original manufacturer settings. Only EEPROM memory supports “Restore factory defaults” Option.



Erase EEPROM

EEPROM content can be erased using this button.

11.1.1.2 Mac Address

This is a 6-byte universally unique Mac address the board will use. Bytes are separated by a colon.

MAC Address

MAC Address

11.1.1.3 Device Identification

For LAN7850, the Device Descriptor fields configure USB 2.0 VID,USB 2.0 PID,USB 2.0 DID. For LAN7800, the Device Descriptor fields configure both the USB 2.0 and USB 3.0 VIDs,PIDs ,DIDs.

Device Identification

Device Descriptor

Vendor ID (hex)	<input style="width: 80px;" type="text" value="0x 424"/>
Product ID (hex)	<input style="width: 80px;" type="text" value="0x 7800"/>
bcdDevice (bcd)	<input style="width: 80px;" type="text" value="0x 200"/>

String Descriptors

Language ID (hex)	<input style="width: 80px;" type="text" value="0x 409"/>
Manufacturer Name	<input style="width: 300px;" type="text" value="Microchip"/>
Product Name	<input style="width: 300px;" type="text" value="LAN7800"/>
Serial Number	<input style="width: 150px;" type="text" value="00800F780000"/>
Configuration String	<input style="width: 300px;" type="text" value="NULL STRING - NOT PROGRAMMED YET"/>
Interface String	<input style="width: 300px;" type="text" value="NULL STRING - NOT PROGRAMMED YET"/>

USB String Descriptors can be disabled by programming empty string as shown below.

String Descriptors

Language ID (hex)	0x 409
Manufacturer Name	NULL STRING - NOT PROGRAMMED YET
Product Name	NULL STRING - NOT PROGRAMMED YET
Serial Number	NULL STRING - NC
Configuration String	NULL STRING - NOT PROGRAMMED YET
Interface String	NULL STRING - NOT PROGRAMMED YET

11.1.1.4 Remote Wakeup and Power

Remote wakeup for the device is used to wake up the device in U1/U2/U3 Low power state to U0 state. External supply of 5V is required for device operation when the device is in Self powered mode.

Remote Wakeup and Power

Remote Wakeup	<input checked="" type="checkbox"/>	
Self Power	<input checked="" type="checkbox"/>	
HS Max Power	2	mA
FS Max Power	2	mA
SS Max Power	8	mA

11.1.2 Advanced Features

11.1.2.1 Interrupt Endpoint bInterval

Polling interval for Interrupt Endpoint can be configured for Full Speed, High Speed and Super Speed Operation as shown below.

Interrupt Endpoint bInterval

Full Speed	1
High Speed	4
Super Speed	6

11.1.2.2 LED Configuration

All the Four LEDs LED0, LED1, LED2, LED3 can be enabled and configured in any of the modes below.

Link/Activity: LED will monitor the Link at any speed and its activity

Link1000/Activity: LED will monitor the Link in 1000BASE-T and its activity

Link100/Activity: LED will monitor the Link in 100BASE-TX and its activity

Link10/Activity: LED will monitor the Link in 10BASE-T and its activity

Link100/1000/Activity: LED will monitor the Link in 1000BASE-T and 100BASE-TX and its activity

Link10/1000/Activity: LED will monitor the Link in 1000BASE-T and 10BASE-T and its activity

Link10/100/Activity: LED will monitor the Link in 100BASE-TX and 10BASE-T and its activity

Duplex/Collision: LED will monitor the Half Duplex, Full Duplex and its Collision Status.

Collision: LED will monitor the Collision in Link

Activity: LED will monitor the Activity in Link

Auto-Negotiation Fault: LED will monitor the Auto-Negotiation Fault in Link

Serial Mode: LED will monitor the Serial Stream

Force LED OFF: This will De-assert the LED

Force LED ON: This will assert the LED

All the Four LEDs LED0, LED1, LED2, LED3 behaviour can be configured using the below fields.

11.1.2.3 LED Common features

All the Four LEDs Behaviour can be configured using the below fields.

LED Common Features

LED Blink/Pulse-Stretch Rate

2.5-Hz blink rate /400 ms

☐ pulse-stretch

5-Hz blink rate /200 ms

☒ pulse-stretch

10-Hz blink rate /100 ms

☐ pulse-stretch

20-Hz blink rate /50 ms

☐ pulse-stretch

LED Pulsing

☒ Normal Operation

pulse with a 5-kHz, programmable duty cycle

☐ when active

11.1.2.4 GPIO Configuration

GPIO Configuration fields are used to Enable/Disable the all the 7 GPIOs GPIO0, GPIO1, GPIO2, GPIO3, GPIO4, GPIO5, GPIO6.

GPIO Configuration

GPIO 0

GPIO 1

GPIO 2

GPIO 3

GPIO 4

GPIO 5

GPIO 6

Output buffer for the GPIO Pins can be configured as a push/pull driver or Open/Drain driver. GPIOs can be configured as input/output by GPIO Direction.

GPIO 7	<input checked="" type="radio"/> enable <input type="radio"/> disable
GPIO 7 Buffer	<input checked="" type="radio"/> Open Drain <input type="radio"/> Push Pull
GPIO 7 Direction	<input checked="" type="radio"/> Input <input type="radio"/> Output
GPIO 7 Wake Up	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
GPIO 7 WakeUp Polarity	<input checked="" type="radio"/> Low <input type="radio"/> High

When the GPIO is set as Output, Output value has to be given in the GPIO data field.

GPIO 7	<input checked="" type="radio"/> enable <input type="radio"/> disable
GPIO 7 Buffer	<input checked="" type="radio"/> Open Drain <input type="radio"/> Push Pull
GPIO 7 Direction	<input type="radio"/> Input <input checked="" type="radio"/> Output
GPIO 7 Wake Up	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
GPIO 7 WakeUp Polarity	<input checked="" type="radio"/> Low <input type="radio"/> High
GPIO 7 Data	<input type="radio"/> Set <input checked="" type="radio"/> Clear

When the GPIO is set as Input, GPIO data field will be hidden.

GPIO 5 Buffer	<input checked="" type="radio"/> Open Drain <input type="radio"/> Push Pull
GPIO 5 Direction	<input checked="" type="radio"/> Input <input type="radio"/> Output

11.1.2.5 Power Management

LAN78XX can wake up the Host Processor via different types of PME wakeup events listed below:

1. GPIO pins
2. PHY Link Change

3. PME Packet
4. PME WUFF

GPIO pins:

GPIO PME wakeup event can be enabled by GPIO PME field. GPIO PME event can be signalled via a level or pulse which can be set in GPIO PME configuration. GPIO PME polarity is used to specify the level as low or high. If set as pulse, the duration of the pulse for which the event should occur can be set in GPIO PME length. GPIO PME can be enabled for desired GPIO using the GPIO Wake Up field and the polarity can be set in GPIO Wake up polarity

PHY Link Change:

Detection of a PHY link partner when in PME mode will result in a PME being asserted. This can be enabled or disabled in PHY Link Change field

PME Packet:

Reception of a Packet when in PME mode will result in a PME being asserted. This can be enabled or disabled in PME packet field

PME WUFF:

Reception of a packet matching the WUFF when in PME mode will result in a PME being asserted. This can be enabled or disabled in PME WUFF field

Power Management

GPIO PME	<input checked="" type="radio"/> disable <input type="radio"/> enable
GPIO PME Configuration	<input checked="" type="radio"/> Level <input type="radio"/> Pulse
GPIO PME Length	<input checked="" type="radio"/> Pulse Length = 1.5ms <input type="radio"/> Pulse Length = 150ms
GPIO PME Polarity	<input checked="" type="radio"/> Signalling Polarity Low <input type="radio"/> Signalling Polarity High
GPIO Buffer Type	<input checked="" type="radio"/> Open Drain Driver <input type="radio"/> Push-Pull Driver
PHY Link Change	<input type="radio"/> Wake up Not supported <input checked="" type="radio"/> Wake up Supported
PME Packet	<input type="radio"/> Packet Event Wakeup disabled <input checked="" type="radio"/> Packet Event Wakeup enabled
PME Perfect DA	<input checked="" type="radio"/> Perfect DA Event Wakeup disabled <input type="radio"/> Perfect DA Event Wakeup enabled
PME WUFF	<input checked="" type="radio"/> Wakeup Frame Detection disable <input type="radio"/> Wakeup Frame Detection enable

11.1.2.6 Live Update

Live Update enables the option of Register Read/Write for LAN registers and PHY registers. Register Address and the length of bytes to read/write is given in Register Address and Length fields

Live Update

Registers ☐ LAN Registers ☒ PHY Registers

Register address(hex)

Length

Register Operation ☒ Read ☐ Write

Register value(hex)

0x

00001000 000079ed 00000007 0000c131 000005e1 0000cde1
0000000f 00002001 00006001 00000200 00003800 00000000
00000000 00004007 00000000

Live Update

Live Update

Registers ☒ LAN Registers ☐ PHY Registers

Register address(hex)

Length

Register Operation ☒ Read ☐ Write

Register value(hex)

0x

0008380c 05ee0025 00000001 6000ffff 00009876 00000000
00000000 780f8000 00000840 000079ed 00000000 00000000
00000000 0021001e 00000000

Live Update

11.1.2.7 OTP/EEPROM Dump Memory

Dump memory allows user to dump OTP memory or EEPROM memory. OTP Memory Dump will be saved in a given file with extension .bin and EEPROM Memory will be saved in a given file with extension .bin.

OTP/EEPROM Dump Memory

Choose Memory

☒ EEPROM Memory ☐ OTP Memory

Save Dump file

Choose File

No file chosen

Dump Memory

11.1.3 Preview Changes

Preview changes option allows the user to generate the Configuration file that is going to be programmed in the device. Configuration file with .bin extension is generated.

Preview Changes

Choose configuration file(.bin)

Choose File

VIDChange

Save Configuration

Close Preview

11.2 Programming Page

Programming Page enables the user to program configuration file in EEPROM or OTP memory.

Protouch2 LAN78XX - Program

Home Configuration Help

Program

Select LAN78XX Controller

Select LAN78XX Ethernet Bridging Device

Refresh

Configuration programming

Status Messages

10/3/2016, 11:38:36 AM:Fetching the LAN list...

11.2.1 Program Once

Single device can be programmed at a time by disabling the “Enable Mass Program”. Select the device of interest from “Select the LAN7800 controller” dropdown. Choose the memory to be programmed.

Configuration programming

Memory ☐ EEPROM ☐ OTP

Select Configuration file No file chosen

Enable Mass Program ☐

MAC Address

Program MAC Address

Start

Maximum

Increment by ⓘ

Single programming can be done in different ways listed below.

1. Program Configuration file with Serial number and MAC address
2. Program Configuration file with Serial number alone
3. Program Configuration file with MAC address alone

Program Configuration file with Serial number and MAC address:

Configuration file will be programmed in either OTP or EEPROM with the given serial number and MAC address overwriting the values in configuration file. MAC addresses for programming each device in Mass program mode can be given in “Start” field. Serial number for programming a device in Single program mode can be given in “prefix”, “Start” field.

Program Configuration file with Serial number alone:

Configuration file will be programmed in either OTP or EEPROM with the given serial number overwriting the values in configuration file.

Program Configuration file with MAC address alone:

Configuration file will be programmed in either OTP or EEPROM with the given MAC address overwriting the values in configuration file.

Example for Single Programming:

Serial Number in Single Programming:

Prefix: MCHP

Start: 1

MAC Address in Single Programming:

Start: "00:80:0F:78:00:02"

If the above values are given, then

Device 1 will be programmed with serial number MCHP1, MAC Address "00:80:0F:78:00:02"

11.2.2 Mass program

Multiple devices can be programmed one after the other by enabling the Mass Program option. Select the device of interest from "Select the LAN9800 controller" dropdown. Choose the memory to be programmed.

Mass programming can be done in different ways listed below.

1. Program Configuration file with Serial number and MAC address
2. Program Configuration file with Serial number alone
3. Program Configuration file with MAC address alone

Program Configuration file with Serial number and MAC address:

Configuration file will be programmed in either OTP or EEPROM with the given serial number and MAC address overwriting the values in configuration file. MAC addresses for programming each device in Mass program mode can be given in "Start", "Maximum", "Increment by" fields. Serial number for programming each device in Mass program mode can be given in "prefix", "Start", "Maximum", "Increment by" fields.

Program Configuration file with Serial number alone:

Configuration file will be programmed in either OTP or EEPROM with the given serial number overwriting the values in configuration file.

Program Configuration file with MAC address alone:

Configuration file will be programmed in either OTP or EEPROM with the given MAC address overwriting the values in configuration file.

Example for Mass Programming:

Serial Number in Mass Programming:

Prefix: MCHP

Start: 1

Maximum: 3

Increment By: 2

MAC Address in Mass Programming:

Start: "00:80:0F:78:00:00"

Maximum: "00:80:0F:78:00:10"

Increment: 10

If the above values are given, then

Device 1 will be programmed with serial number MCHP1, MAC Address "00:80:0F:78:00:00"

Device 2 will be programmed with serial number MCHP3, MAC Address "00:80:0F:78:00:10"

The screenshot displays the 'Protouch2 LAN78XX - Program' web interface. At the top, there are navigation links for 'Home', 'Configuration', and 'Help'. A green 'Program' button is located in the top right corner. Below this, a section titled 'Select LAN78XX Controller' contains a dropdown menu set to 'Select LAN78XX Ethernet Bridging Device' and a green 'Refresh' button. The 'Configuration programming' section follows, featuring radio buttons for 'Memory' (selected) and 'OTP'. Below these is a 'Select Configuration file' section with a 'Choose File' button and the text 'No file chosen'. An 'Enable Mass Program' checkbox is also present. The 'MAC Address' section includes a 'Program MAC Address' checkbox, a 'Start' button labeled 'Current MAC Addr:', a 'Maximum' button labeled 'Maximum MAC Add', and an 'Increment by' dropdown menu. The 'Serial Number' section similarly includes a 'Program Serial' checkbox, a 'Prefix' button labeled 'Current Serial Numt', a 'Start' button labeled 'Current Serial Numt', a 'Maximum' button labeled 'Maximum Serial Nur', and an 'Increment by' dropdown menu.

11.3 Offline LAN78XX Configuration Page

Offline support allows for generation of configuration file even without the hub being connected to the system.

Selecting Offline mode

Select the radio button on the landing page as shown below.

The screenshot shows the Protouch2 landing page with the Microchip logo. Below the logo, it states "Protouch2 supports programming of the following Microchip Product Families". There are three rows of product families, each with two radio buttons: "Online" and "Offline". The first row is "USB253X(8)460X Hub", the second is "USB57X4 Hub", and the third is "LAN78XX Ethernet Bridging device". In the third row, the "Offline" radio button is selected and highlighted with a black box.

Selecting the part number

Select the part number of interest from the drop down shown below. Choose the Memory type for which the configuration file has to be generated

The screenshot shows the "Protouch2 LAN78XX Offline Configuration" page. At the top, there is a navigation bar with links: Home, Program, Online Configuration, and Help. Below the navigation bar, there are two tabs: "Basic Features" and "Advanced Features". Under "Basic Features", there is a dropdown menu for selecting a part number. The dropdown is open, showing "LAN7800" selected and highlighted with a black box. Below the dropdown, there are two radio buttons for selecting a memory type: "EEPROM Memory" and "OTP Memory". "EEPROM Memory" is selected and highlighted with a black box. To the right of the memory type selection, there is a "Load configuration file" section with a "Choose File" button and a text box showing "No file chosen". There are also "Reset" and "Save" buttons. Below the "Basic Features" section, there are four input fields: "MAC Address", "Device Identification", "Remote Wakeup and Power", and "Interrupt Endpoint bInterval".

If EEPROM is chosen, then the size of EEPROM to be programmed has to be selected as shown below.

Protouch2 LAN78XX Offline Configuration

Home Program Online Configuration Help

Basic Features Advanced Features

LAN7800

Load configuration file Choose File No file chosen

Reset Save

Choose Memory

EEPROM Memory EEPROM Size 256

OTP Memory 512

MAC Address

Device Identification

Remote Wakeup and Power

Interrupt Endpoint Interval

Loading a configuration file on top of the default SKU settings

If user wants to generate configuration file for a device whose configuration is already modified then that device's dump file should be loaded using "Load Configuration file" option. This should be done before any changes are done to the configuration settings, once changes are made to the default settings; the "Save Configuration File" becomes active instead of the "Load Configuration File"

"SAVE" button is inactive at this time since no changes are made to the configuration settings.

Note: If user wants to generate configuration file for a device whose OTP is already programmed once, then OTP dump file of the device should be loaded using "Load Configuration file" option.

Protouch2 LAN78XX Offline Configuration

Home Program Online Configuration Help

Basic Features Advanced Features

LAN7800

Load configuration file Choose File No file chosen

Reset Save

Choose Memory

EEPROM Memory EEPROM Size 256

OTP Memory 512

MAC Address

Device Identification

Remote Wakeup and Power

Interrupt Endpoint Interval

Change configuration settings

Configuration settings of the hub as desired can be changed from the default or default+ Load configuration settings as shown below

The SAVE button becomes active as soon as any changes are done

Basic Features Advanced Features

LAN7800 Save Configuration file Choose File No file chosen Choose Memory
☐ EEPROM Memory ☒ OTP Memory

Reset Save

MAC Address

MAC Address 00:80:0F:79:00:00

RESET

If the changes are to be reversed, then the RESET button can be used to reset to default settings.

Save the new configuration file

Once the required changes are made, the user can select the File name and click on the SAVE button

Protouch2 LAN78XX Offline Configuration Home Program Online Configuration Help

Basic Features Advanced Features

LAN7850 Save Configuration file Choose File MACChange Reset Save

Choose Memory ☐ EEPROM Memory ☒ OTP Memory

STEP2 STEP3

MAC Address

MAC Address 00:80:0F:78:50:01 STEP1

12 Appendix I

12.1 Troubleshooting

1. Please check if you have installed the VSM and WinUSB drivers before running this tool using the CLI. Navigate to PT2_CLI folder and run this command as administrator in CMD line for installing the drivers. Refer to “Protouch2 CLI User Manual.pdf” for more details

```
>>pt2main.exe /i
```
2. If the MCHP hub is connected to a USB3.1 Gen1 Host controller , please check if you have disabled power saving in the Hub using the device manager (Refer to GUI user manual) or connect a USB device(like mouse or pen drive) to one of the downstream ports to prevent the hub from going to sleep
3. If you are still having issues, please email the “PT2.log” file created in the same directory as the tool to the Support contact mentioned above

Debugging failures can be done by analysing the log file generated which contains the error codes as mentioned in [Section 14.2](#). Please send the “PT2.log” file created in the same directory as the application to Microchip for debugging.

12.2 Error codes

Error codes will be displayed in case of errors and the detailed description of them are as follows

Error code	Description
0x0000	Success ; No Errors
0x0001	The specified device was not found
0x0003	Device handle passed to the API is not valid
0x0004	API of the WinUSB library failed
0x0005	System reboot is required
0x0006	Error in installing VSM filter driver
0x0007	Operation successful but requires reboot
0x0008	Bin file size is invalid
0x0009	Error while reading cfg/bin file
0x0011	Error in installing WinUSB driver
0x0012	Invalid argument
0x0013	Error when VSM Filter is not available
0x0014	Error when application does not have admin rights
0x0015	Error if VSM command is failed due to power state of the device
0x0016	Error if Firmware and configuration file are programmed at one shot for USB253X/USB4604 Hubs
0x1000	Could not load the binary file
0x1001	Reading from SPI flash failed
0x1002	File size did not match

0x1003	SPI pass through write command failed
0x1004	SPI pass through Enter command failed 1
0x1005	SPI flash could not be detected or was not present
0x1006	SPI Cancel Download
0x1007	SPI flash programming failed
0x1008	SPI pass through Enter command failed 2
0x1009	SPI pass through read command failed
0x100A	Unsupported SPI flash detected
0x100B	SPI flash read back and compare failed with programmed binary
0x100C	Open Erase signature bin file failed
0x100D	Read Erase signature bin file failed
0x100E	SRAM programming failed
0x100F	SPI Flash Erase Signature Failed
0x1010	SPI Flash Chip Erase Failed
0x1011	Could not load the Json file
0x1012	Could not load the INI file
0x1013	Flex register field was not programmed
0x1014	SPI Flash access was not supported for the device
0x2000	Cannot enable I2C Passthrough interface
0x2001	Cannot disable I2C Passthrough interface
0x2002	I2C Transfer failed
0x2003	I2C Max size error
0x3000	Maximum configuration block is already programmed.
0x3001	Bitrate error
0x3002	Data length error
0x3003	SMBus Write Access failed
0x3004	SMBus Read Access failed
0x3005	SMBus Close error
0x4000	Communication at the specified baud rate will be error prone
0x4001	Cannot set USB2534 UART registers, probably command failure
0x4002	Transmit failed without transmitting any data
0x4003	Transmit failed after transmitting some data
0x4004	Receive failed due to buffer overrun, reduce baud rate
0x4005	Receive failed due to unexpected Rx FIFO status
0x4006	Receive failed since worker thread creation failed
0x4007	UART Rx is pending due to asynchronous mode
0x4008	UART receive aborted as per user request
0x4009	UART Receive command failed by the firmware
0x400A	Receive failed without receiving any data
0x400B	UART Receive Timeout

0x5000	Invalid GPIO pin number
0x6000	Cannot access LAN78XX products
0x6001	LAN78XX adaptor busy
0x6002	Requested LAN operation failed
0x6003	Physical eeprom is absent and OTP is blank
0x6004	EEPROM absent and OTP has free space
0x6005	EEPROM absent and no free space in OTP
0x6006	EEPROM present and no free space in OTP
0x6007	EEPROM present and OTP is blank
0x6008	EEPROM present and OTP has invalid signature
0x6009	EEPROM absent and OTP has invalid signature
0x600A	EEPROM absent
0x600B	EEPROM is present and highest priority goes to EEPROM
0xFFFF	Unknown error occurred

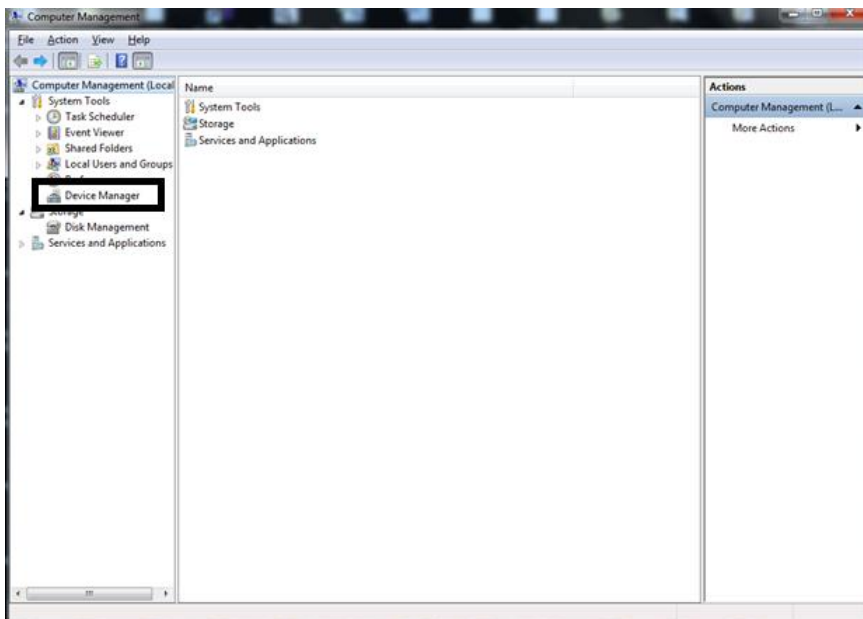
13 Appendix II- Disable Power Management

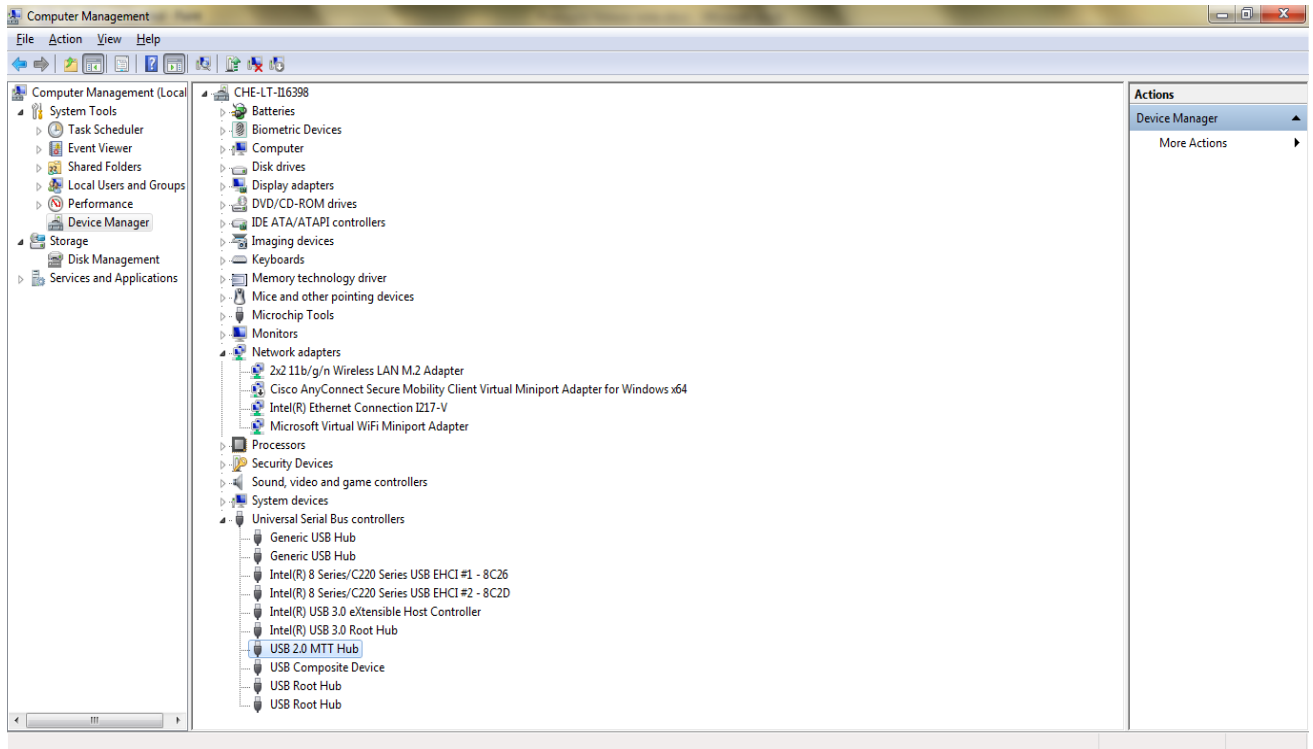
13.1 Windows 7

1. Right click “My Computer” and choose “Manage”.



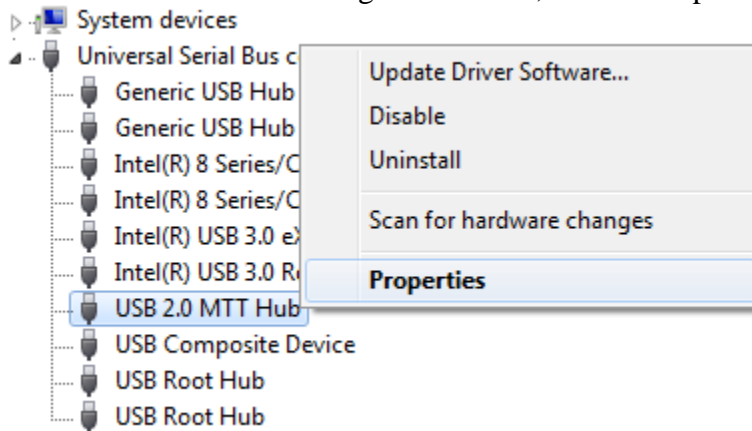
2. Select Device Manager.



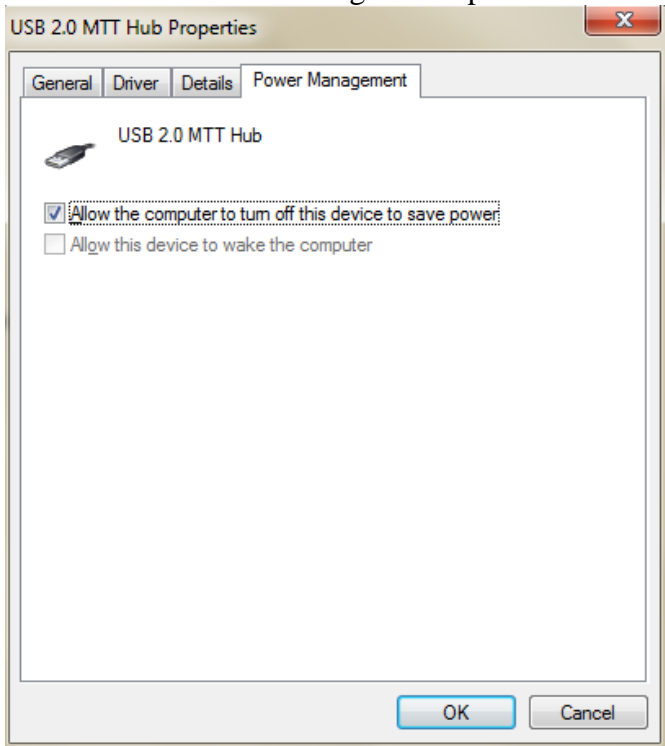


3. Search the hub based upon the VID & PID.

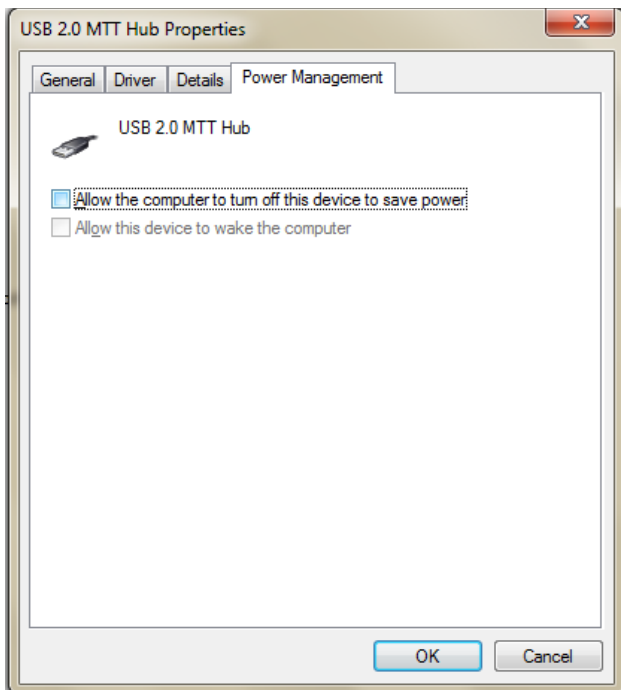
4. Select the hub and Right click on it, choose Properties option.



5. Select Power Management option.



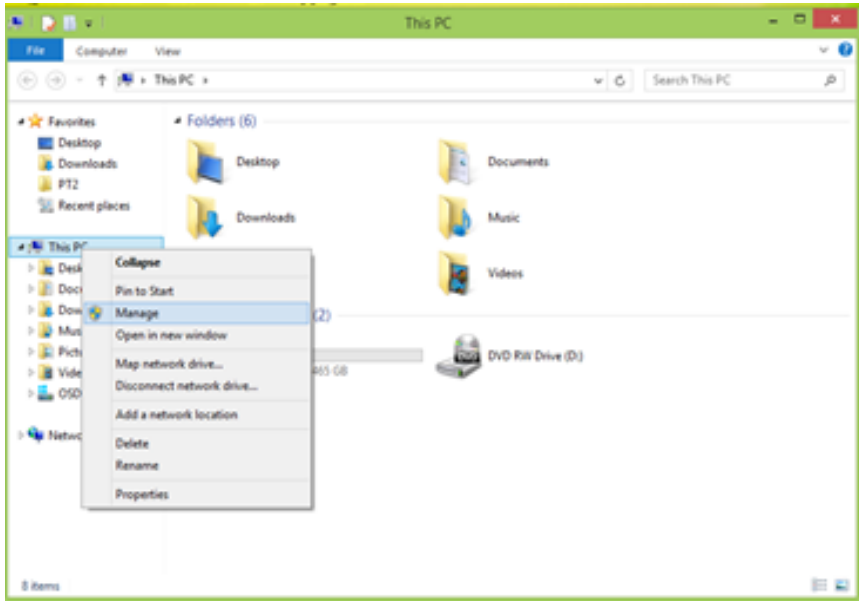
6. To disable a Power Management uncheck the checkbox (Allow the computer to turn this device off to save power).



7. Repeat the procedure (Steps 3 to 6) for USB 3.0 MTT hub if the connected hub is USB3.1 Gen1 Hub.

13.2 Windows 8.1

Right click Mycomputer and choose Manage option.



All the other steps are same as for Windows 7.

14 Appendix III – Protouch/Protouch2 interoperability

PT2 can be used on a system which has PT1 already installed on it.

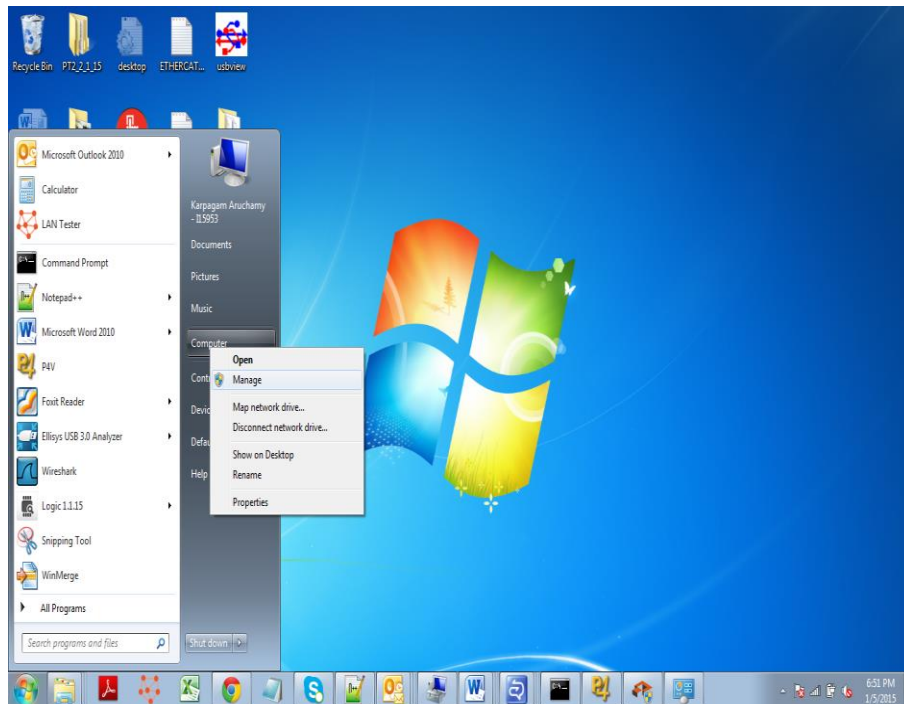
To use the PT2 application, user can install PT2 drivers and can start using PT2 GUI or CLI.

PT1 – Protouch1

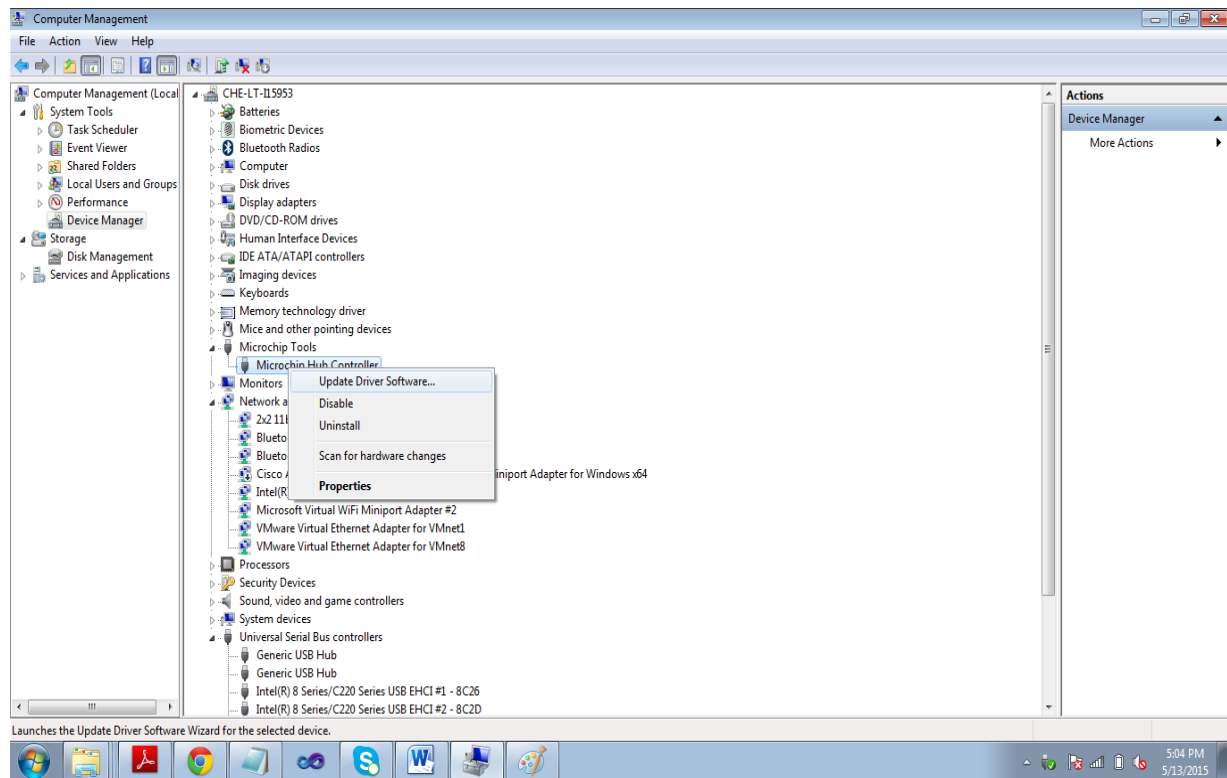
(<http://www.microchip.com/SWLibraryWeb/product.aspx?product=Protouch>)

PT1 and PT2 use different drivers. Hence after installing PT2, if user wants to use PT1, the drivers have to be restored as given below.

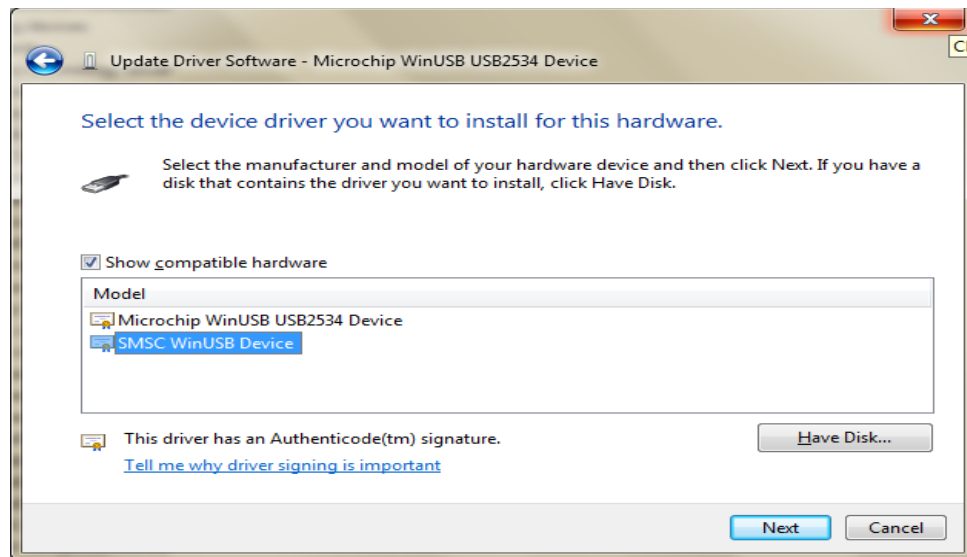
1. Open PT1 Tool after connecting Microchip Hub.
2. HCE (internal USB device) will get enabled with PT2 Driver.
3. Manually load WinUSB driver as follows, Open Device Manager



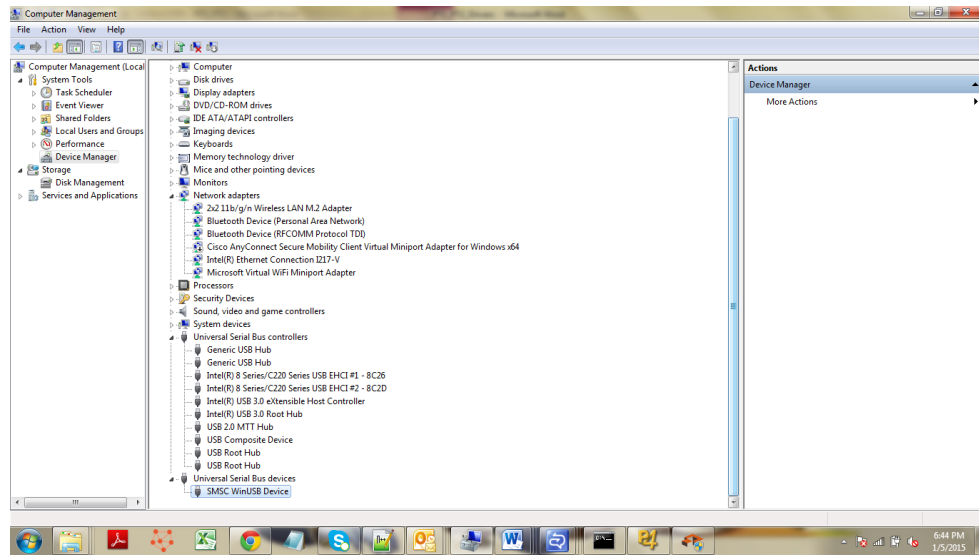
4. Right Click on the WinUSB Device and select Update Driver Software



5. Select SMSC WinUSB Device



6. Now WinUSB Device will be loaded with SMSC WinUSB device driver



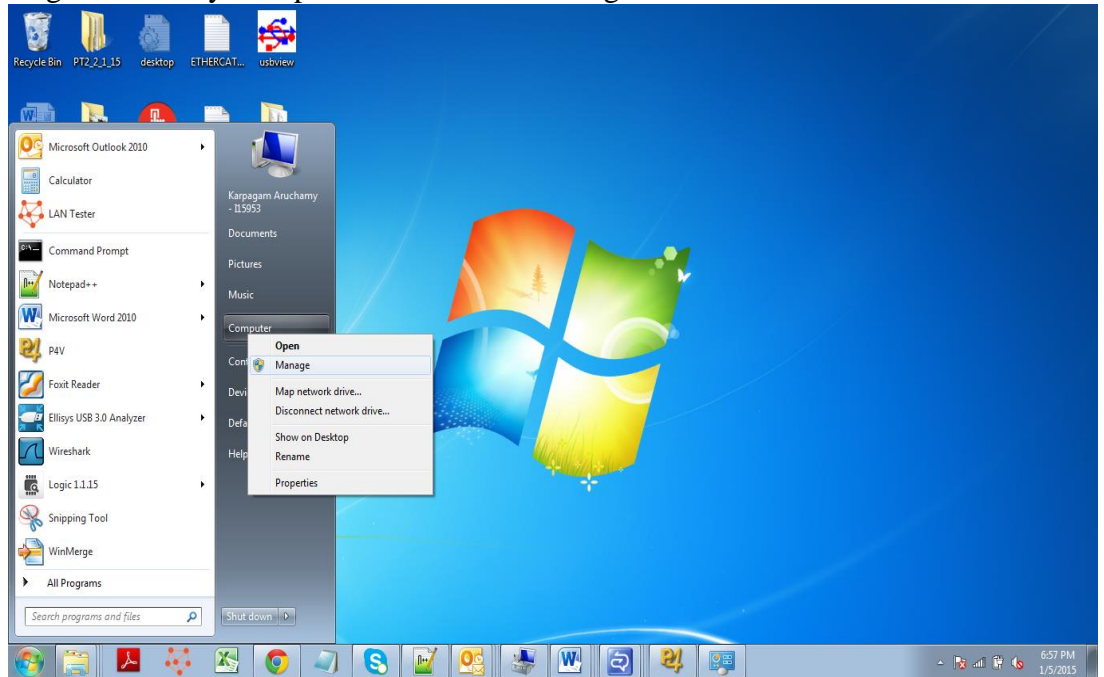
7. Now User can use PT1 tool.
8. Install the PT2 drivers for running PT2.

15 Appendix IV – Checking whether drivers were installed correctly for PT2

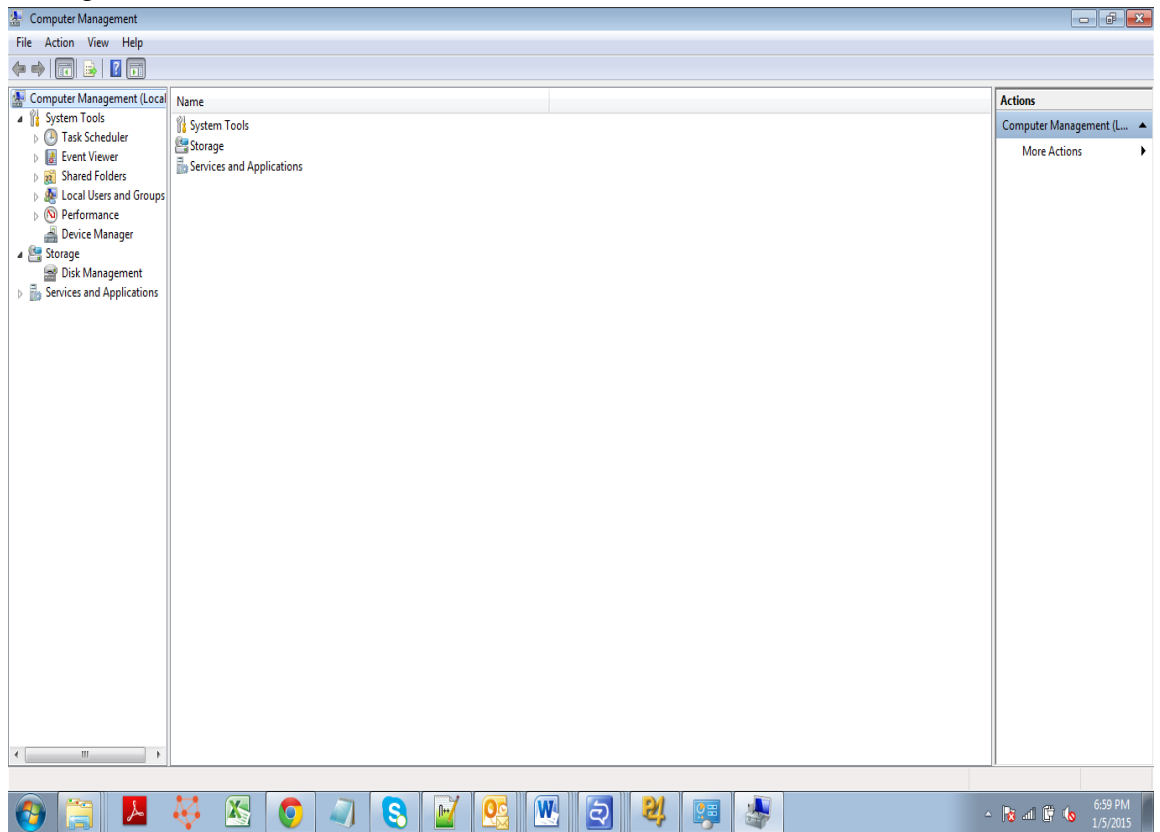
To check whether the drivers (VSM and WinUSB) were installed correctly

15.1 VSM as Class Filter

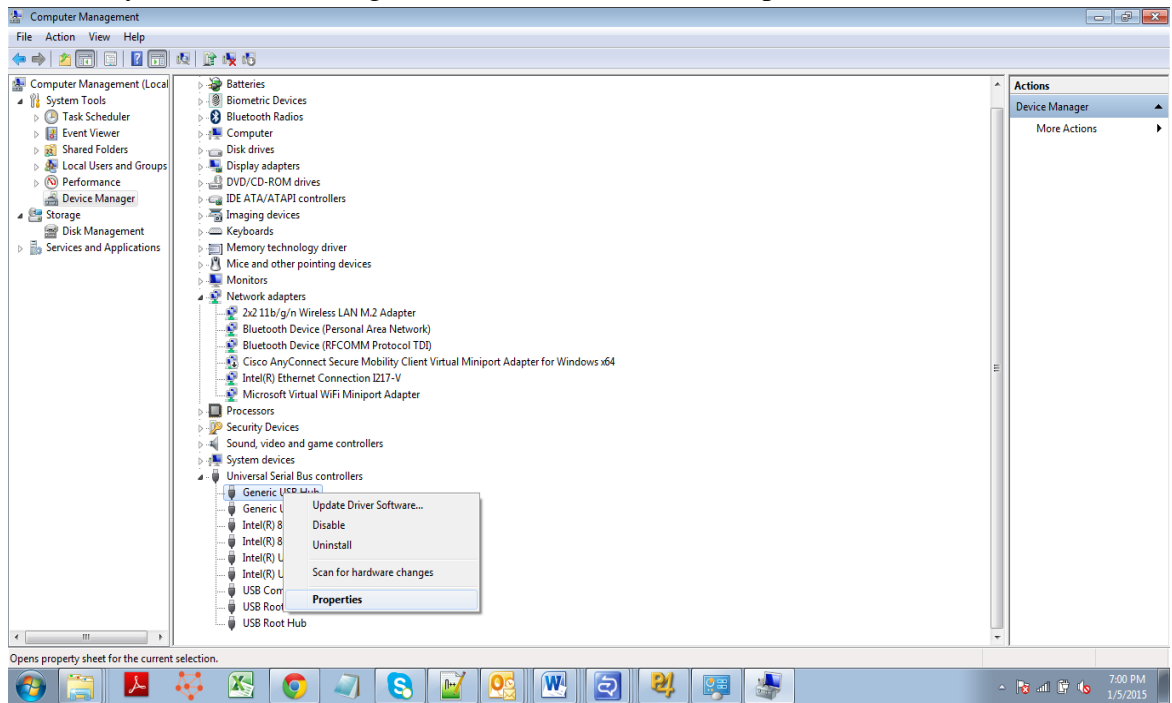
1. Right click “My Computer” and select “Manage”



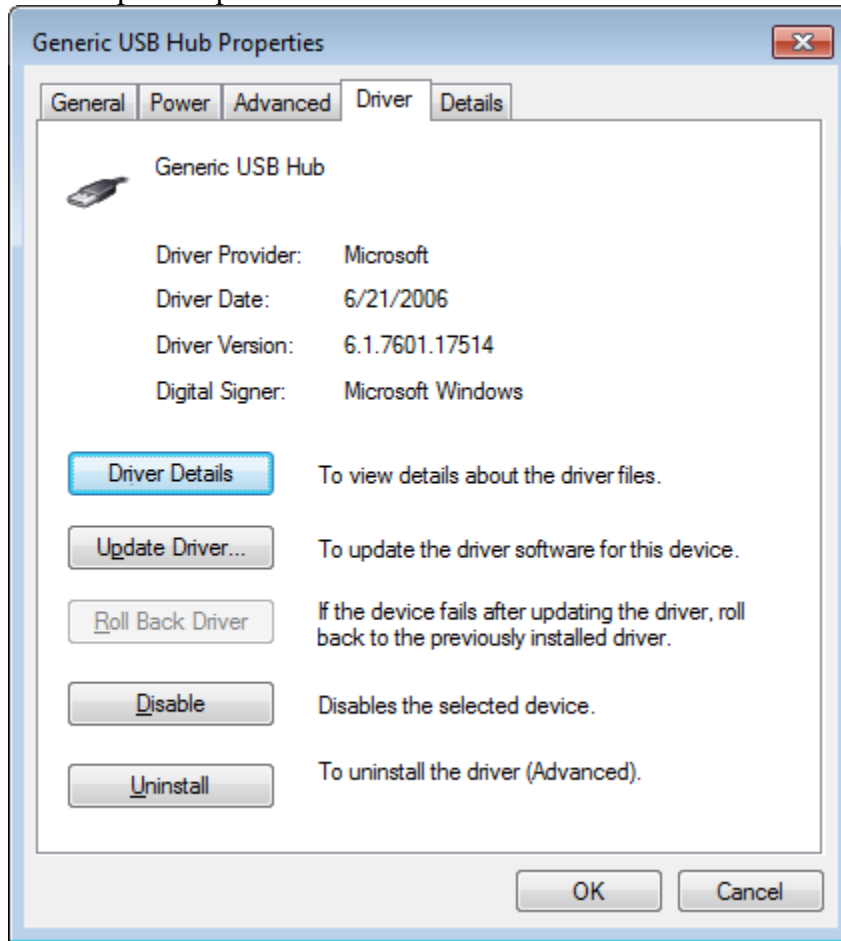
2. It will navigate to Computer Management Window. In this, click Device Manager.



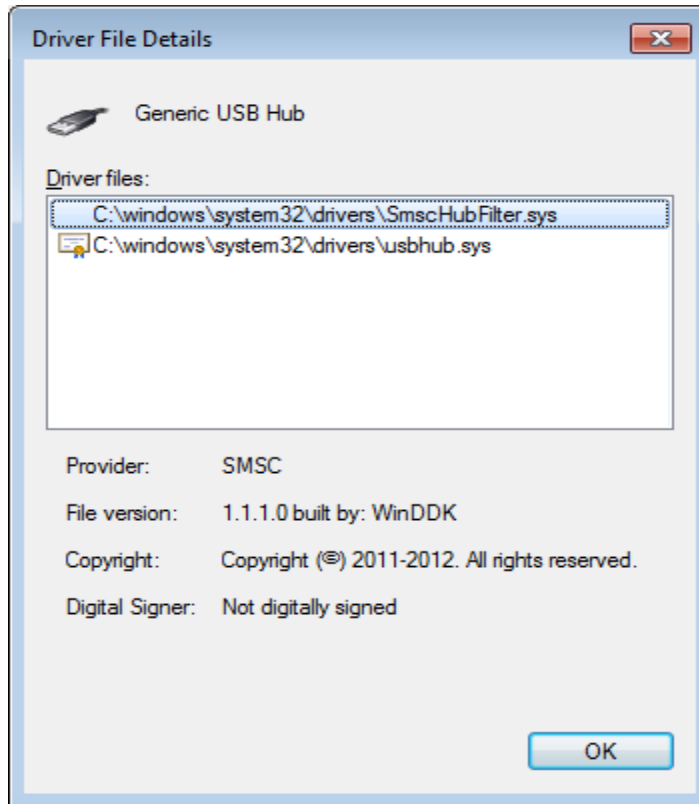
3. Select any one of the hub, right click on it and choose “Properties”.



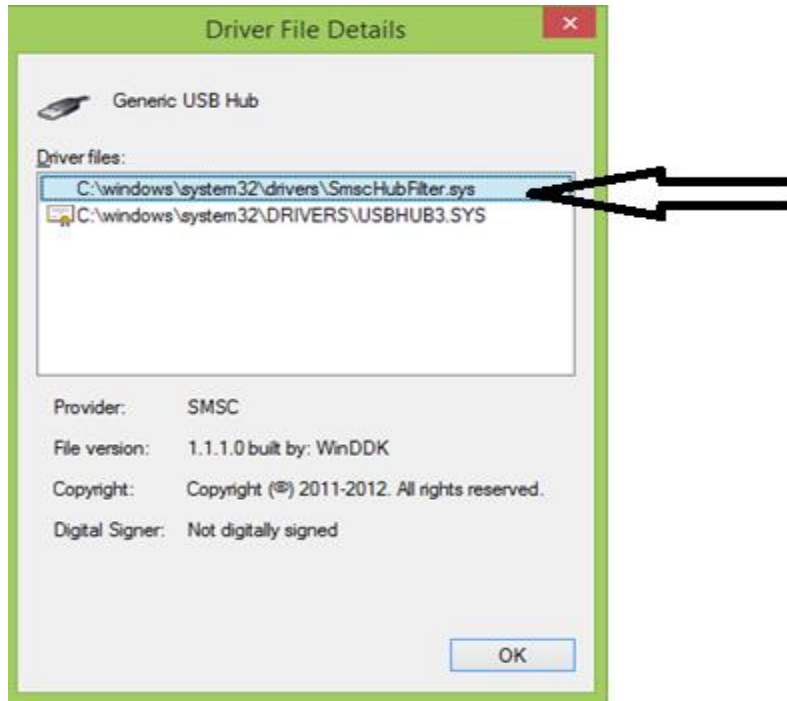
4. It will open Properties of the Hub. Choose Driver tab.



5. In the Driver tab, click Driver Details option. It will redirect to Driver File details dialogue box.

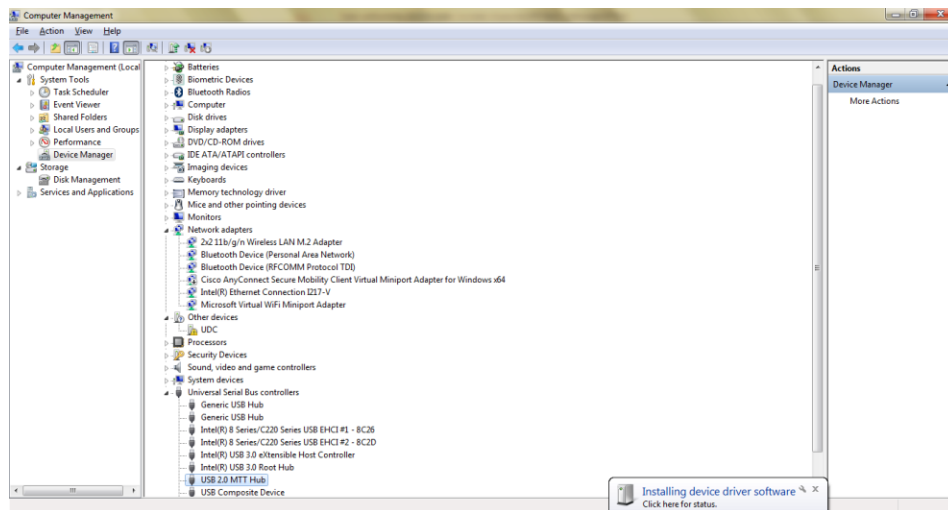


6. If the VSM driver was installed as a class filter, there will be an entry for "Smshubfilter.sys".



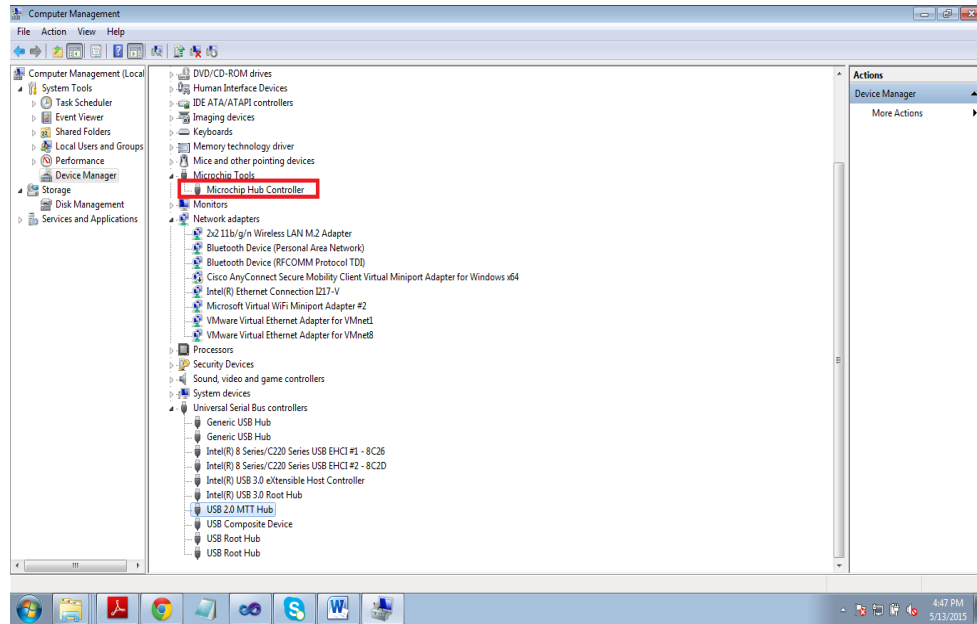
15.2 WinUSB Driver

It may take few seconds to load the WinUSB driver. While it is loading, its status can be monitored in the device manager.

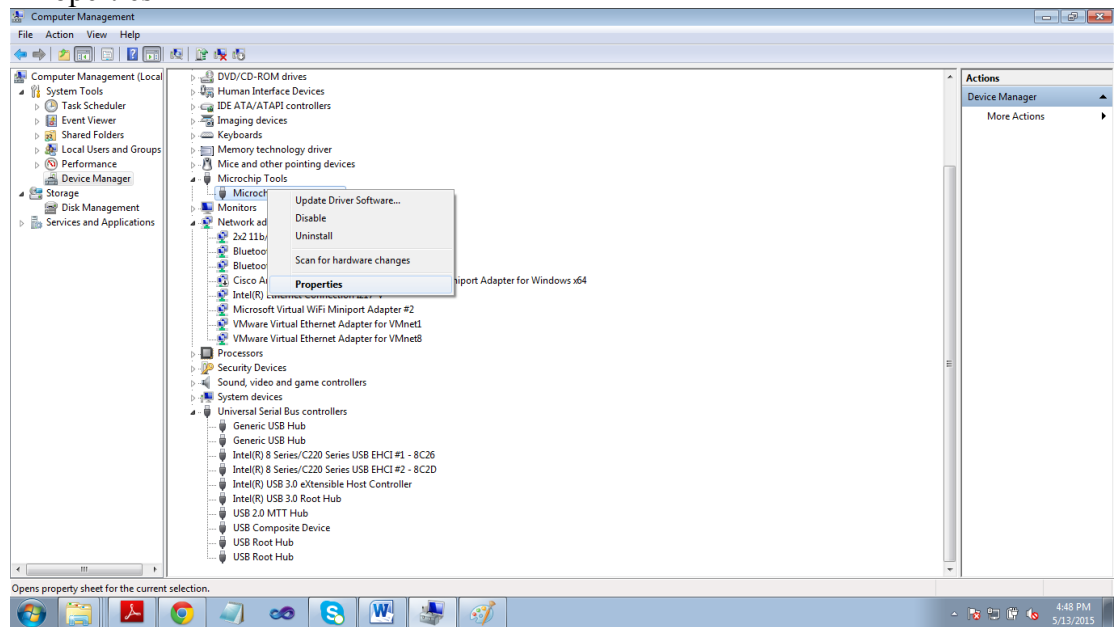


Following are the steps to check the installation of WinUSB driver.

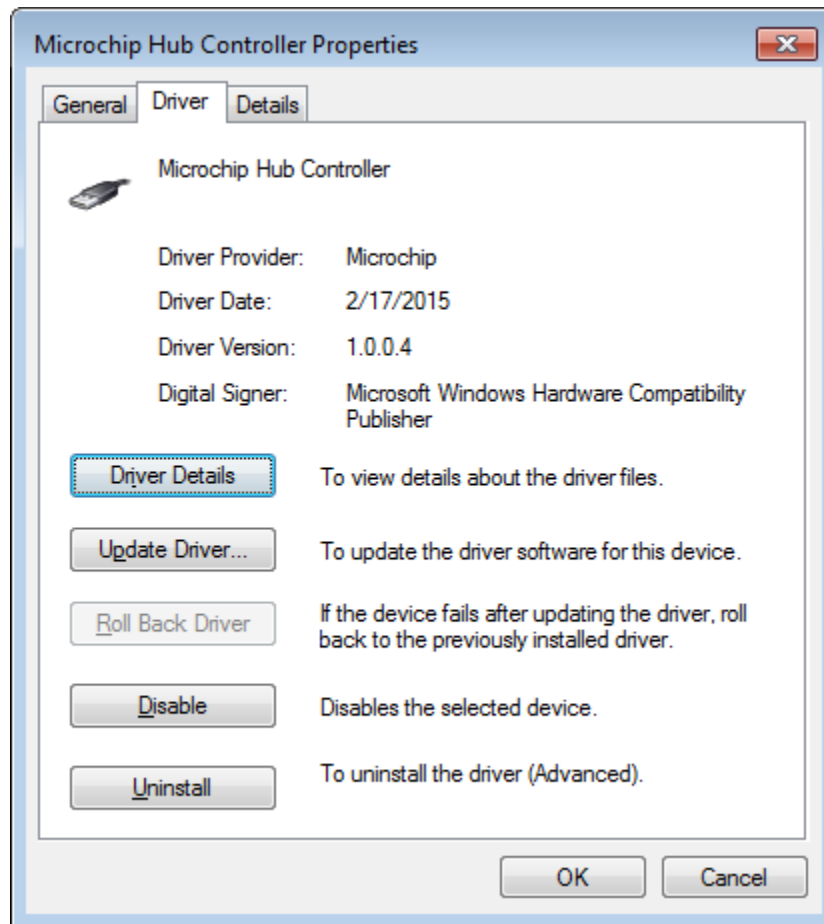
1. HCE (Internal USB device) will be enabled once PT2 Tool is launched. (Microchip Hub should be connected)



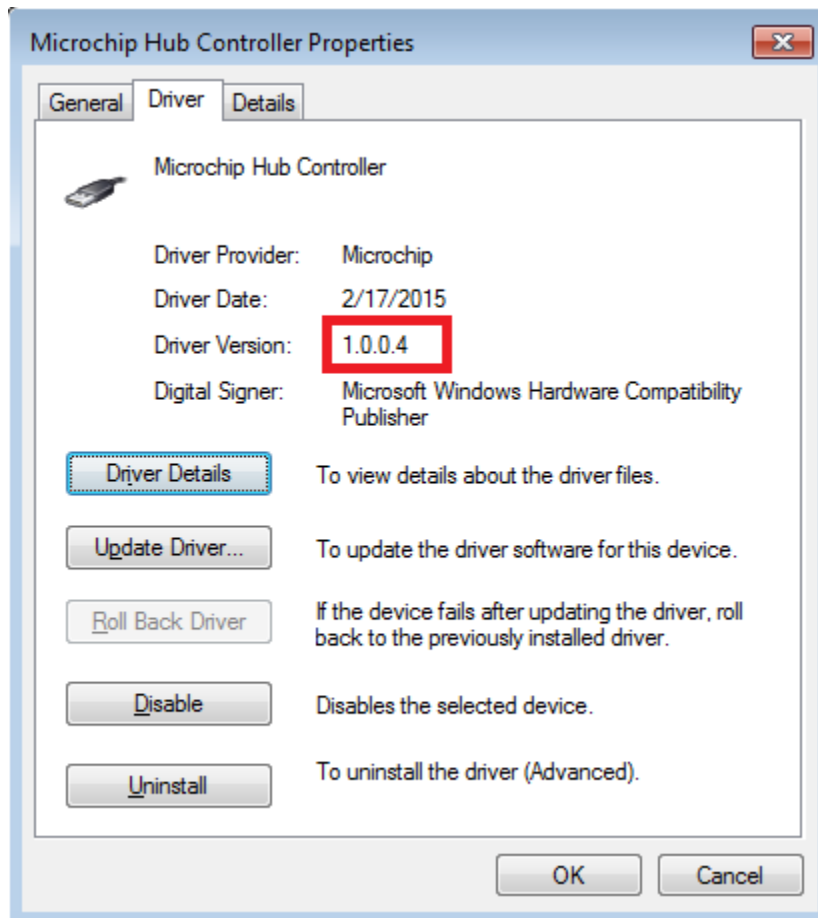
2. To check the Driver version. Right click the HCE in device manager and click “Properties”



3. It will open “Microchip Hub Controller properties”.



4. In the Properties of Microchip Hub controller, we can find the driver Version. The driver version should be 1.0.0.4



16 Appendix V

Supported configuration items for USB Hubs that can be used in .json file:

Name	Explanation	Example
Configuration items common for USB253x/USB4604/USB3X13, USB57x4 family		
vid	16-bit value that uniquely identifies the Vendor ID of the USB2 device	"vid": "0x0424"
pid	16-bit value that the Vendor can assign that uniquely identifies particular Product ID for USB2 device	"pid": "0x2744"
did	16-bit device release number for USB2 device in BCD format	"did": "0x1234"
usbvcd	USB2 Specification Release Number in BCD format	"usbvcd": "2.10"
languageid	USB2 LANGUAGE ID	"languageid": "0x0409"
manufacturer	Manufacturer String of the USB2 HUB	"manufacturer": "Microchip"
product	Product String of the USB2 HUB	"product": "USB2734"
serial	Serial String of the USB2 HUB	"serial": "123456"
hceenable	Force enable 5 th endpoint device Value : 1 – Force enable Value : 0 – Default behaviour	"hceenable": "1"
enableport1 enableport2 enableport3 enableport4	Enable/Disable USB2.0 downstream ports Value: 1 – Enable Value: 0 – Disable	"enableport1": "1"
swapupstreamdpdm swapport1dpdm swapport2dpdm swapport3dpdm swapport4dpdm	Swaps dp and dm Value : 1 – Swaps D+ and D- Value : 0 – Default behaviour	"swapupstreamdpdm": "1"
nrdeviceport4 nrdeviceport3 nrdeviceport2 nrdeviceport1	Configures Port as removable/non-removable Value : 1 – Port Non-removable Value : 0 – Port Removable	"nrdeviceport4": "1"
flexconnect	Enables flexconnect. Swaps downstream port1 and upstream Value : 1 – Enable Flexconnect Value : 0 – Disable Flexconnect	"flexconnect": "1"
hubpower	Configures hubpower as self-power or bus-power Value : 1 – Self-power Value : 0 – Bus-power	"hubpower": "1"
PHYBOOST PHYBOOSTdownstreamport1 PHYBOOSTdownstreamport2 PHYBOOSTdownstreamport3 PHYBOOSTdownstreamport4	Configures phy boost Value 0 -Nominal 17.78 mA 1 -5% below nominal 2 -10% above nominal 3 -5% above nominal 4 -20% above nominal 5 -15% above nominal 6 -30% above nominal 7 -25% above nominal	"PHYBOOSTdownstreamport1": "1"
SQUELCH SQUELCHdownstreamport1 SQUELCHdownstreamport2	Configures Varisense of hub 0 -Nominal 100mV 1 -12.5mV below nominal 2 -25mV below nominal 3 -37.5mV below nominal	"SQUELCHdownstreamport1": "2"

SQUELCHdownstreamport3	4 -50mV below nominal	
SQUELCHdownstreamport4	5 -62.5mV below nominal	
	6 -25mV above nominal	
	7 -12.5mV above nominal	
downstreamBCsettingport1	Configures Battery charging of port	"downstreamBCsettingport1": "1"
downstreamBCsettingport2	0 – Standard USB port Max-500mA	
downstreamBCsettingport3	1 – BC 1.2 Compliant Port Max-1.5A	
downstreamBCsettingport4	2 – Most Devices supported mode Max-2A	
upstreamHsRiseFall	Configures High Speed Rise/Fall time of port	"downstreamport1HsRisefall": "1"
downstreamport1HsRiseFall	0 – Default	
downstreamport2HsRiseFall	1- +18%	
downstreamport3HsRiseFall	2- -18%	
downstreamport4HsRiseFall	3- -12%	
hce_vid	16-bit value that uniquely identifies the Vendor ID of the HFC device	"hce_vid": "0x0424"
hce_pid	16-bit value that the Vendor can assign that uniquely identifies particular Product for HFC ID Device	"hce_pid": "0x2740"
hce_did	16-bit device release number for HFC device in BCD format	"hce_did": "0x1234"
hce_languageid	Language id of HFC device	"hce_languageid": "0x0409"
hce_manufacturer	Manufacturer string of HFC device	"hce_manufacturer": "Microchip"
hce_product	Product string of HFC device	"hce_product": "Controller hub"
hce_serial	Serial String of HFC device	"hce_serial": "123456"
Additional Configuration items for HSIC Enabled ports of USB3X13		
swapupstreamhsic	Swap data and strobe in HSIC enabled port	"swapupstreamhsic": "1"
	0 – Enable Swap	
	1 – Disable Swap	
DOI	HSIC Driver Output Impedance	"DOIdownstreamport1": "0"
DOIdownstreamport1	0 – 40 ohm	
DOIdownstreamport2	1 – 50 ohm	
DOIdownstreamport3		
SLEW	Slew Tune for HSIC enabled ports	"SLEWdownstreamport1": "0"
SLEWdownstreamport1	0 – Default	
SLEWdownstreamport2	1 – +30%	
SLEWdownstreamport3		
Additional Configuration items for USB57x4		
usb3vid	16-bit value that uniquely identifies the Vendor ID of the USB3.1 Gen1 device	"usb3vid": "0x0424"
usb3pid	16-bit value that the Vendor can assign that uniquely identifies particular Product ID for USB3.1 Gen1 device	"usb3pid": "0x5744"
usb3did	16-bit device release number for USB3.1 Gen1 device in BCD format	"usb3did": "0x5678"
usb3languageid	USB3.1 Gen1 LANGUAGE ID	"usb3languageid": "0x0409"
usb3manufacturer	Manufacturer String of the USB3.1 Gen1 HUB	"usb3manufacturer": "Microchip"
usb3product	Product String of the USB3.1 Gen1 HUB	"usb3product": "USB5734"
usb3serial	Serial String of the USB3.1 Gen1HUB	"usb3serial": "456789"

cdcenable	Communication Device class Value:0 – Disable CDC Value:1 – Enable CDC at interface 1 Value:2 – Enable CDC at interface 0	"cdcenable": "1"
usb3nrdeviceport1 usb3nrdeviceport2 usb3nrdeviceport3 usb3nrdeviceport4	Configures Port as removable/non-removable for USB3.1 Gen 1 Ports Value : 1 – Port Non-removable Value : 0 – Port Removable	"usb3nrdeviceport": "1"
usb3enableport1 usb3enableport2 usb3enableport3 usb3enableport4	Enable/Disable 3.1 Gen 1 Downstream ports Value: 1 – Enable Value: 0 – Disable	"usb3enableport1": "1"