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## 1. Introduction

Marvell® SMI Register Access GUI Application software provides a solution to allow user accessing internal registers of certain Marvell® products. The software requires a USB based SMI adapter card and Microsoft Windows® based PC. This document describes the hardware setup, software installation, features and usage. It also provides detailed information for MDC/MDIO and XMDC/XMDIO register accessing, as well as some related utilities. This guide is intended for customers who want to access register information through the software. It is assumed that users are familiar with related protocols and products.

## 2. USB-2-SMI Adapter Card

The USB-2-SMI adapter card is a debugging tool that can be used by Marvell® customers to accelerate the development based on Marvell products. Hardware engineers can use the USB-2-SMI adapter card in the early stages of the board debugging utilizing an easy-to-use Graphic User Interface (GUI) to access the device internal registers and tables without any other interface.

Two versions of the USB-2-SMI Adapter Card are available:

- DB-USB-2-SMI—Single-port adapter card. Supports MII management interface, MDC/MDIO, XMDC/XMDIO, and I<sup>2</sup>C management interfaces.
- DB-USB-2-SMI-4 (Model DC201: CPLD Version 6100 or greater)—Four-port adapter card. Supports MDC/MDIO, XMDC/XMDIO, and I<sup>2</sup>C management interfaces. MII management interface is not supported in the 4-port adapter card version.

The 4-port DB-USB-2-SMI-4 adapter card requires SMI Register Access GUI Version 3.26 or greater (see Section 4.6 to check the software version of the GUI). The 4-port version can be useful for boards that require two or more management ports such as 10GBASE-T evaluation board (one port is used for XMDC/XMDIO port and the other port is used for I<sup>2</sup>C for power supply module management)

Note: The SMI Register Access GUI Version 3.26 or greater can support both versions of the adapter card, however, the older version of the GUI can only support the single-port version of the adapter card. To avoid adapter compatibility issues the user should upgrade the SMI Register Access GUI to the latest version of the software.

Figure 1 and Figure 2 show the single-port and four-port versions of the adapter card.

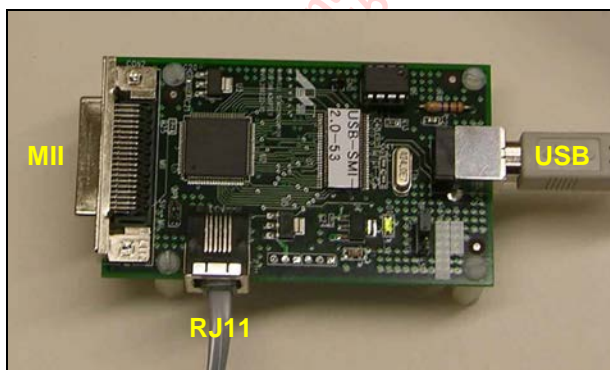


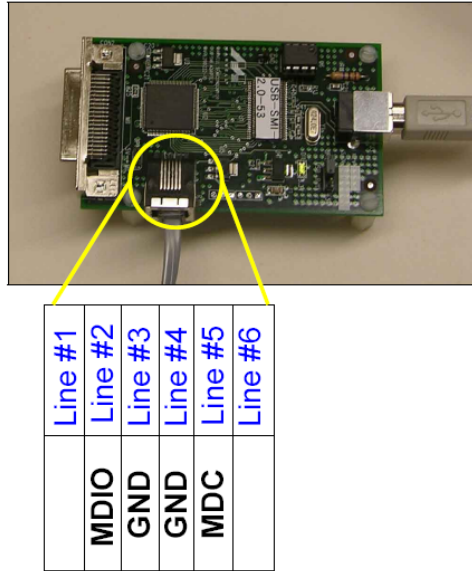
Figure 1: DB-USB-2-SMI Adapter Card



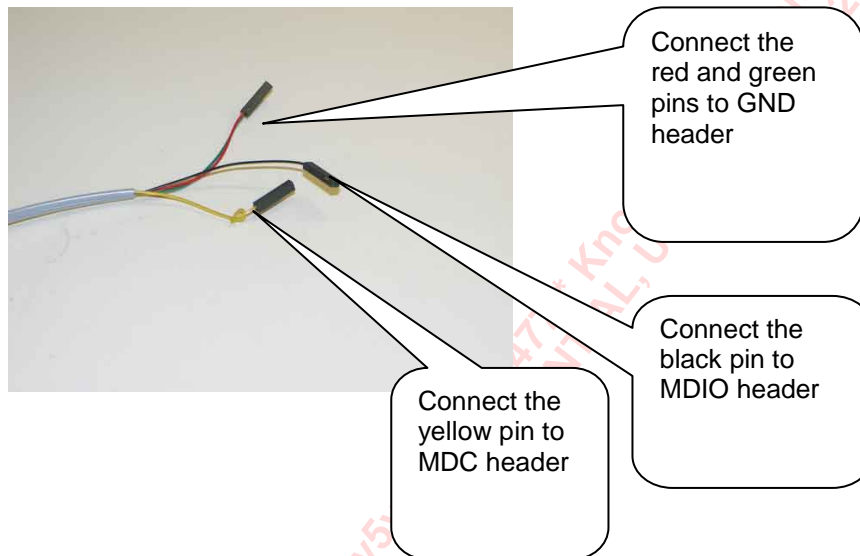
Figure 2: DB-USB-2-SMI-4 Adapter Card

The adapter card has few interfaces, an USB connector for PC connection, a RJ11 connector, and a standard MII connector (single-port only) for SMI connection to Device Under Test (DUT). Marvell recommends that the board be powered from the USB host; therefore, JP13 should be closed.

For the RJ11 connector, a 4/6-wire RJ11 cable (see Figure 3) or a special 3-wire cable (see Figure 4) is required to connect to DUT.



**Figure 3: RJ-11 Cable Header Connections**



**Figure 4: RJ-11 Cable Header Connections**

For some Marvell evaluation boards which require MII management interface, an optional MII port is available on the single-port adapter card. When MII is used to connect to the MII port of a Marvell evaluation board, JP14 needs to be closed to supply 5V to the level shifter on the DUT board.



Figure 5: MII Cable

### 3. Installation

#### 3.1 System Requirements

The operating systems supported are Microsoft Windows® XP, Microsoft Windows Vista, and Windows 7. The installation computer must also have a drive with approximately 25MB of extra space, and at least one USB 1.1 or USB 2.0 compatible ports.

#### 3.2 Installation Notes

- Older versions of the Register Access GUI must be removed before installing the new version of the GUI. Note that the DB-USB-2-SMI-4 (Model DC201) requires Register Access GUI version 3.26 or greater.
- Administrator privileges might be required to perform the installation. If needed, contact your IT department to gain access to the administrator privileges of your PC or laptop.
- To avoid any bus contention, Marvell recommends that the USB-2-SMI adapter card be connected to the target device SMI bus through a special header and disconnected from any other active devices such as a CPU or CPLD. Connect the three-pin header to the device MDC, MDIO, and GND.
- If the installation fails to work under Windows Vista / Windows 7, it can be installed under Windows Vista / Windows 7 with Windows Virtual PC > Windows XP Mode. First, install the Microsoft Windows Virtual PC - Windows XP Mode from the Microsoft website. When using Windows XP Mode, other companion tools must be installed inside the Windows XP Mode as well (for example, the MATLAB Compiler Runtime (MCR) used for Alaska X 10GBASE-T family of devices).

Start Windows XP Virtual PC. If not done already, perform Windows Update to make sure the Windows XP Mode is up-to-date with latest service pack and have the Microsoft .NET Framework 2.0 installed. Then, follow the instructions to install the MATLAB Compiler Runtime.

## 3.3 USB to SMI Adapter Driver Installation for Windows XP

If necessary, follow this guide to install the drivers for the Marvell USB to SMI adapter onto your Windows XP PC.

1. If the USB to SMI adapter driver is not installed, the system tray icon alert appears after connecting the adapter to the PC.

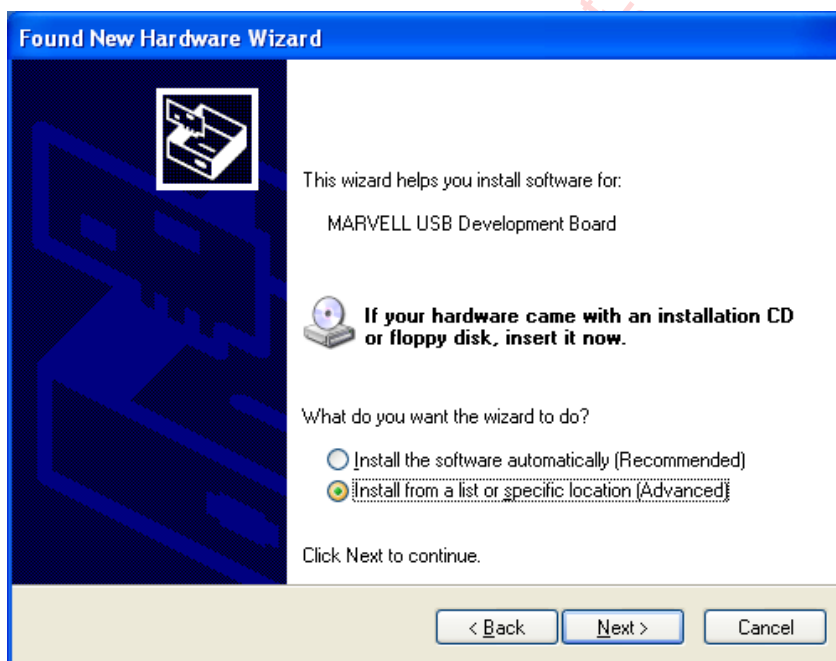


2. Select **No, not this time** and click **Next**.

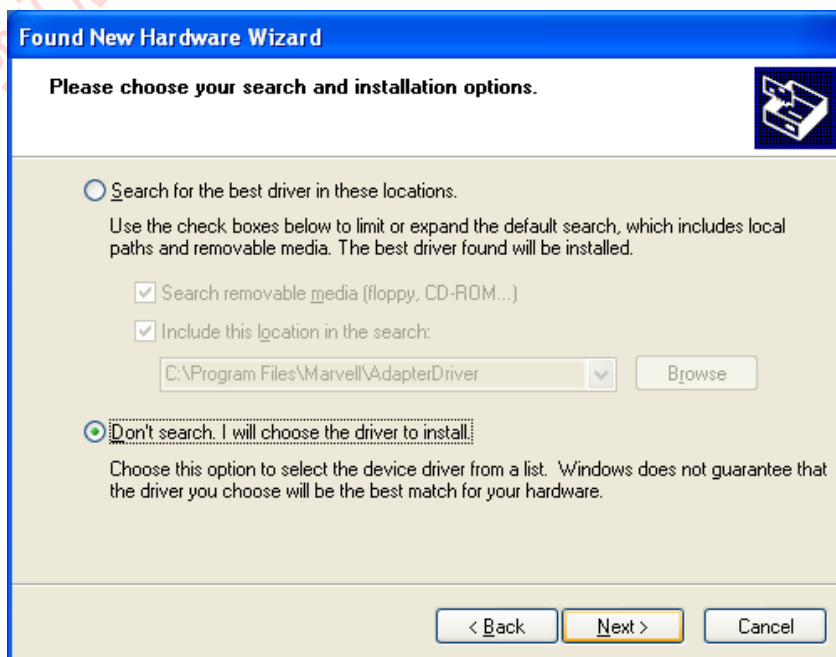




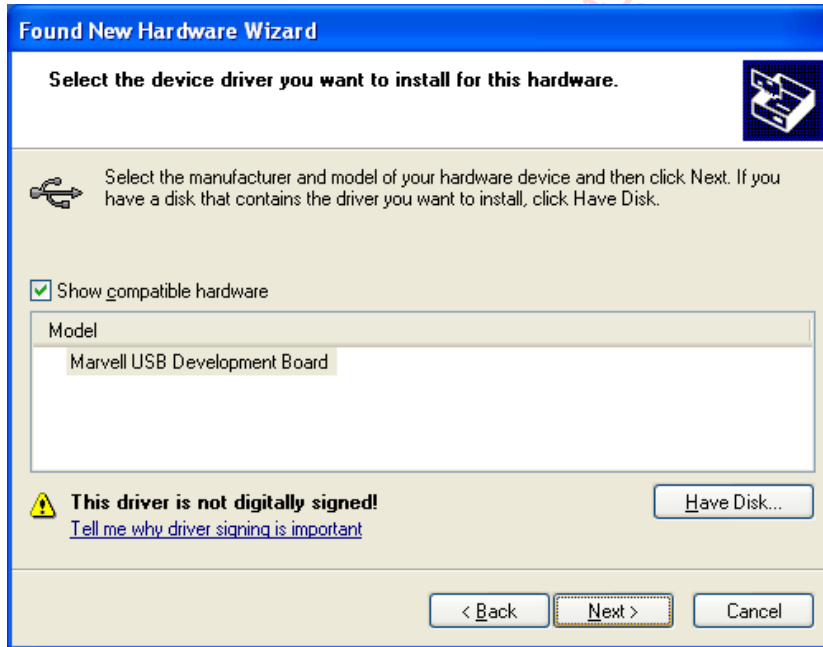
3. Select **Install from a list or specific location (Advanced)** and click **Next**.



4. Select **"Don't search. I will choose the driver to install."** and click **Next >**

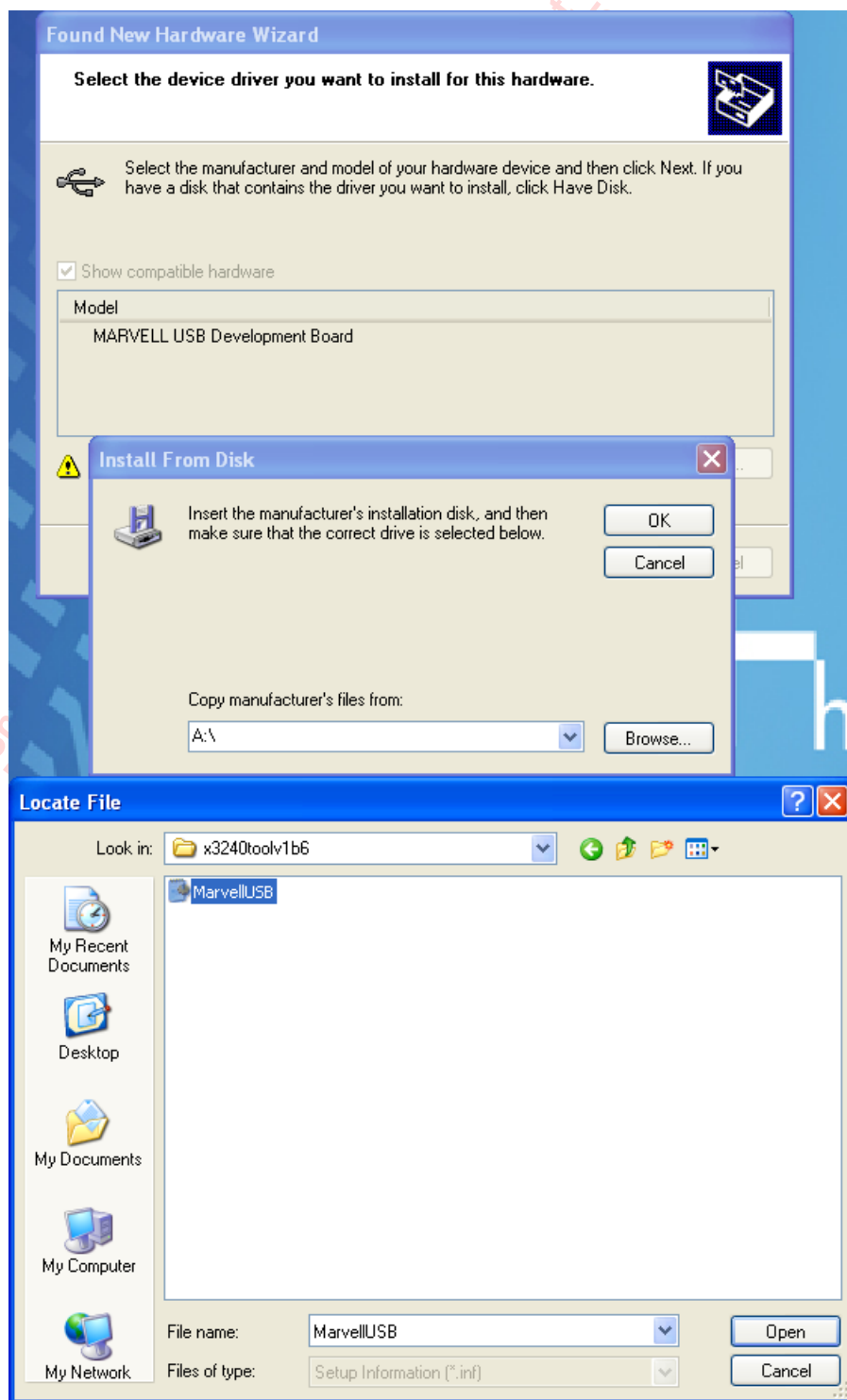


5. Click **Have Disk...**





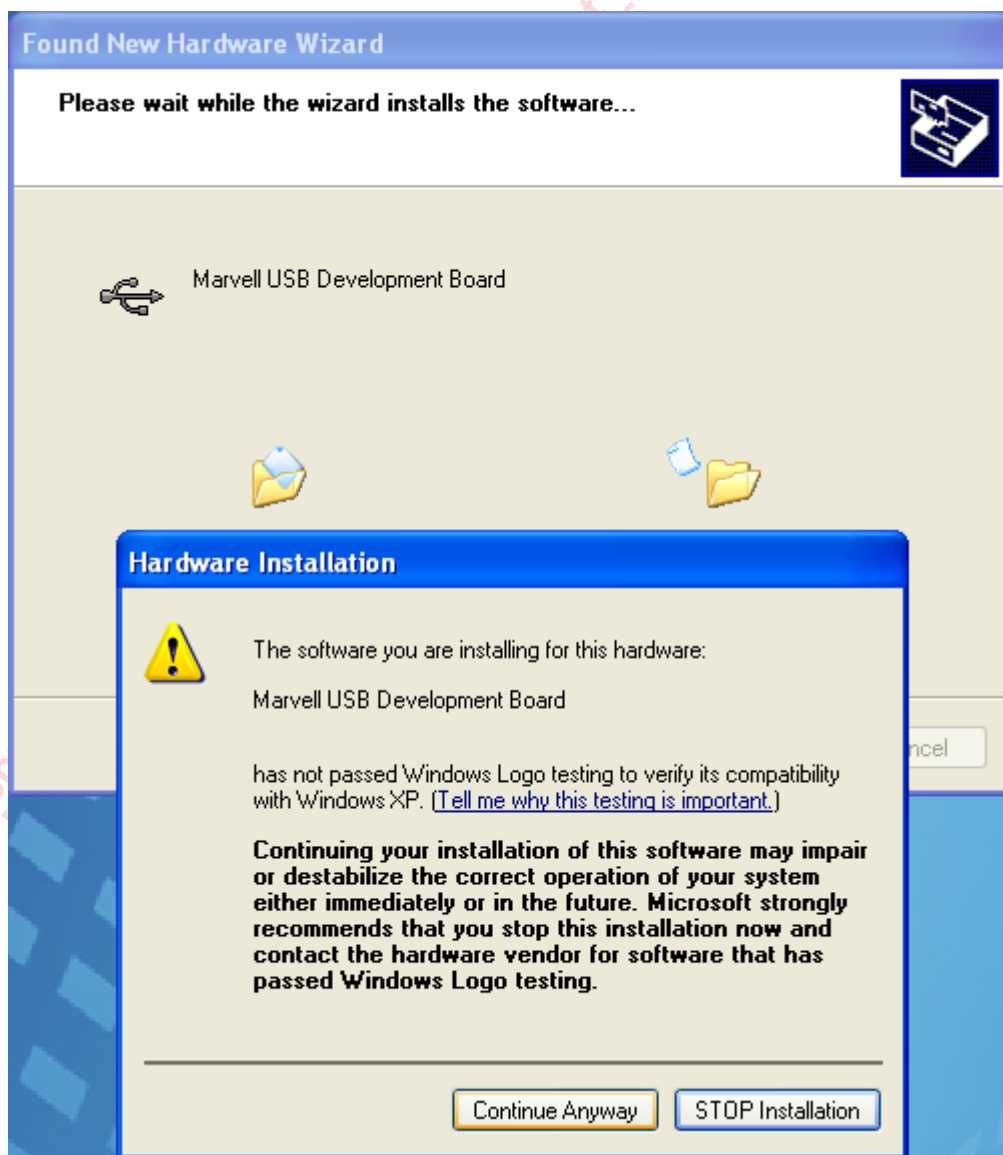
6. Click **Browse...** and locate the *MarvellUSB.inf* file, then click **Open**.



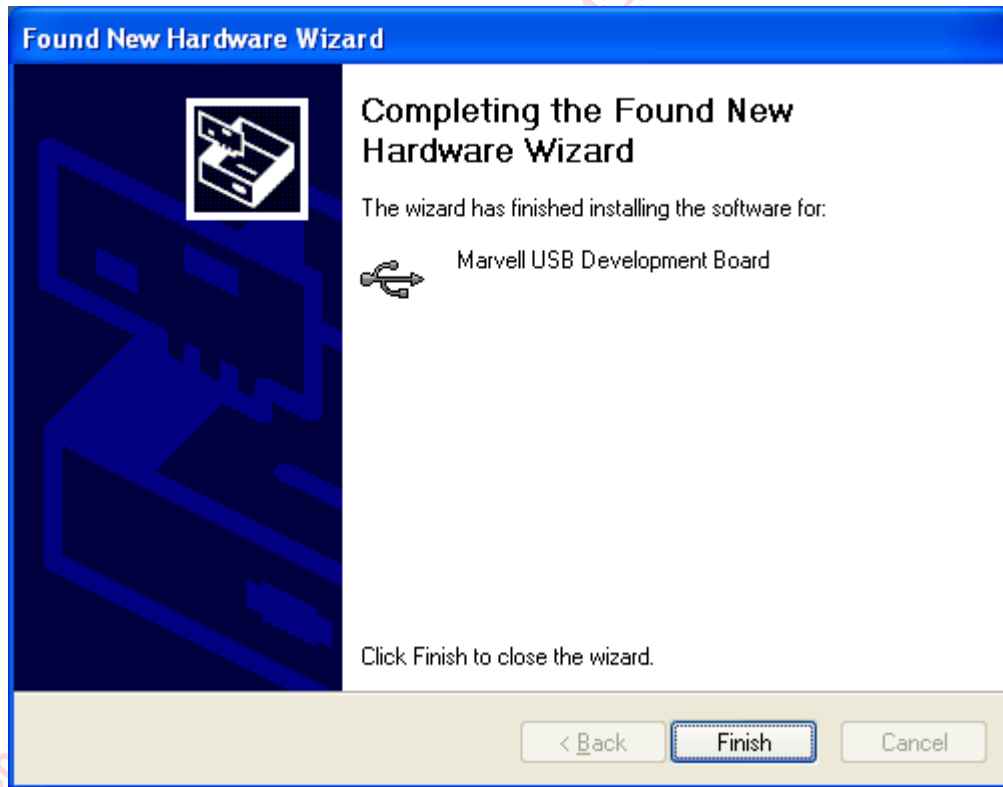
7. Click **Next**.



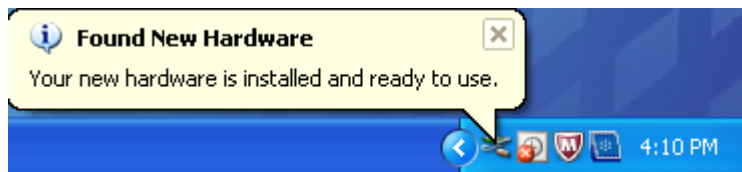
8. Click **Continue Anyway**.



9. Click **Finish**.

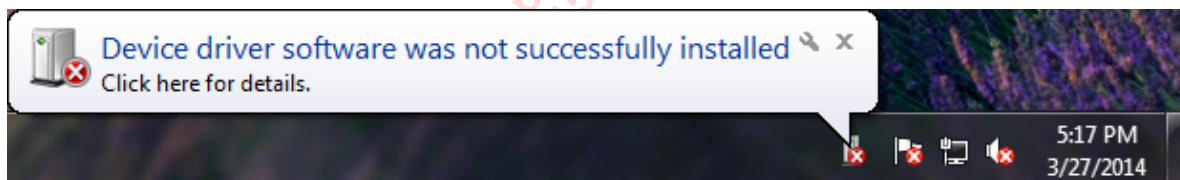


10. If the driver installation is successful, the system tray notification indicates that the new hardware is installed and ready to use.



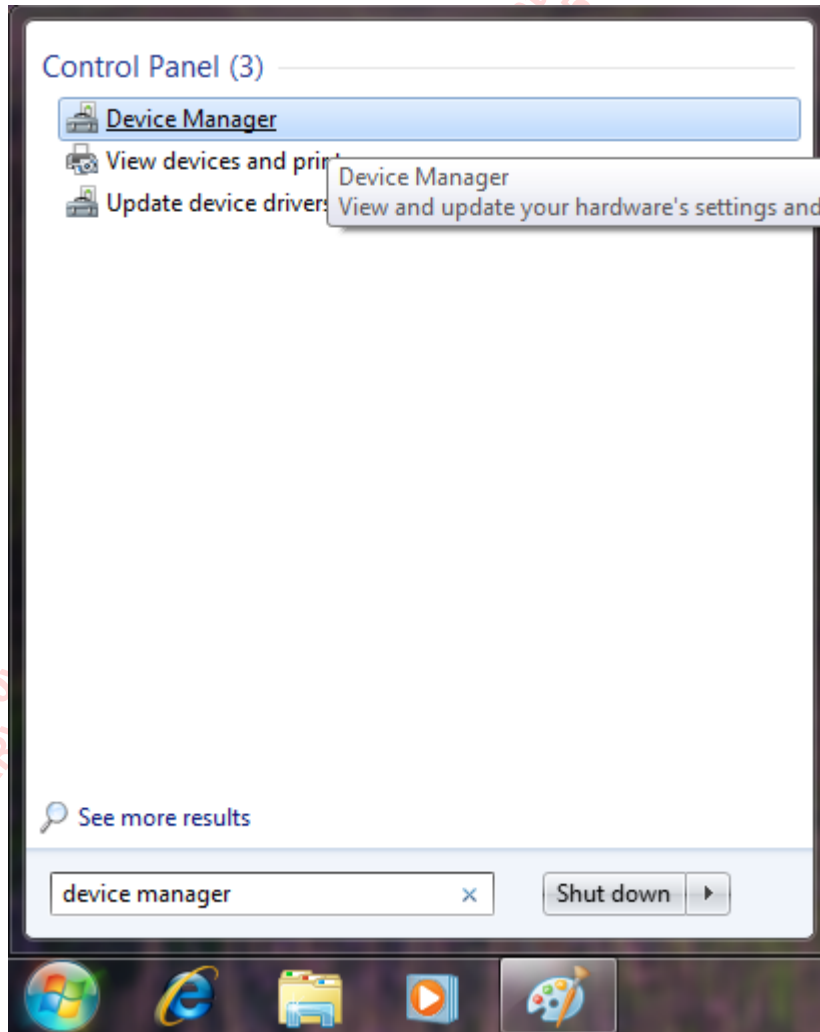
### 3.4 USB to SMI Adapter Driver Installation for Windows 7

1. If the system tray notification appears indicating that the device driver software was not successfully installed, to the user must install the driver for the Marvell USB to SMI adapter.

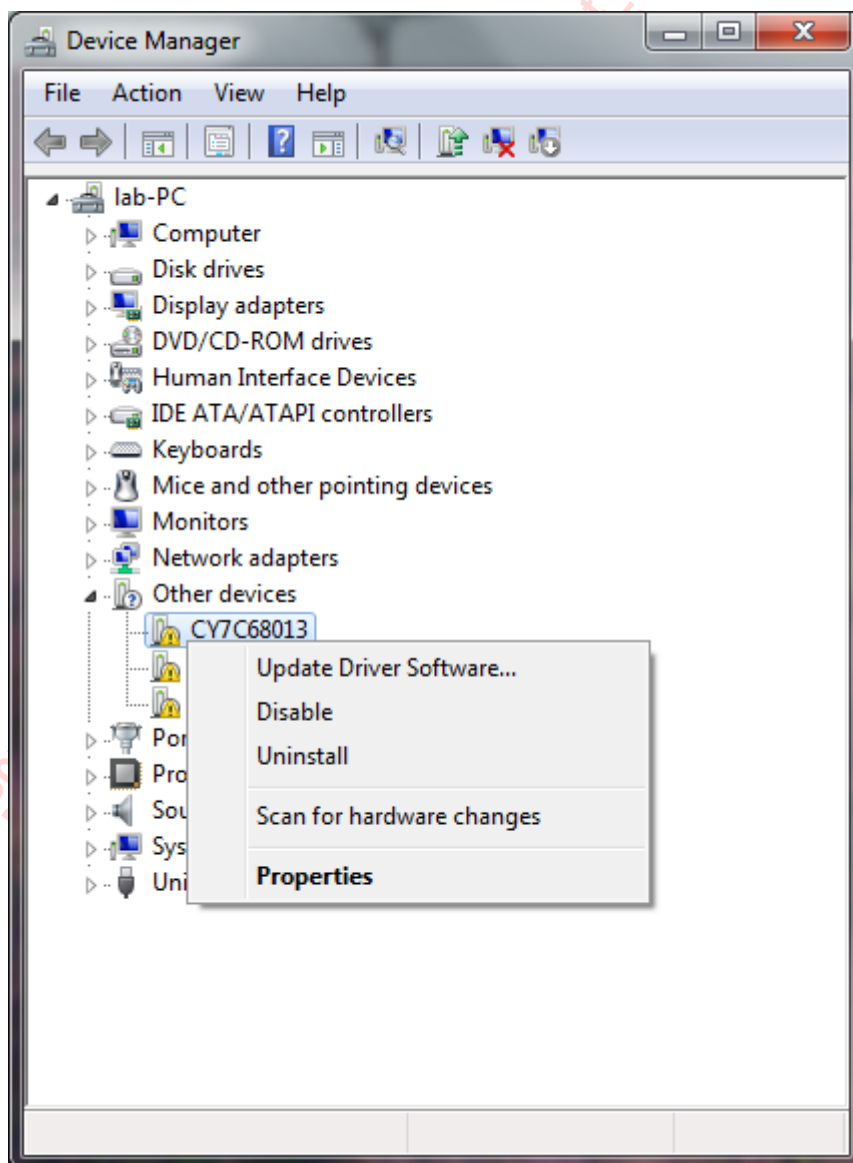


2. Click **Start**, and in the **Search programs and files** box type *device manager*. The search results populates in the frame above.

3. Click **Device Manager**.

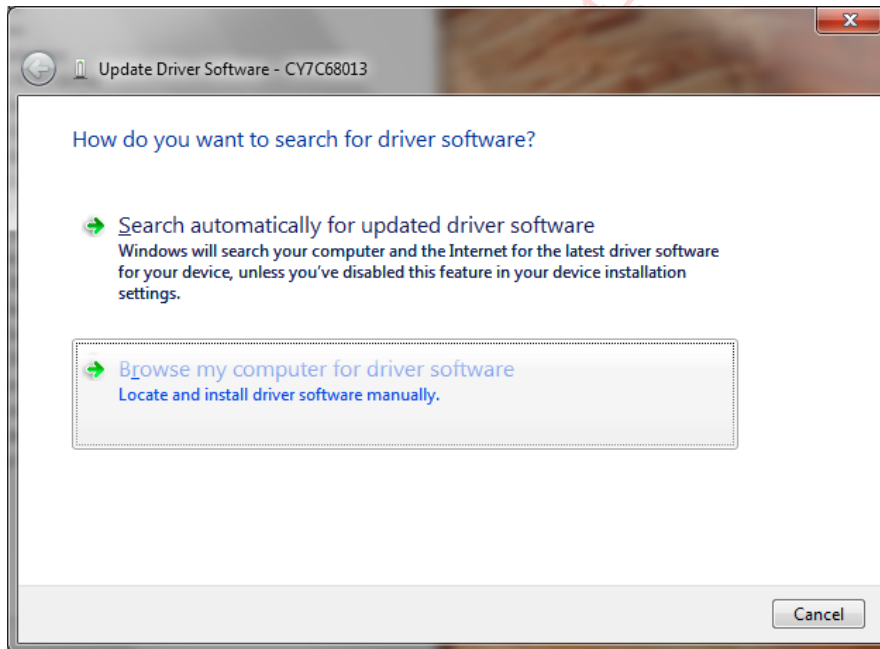


4. Right-click on **CY7C68013** and select **Update Driver Software...**

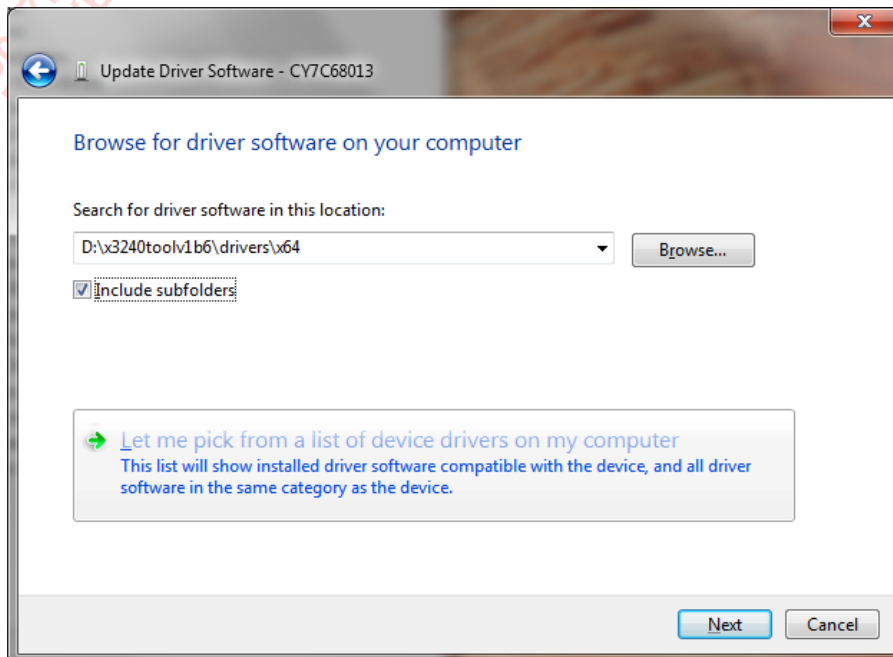




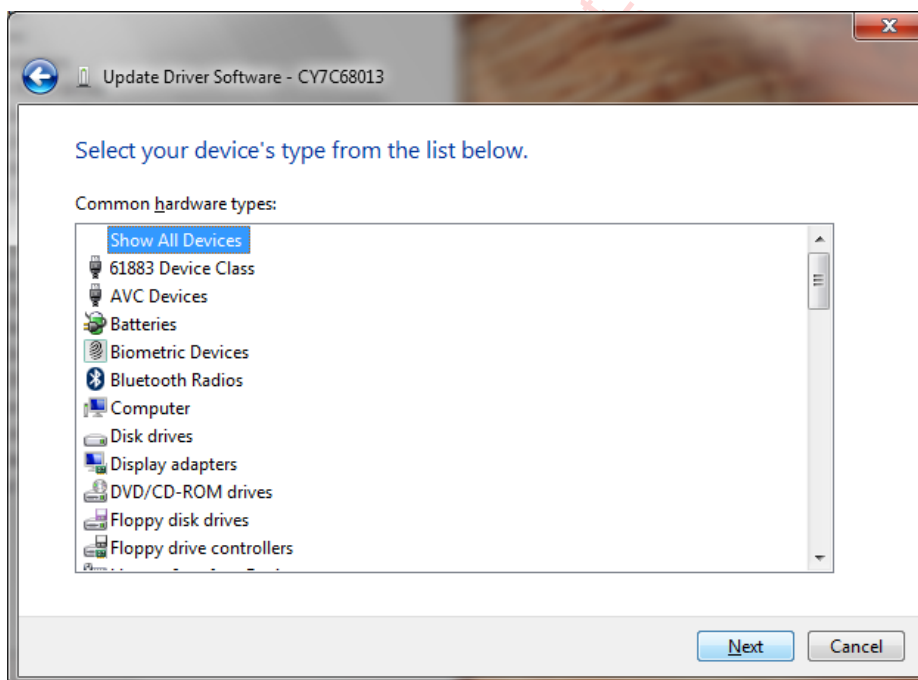
5. Click **Browse my computer for driver software**.



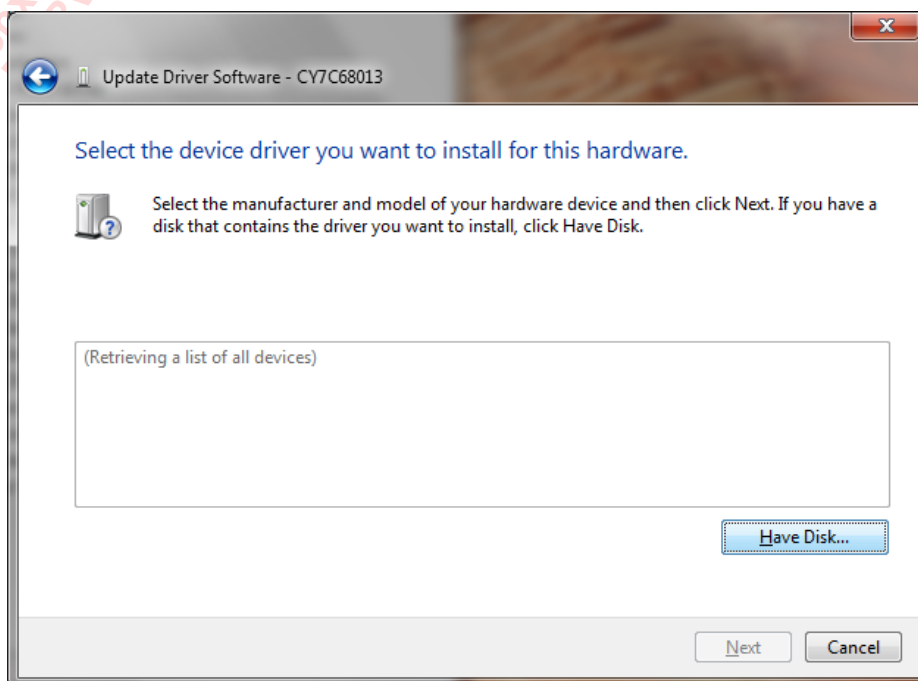
6. Click **Let me pick from a list of device drivers on my computer**.



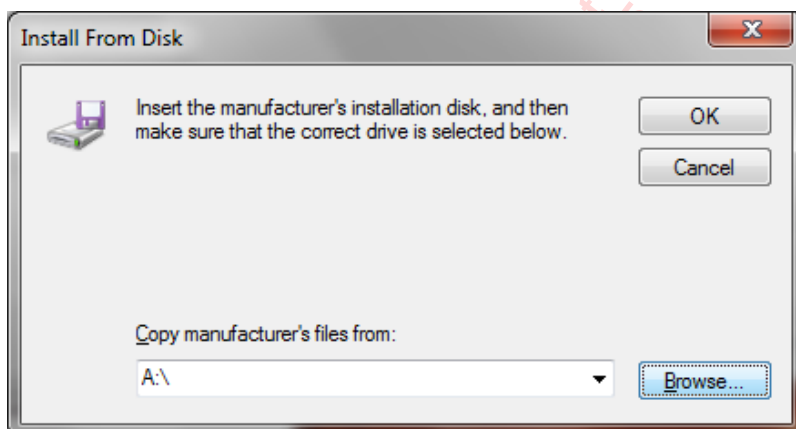
7. Select **Show All Devices** and click **Next**.



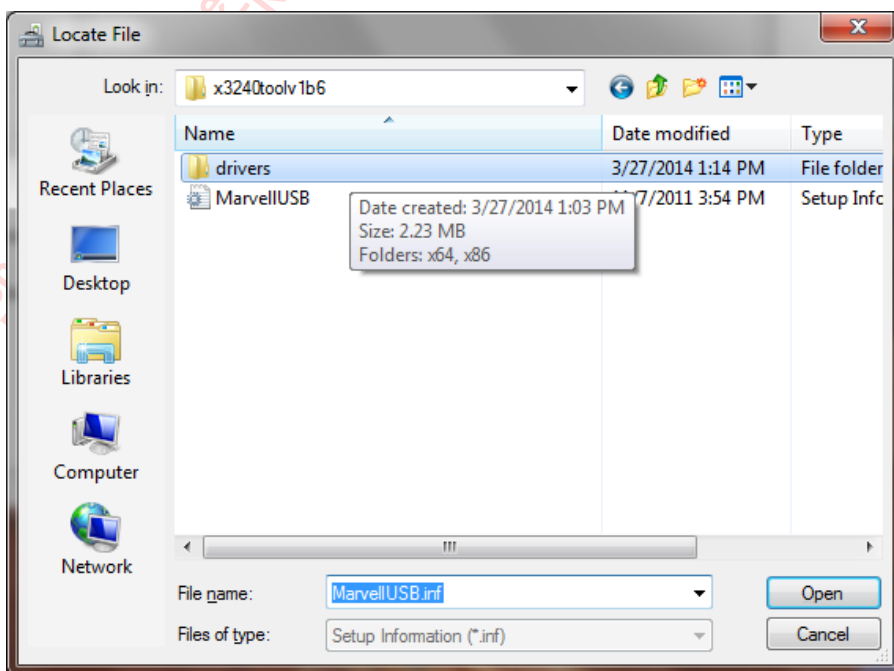
8. Click **Have Disk**.



9. Click **Browse**.




10. Open the **drivers** folder.



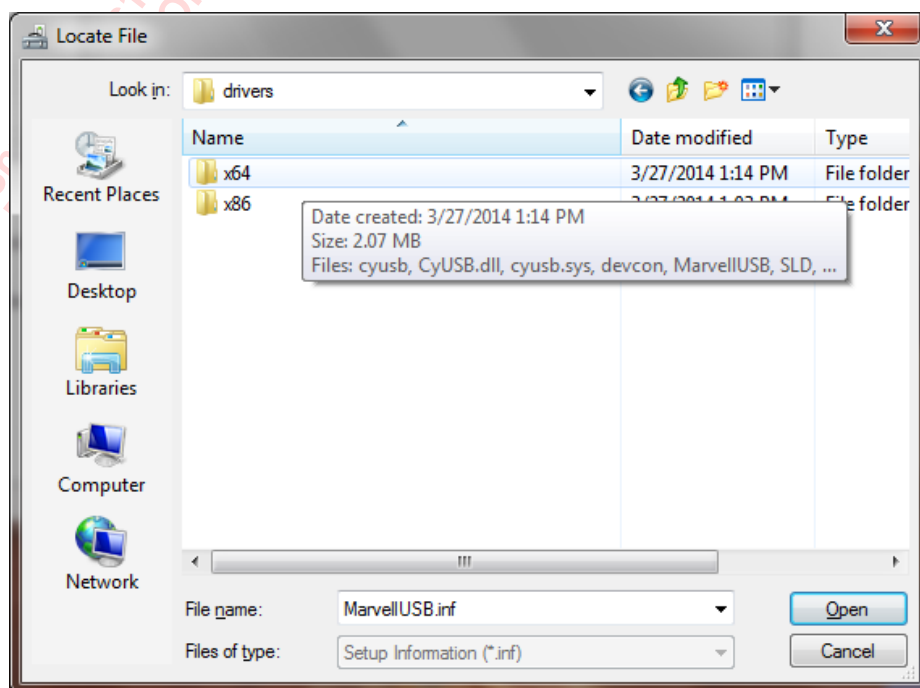
11. Open the folder that corresponds to your specific Windows version (for example, if you are running Windows 64-bit, open the x64 folder, and if you are running Windows 32-bit, open the x86 folder).

To find out what version of Windows your computer is running (32- or 64-bit) do the following:

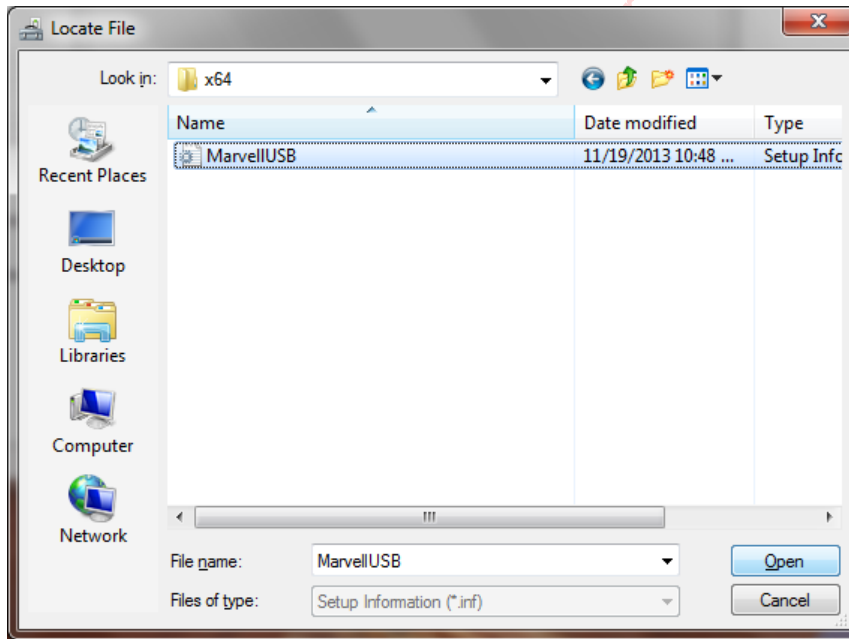
1. Click **Start** , right-click **Computer**, and select **Properties** from the menu, the System screen appears.
2. From the System screen, you can view the system type.

If your computer is running Windows XP, do the following:

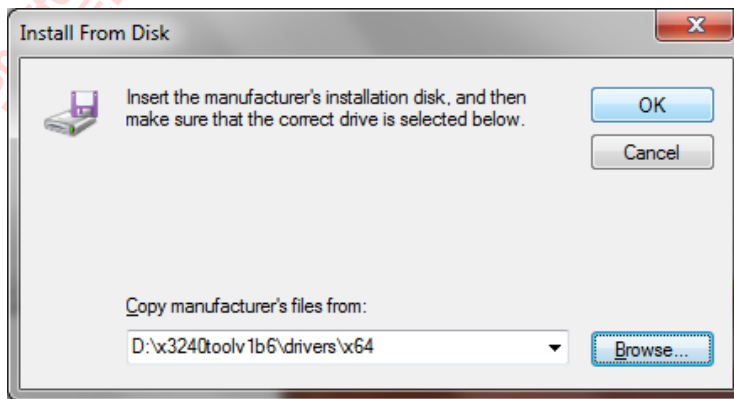
1. Click **Start**.
2. Right-click on **My Computer**, and then click **Properties**.
  - If **x64 Edition** is not listed under *System*, then the system is running the 32-bit version of Windows XP.
  - If **x64 Edition** is listed under *System*, then the system is running the 64-bit version of Windows XP.



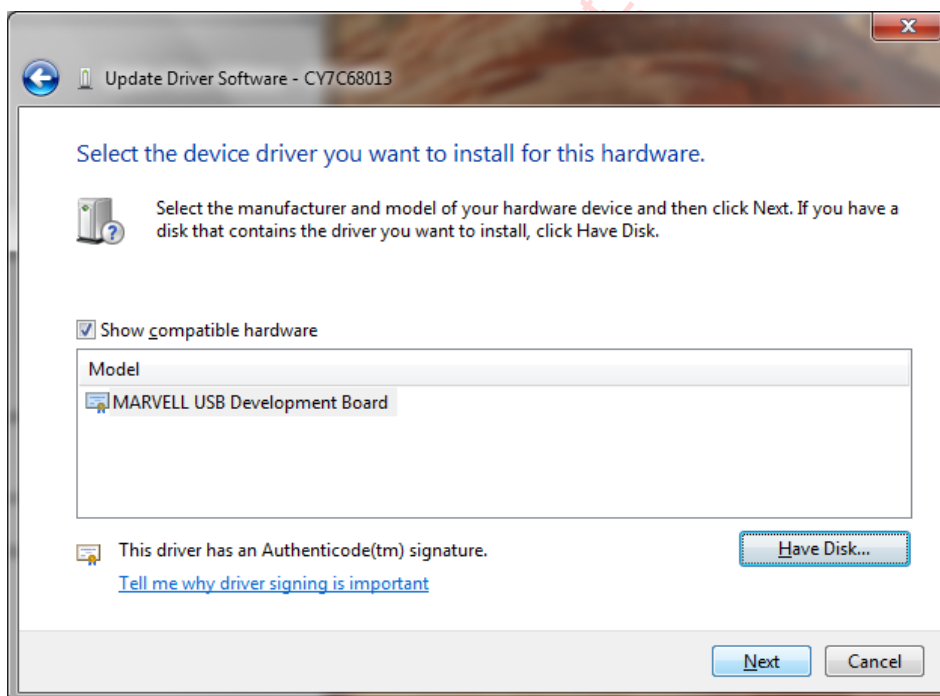
3. Select the **MarvellUSB inf** file and click **Open**.



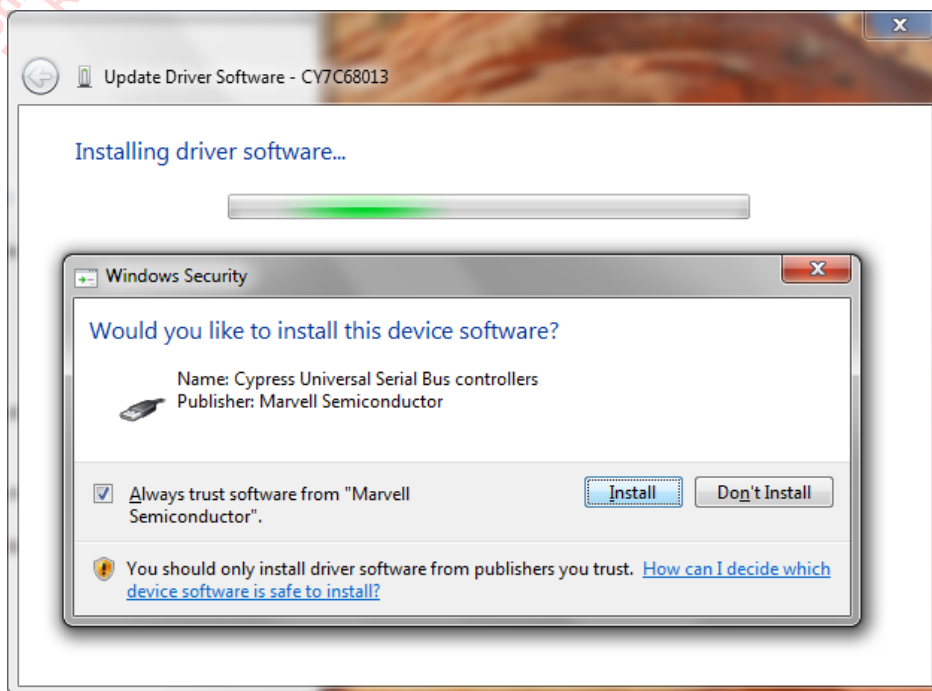
4. Click **OK**.



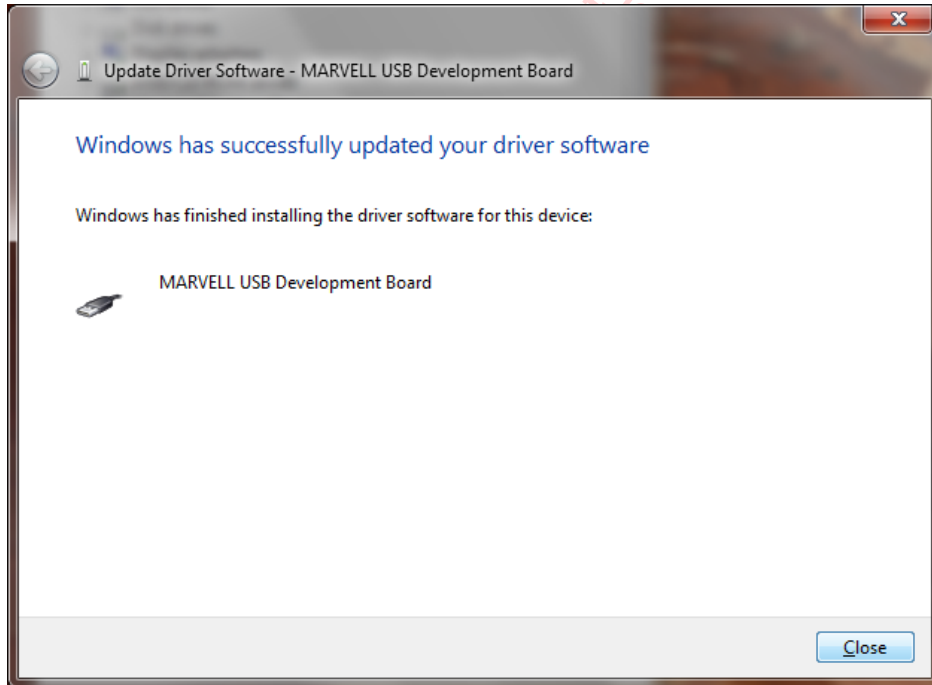
5. Click **Next**.



6. Click **Install**.



7. The Marvell USB to SMI adapter driver has been installed. Click **Close**.





## 4. SMI Register Access Software GUI

### 4.1 Launch the program

1. Select **Start -> Programs -> Marvell -> SMIRegAccessGUI**.

This software automatically launches Marvell Virtual Bench Service (VBS). This window must be kept running while using the SMI Register Access GUI. VBS helps maintain the current available instrument list for your PC (for example, USB boards and VBS GUI for current available instruments that are connected to your PC).

Figure 6 shows when the USB-2-SMI is properly detected.

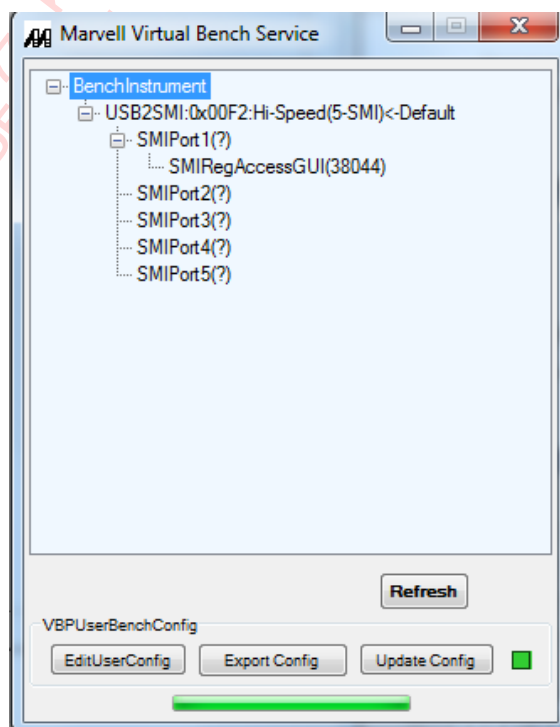
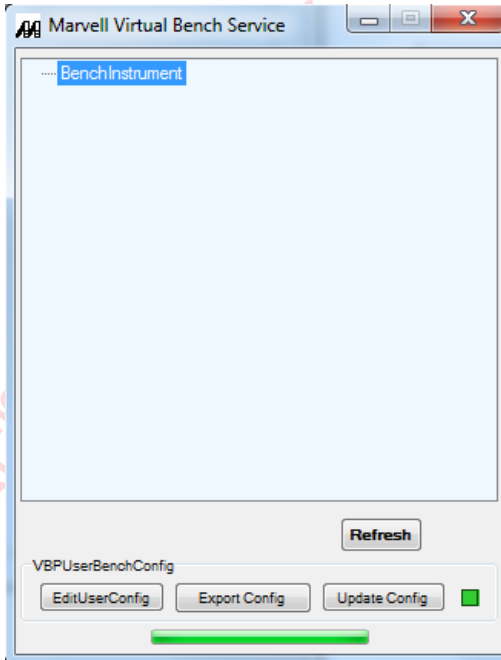


Figure 6: Marvell VBS window (USB-2-SMI board is detected)

If the USB-2-SMI is not detected properly, **BenchInstruments** will be blank as shown in Figure 7. Check the USB-2-SMI Adapter and the USB cable connections. Another problem could be that the usb-2-smi driver is not being installed properly. For further assistance, please contact a Marvell representative or FAE.



**Figure 7: Marvell VBS window (USB-2-SMI board is not detected)**

The SMI Register access GUI opens.

2. After SMIRegAccessGUI is up and running, the user needs to select the USB board for the connection such that the GUI communicates with the Device Under Test (DUT) through the selected USB board. Then, the DUT Connection Box will be activated.
3. At this point, the user has to select the **ProductFamily** and **Protocol**.
4. Click **Refresh**. All of the connections are complete and the user can now read and write any registers.

Figure 8 shows the Register Access GUI before connection to the DUT is established.

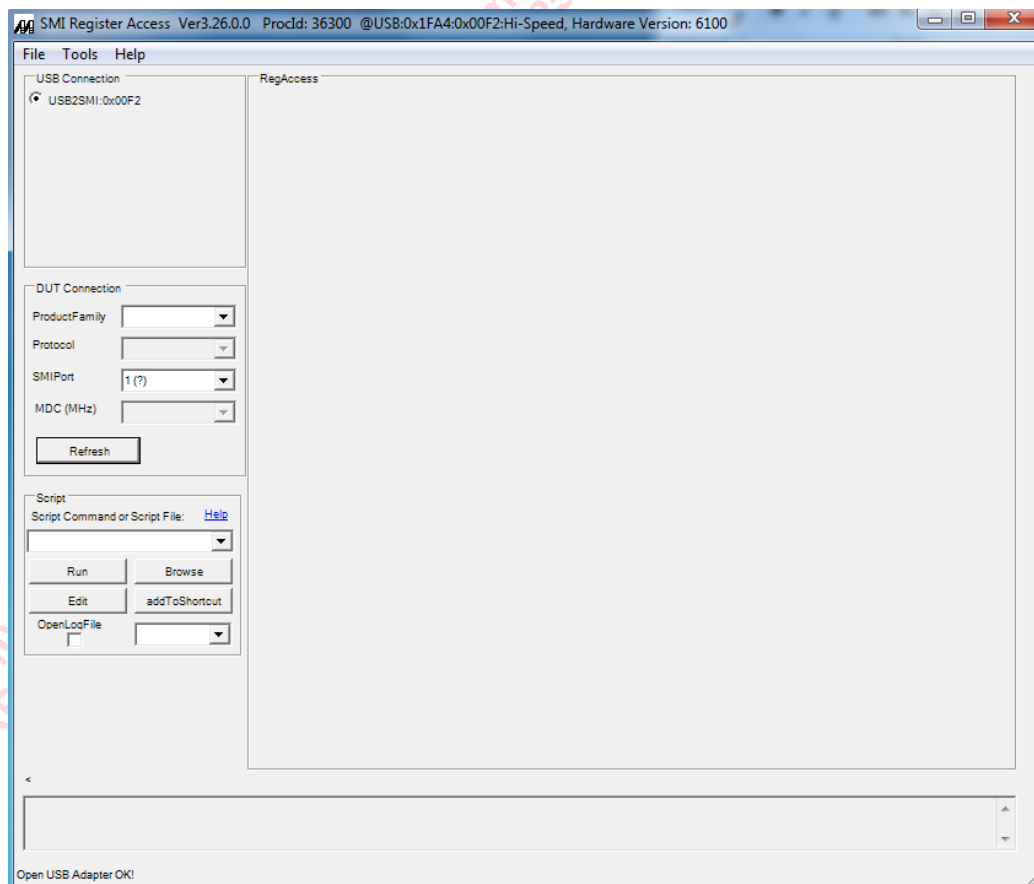


Figure 8: Register Access software GUI before DUT connection

## 4.2 DUT Connection

The MDC/MDIO, XMDIO, and I<sup>2</sup>C interface protocols are currently supported. Check with IEEE 802.3 for more details about these protocols.

There are two Marvell USB SMI Adapter ports—one is through RJ11 connector and the other is through MII connector. The default is the RJ11 port.

The MDC clock can also be adjusted to several frequency options up to 12.5 MHz.

1. Select the target **Product Family** and click **Refresh**.

If you choose a different USB Adapter port or MDC Clock value, click **Refresh** and the software will restart, opening the USB adapter with the selected settings.

Figure 9 shows the Register Access GUI after connection to the DUT is established.

## Marvell SMI Register Access GUI Application Installation and User Guide

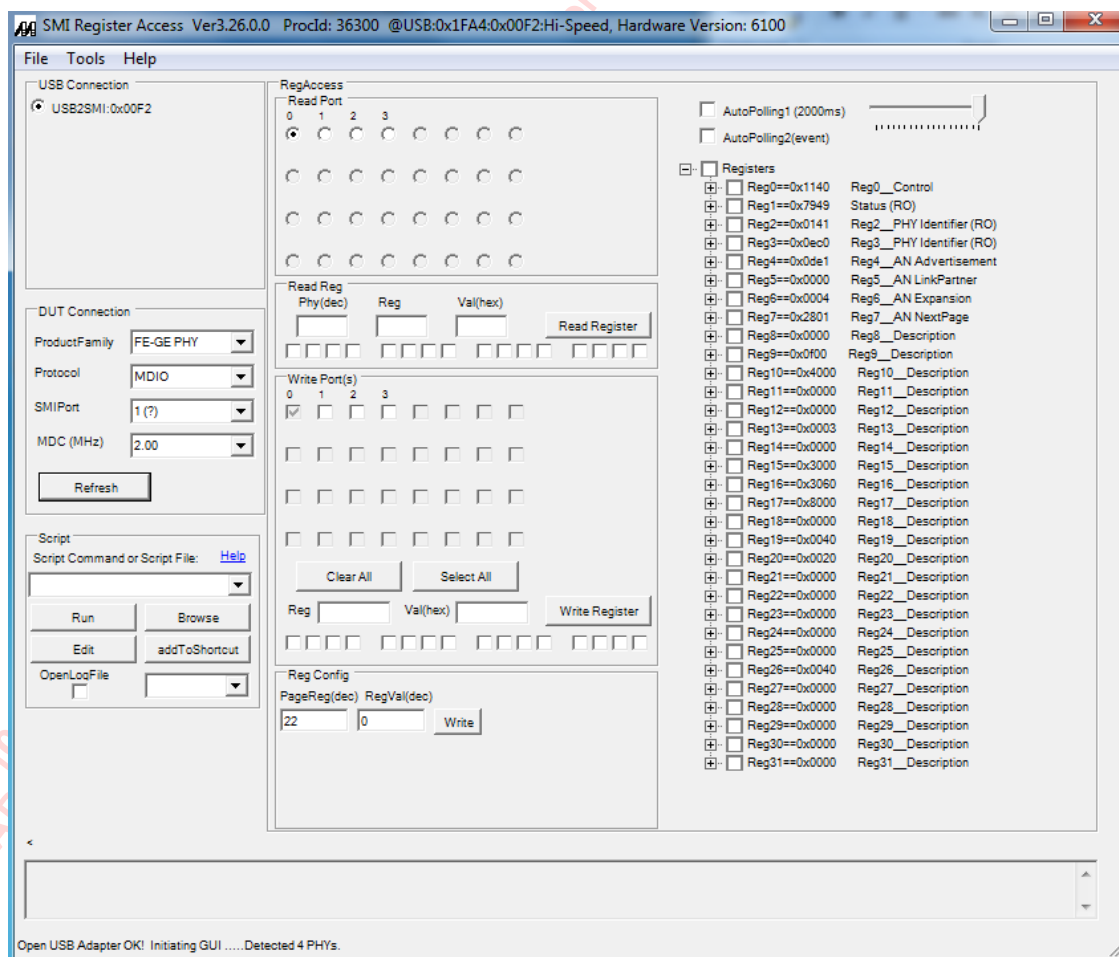


Figure 9: Register Access Software GUI after DUT Connection

## 4.3 MDIO/MDC Interface

### 4.3.1 Auto Detect PHY

The software automatically detects the Marvell PHY. Upon starting the software, choose the Protocol of MDIO from Connection, and choose the USB Adapter port and MDC Clock, then click **Refresh**. The text will display on the status bar as **Open USB Adapter Succeeded! Initiating GUI ....**

If there is no Marvell PHY detected, it will show as **...No PHY detected!** The Read Port radio buttons and Write Port(s) check boxes are grayed out.

On the other hand, if there are any Marvell PHY detected, the status bar shows the number of PHY that it found. The Read Port radio buttons enable the detected ports. The Write Port(s) check boxes enable the detected ports.

### 4.3.2 Read Port and Write Port(s)

Read Port and Write Port(s) are used to easily access registers from and to the DUT ports.

Read Port is displayed as radio buttons because only one port can be read at a time. So, only one read port is allowed to be selected at a time. The 32 register values of this selected read port are displayed on the Register Tree.

Write Ports allow writing register values to multiple ports. **Clear All** clears all of the selection, and **Select All** selects all the enabled ports for write operation. Note that there is always a selected write port, which is the current read port. Select the register from the Register drop-down box and put its value in the text field in hex format, then click **Write Register** to write the register value to all the selected write ports.

### 4.3.3 Read Reg

Read Reg is used to directly read the register without a need to change the selected port in the Read Port.

### 4.3.4 Reg Config

Reg Config is used to quickly change the Reg 22 paging on a selected port.

### 4.3.5 Register Tree

On the right side of the Register Access Panel there is a 32-register value tree display. Each register tree node can be expanded and collapsed. The register value (hex value) is displayed as part of the register tree node description.

When one register node is expanded, its 16-bit value will be displayed with each bit's description. The check box of the register bit can be checked and unchecked; when checked the bit is TRUE, or else it is FALSE. As the bit is checked or unchecked, the register's value changes accordingly.

To refresh the current register value and all its bit values, place a mark in the check box of the register. The register bit description can be loaded dynamically through the utility on the left end of the GUI, see the following Register Bit Description section.

## 4.3.6 Register Bit Description

For each product, the register bit description can be different, therefore, the software provides a utility to dynamically load the corresponding bit description file for the current DUT. The combo box picks up all the XML files that are located in the folder of the installed executables, (that is, the **C:\Program Files\Marvell\SMIRegAccessGUI** folder). The XML file format should follow exactly the DefaultRegisterTree.xml file, otherwise errors can occur.

**Edit File** opens the notepad of the selected XML file from the combo box which allows the user to view and update the file as needed.

**Load File** loads the selected XML file from the combo box. The register tree repaints itself with the new bit description file.

## 4.3.7 Auto Polling

By default, there is no automatic polling. To see the changes of the whole register tree, the user can collapse the entire tree to the root node and expand it again, the new values will be displayed. To see only certain register values, place a mark in the check box of the Register Nodes.

There are two kinds of Auto Polling available (located on the top right corner of the Register Access Panel). One is continuous Auto Polling for each every two seconds; another is Auto Polling only when an event is triggered (for example, when a user checks or unchecks the Register Bit check box). During Auto Polling, all 32 of the registers are refreshed with the new values.

## 4.3.8 Status Bar

The status bar is located at the bottom of the GUI (see Figure 10). Important information is displayed as text in the status bar. The information includes status, warning, error, register values, etc. It is important to note the details listed in the status bar.

## 4.4 XMDIO Interface

### 4.4.1 Connection Setup

Choose the XMDIO protocol from the Connection section of the application GUI with the corresponding Port and Clock. The Register Access panel will automatically change to the XMDIO register access GUI. For an example of the XMDIO Register Access, see Figure 10.



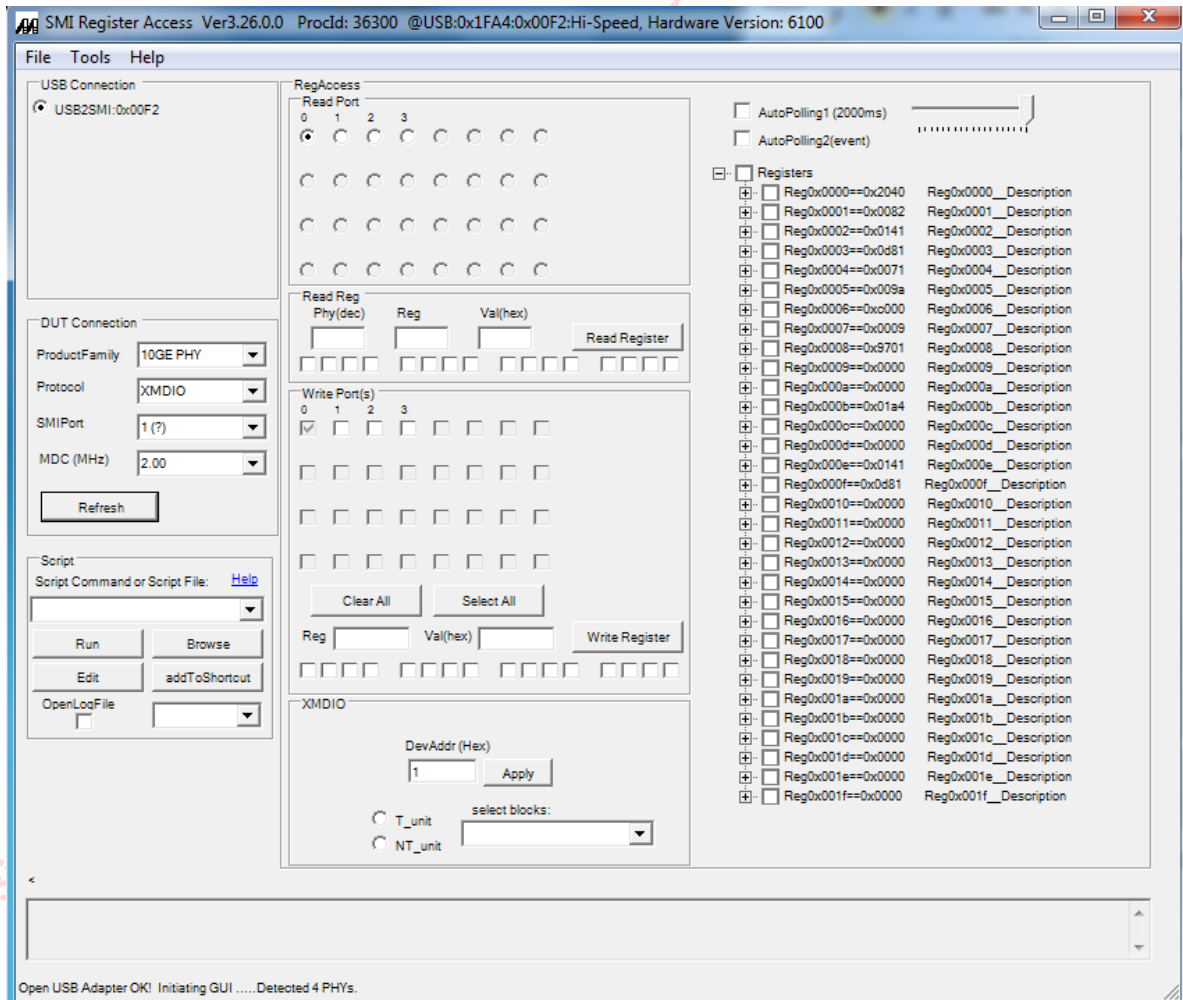


Figure 10: XMDC/XMDIO Register Access

## 4.5 Script Utility

The software also provides flexible script commands and files that allow users to batch mode access the registers.

### 4.5.1 Script Help File

The Help file describes the script utility in detail.

### 4.5.2 Script Command

There are two script commands: read register and write register. The application GUI status bar displays whether the script command succeeded or failed. The value of the read register command appears in the status bar of the application GUI.

- Example of script command for reading register (Clause 22 MDC/MDIO):

```
RR U1 P0 R20
```

RR – Register Read;

U1 – USB SMI Port, U1 is for the RJ11 Port 1, U5 for the MII Port;

P0 – PHY Address 0, the PHY address can be 0~32 any value of the valid DUT;

R20 – Register 20, the Register address can be 0~32 any value of the registers to be accessed.

- Example of script command for writing register (Clause 22 MDC/MDIO):

```
RW U5 P0 R20 xxxx xxxx xxxx x100
```

RW – Register Write;

U1 – USB SMI Port, U1 is for the RJ11 Port 1, U5 for the MII Port;

P0 – PHY Address 0, the PHY address can be 0~32 any value of the valid DUT;

R20 – Register 20, the Register address can be 0~32 any value of the registers to be accessed.

xxxx xxxx xxxx x100 – The register data is a 16-bit string value.

x means the corresponding bit value is not changed;

0 means the corresponding bit value is changed to 0;

1 means the corresponding bit value is changed to 1.

- Example of script command for reading register (Clause 45 XMDC/XMDIO):

```
XRR U2 D3 P0 R1A3
```

```
XRR U[UsbPort] D[DeviceAddr] P[PhyAddr(s)] R[RegAddr(s)]
```

[UsbPort#] is decimal value, value 1~5

[PhyAddr(s)] is(are) decimal value(s)

[DeviceAddr] is decimal value

[RegAddr(s)] is(are) hex value(s) in range of [0~0xFFFF]

return-Value(s) is(are) hex value(s) in range of [0~0xFFFF] if success; "Error on syntax or execution" if fail

- Example of script command for writing register (Clause 45 XMDC/XMDIO):

```
XRW U2 D3 P0 R1A3 HAA99
```

```
XRW U2 D3 P0,3-5 R1A3 D43673
```

```
XRW U2 P0,5,8 D3 R1A3 B10xx xxxx 0000 1001
```

[UsbPort#] is decimal value, value 1~5

[DeviceAddr] is decimal value

[PhyAddr(s)] is(are) decimal value(s)

[RegAddr(s)] is(are) hex value(s) in range of [0 ~ 0xFFFF]

H[RegValue] is(are) hex format value(s) in range of [0 ~ 0xFFFF]

D[RegValue] is(are) decimal format value(s)

B[RegValue] is(are) binary format value(s), 'x' means the bit will not change

## 4.5.3 Script File

The Script File utility allows batch mode operation on the register accessing. The script files are located in the **C:\Program Files\Marvell\SMIRegAccessGUI\scripts** directory. Click **Browse** to browse the scripts folder. The file name must start with **script\_** and the file type must be a text (.txt) file. The combo box displays all the script files found in that folder.

**Edit** opens the notepad of the selected script file from the combo box. The user can view and edit the script file.

**Run** executes each command of the script file sequentially; the execution result appears in the status bar of the application GUI.

Following is an example script file:

```
/* Read scripts */
RR U5 P0 R20
RR U5 P0 R21

/* Write scripts */
RW U5 P0 R20 xxxx xxxx xxxx x100
RW U5 P0 R21 xxxx 1xxx xxxx xxxx
RW U5 P0 R20 xxxx xxxx xxxx x101
RW U5 P0 R21 xxxx xxx0 xxxx xxxx

/* End of File */
end
```

Note: (1) Comment line should start with “/\*” and end with “\*/”.  
 (2) Space line will not be counted.  
 (3) File must finished with end.

## 4.5.4 AddToShortcuts

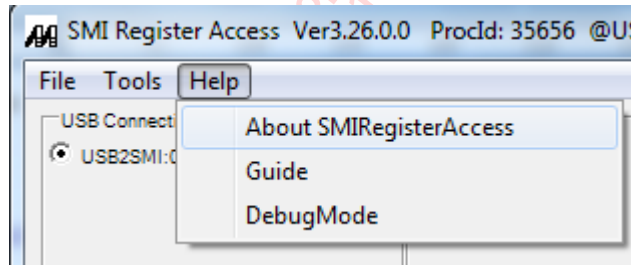
**AddToShortcuts** is used to quickly add the selected script file in the combo box to the shortcuts list. After clicking **AddToShortcuts**, type the shortcut name to be used for the selected script.

To see a list of available shortcuts, right-click the **AddToShortcuts** button.

The shortcuts list is maintained in the **C:\Program Files\Marvell\SMIRegAccessGUI\scripts\ShortcutNameList.txt** file and can be edited manually.

## 4.6 About SMI Register Access

The Help menu has an About submenu that displays the version and copyright of SMI Register Access application (**Help > About SMIRegisterAccess**).



## 5. Frequently Asked Questions

1. Why should the MDC and MDIO signals of the target device be isolated from the CPLD or CPU?

The MDC and MDIO should be isolated from the CPU using a zero-ohm resistor or any other isolation method to avoid any bus contention.

2. Does the USB-2-SMI adapter card need an external power supply?

No. The adapter card is powered through the USB connection.

3. Is it possible to get the design files of USB-2-SMI Adapter, or the CPLD code?

The USB-2-SMI Adapter is Marvell proprietary intellectual property. The CPLD code may not be distributed to customers.

4. Does the MDIO line on the USB-2-SMI adapter have a pull-up resistor already?

No. The pull-up resistor must be included in the MDIO trace on the board before connecting to the USB-2-SMI adapter card.

5. A message appears to locate the usb-2-smi adapter card driver. Where can I locate the driver?

In some cases, the installation cannot locate the driver automatically. The driver is located in the **C:\windows\system32\drivers** directory.

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