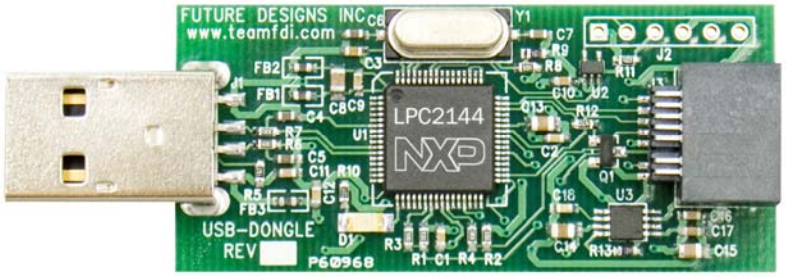
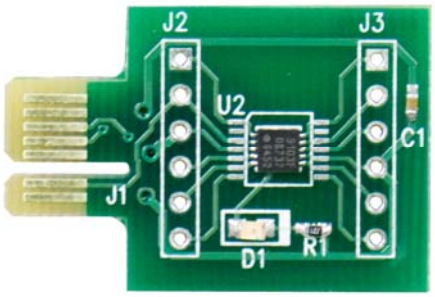
USB-Dongle and Derivative Board

User's Manual





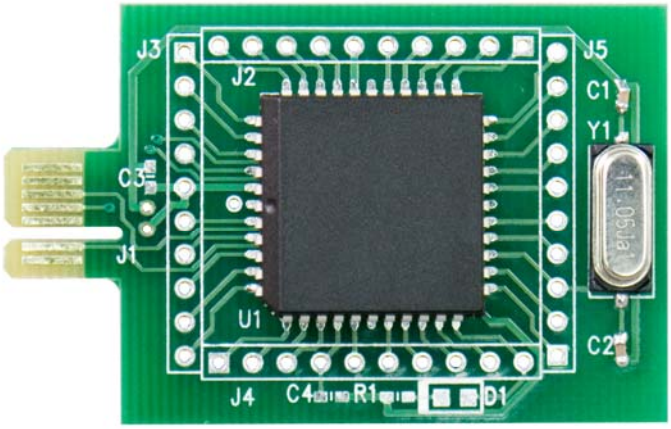


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Table Of Contents

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1.0 Introduction

The USB-Dongle and Derivative Boards allow quick and easy ICP or ISP programming of many popular NXP Semiconductors microcontroller families such as the LPC9xx, ARM7 LPC2xxx and 89V52X2. The unit also provides a low cost platform for testing or prototyping of simple microcontroller based designs. The USB-Dongle provides a Virtual COM Port interface to the PC and allows hex files to be downloaded and programmed using Flash Magic or other common utilities. The USB-Dongle provides all power needed by the various Derivative Boards so no external power supply is required. Low cost Derivative Boards are available for many different microcontrollers from NXP, please consult our website for details.

The USB-Dongle is an interface module providing easy USB control of multiple test boards called Derivative Boards. Features include:

- Virtual COM Port connection to the PC
- ICP/ISP interface to program and control Derivative Boards
- Interface connector (J3) to Derivative Board for ICP/ISP, expansion

2.0 Guide to Kit

2.1 Kit Contents

The following items are included in the USB-Dongle Kit.

- USB-Dongle
- Derivative Boards are sold separately (see **www.teamfdi.com/USBDongle** for a complete list of available boards)
- Download all documentation and software examples at

  www.teamfdi.com/USBDongle

2.2 Power Requirements

The USB-Dongle and Derivative Boards are powered by the USB port from the connected PC. No outside power should be needed.

2.3 Jumpers

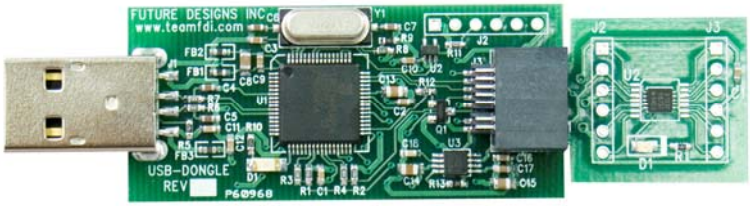
No jumpers for hardware configuration are used.

3.0 Hardware Setup

To setup the hardware, follow these two steps.

1. Plug in the USB-Dongle. If this is the first time you have plugged in the device, you will need to follow the Software Installation procedure in the next section.

2. Plug the selected Derivative Board into J3 as shown below. The connector is keyed so the Derivative Board can only be plugged in correctly.



4.0 Software Installation

4.1 Windows XP

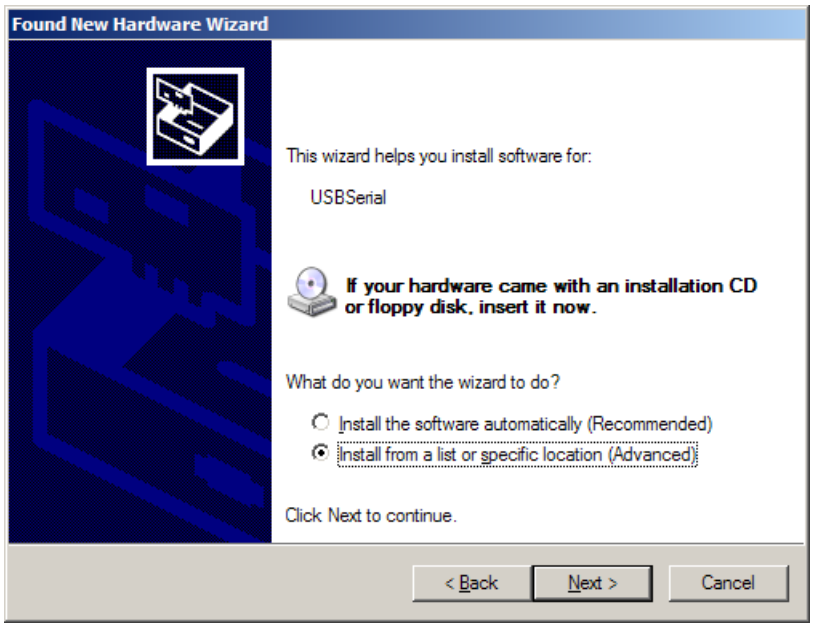
These instructions assume a Windows XP operating system. Different OS's may have different dialogs.

NOTE: Your specific version of Windows MAY already include drivers. If drivers are not found, please download and unzip the latest drivers from:

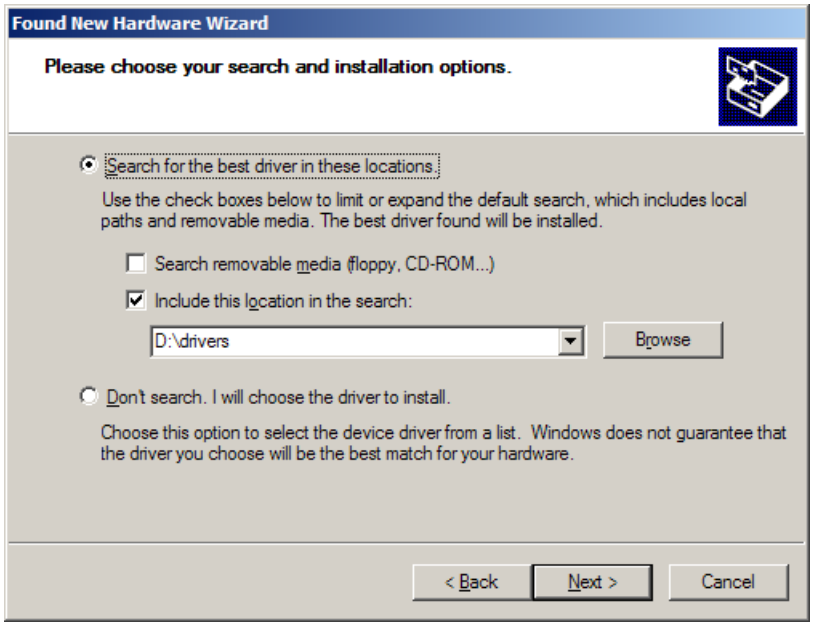
http://www.teamfdi.com/USBDongle/

When the USB-Dongle is plugged into the device, Windows XP will identify a device named "USBSerial" and bring up the following dialog box:

Select "No, not this time" and click **Next**. The following dialog will appear:

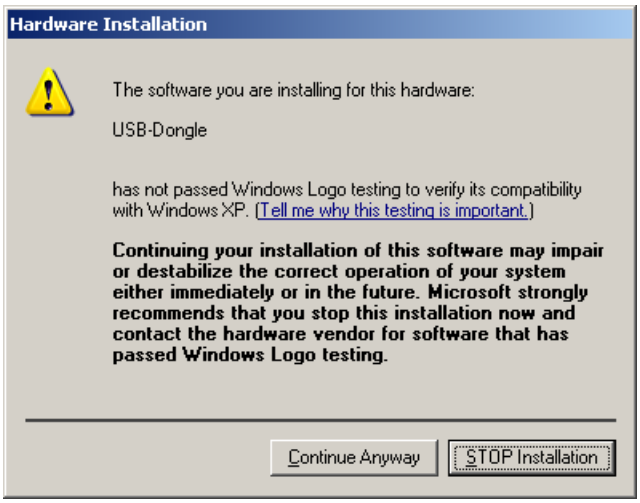


Click on "Install from a list or specific location (Advanced)" and click **Next**. The following dialog will appear:



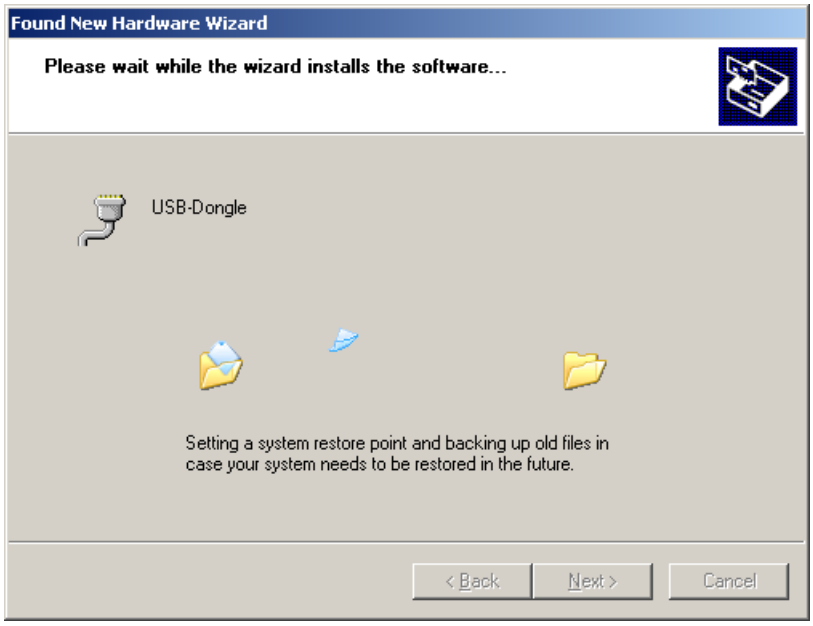
Select "Search for the best driver in these locations." and select only "Include this location in the search:". Click Browse and find the previously downloaded and unzipped directory "USB Serial Driver".

Two dialogs will appear. The one on top is this one:



Click **Continue Anyway**.

The following dialog will appear during the install process:



Finally, the following dialog should appear:

The device has been installed and attached to a serial port. Follow the instructions in section 5.0 to determine the serial port.

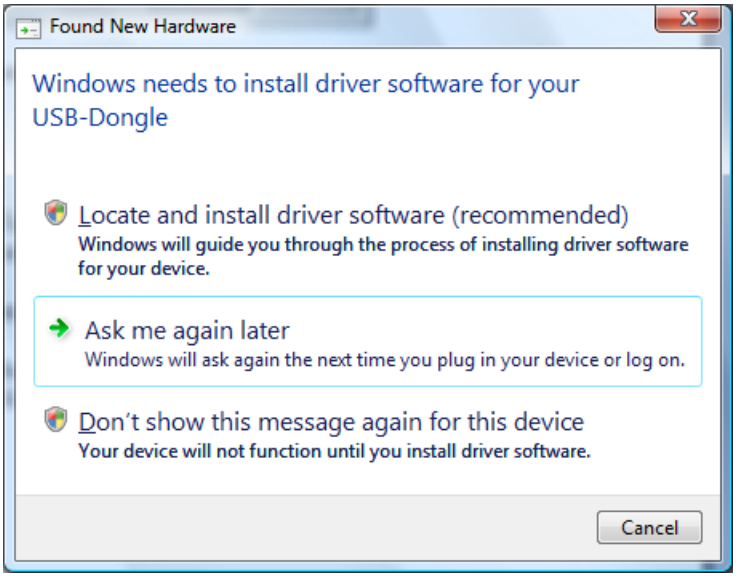
4.2 Windows Vista

These instructions assume a Windows Vista operating system. Different OS's may have different dialogs.

NOTE: Your specific version of Windows MAY already include drivers. If drivers are not found, please download and unzip the latest drivers from:

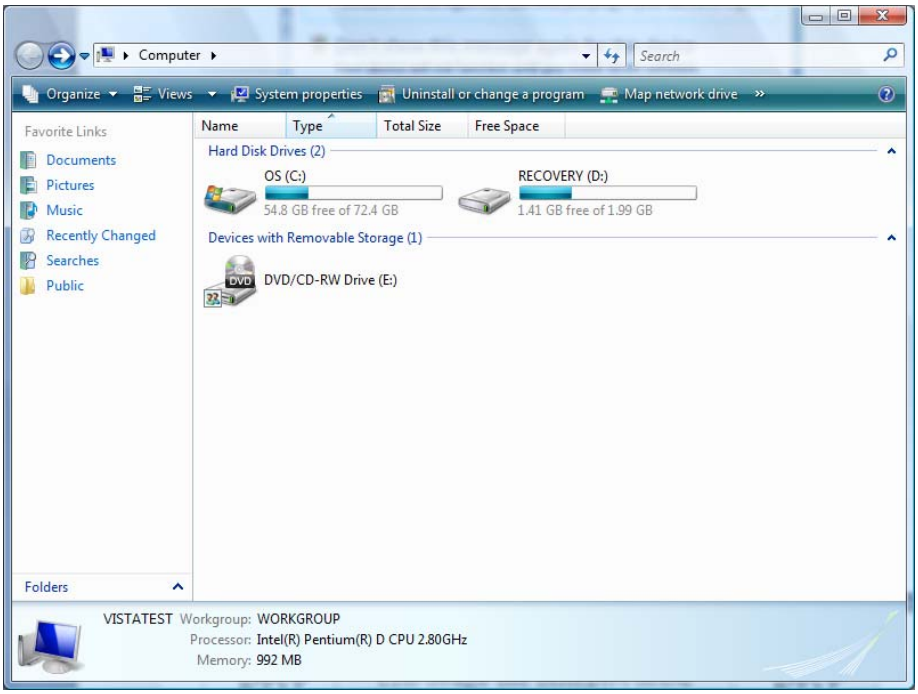
http://www.teamfdi.com/USBDongle/

When the USB-Dongle is plugged into the device, Windows Vista will identify a device named "USB-Dongle" and bring up the following dialog box:

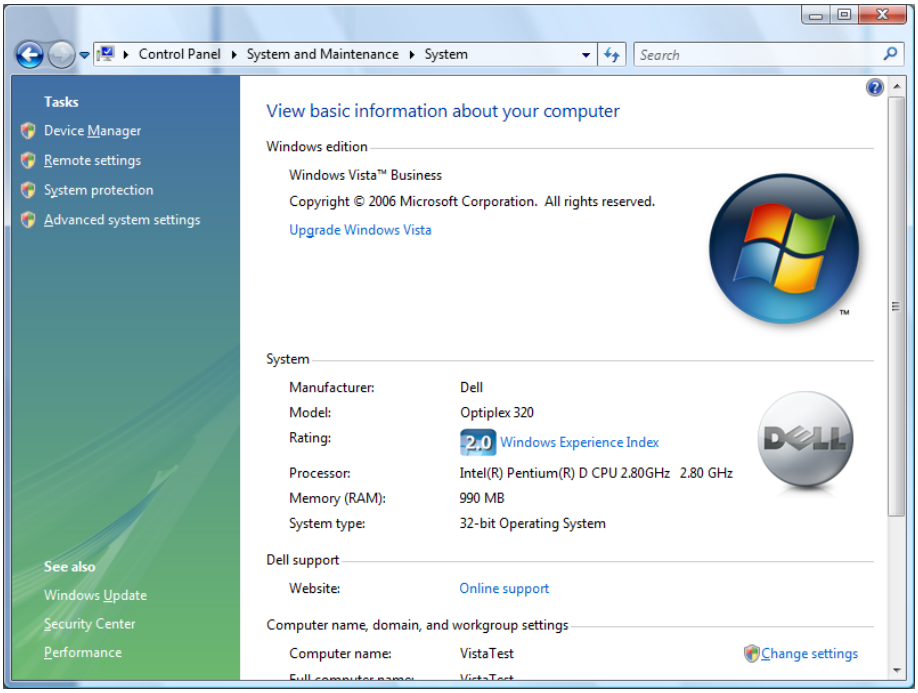


Select "Don't show this message again for this device", and a dialog box asking for user permission may appear, please press C**ontinue**.

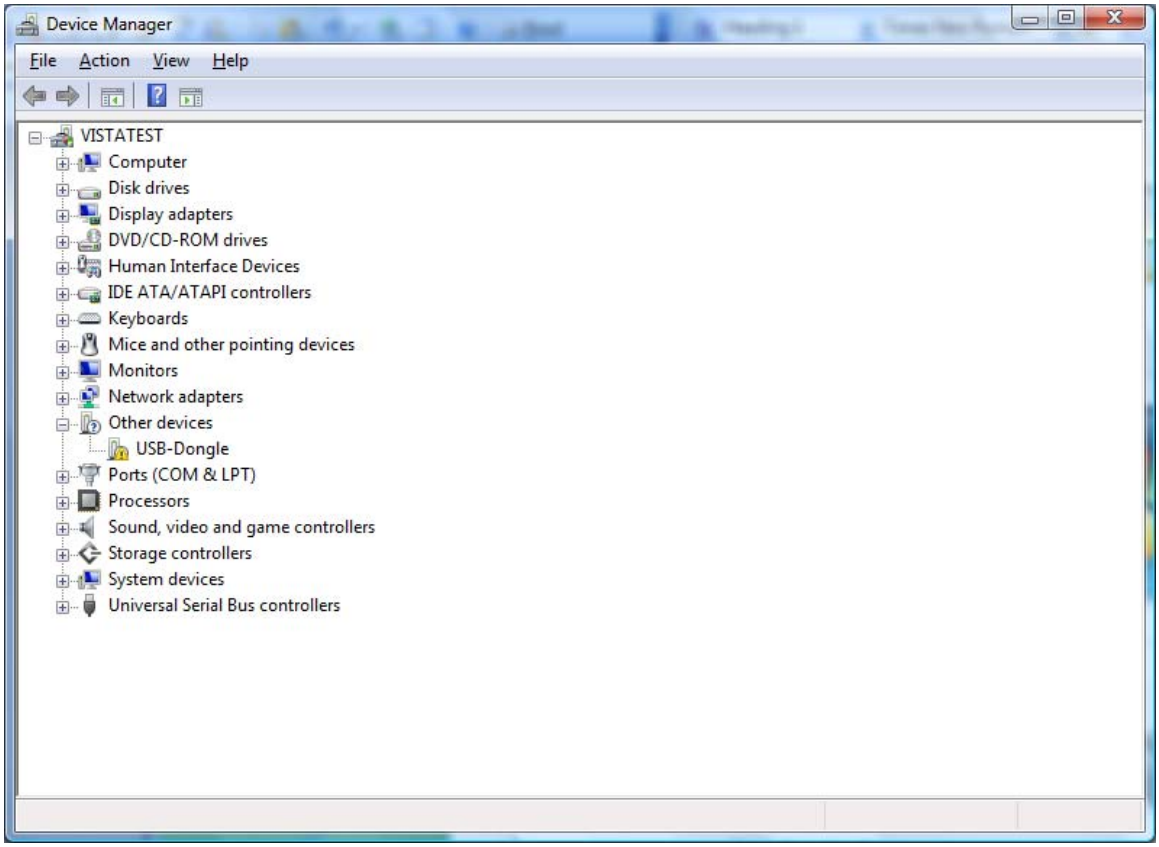
Go to the start menu and select "Computer" located on the right side of the start menu to bring up "My Computer". If you are using the classic start menu, just double-click the "My Computer" on the desktop.



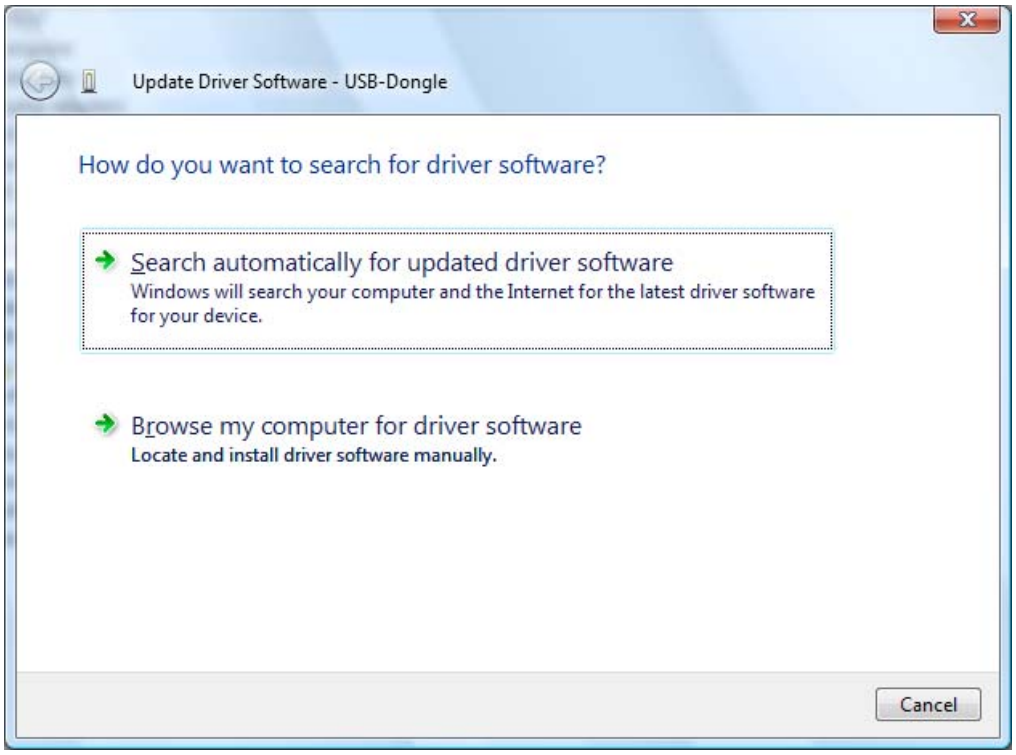
Select System Properties, located near the top of the window to bring up the following window.



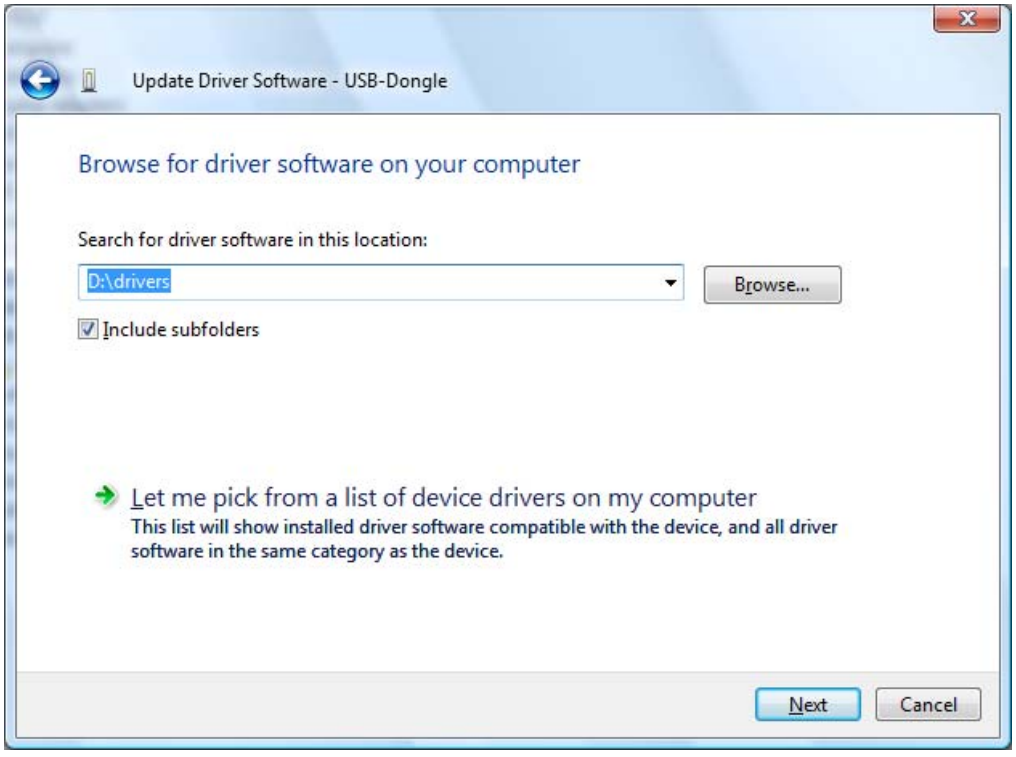
Select "Device Manager" from the left pane under "Tasks" to pull up the device manager. A dialog box asking for user permission may appear, please press **Continue**.



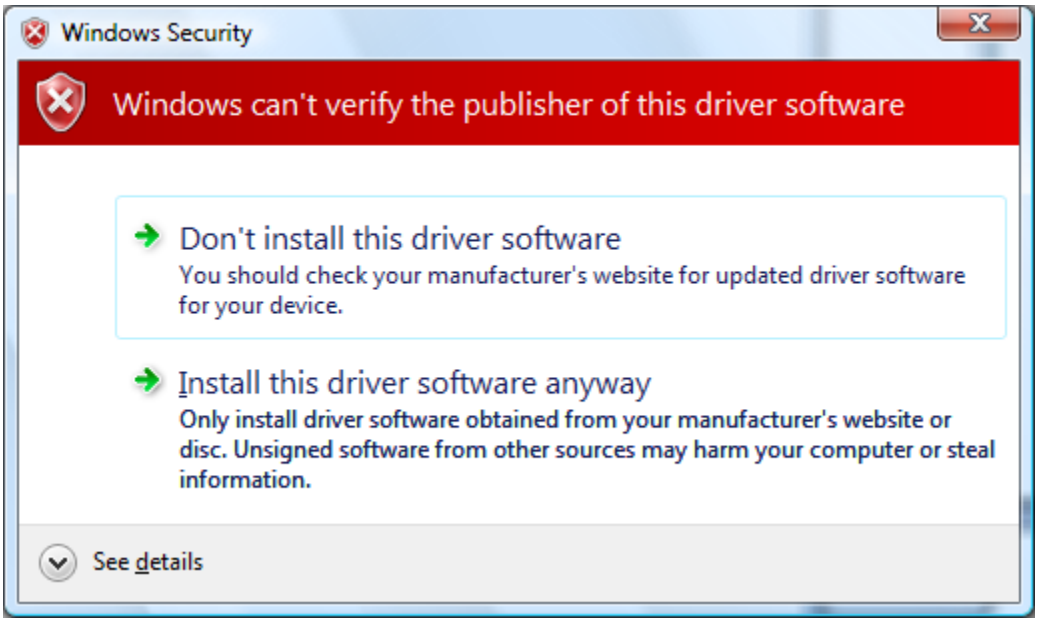
Under "Other devices", right-click on "USB-Dongle" and select **Update Driver Software.**



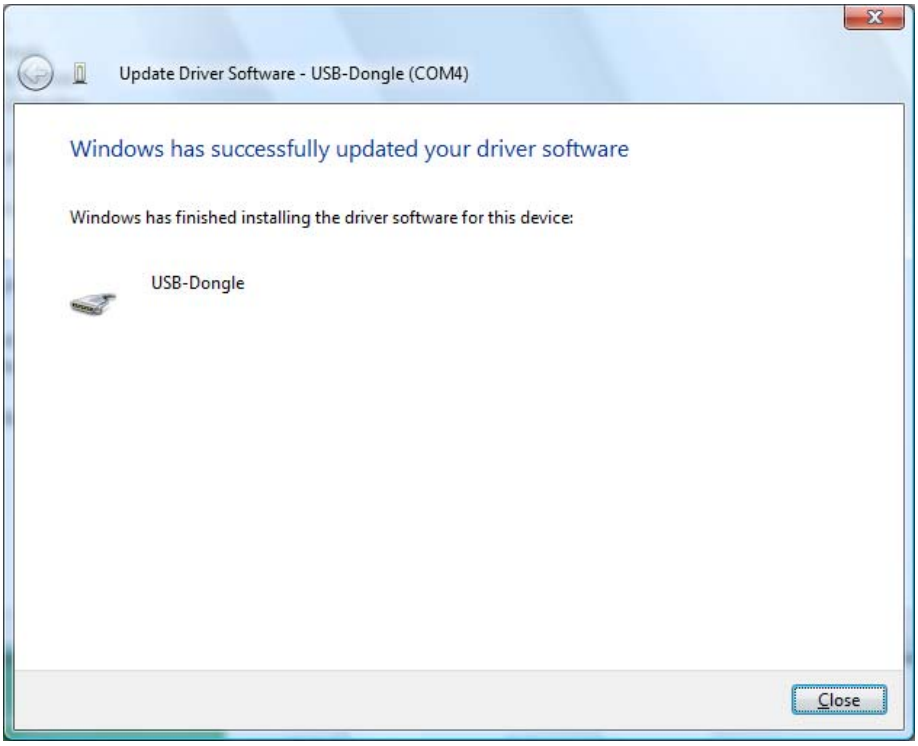
Select "Browse my computer for driver software".



Specify the location in which you downloaded and unzipped the drivers and click **Next**. Installation of the driver will begin and a warning dialog box will appear.



Select "Install this driver software anyway" and the installation will complete.

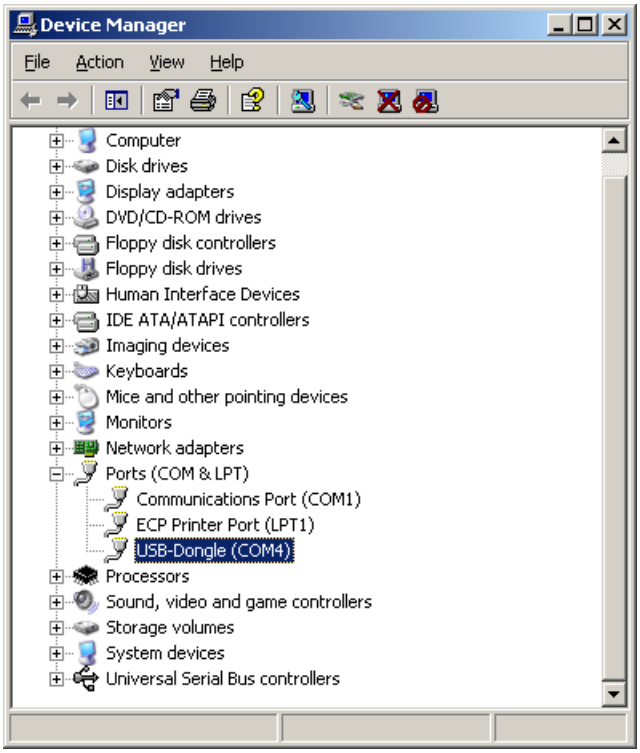


The device has been installed and attached to a serial port. Follow the instructions in section 5.0 to determine the serial port.

5.0 Determining USB-Dongle Serial Port

NOTE: This step is VERY IMPORTANT for proper operation of the USB-Dongle with FlashMagic Software.

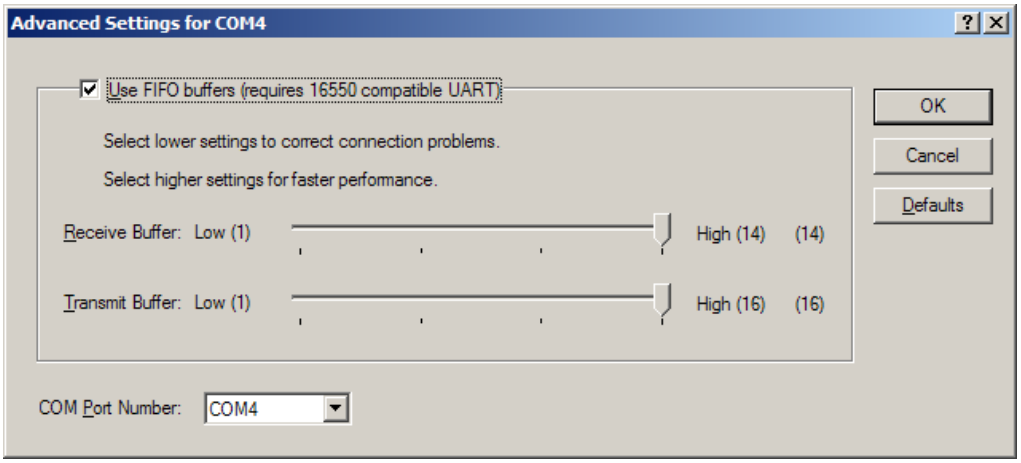
To determine the correct port for the USB-Dongle, go to the Windows Control Panel and open **System**. Click on tab **Hardware** and then click on **Device Manager**. You should see a similar list:



Open up "Ports (COM & LPT)" and look for a device called "USB-Dongle". Next to it is the COM port address. In the above picture, this is COM4.

5.1 Changing the COM port address

If the COM port is at an unacceptable location, right click on the device and select **Properties**. Then click on tab **Port Settings**. Finally click on **Advanced…** and the following dialog will appear:



The last field is "COM Port Number" and can be used to change the COM port to another address. NOTE: Entries marked "in use" may still be usable. Just make sure nothing else is currently listed on that COM port in the Device Manager dialog.

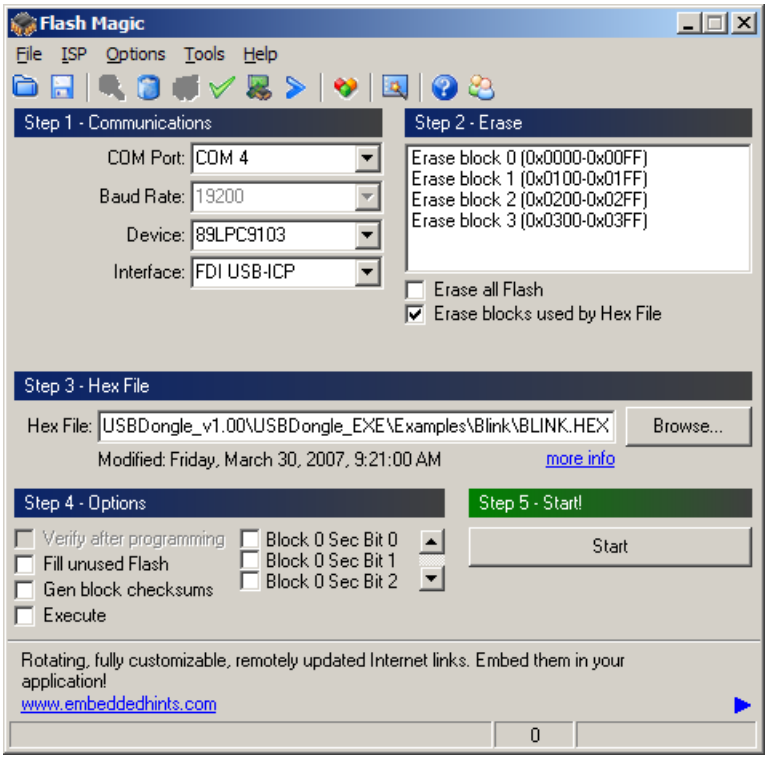
When a new COM Port address is selected, click **OK** and then **OK** again. Then unplug the USB-Dongle and wait until the device disappears from the Device Manager list. Now plug the USB-Dongle back in. The COM address will change to the new address.

6.0 Programming a Derivative Board with Flash Magic

Using Derivative Boards with the USB-Dongle requires the Flash Magic software from Embedded Systems Academy (**www.esacademy.com**). Make sure you are using version 3.51 or later.

If you have not already done so, plug the Derivative Board into the connector (J3) on the back of the USB-DONGLE. In this example, we'll use a DB-HVSON-LPC9103 Derivative Board to load LED blinking code into.

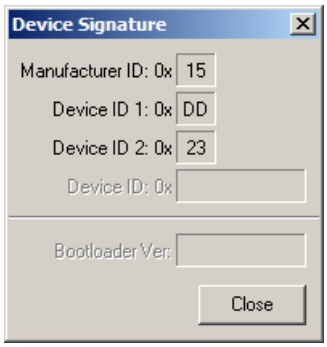
Open Flash Magic and put in the following settings:



The settings should be:

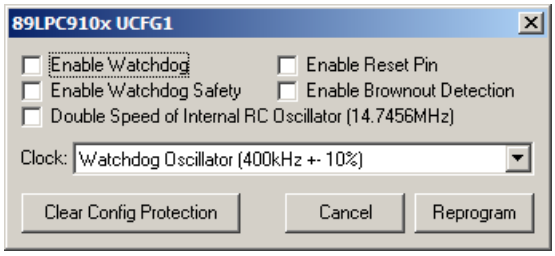
Field	Setting
COM Port	COM port that USB-Dongle is in. For this example, COM4 is used.
Baud Rate	Flash Magic will forces this to be 19200
Device	89LPC9103
Interface	FDI USB-ICP
Erase	Select "Erase blocks used by Hex File"
Checkboxes	Leave all other checkboxes unchecked

Before programming the device, select ISP -> Read Device Signature and make sure the following appears:



If the above is correct, click **Start** to program the device. The text "Finished" should appear at the bottom.

Additionally, for the LED Blink example, use option ISP -> Device Configuration to setup these settings:

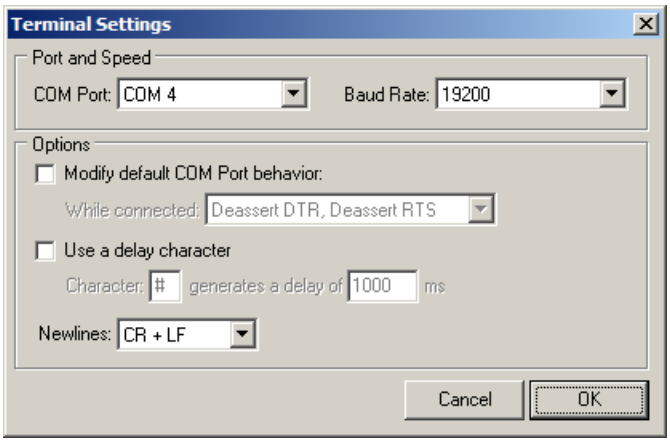


Click **Reprogram** to save the settings.

The device is now ready to run. Continue with the next section.

7.0 Running code on the Derivative Board

After programming, the Derivative Board will still be held in programming mode by the USB-DONGLE. To start executing the code on the Derivative Board, the character '$' must be sent to the COM port. Do this by selecting Tools -> Terminal and the following dialog will appear:



Make sure the COM port is correct and click **OK**. Under "Input >>" type the single character '$'. Looking at the Derivative Board that is attached to the USB-Dongle, the small green LED (D1) should be flashing.

When done, close Flash Magic's terminal window. Using another terminal program, open the same COM port to 110 baud and then close (FlashMagic does not support less than 2400 baud) or unplug the USB-Dongle and plug back in to reset. Reprogramming of the Derivative Board can now occur.

Once out of run mode, select the correct hex file, and click **Start**. The microcontroller on the Derivative Board will be reset and programmed as expected.

8.0 Blink Example

Used in the above example was the BLINK.HEX file. The source code to the Blink example has been included in Examples\Blink. Any appropriate 80C51 compiler should be able to compile and recreate the .hex file.

The Blink example toggles pins on P0.1 and P3.5. Delays are performed with simple loops; therefore, changing the timing of the target device will change the speed of the LED blink rate.

9.0 Communicating between Derivative Board and PC

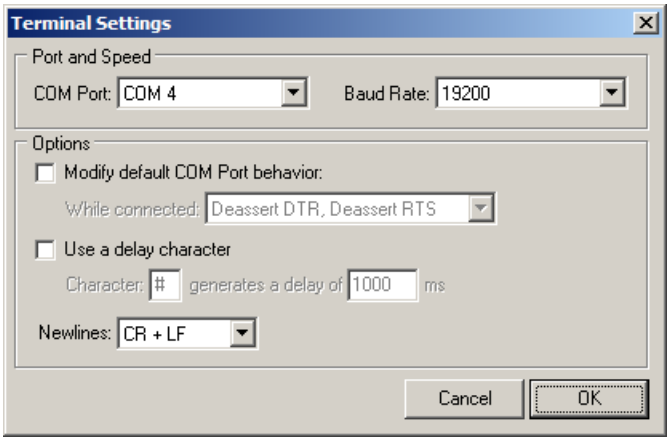
Once the microcontroller on a Derivative Board has been programmed, communications between the PC and the Derivative Board can be established using the same COM port that the USB-Dongle is on.

To change the USB-Dongle from program mode to communications mode, send the single character '$' to the USB-Dongle. The USB-Dongle will then act as a serial pass through between the Derivative Board and PC.

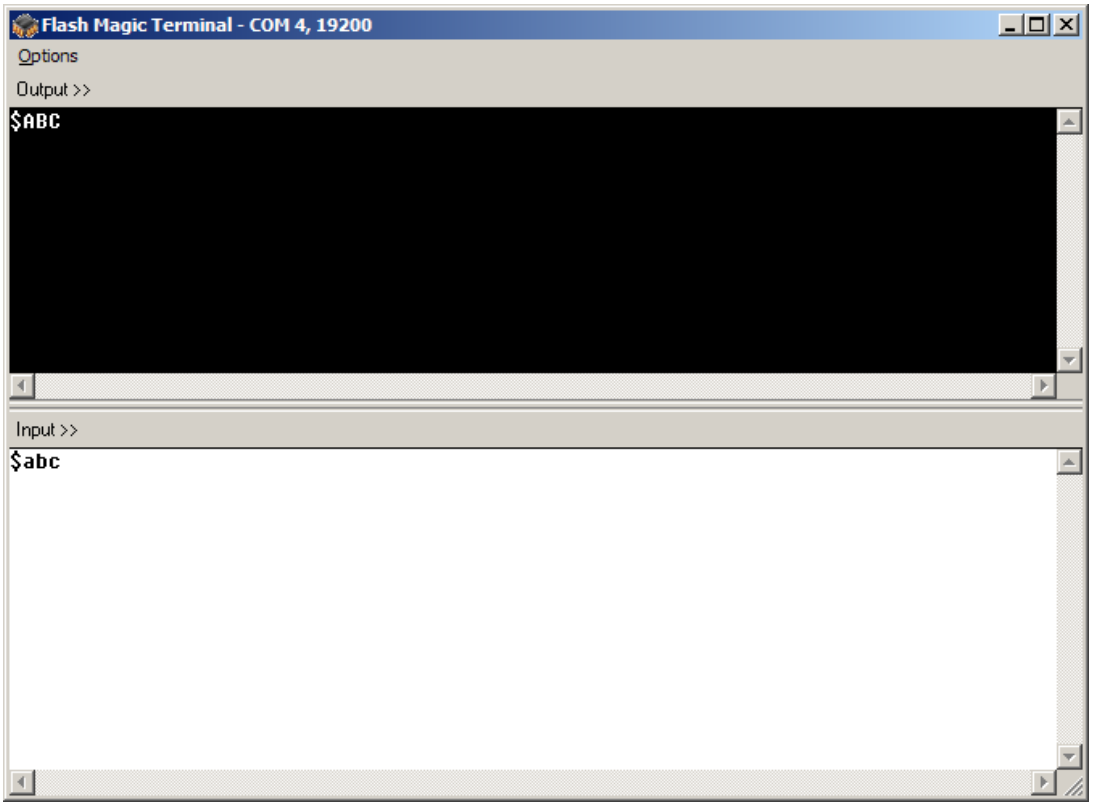
All data to and from the Derivative Board will be passed at the baud rate specified by the PC. Note that Derivative Boards may not be able to run all baud rates and may depend on target processor speed. In addition, because handshake lines are not available, buffer overflow may occur and may require software handshaking.

To take the USB-Dongle out of communications mode, change to 110 baud and then back to 19200 baud.

In the Examples folder (see website for latest), there is an Uppercase example for several of the Derivative Boards. Assuming you are using a DB-TSSOP-LPC938 with a LPC938, program the file UPPERCASE.HEX into the device. Then click on Tools -> Terminal in FlashMagic. Select the same COM port as the USB-Dongle and a baud rate of 19200. Leave all other options unchecked. Click **OK**.



Notice that as you type lower case characters in the input box, uppercase characters appear in the output window. Close the dialog when done.



Using another terminal program, open the COM port to 110 baud and then close (FlashMagic does not support less than 2400 baud) or unplug the USB-Dongle and plug back in to reset. Reprogramming of the Derivative Board can now occur.

10.0 Technical Support

NXP Semiconductors provides technical support for the NXP devices utilized on these boards. Please contact your local NXP sales office or Field Applications Engineer.

Technical support for the USB-Dongle and Derivative Boards is provided by Future Designs, Inc. For fastest response;

- e-mail: **support@teamfdi.com**
- fax: (256) 883-1241
- phone: (256) 883-1240

FDI also provides a Web site at: http://www.teamfdi.com. This web site provides the latest product information and updates for all FDI products.

FlashMagic support is provided at: **http://www.flashmagictool.com/** Check this website for the latest software version and forums for discussing problems.

11.0 General Sales and Contact Information

11.1 General Sales

Authorized sales representatives for the USB-Dongle family of products include:

Digi-Key Corporation	**http://www.digikey.com**	(800) 344-4539
Mouser Electronics	**http://www.mouser.com**	(800) 346-6873

11.2 Contact Information

The following is a list of company contact information related to the USB-Dongle Kit.

NXP Semiconductors web site: **http://www.NXP.com**

Future Designs, Inc web site: **http://www.teamfdi.com**

Embedded Systems Academy web site for FlashMagic:
http://www.flashmagictool.com/

Digi-Key web site: **http://www.digikey.com**
Mouser website: **http://www.mouser.com**