Stellaris® LM3S6965 Evaluation Kit

The Stellaris LM3S6965 Evaluation Kit for Ethernet provides a low-cost way to start designing Ethernet applications with Stellaris microcontrollers. The LM3S6965 Evaluation Board (EVB) can function as either a complete evaluation target, or as a debugger interface to any external Stellaris device. The included USB cable is all that is needed to provide power and communication to the host PC.

LM3S6965 Evaluation Board

Requirements

- You have a PC, with a USB interface, running Microsoft® Windows 2000. XP, or Vista
- You have the Stellaris LM3S6965 Evaluation Kit Documentation and Software CD

Board Set-Up

The LM3S6965 Evaluation Board is configured for immediate use. To power the EVB, use the USB cable supplied in the kit. Connect the mini-b (smaller) end of the USB cable to the connector labeled "USB TO JTAG/SWD" on the EVB. Connect the other end (Type A) to a free USB port on your host PC. The USB is capable of sourcing up to 500 mA for each attached device, which is sufficient for the evaluation board. If connecting the board through a USB hub, it must be a powered hub.

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When you plug in the EVB for the first time, Windows starts the Found New Hardware Wizard and asks if Windows can connect to Windows Update to search for software. Select "No, not this time" and then click Next.
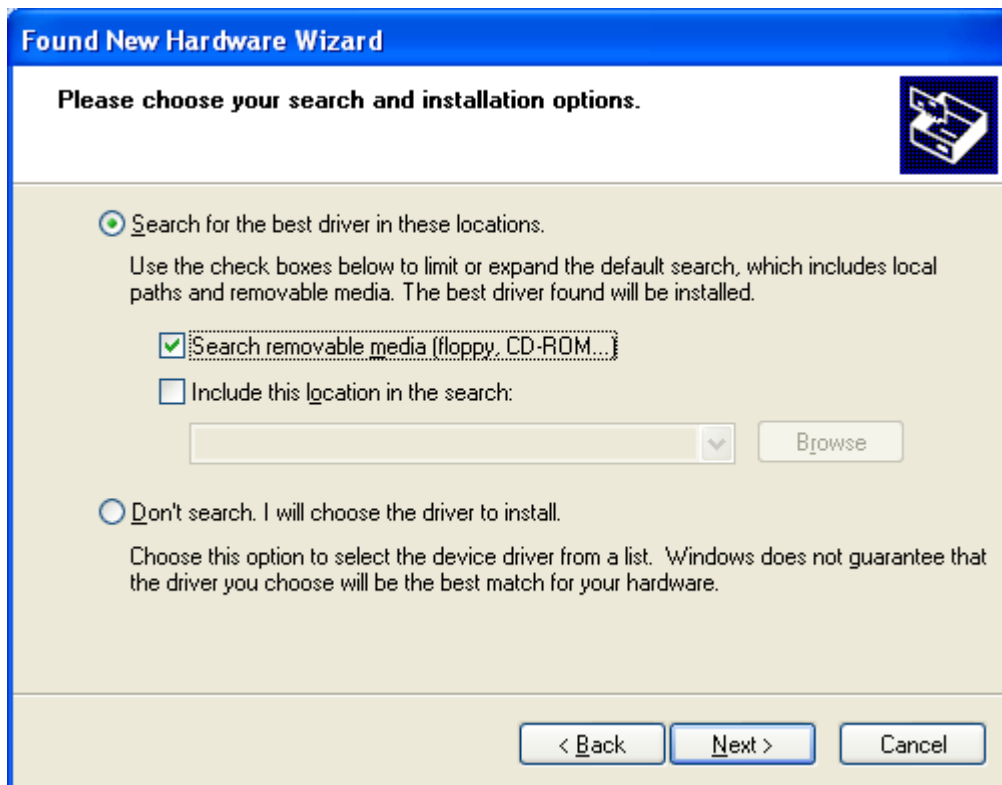
Next, the Found New Hardware Wizard asks from where to install the software. Select "Install from a list or specific location (Advanced)" and click Next.
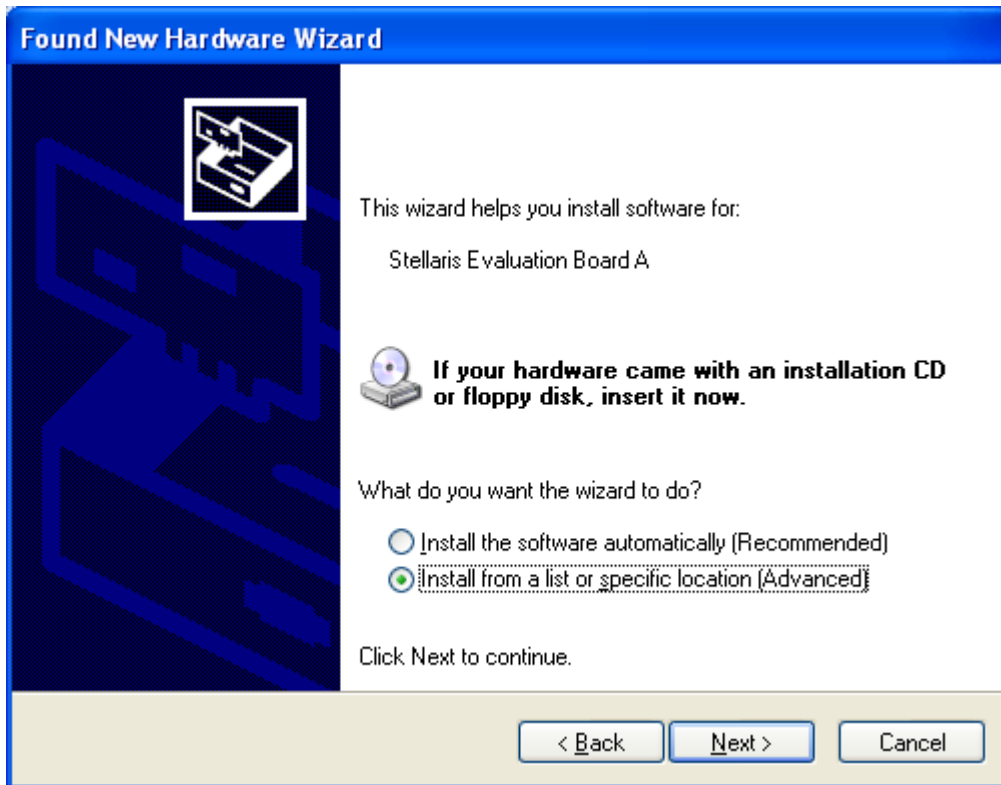
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Make sure the "Documentation and Software" CD that came with the Evaluation Kit is in your CD-ROM drive. Select "Search for the best driver in these locations," and check the "Search removable media (floppy, CD-ROM…)" option. Click Next.
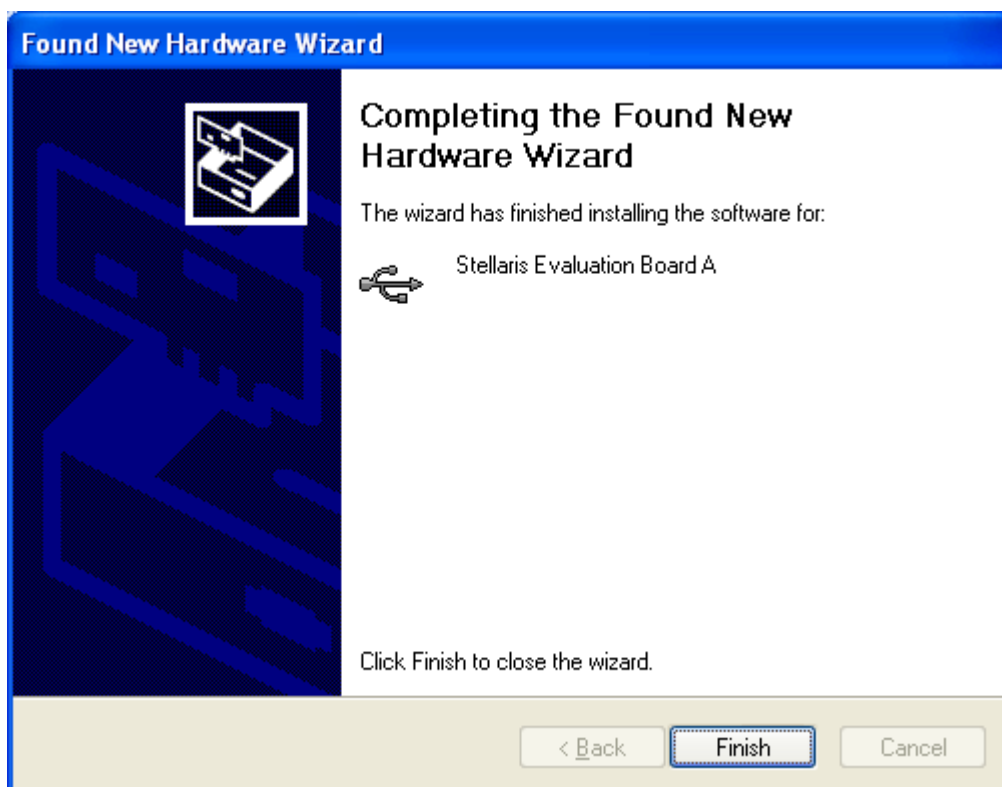
A warning may pop up during the Hardware Installation like the one below; click Continue Anyway.

Windows finishes installing the drivers for "Stellaris Evaluation Board A." When the driver install is finished, the Found New Hardware Wizard window appears like the one below. Click Finish to close the dialog box.

You have just installed the drivers for "Stellaris Evaluation Board A." The USB device built into the EVB is a composite USB device. After you click Finish, Windows automatically installs a driver for the "Stellaris Evaluation Board B" part of the composite USB device. Follow the same instructions as above to install the drivers for this device.

The Found New Hardware Wizard appears one last time. This is to install the drivers for the "Stellaris Virtual COM Port." Again, follow the same instructions to install the drivers for this device.

Now all of the hardware drivers for the LM3S6965 Evaluation Board have been installed. These drivers give the debugger access to the JTAG interface and the host PC access to the Virtual COM Port.

With the drivers installed, Windows automatically detects any new Stellaris boards that you attach, and install the drivers for you.

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Quickstart Application

The LM3S6965 Evaluation Board comes preprogrammed with a quickstart application. Once you have powered the board, this application runs automatically. You have probably already noticed this running as you installed the drivers. A splash screen appears on the OLED display for a few seconds before the application begins.

The quickstart application is a game in which you navigate a character through a maze. Use the directional push buttons to move the character, and the user pushbutton (SELECT) to fire a missile to destroy the monsters. Score accumulates for maze progress and the number of monsters destroyed. The game lasts for only one character "life," the score displays at the end of the game.

Since the OLED display on the evaluation board has burn-in characteristics similar to a CRT, the application also contains a screen saver. The screen saver only becomes active if two minutes have passed without the user pushbutton being pressed while waiting to start the game (that is, the screen saver never appears during game play).

After two minutes of running the screen saver, the display turns off and the user LED blinks. Exit either mode of screen saver by pressing the user pushbutton (SELECT). Press the button again to start the game.

The LM3S6965 microcontroller contains an Ethernet controller, which is also used by the game. During the game, a user can attach the board to a LAN. If there is a DHCP server present on the LAN, the board attempts to obtain an IP address from the DHCP server. After about a minute, if no DHCP server is found, the board defaults to an IP address of 169.254.19.63. The IP address then displays at the bottom of the main game screen. To view the web page you must configure your host machine to be on the same subnet as the board. If connecting to a LAN, your PC's configuration should match the board's, except for the IP address. In most cases, if you connect the board directly to your PC, your machine automatically detects the correct IP address and subnet settings after several seconds.

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In some cases, you need to manually configure your IP address and mask subnet. To do this, disable the machine's wireless network connection and any other internet connections that could interfere with the network being created. Select the Internet Protocol (TCP/IP) connection within the Local Area Connection Properties and click on Properties. Next, manually configure your IP address as 169.254.19.60 and your subnet mask to 255.255.0.0, as shown below.
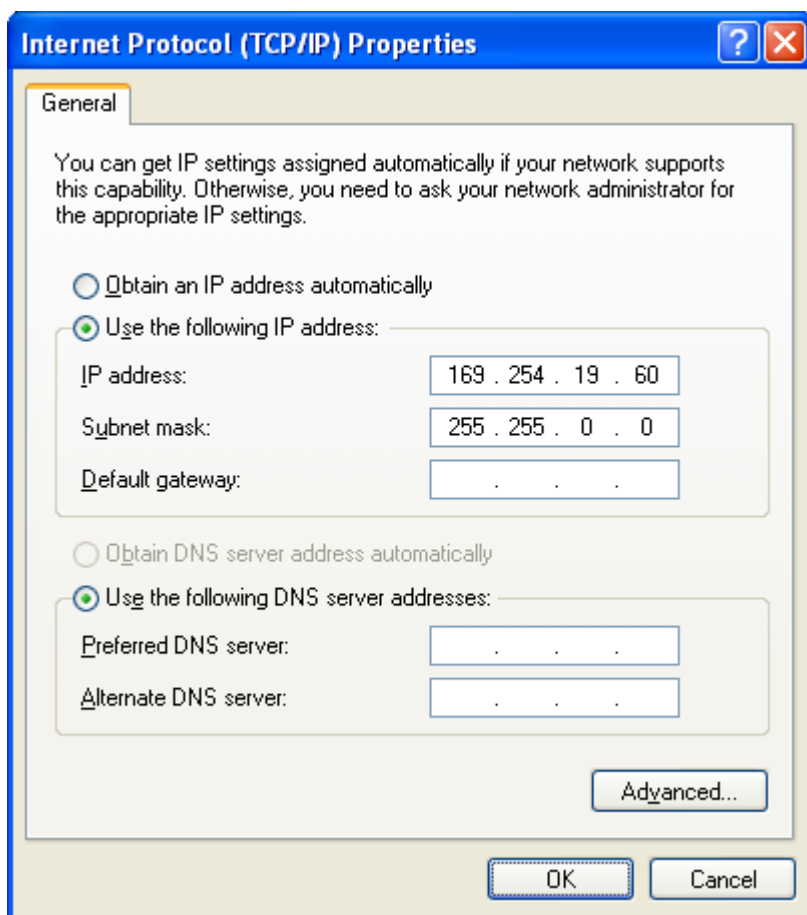
Now you can connect your host machine directly to the LM3S6965 evaluation board with the Ethernet cable provided in the evaluation kit. The integrated PHY on the LM3S6965 has an Auto-MDX feature which allows you to use a straight-though or cross-over Ethernet cable. To access the board's web page, simply type in the address displayed at the bottom of the game screen (for example, http://169.254.19.63) into the address bar of your host's web browser and the web page will be loaded from the LM3S6965 evaluation board.

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While the game is being played, a running tally of the score is output through UART0 of the LM3S6965 microcontroller. UART0 is connected to the FTDI's second serial channel. This serial channel is available to Windows as a Virtual COM port. To view the score, open up a terminal application such as HyperTerminal. Connect using COM#, where # is the number Windows has assigned the Virtual COM port. Set the serial connection to a baud rate of 115200, 8 data bits, no parity, 1 stop bit, and no flow control.

To determine which COM# Windows has assigned to the Virtual COM port on the LM3S6965 microcontroller, follow these steps:
1) From the Start Menu, select Control Panel, then double-click the System icon.
2) Select the Hardware tab.
3) Click on the Device Manager button.
4) Click on the + symbol to expand the Ports (COM & LPT) group.
5) "Stellaris Virtual COM Part (COM#)" is listed as shown in the figure below. This COM# is the device you connect to using your terminal application. In this example, the COM port is COM13.

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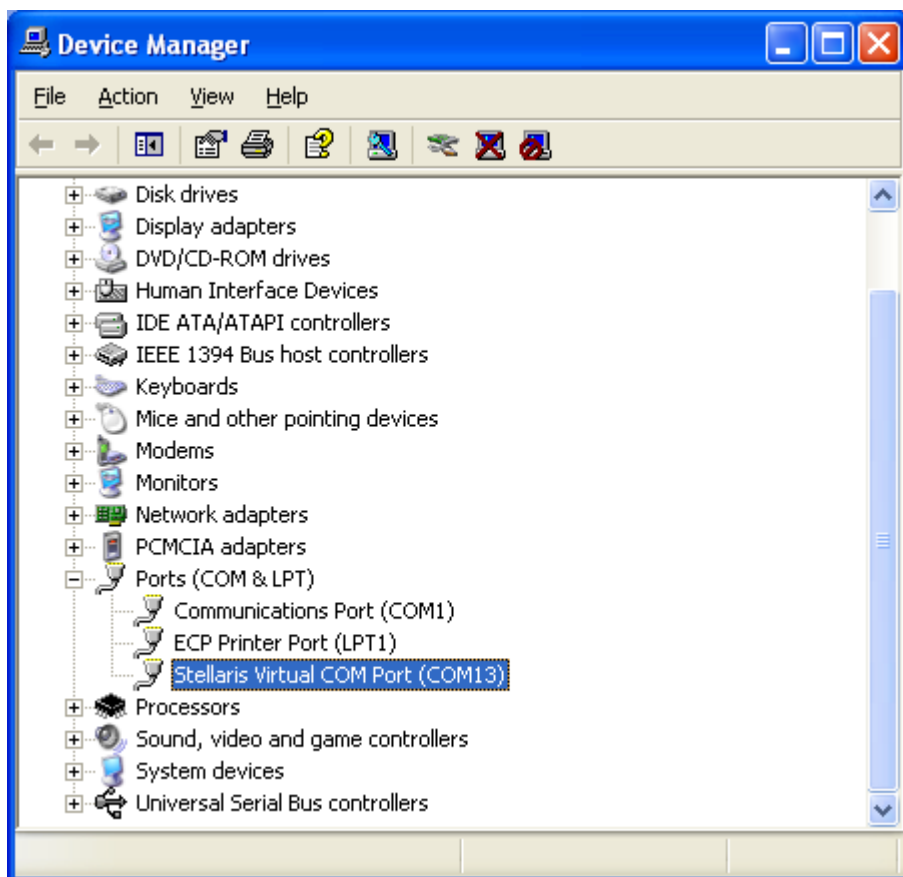
Software Development Tools

The next step is to install and run the software development tools included in the evaluation kit. For more information, see the quickstart guides included on the Stellaris LM3S6965 Evaluation Kit CD. Additional tools may be available through the www.ti.com/stellaris web site.

References

The following references are included on the Stellaris LM3S6965 Evaluation Kit Documentation and Software CD and are also available for download at www.ti.com/stellaris:

- *Stellaris LM3S6965 Evaluation Kit User's Manual*

- *EK-LM3S6965 Firmware Development Package User's Guide*

- EK-LM3S6965 Firmware Development Package

- *StellarisWare® Driver Library User's Manual*

- *Stellaris LM3S6965 Microcontroller Data Sheet*

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