

# Adept™ Software Basic Tutorial

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## Overview

This tutorial provides basic instruction for using the basic features of the Adept application.

This tutorial covers the following steps:

- Configuring an FPGA board directly from the PC or laptop.
- Configuring an FPGA board indirectly from platform flash.
- Running a diagnostic test on an FPGA board to verify its functionality.

## Getting Started

You will first need to install Diligent's Adept software, which is available as a free download from the Software section of [www.digilentinc.com](http://www.digilentinc.com).

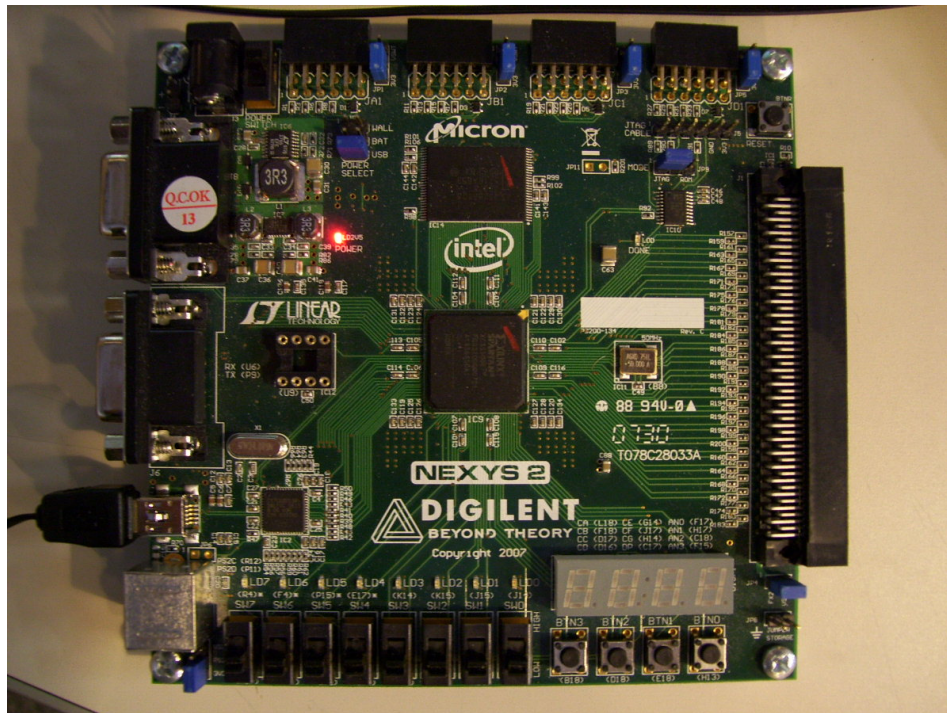
This tutorial uses the Nexys2 500k board, which can be purchased from [www.digilentinc.com](http://www.digilentinc.com).

This tutorial also uses the project example1-VHDL, from the Xilinx ISE tool tutorial. This tutorial is available as a free download from [www.digilentinc.com](http://www.digilentinc.com).

## Board Setup

First, connect the Nexys2 board to your PC or laptop via the retractable USB cable that comes with the board. Make sure that the Power select mode jumper (JP7) is shorted to USB and the Mode select jumper (JP9) is shorted to JTAG.

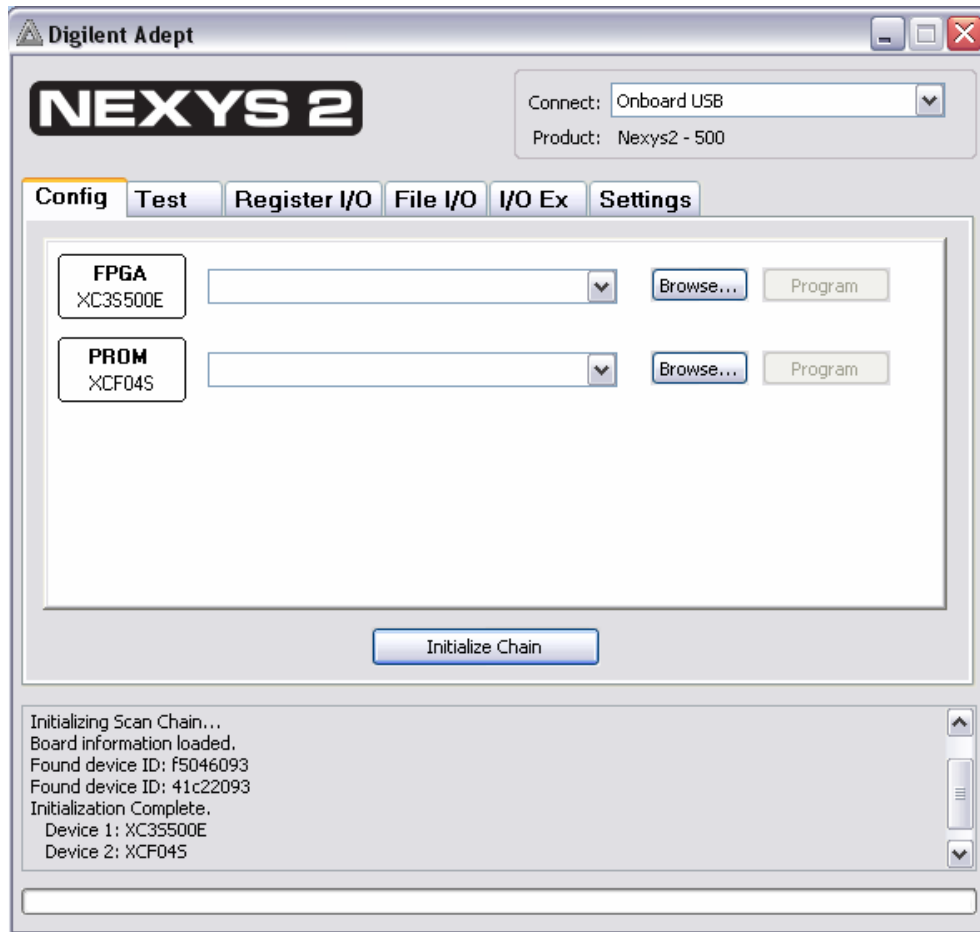
Finally, flip the power switch on the board to the ON position. The complete board setup should look as follows:



If your PC is running Windows XP, you might need to wait for the operating system to recognize the board and install the USB driver for the USB port you're using. During driver installation, you will see a warning that the driver has not been Windows Logo tested. Select the Continue Anyway option to complete the driver installation.

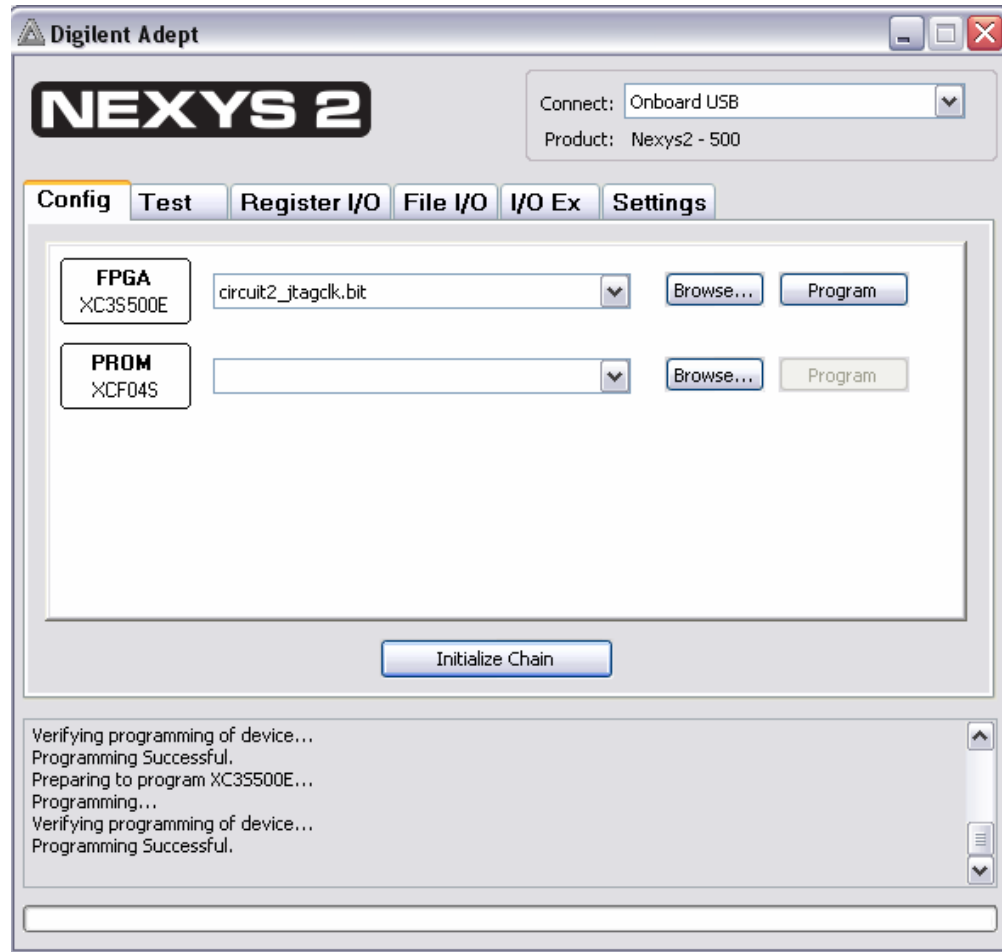
## FPGA Configuration: Direct from PC

To configure the Nexys2 board from your PC, open the Adept application (Start > Programs > Diligent > Adept > Adept). When launched, Adept connects to the first Diligent product it finds (or the last one selected) and attempts to initialize itself for device configuration. Most Diligent products contain device configuration capabilities, so the Config (configuration) tab is usually shown by default. Any configurable devices on the board are listed in the Config tab.



To directly program the FPGA, click the Browse button next to the FPGA device icon. An Open dialog box will appear. Select the appropriate configuration file in the Open dialog box and click the Open button. The selected file will be shown in a drop-down list box next to the device. This drop-down list box also contains a history of opened configuration files for future access.

Click the Program button or right-click on the device icon and select Program Device. Once the FPGA has been programmed you should see a screen similar to the following:



For this example, we are using the same configuration .bit file that we generated in the ISE webPACK tutorials to program the board. If you are doing the same then you should be able to test the configuration by cycling switches 0 and 1 or 2 and 3 to the on position to see LED0 light up.

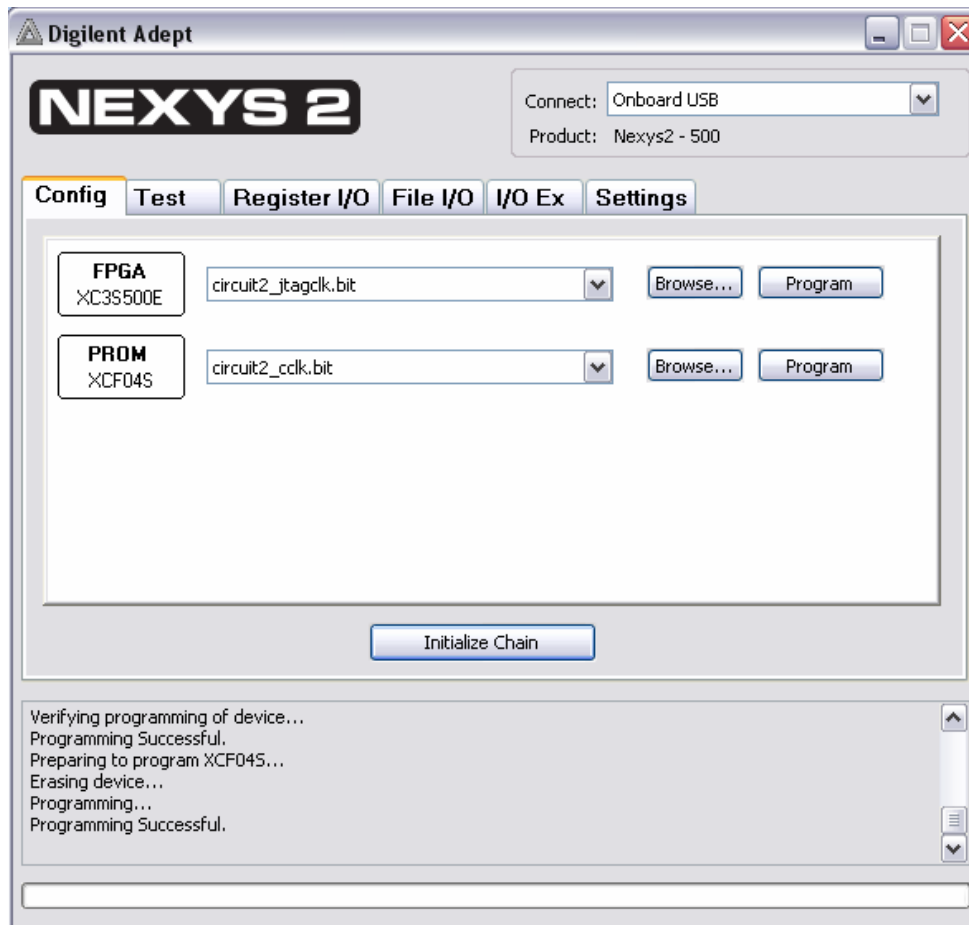
## FPGA Configuration: Indirectly from Platform Flash

It's often useful to automatically load a given configuration into an FPGA at power-up. This is done by loading the configuration into an onboard platform flash (or PROM).

The platform flash can be programmed with a .bit file or .mcs file, generated by iMPACT. To program the platform flash with a .bit file, the startup clock option must be set to CCLK. For more information, see the ISE WebPACK tutorials at [www.digilentinc.com](http://www.digilentinc.com). To generate an .mcs file, see the MCS Creation tutorial.

To program the platform flash, click the Browse button next to the PROM device icon in the window. An Open dialog box appears. Select the appropriate configuration file in the Open dialog box and click the Open button. The selected file is shown in a drop-down list box next to the device. This drop-down list box also contains a history of opened configuration files for future access.

Click the Program button or right-click on the device icon and select Program Device. Once the PROM has successfully been programmed you should a screen similar to the following:



Once the PROM has successfully been programmed, do the following to see the configuration:

1. Turn off the board.
2. Short the configuration mode jumper (JP9) to ROM.
3. Turn on the board.

For this example we are using the same configuration .bit file that we generated in the ISE webPACK tutorials to program the board. If you are doing the same, then you should be able to test the configuration by cycling switches 0 and 1 or 2 and 3 to the on position to see LED0 light up.

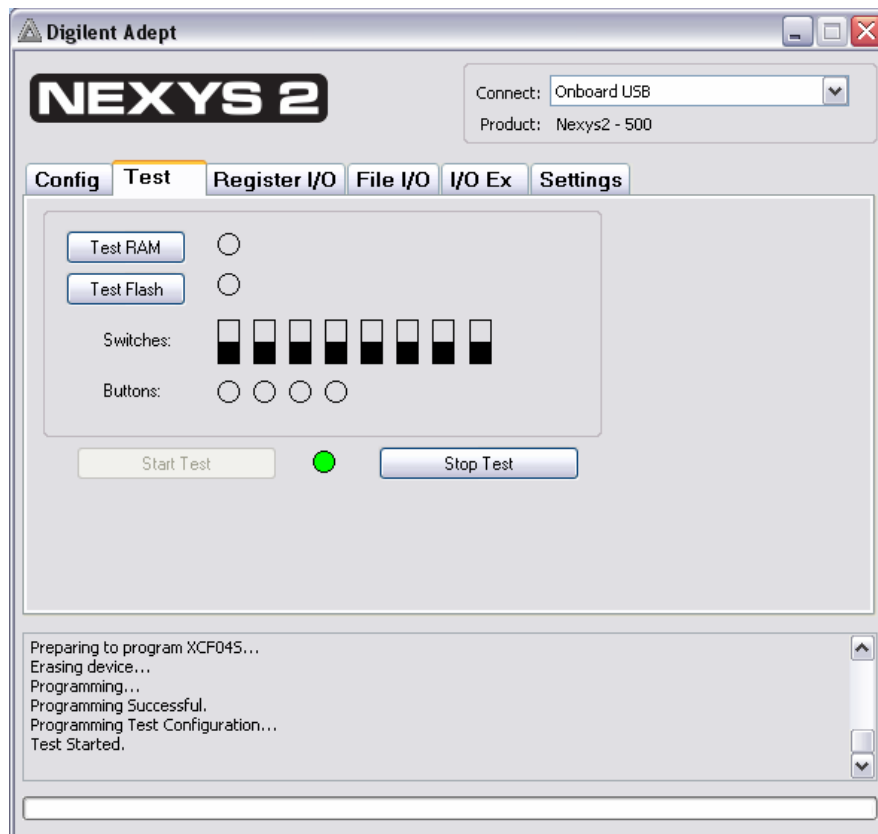
## Running a Board Diagnostic Test

Adept can run simple diagnostic tests on some boards so that you can verify that the board is functioning properly. Before starting, make sure the Mode select jumper (JP9) on the Nexys2 is shorted to JTAG.

To begin a test, click the Start Test button in the Test tab of the Adept application. This automatically loads a diagnostic test configuration to the FPGA.

While the test is active, the board's button and switch status is displayed to help identify any failing I/O component. Automated onboard memory tests are provided for the Nexys2. Click the Test RAM and Test Flash buttons to run a walking '1' test through the respective memory device to verify proper operation.

The test can be stopped any time by pressing the Stop Test button, switching to a different tab, or changing the connected device. The Adept application looks like this while the test is running:



## Adept Advanced Features

The Adept application has several extra, more advanced features that can be utilized for various applications. For more information, see the *Adept Software Advanced Tutorial*.