

LabVIEW FPGA Module Course

Overview

The LabVIEW FPGA Module course prepares you to design, debug and implement efficient, optimized applications using the LabVIEW FPGA Module and reconfigurable I/O (RIO) hardware. You learn how to deploy your VIs to a NI RIO target and how to control timing, synchronization, and priority of operations on the target. The course also discusses how to use the LabVIEW Real-Time Module to create multithreaded and deterministic applications in conjunction with the LabVIEW FPGA Module.

Duration – One Day

Audience

- New LabVIEW FPGA Module users and users preparing to develop applications using LabVIEW FPGA and RIO hardware
- Users and technical managers evaluating LabVIEW FPGA in purchasing decisions
- LabVIEW or LabVIEW Real-Time Users who need the performance and flexibility of an FPGA hardware target

Prerequisites

- LabVIEW Basics I course or equivalent experience
- Although preferred, the LabVIEW Real-Time Systems Using PXI course is *not* a pre-requisite

NI Products Used During the Course

- LabVIEW Professional Development System Version 7
- LabVIEW Real-Time Module
- LabVIEW FPGA Module
- PXI-7831R Reconfigurable I/O
- PXI Real-Time Controller

REGISTRATION

Register online at ni.com/training or call (800) 433-3488 • Fax: (512) 683-9300
info@ni.com

Outside North America, contact your local NI office. Worldwide Contact Info: ni.com/global

NI can also hold this class onsite at your facility.

Part Number 910661-xx

-01 NI Corporate or Branch, -11 Regional, -21 Onsite

Ordering Information (Self Paced Use Only)

LabVIEW FPGA Module Course Manual Kit....778798-01

The course manual kit is also designed for self-paced use and consists of the course manual and a multimedia CD containing audio and video presentation on how to develop applications using the LabVIEW FPGA Module and reconfigurable I/O (RIO) hardware. System requirements include a PC with multimedia capabilities and LabVIEW, LabVIEW FPGA Module, and PXI-7831R reconfigurable I/O hardware. (Optional) LabVIEW Real-Time Module and a PXI real-time controller.

After attending this course you will be able to:

- Design and implement applications using the LabVIEW FPGA Module
- Control timing, synchronization, and priority of operations on the FPGA target
- Compile your LabVIEW FPGA VI and deploy to NI RIO hardware
- Create deterministic control and simulation solutions on the NI LabVIEW platform

Suggested Next Courses

- LabVIEW Real-Time Systems Using PXI (best taken prior, but not required)
- LabVIEW Advanced: Performance and Communication
- LabVIEW Advanced Application Development

LabVIEW FPGA Module Course Outline

Application development for LabVIEW FPGA Module

This lesson describes some of the issues involved when developing LabVIEW FPGA applications, including the design process, testing the application, and compiling the application. You learn how to think in terms of coding in LabVIEW for a hardware target. Topics include:

- Design process overview
- Interactive and Emulation modes
- Using the Compile Server
- Basics of LabVIEW FPGA Module application design

FPGA Module VI Design Techniques

This lesson describes developing applications to communicate through the reconfigurable I/O (RIO) hardware. The first part of the lesson illustrates how to configure I/O nodes for use with RIO devices. The second part of the lesson focuses on programming techniques to attain the maximum results with the FPGA application while illustrating some simple examples. Topics include:

- Communicating to the RIO hardware input and output
- Timing and shared resource considerations for deterministic loop rate development
- Good programming techniques to optimize for speed
- Creating custom counters
- Utilizing onboard memory
- Handling integer overflow

Synchronizing the FPGA application with the Host

This lesson illustrates methods of controlling and monitoring an FPGA application from a host application. In earlier lessons, you developed your own customized hardware. In this lesson, you create the driver-level software needed to interact with your customized RIO hardware. Several techniques for synchronizing with the host application including handshaking strategies will be reviewed. Topics include:

- Controlling and interacting with an FPGA application
- Techniques for synchronization with the host
- Interrupt driven versus polling strategies

Using the LabVIEW Real-Time Module with the LabVIEW FPGA Module

This lesson describes the use of the LabVIEW Real-Time Module to create multithreaded and deterministic applications in conjunction with the LabVIEW FPGA Module. Use of LabVIEW FPGA provides a real-time, deterministic host for your LabVIEW FPGA VI, but it is not required. (You can use LabVIEW for Windows if you choose.) Topics include:

- Prioritizing loops for maximum efficiency
- Considerations for multithreaded applications