LabVIEW Real-Time 1 Course

Overview
The LabVIEW Real-Time 1 course delivers hands-on training for prototyping deterministic measurement and control systems. At the end of the course, you will be able to design, develop, and prototype a real-time application that handles communication between the RT target and a host computer using NI recommended methods and LabVIEW Real-Time.

Duration
Classroom: Two (2) Days
Online: Three (3) Days

Audience
- LabVIEW Real-Time Module users preparing to develop applications using real-time targets
- Users developing deterministic closed-loop control systems or increasing reliability of measurement systems
- Users developing applications for deployment in industrial environments or remote locations
- Users and technical managers evaluating LabVIEW Real-Time or NI Developer Suite in purchasing decisions

Prerequisites
- LabVIEW Core 1, or equivalent experience

Suggested Next Courses
- LabVIEW Real-Time 2
- LabVIEW FPGA
- LabVIEW Core 2
- LabVIEW Core 3
- Data Acquisition and Signal Conditioning

NI Products Used During the Course
- LabVIEW Professional Development System
- LabVIEW Real-Time Module
- CompactRIO Integrated Controller
- CompactRIO Thermocouple Input Module
- CompactRIO Sourcing Digital Output Module

Registration
Register online at ni.com/training or call (800) 433-3488 Fax: (512) 683-9300 email info@ni.com
Outside North America, contact your local NI Office.
Worldwide Contact Info: ni.com/global

Part Number
910808-xx
-01 NI Corporate or Branch
-11 Regional
-21 Onsite (at your facility)
-69 Online

After attending this course, you will be able to:
- Determine if a real-time solution is appropriate for a given problem
- Choose and configure the RT target hardware for a given real-time application
- Implement a deterministic application
- Understand how to reduce the jitter in a real-time application
- Communicate between a host computer and RT target using network communication

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LabVIEW Real-Time 1 Course Outline

Introduction to Real-Time
This lesson introduces the concepts of real-time development. You learn how to determine whether an application requires a real-time operating system or a general operating system. You also learn about the hardware architecture of a LabVIEW Real-Time system. Topics include:
- Real-time concepts including determinism and jitter
- Real-time operating systems
- Real-time hosts and targets
- RT input and output hardware

Configuring Your Hardware
This lesson describes how to setup real-time hardware and software. You receive hands-on experience in configuring a CompactRIO Real-Time system. Topics include:
- Overview of hardware setup and installation
- Configuring network settings of RT target and host computer
- Configuring Real-Time (RT) targets in Measurement and Automation Explorer

Accessing Your I/O in LabVIEW
This lesson describes how to access the inputs and outputs of your RT target in your application. Topics include:
- Configuring Real-Time targets through the LabVIEW Project
- Accessing I/O using driver APIs or Scan Engine

Real-Time Architecture
This lesson describes how to design a real-time application. You learn about the general architecture of a real-time application, multithreading, priorities, and how to improve the determinism of an application. Topics include:
- Host and target application architecture
- Multithreading
- Understanding and using priority levels
- Using sleep to ensure processor time
- Timing loops in LabVIEW Real-Time

Inter-Process Communication
This lesson describes how to share data between multiple processes on your RT target. Topics include:
- Sharing data locally on RT target
- Sharing data between deterministic and non-deterministic processes
- Sharing data between non-deterministic processes

Communicating Between RT Target and Host
During this lesson, you implement the network communication portion of a real-time application. You learn about communicating with an application on a real-time target from the host computer. You also learn about various communication techniques such as front panel communication, network-published shared variables, network streams, TCP, and UDP. Topics include:
- Communicating with applications on an RT target
- Implementing network communication

Verifying Your Application
This lesson introduces methods for verifying the application behavior, performance, and memory usage of your application. You apply these methods to a real-time application. Topics include:
- Standard debugging techniques
- Verifying performance memory usage

Introduction to Deployment
This lesson introduces how to deploy a real-time application. Topics include:
- Introduction to deployment
- Creating a build specification
- Communicating with deployed applications
- Additional resources for further learning