

R Series Intelligent DAQ – Data Acquisition and Control with Onboard Processing

NI 781xR, NI 783xR, NI PXI-784xR, NI PXI-785xR **NEW!**

- Onboard FPGA chip, programmable with the LabVIEW FPGA Module
- User-defined triggering, timing, and decision making in hardware with 25 ns resolution
- Up to 8 analog inputs, independent sampling rates up to 750 kHz, 16-bit resolution
- Up to 8 analog outputs, independent update rates up to 1 MHz, 16-bit resolution
- Up to 160 digital lines configurable as inputs, outputs, counters, or custom logic at rates up to 40 MHz
- Direct memory access (DMA) channels for high-speed data streaming
- Implement custom control logic, inline signal processing, and digital communication protocols

Operating Systems

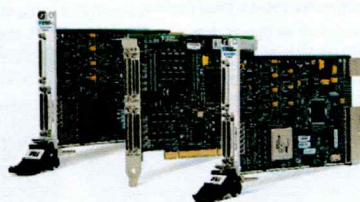
- Windows XP/2000
- LabVIEW Real-Time

Recommended Software

- LabVIEW
- LabVIEW FPGA Module
 - LabVIEW code compiler for FPGAs
 - Emulated debugging mode
- LabVIEW Real-Time Module

Driver Software (included)

- NI-RIO



Calibration Certificate Available

Product	Bus/Form Factor	FPGA	Analog Inputs (16-Bit)	Max Sampling Rate per Channel (kS/s)	Analog Outputs (16-Bit)	Max Update Rate per Channel (MS/s)	Digital I/O
Multifunction R Series							
NI 7851R	PXI	Virtex-5 LX30	8	750	8	1	96
NI 7852R	PXI	Virtex-5 LX50	8	750	8	1	96
NI 7853R	PXI	Virtex-5 LX85	8	750	8	1	96
NI 7854R	PXI	Virtex-5 LX110	8	750	8	1	96
NI 7841R	PXI	Virtex-5 LX30	8	200	8	1	96
NI 7842R	PXI	Virtex-5 LX50	8	200	8	1	96
NI 7830R	PCI, PXI	Virtex-II 1M gates	4	200	4	1	56
NI 7831R	PCI, PXI	Virtex-II 1M gates	8	200	8	1	96
NI 7833R	PCI, PXI	Virtex-II 3M gates	8	200	8	1	96
Digital R Series							
NI 7811R	PCI, PXI	Virtex-II 1M gates	—	—	—	—	160
NI 7813R	PCI, PXI	Virtex-II 3M gates	—	—	—	—	160

Table 1. R Series Selection Guide

Overview

Intelligent DAQ is multifunction data acquisition that features user-defined onboard processing as well as complete flexibility of I/O timing and triggering. You can configure all device functionality by creating NI LabVIEW block diagrams with the LabVIEW FPGA Module. Your block diagram executes in hardware, giving you direct, immediate control of all I/O signals on the PXI or PCI device. With R Series and LabVIEW FPGA, you can configure user-defined hardware for a wide variety of applications requiring precise timing and control such as:

- Data acquisition with flexible triggering and onboard processing
- High-speed analog and discrete control loops
- Pulse-width modulation (PWM) and encoder interfacing
- User-defined digital communication protocols
- Custom counters with up to 64-bit resolution
- Hardware-timed decision making at 40 MHz

Key Features

Through programming in LabVIEW FPGA, you can control each of the I/O signal lines independently or synchronize a line with other channels. You can configure the digital I/O lines as custom counter/timers, PWM channels, or communication buses for user-defined protocols. All multifunction R Series devices have dedicated analog-to-digital converters/digital-to-analog converters on every analog I/O channel. This offers specialized functionality such as multirate sampling and individual channel triggering, which are beyond the capabilities of typical data acquisition hardware. You can sample every analog input channel on an R Series device simultaneously at rates up to 750 kHz, and you can program every analog output on an R Series device to update simultaneously at rates up to 1 MHz. You can also store your compiled LabVIEW FPGA application in the onboard flash memory of any R Series device and configure it for automatic loading and/or execution at power up.

