

Software for Creating Intelligent, Distributed Wireless Sensor Networks with LabVIEW

NI LabVIEW Wireless Sensor Network (WSN) Module Pioneer **NEW!**

- Add intelligence to NI WSN measurement nodes with LabVIEW graphical programming
- Download application updates wirelessly
- Achieve higher sample rates on the node
- Increase battery life by optimizing node behavior
- Perform custom analysis and data reduction on the node
- Embed decision making on the node

Required Software

- LabVIEW development system, current version
- NI-WSN

Compatible with Programmable NI WSN Measurement Nodes



Overview

The NI LabVIEW Wireless Sensor Network (WSN) Module Pioneer extends the LabVIEW development environment so you can create and deploy embedded intelligence to NI WSN measurement nodes. Develop with graphical programming and download applications wirelessly to run embedded on the node. In addition, use LabVIEW WSN Pioneer to perform custom analysis, embed decision making on NI WSN measurement nodes, and extend battery life by optimizing node behavior.

By using NI LabVIEW software to design your WSN system, you benefit from the rapid development of graphical programming for your entire solution. With LabVIEW, you can use the same graphical programming approach to create the node intelligence and develop desktop or embedded real-time applications to perform data logging, processing, and alarming. You also can host Web services that provide access to your application from any Web-enabled device.

Graphical Development

When targeted to the NI WSN measurement node, LabVIEW displays a focused palette containing only the functions that you can implement on the device. Use a combination of these functions to define logic and embed intelligence in your measurement node. The supported programming structures include typical LabVIEW constructs and functions, such as while loops, for loops, case structures, and sequence structures. The measurement node also features support for floating-point math, trigonometric, hyperbolic, and exponential math functions; array and string manipulation; Boolean logic; timing; and nonvolatile user memory. In addition, you can incorporate C code into your application with the inline C node.

Because NI WSN measurement nodes are optimized for low-power and long-term deployment instead of processor speed, they have limited performance compared to other embedded LabVIEW targets. For example, LabVIEW WSN Pioneer implements only serial execution, so parallel structures do not execute concurrently. Each operation must finish before the processor is released. Additionally, LabVIEW WSN Pioneer can send and receive debug messages to and from the measurement node, but it does not support LabVIEW debugging.

Extend Battery Life

With LabVIEW WSN Pioneer, you can significantly increase the battery life of your NI WSN measurement nodes while increasing performance and flexibility. By default, a node transmits every acquired value back to the gateway at the specified sample rate; however, in many applications, it is sufficient to simply monitor a given input for a threshold crossing or average values over a period of time. In these applications, powering the radio to transmit every acquired sample uses excessive power and reduces battery life. With LabVIEW WSN Pioneer, you can add intelligence to the node to transmit data only when required. Additionally, you can monitor battery voltage and network status as well as modify the sample and heartbeat rates of the node to optimize behavior for specific operating conditions.

Perform Custom Analysis

Using a subset of LabVIEW analysis functions and floating-point math operations, you can preprocess data acquired by NI WSN measurement nodes. Interfacing with sensors is one common use of analysis on the node. A variety of analog and digital sensors can interface directly with NI WSN measurement nodes, and you can use LabVIEW WSN Pioneer to scale and convert raw sensor data into meaningful engineering units before transmitting.

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Embed Decision Making

With LabVIEW WSN Pioneer, you can embed decision making on NI WSN measurement nodes, so decisions can be made autonomously without transmitting the stimulus and response to and from a host computer or embedded controller. You can use the digital output lines on an NI WSN measurement node to actuate relays and perform simple on/off control. For example, you can embed on the node the decision to turn on a fan when a temperature threshold is exceeded, which reduces response time and increases reliability by removing the need for host interaction.

Ordering Information

NI LabVIEW Wireless Sensor Network (WSN)
Module Pioneer 781180-09

BUY NOW
For complete product specifications, pricing, and accessory information, call 800 813 3693 (U.S.) or go to **ni.com/wsn**.

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