

GETTING STARTED GUIDE

NI Wireless Sensor Network Devices

This guide describes how to install, configure, and verify the National Instruments Wireless Sensor Network (WSN) devices and NI software.

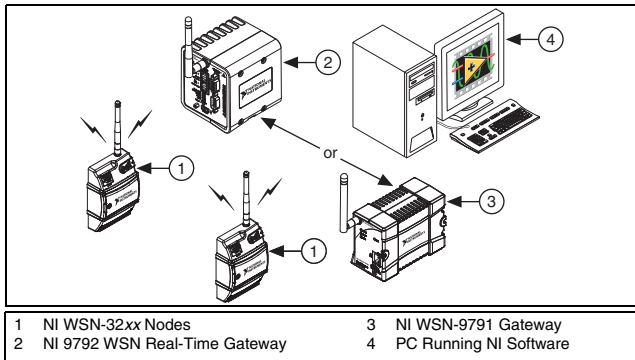


Figure 1. NI WSN System Components

The NI WSN system contains four main components: a PC running Windows and NI software, a NI WSN gateway, NI WSN-32xx node(s), and an Ethernet network as shown in Figure 1.

What You Need To Get Started

- PC running Windows and NI software
- NI-WSN software installation disc, which contains NI Measurement & Automation Explorer (MAX)
- NI LabVIEW
 - the NI WSN-9791 Gateway requires LabVIEW 8.6.1 or later
 - the NI 9792 WSN Real-Time Gateway requires NI LabVIEW 2009 Service Pack 1 (SP1) (32-bit) or later, and NI LabVIEW 2009 SP1 (32-bit) Real-Time Module or later
 - the NI WSN-3226 node requires LabVIEW 2010 or later
- NI WSN gateway and appropriate power supply
- NI WSN-3202/3212 nodes and four AA alkaline batteries or a 9–30 V power supply

- NI WSN-3226 nodes and four AA alkaline batteries or a 5–30 V power supply
- RJ45 Ethernet cable/Ethernet network

Related Documentation

For a complete list of documentation related to NI WSN, refer to ni.com/info and enter `rdwsnr`. In addition to this guide, the following documents may be useful when configuring your NI WSN system.

- *NI WSN-9791 User Guide and Specifications* or *NI 9792 WSN Real-Time Gateway User Guide and Specifications*
- *NI WSN-32xx User Guide and Specifications*
- *MAX Help for WSN Devices*, available in MAX from **Start»Programs»National Instruments»NI-WSN»Configuring WSN in MAX**
- Refer to the *NI-WSN* book on the Contents tab of the *LabVIEW Help*, which is available by selecting **Help»Search the LabVIEW Help** in LabVIEW.
- *NI-WSN Readme*, available on the installation disc included with your device



Caution Before installing your device, read all product documentation to ensure compliance with safety, EMC, and environmental regulations.

Step 1. Unpack and Set Up the Devices

Remove the devices from the packaging and inspect them. Contact NI if the devices appear damaged. Do *not* install damaged devices.



Caution The devices are static sensitive. Always properly ground yourself and the equipment when handling or connecting to the devices.

Powering on and Mounting the NI WSN Devices

Refer to the NI WSN device documentation for more information about powering on and mounting your devices. Before setting up NI WSN nodes, remove and save the serial number sticker located on the back of NI WSN device for future use when configuring your device in the software.

Step 2. Install the NI-WSN Software on the PC Host

You must be an Administrator to install NI software and devices on your computer. To use the NI WSN-9791 Gateway, you must have NI LabVIEW 8.6.1 or later installed. To use the NI 9792 WSN Real-Time Gateway, you must have NI LabVIEW 2009 SP1 (32-bit) or later, and NI LabVIEW 2009 SP1 (32-bit) Real-Time Module or later installed. To use the NI WSN-3226 node, you must have NI LabVIEW 2010 or later installed. To install the NI-WSN software, complete the following steps:

1. Close all other applications.
2. Install NI LabVIEW.
3. For the NI 9792, refer to the instructions included with your NI LabVIEW software and install the NI LabVIEW 2009 SP1 (32-bit) Real-Time Module or later.
4. Insert the NI-WSN software installation disc into your computer.
5. Follow the onscreen instructions to install the NI-WSN software.

Step 3. Install NI-WSN Software on the NI-9792

If using a NI 9792, complete the following steps to install NI-WSN software on the NI 9792 WSN Real-Time Gateway:

1. Launch MAX.
2. Expand **Remote Systems** to confirm that MAX detects the NI 9792. If MAX is not detecting your device, refer to step 2 of *Step 4. Configure the NI WSN System*.
3. Click on **Software** and select **Add/Remove**.
4. Install NI-WSN for LabVIEW software.

Step 4. Configure the NI WSN System

You must configure the NI WSN devices in MAX before using NI LabVIEW to take measurements. For information about configuring the WSN system, refer to **Start»Programs»National Instruments»NI-WSN»Configuring WSN in MAX**. To confirm device recognition and configure the NI WSN system, complete the following steps:

1. Launch MAX.

2. Expand **Remote Systems** to confirm that MAX detects the NI WSN-9791 or NI 9792 gateway. If plugged into an Ethernet port on the local subnet or directly into the PC host, the device appears in **Remote Systems**. If the device is plugged into a port that is not on your subnet, try manually adding it by right-clicking **Remote Systems** and selecting **Create New» WSN Gateway**.
 - If your DHCP server is set up to automatically register hostnames, the hostname is registered as NI-WSN9791<serial number> or NI-NI9792-<serial number>. Enter the hostname and click **Finish**.
 - If you know the device IP address, such as 192.168.0.2, enter it and click **Finish**.



Note If you are still unable to detect your device, wait until the POWER LED on the device is green and the STATUS LED turns off. Wait one minute to allow the device to connect to the network and then press <F5> to refresh MAX. If the device does not appear, contact your system administrator to confirm that the network is working and that a firewall is not interfering with device discovery. For more information about the ports used for device discovery and communication, refer to the *NI WSN-9791 User Guide*

and Specifications or the NI 9792 WSN Real-Time Gateway User Guide and Specifications.

3. Select the NI WSN Gateway and open the **Network Settings** tab.
 - a. Confirm or change the default settings.
 - b. If the NI WSN gateway is connected to a DHCP server, select **Obtain an IP address automatically**. For static IP addresses, select **Use the Following IP address**.
 - c. Click **Apply** to save changes.
4. To add a WSN node to a gateway, complete the following:

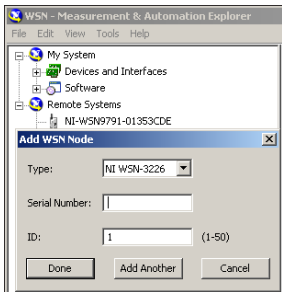
Adding a Node to the NI WSN Gateway

1. Select the gateway you want to use:
 - **(NI 9792 WSN Real-Time Gateway)** Expand **NI-9792**, select **Devices and Interfaces**, and then select **WSN**.
 - **(NI WSN-9791 Gateway)** Select the **NI WSN-9791** and then click the **WSN Nodes** tab.
2. Click **Add Node**.
3. In the Add Node dialog box:
 - a. Select the Type.

- b. Enter the NI WSN-32xx device Serial Number, which is listed on the sticker on the underside of the device, and an ID Number (number between 1 and 50).
4. Click **Done** if you are done adding nodes. If you want to add other nodes, click **Add Another**.



Note Upon completion, these changes are automatically applied.



5. After nodes are added in MAX, nodes connect automatically when they are in range of a gateway.



Note If your node does not connect automatically, refer to ni.com/info and enter `exxhqv` for troubleshooting information.

Step 5. Attach Sensors and Signal Lines

Attach sensors and signal lines to the terminal block or accessory terminals for each device. For device pinouts, refer to the device documentation.

Step 6. Start Using the NI WSN System

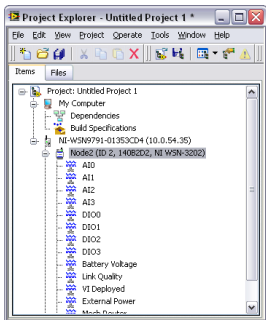
To use the NI WSN system, open a new LabVIEW project. If the gateway is on the local subnet, complete the following steps:

1. Right-click the project name and select **New»Targets and Devices**. In the Add Targets and Devices on My Project dialog box, select **Existing target or device** and expand the **WSN Gateway** folder. When you expand the WSN Gateway folder, the network is scanned for any connected NI WSN gateway devices. Wait for device detection.
2. Once detected, click the NI WSN gateway device you wish to use and click **OK**. Clicking **OK** adds the NI WSN-9791 or NI 9792 device to the Project Explorer window.

3. Expand the listing for the NI WSN gateway in the NI LabVIEW project to see the NI WSN-32xx nodes connected to it. Expand each node to list the I/O variables.

If the gateway is not on the local subnet, complete the following steps:

- a. Right-click the project name and select **New»Targets and Devices**, click **Existing target or device**, and click **Specify a target or device by IP address**.
- b. Select **IP Address** and enter the IP address.
- c. Expand the **WSN Gateway** folder and select the Gateway type and click **OK**.
- d. To add the nodes, right click the gateway in the project and select **New»Targets and Devices**. Expand the **WSN Node** folder, select the node, and click **OK**.



- To configure the I/O variables properties (such as Range and Sample Interval), right-click on the node and select **Properties**.
- To acquire data, create a new VI, and drag the I/O variable to the block diagram, create an indicator, and click **Run**. For more information about configuring the WSN system in NI LabVIEW, select **Help»Search the LabVIEW Help** and enter WSN.

Programming Examples

NI LabVIEW includes example programs to help you develop an application. To locate LabVIEW examples, go to ni.com/info and enter `wsnexamples`. For additional examples, refer to zone.ni.com.

Troubleshooting

- Go to ni.com/support/install.
- If you need to return your National Instruments hardware for repair or device calibration, go to ni.com/info and enter `redesign` to start the Return Merchandise Authorization (RMA) process.

Worldwide Technical Support

For support information, refer to the *Technical Support Information* document available at ni.com/manuals. Also visit ni.com/support or ni.com/zone. For support available at the National Instruments worldwide offices, visit ni.com. National Instruments corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504.

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