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Wireless Vehicle Bus Adapter (WVA)

Getting Started Guide

Revision history—90001929

Revision	Date	Description
A	December 2013	Original release.
B	December 2013	■ Updated description of passkey. ■ Added information for disabling factory default reset from the WVA button.
C	March 2014	Corrected link for **Contact Support**.
D	November 2014	■ Added new features: Wi-Fi Direct, Python Programmability and File Management. ■ Changed how WVA is referenced in network: from **wva-serial-number** to **wva-mac-address**
E	September 2017	■ Updated to new format. ■ Edited and updated content.
F	November 2017	Added information for reviewing fault codes in the demo application.

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Wireless Vehicle Bus Adapter Getting Started Guide

The Wireless Vehicle Bus Adapter (WVA) is a telematics component that makes vehicle bus data available through wireless communication. Using Wi-Fi, the WVA connects to other intelligent devices or routers as a client, host, or through a Wi-Fi Direct connection. The WVA can accommodate vehicle bus data in J1939/CAN or J1587/J1708 form.

You can use the WVA in a desktop development environment with a CAN bus simulator, and can install it in a vehicle by plugging into the vehicle's diagnostic port.

The WVA provides an option for wireless connectivity within the vehicle cab as an alternative to wired installation process. If you already have a system that includes an on-board computer (OBC) with Wi-Fi capabilities in your vehicles, you can integrate the WVA into your existing system. If you have not yet installed an OBC in your vehicles, you can use a smart phone, tablet, or rugged display combined with a custom application to interact with the WVA.

Features

- Embedded Wi-Fi with b/g/n Internet speeds
- Standard Deutsch 9-pin diagnostic port connector
- Two J1939/CAN vehicle bus interfaces
- J1587/J1708 vehicle bus interface
- LEDs to indicate power and user-defined functions in applications
- 12 VDC power through a vehicle diagnostic port; can be powered directly from the vehicle
- Basic power management
- Custom buzzer for driver alerts

- Web interface for configuration and management, password-protected

- Web services, a RESTful programming interface to vehicle data, password-protected

For detailed hardware specifications, see the Hardware topic of the *Wireless Vehicle Bus Adapter (WVA) Application Developer's Guide*.

Setting up your Wireless Vehicle Bus Adapter

This *Getting Started Guide* walks you through the steps to set up your Wireless Vehicle Bus Adapter. These steps include:

1. Connect the hardware

2. Evaluate deployment decisions

3. Connect to the WVA

4. Configure the WVA

5. Run the WVA demo application

In addition, the Troubleshooting section provides troubleshooting tips.

Connect the hardware

You can use the WVA for desktop development with a CAN simulator, or plug it into a vehicle's diagnostic port.

Follow the steps in this section to connect the WVA hardware.

Verify product components

The Wireless Vehicle Bus Adapter includes the following components. Make note of any missing or damaged item and contact your supplier.

Wireless Vehicle Bus Adapter   QR code label

Optional equipment

You can order the following equipment separately, if needed.

CAN bus simulator and optional recommended cabling for connecting to the computer.

Note This part is not sold by Digi International Inc. See Recommended CAN bus simulator model for ordering information.

Wiring harness
Digi part number 76000931

Communications equipment

You will need a mobile device to interact with the WVA, such as a laptop, tablet or smart phone.

Recommended CAN bus simulator model

For the CAN simulator, Digi recommends the following model and part number, which you can order from the AU Group Electronics on-line store:

■ **Model**: Au SAE J1939 Simulator-Gen II 1.00A (Engine Basic Edition)

■ **Part number**: **SIMJ1939-001**

The CAN simulator connects directly to the WVA wiring harness.

You can also purchase cabling to connect the CAN simulator to a PC from AU Group Electronics.

Connect the WVA to a CAN simulator

Follow this process to connect a WVA device to a CAN simulator.

Note You can skip this process if you are connecting the WVA to a vehicle. See Connect the WVA to a vehicle's diagnostic port.

1. Before you begin, you should manually set the baud rate for the CAN simulator. See Configure CAN bus baud rate (CAN bus simulator use only).

2. Locate the alignment pin on the WVA and the wiring harness.

3. Following the pin alignment indicated by the alignment pin, connect the WVA to the 9-pin connector of the wiring harness. Locate the locking ring on the base of the WVA and twist it clockwise to lock in place.
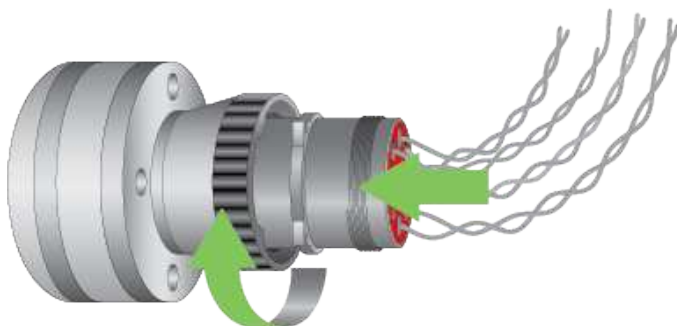
4. On the wiring harness, connect the wiring leads labeled **CAN J1939** or **J1708** to the **BUS** connector of the CAN simulator, following the CAN simulator's installation instructions. The image shows only one CAN connection. Connect additional J1939/CAN or J1587/J1708 leads as required.

> ⚠ **CAUTION!** Do not allow bare wires of the wiring harness to touch the CAN simulator. Touching the bare wires to the CAN simulator can cause a short circuit which can damage the CAN simulator.

DB-9 connector for
J1939 lead on wiring harness   CAN simulator
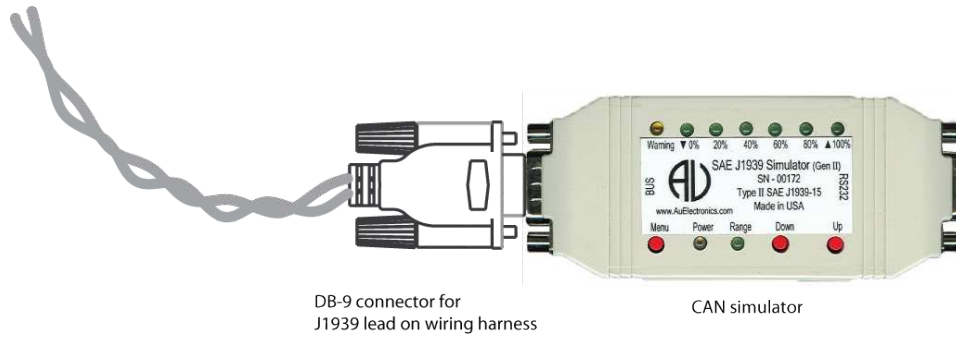
5. Connect the power supply for the cable harness to a power source.

> ⚠️ **CAUTION!** When the WVA is being used with a CAN simulator, please note that its baud rate must be manually set to **250000**. Failure to set the baud rate to **250000** results in a baud rate mismatch, which impacts vehicle bus data. An indicator that the baud rate is set wrong is the apparent absence of vehicle data. See Configure CAN bus baud rate (CAN bus simulator use only) and Cannot receive data from the CAN bus.

Connect the WVA to a vehicle's diagnostic port

Follow this process to connect a WVA to a vehicle's diagnostic port.

Note You can skip this process if you are connecting a WVA device to a CAN simulator. See Connect the WVA to a CAN simulator.

The WVA is compatible with 9-pin diagnostic ports only.

1. Consult the vehicle's owner's manual to locate the diagnostic port of the vehicle.

2. Locate the alignment pin on the WVA and diagnostic port.

Connector alignment pin
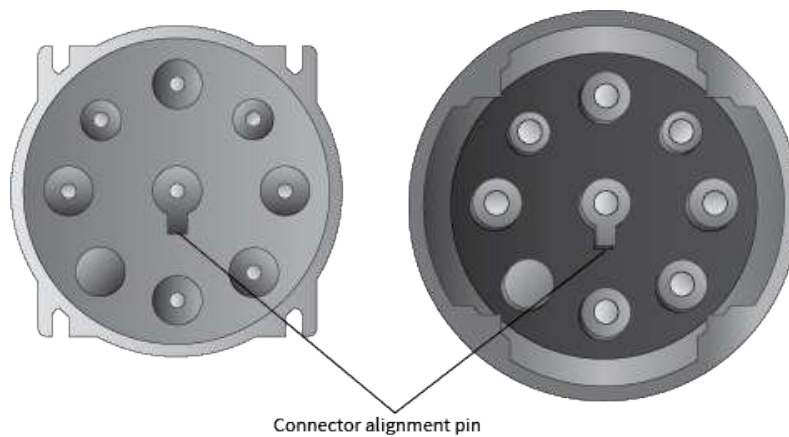
3. Connect the WVA to the diagnostic port. Twist the WVA locking ring clockwise to lock.
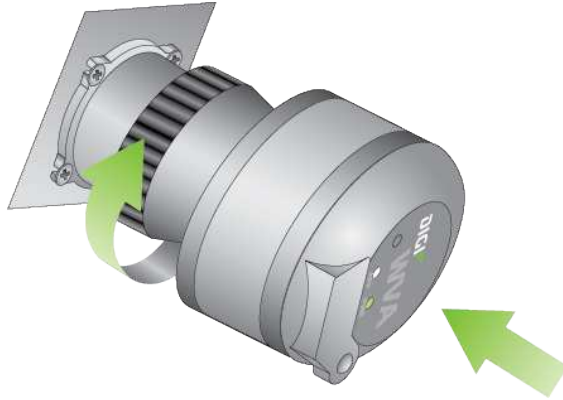
Remove the WVA from the diagnostic port

You can remove the WVA from the diagnostic port in a vehicle.

1. Twist the WVA locking ring counterclockwise.

2. Pull the WVA from the diagnostic port.
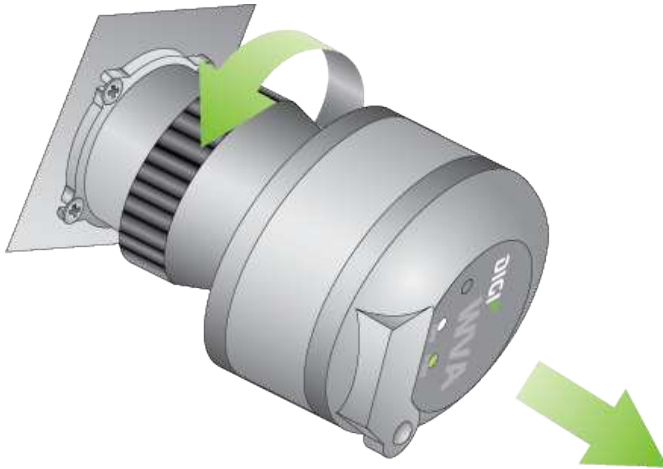
WVA LEDs

The WVA has several LEDs on the top of the device:
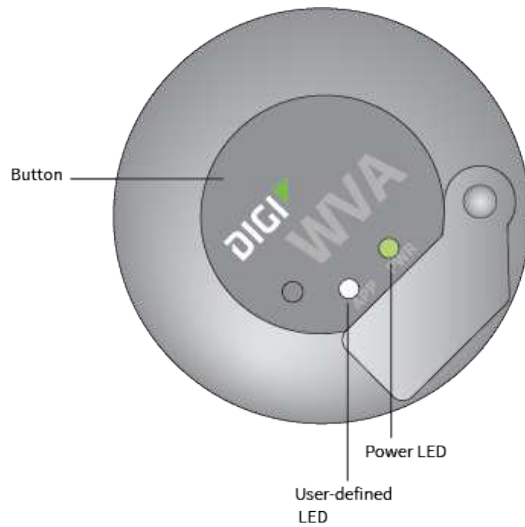
Power LED

- **Off (dark)**: No power. For more information, see Power LED is dark.

- **Solid green**: The device is powered.

   Note The WVA must be powered on and able to connect with a wireless network to work as expected. You can confirm that the WVA can connect to a wireless network in the **Network Connectivity Status** section in the **Device Information** page in the web interface. For more information, see Device Information page descriptions.

- **Blinking green**: An update of the firmware for the device is in progress.

User-defined LED

The user-defined LED allows you to set LED functionality as needed for your particular application. By default, this LED is not enabled.

For more information on programming the user-defined LED, see the *Wireless Vehicle Bus Adapter Application Developer's Guide*.

Connect to the WVA

After you have connected the WVA to a CAN simulator or plugged it into a vehicle's diagnostic port, you can connect to the WVA from a smart phone, tablet, or laptop. This enables you to configure the WVA settings, view device status, perform firmware updates, and view a log of system events.

The WVA has several default startup and operation behaviors that should be considered in your own network's setup and operation. For more information, see Deployment decisions.

Note You will need the QR code label included in the WVA packaging to connect to the WVA. Make sure you have access to this label before you begin.

Connect to the WVA from a smart phone or tablet

Connecting to the WVA from a smart phone or tablet requires a QR code reader. If you do not already have a QR code reader available on your phone or tablet, download one for your mobile device or tablet. Digi recommends the QR code reader by Scan, Inc.

1. From your smart phone or tablet, download a QR Code Reader if you do not have one available.

   a. Navigate to www.scan.me.

   b. Click the **Download App** button to start the download process.

2. Set the WVA to factory defaults. Press and hold the button on the device for at least **10** seconds to return the gateway to its initial state.

3. With the QR code reader, scan the QR code label shipped with your WVA.

SSID: wva-00:40:9D:5C:49:98
PASS: AZ09azAZ09azAZ

4. A prompt appears, asking whether you want to connect to the WVA. Select **Yes**. Your device connects to the WVA access point automatically.

If you are unable to connect to the WVA, see WVA does not connect to an access point.

Connect to the WVA from a laptop

Connecting to the WVA from a laptop requires the network security key from the QR code label included in the WVA packaging.

1. Set the WVA to factory defaults before starting this procedure. Press and hold the button on the device for at least **10** seconds to return the gateway to its initial state.

2. The WVA appears in the list of available network connections as a wireless network access point. The access point has a default name derived from the serial address for the device in this format: ***wva-mac-address***.
On the laptop, search the list of network connections for the access point name ***wva-mac-address***. For example: wva-00:40:4d:41:88:81

3. Select the access point name and click **Connect** to connect to the WVA as a wireless access point. If you do not see the WVA in the connections list, or cannot connect to it, see WVA does not connect to an access point.

4. Enter the network security key. This network security key is labeled **PASS** on the QR code label in the WVA packaging.

Access and use the WVA web interface

The WVA has a web interface for configuring device settings, viewing device status, performing firmware updates, and viewing a log of system events.

See the topics below for more detailed information:

Apply and save changes

The web interface runs locally on the device, which means that the interface always maintains and displays the latest settings in the Digi device. On each screen, clicking **Apply** saves any configuration changes to the Digi device.

# Cancel changes to configuration settings

Click the **Refresh** or **Reload** button on the web browser to reload the page. Any changes made since the last time you clicked the **Apply** button are reset to their original values.

Open the web interface

Use the WVA web interface to configure device settings, view device status and system settings, and perform firmware updates.

Note Before you can open the web interface, you must connected to the WVA. For more information see Connect to the WVA.

1. Go to a browser and access the web interface using the default IP address for the WVA access point: **192.168.100.1**
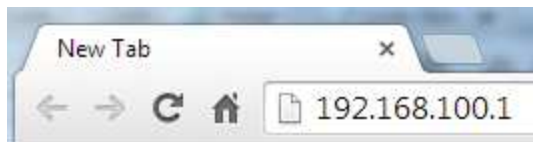
2. The first time you attempt to access the WVA, a certificate management prompt appears. Click **Proceed Anyway**.

3. A login prompt appears.

    - For **username**, enter **admin**.

    - For **password**, enter **admin**.

    Note You can change the password from the default at a later time on the **Configuration > Admin Password** page.

4. The **Device Information** page appears. This page is also known as the **Home** page. You can return to it at any time in the interface by clicking **Home** in the menu on the left side. For information about the sections in the **Device Information** page, see Device Information page descriptions.

    Note If you cannot open this page for the WVA, see Cannot open web interface or access web services.

5. You can make the configuration changes as needed by clicking a menu option in the left-hand pane. When a change is made, click **Apply** to save any changes to the WVA device. For more information, see Apply and save changes.

Upload a file to the WVA

In the **File Management** page, you can manage custom applications, their associated data files, and other files. You can also push firmware upload files to the device filesystem, pull log files from the device filesystem, and load files onto the WVA. The **File Management** page also displays current information about loaded files.

For more information about the **File Management** page, see File Management page descriptions.

This process explains how to upload files to the WVA, such as a Python script.

1. Open the WVA web interface. For instructions, see Open the web interface.

2. Click the **Administration > File Management** link in the WVA web interface. The **File Management** page appears.

3. Click the **Browse** button to locate the file on your computer that you want to upload to the WVA.

4. Click **Update file** to begin the file upload process.

Configure the WVA

You can configure settings for the WVA in the web interface. You must first connect to the WVA. See Connect to the WVA and Open the web interface to get started.

Once you have accessed the web interface, you can configure the WVA settings. The following topics describe how to configure your WVA's wireless settings and perform other set up and management tasks.

Configure wireless settings

Configure the WVA's wireless settings from the web interface to establish the wireless network method.

Choose one of the following wireless network communication methods:

- **As an access point**. Wireless communication is possible with an access point that uses the default IP address, an SSID, and a pre-shared key. The access point is always accessible at the address **192.168.100.1** when devices connect to it.

- **As a client device in a wireless network infrastructure**: You must set up this type of configuration for each type of wireless network in which you want the WVA to operate. The web interface has a wizard for configuring the WVA as a client device. By default, when the WVA connects to another access point as a client, which it can do in parallel with devices connecting to it as an access point, it gets its IP address via DHCP. IP address assignment via DHCP is enabled by default. For instructions on configuring the WVA as a client device, see Configure WVA for Wi-Fi Infrastructure mode.

- **Using Wi-Fi Direct**. Wi-Fi Direct is a Wi-Fi standard that enables devices to connect easily with each other without requiring a wireless access point and to communicate at typical Wi-Fi speeds. Wi-Fi Direct requires a one-time configuration for WVA units, where you set how the WVA user establishes a Wi-Fi Direct connection: by pressing the button on the WVA, or by entering a PIN. After this configuration, users establish a Wi-FI Direct connection by a button press or entering a PIN. In Wi-Fi Direct mode, the default IP address is **192.168.43.1** when devices connect to it. For instructions on configuring the WVA to use Wi-Fi Direct, see Configure WVA for Wi-Fi Direct.
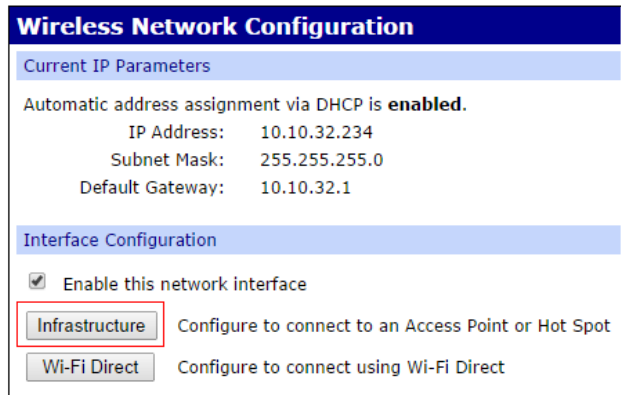

⚠️ **CAUTION!** Switching the WVA to Wi-Fi Direct mode disables access point mode. This means the only way that you can access the WVA is through a device supporting Wi-Fi Direct. If you cannot access the WVA, reset the device to factory defaults. For more information, see Reset the WVA to factory defaults.

Configure WVA for Wi-Fi Infrastructure mode

To configure the WVA as a client device in a wireless network infrastructure:

1. Open the web interface.

2. In the web interface, go to **Configuration > Wireless Network**.

3. The **Wireless Network Configuration** page appears. In the **Interface Availability Configuration** section, click **Infrastructure**.

4. The Wi-Fi Infrastructure Wizard appears.
   a. The wizard scans for available wireless networks, and displays them in a list.

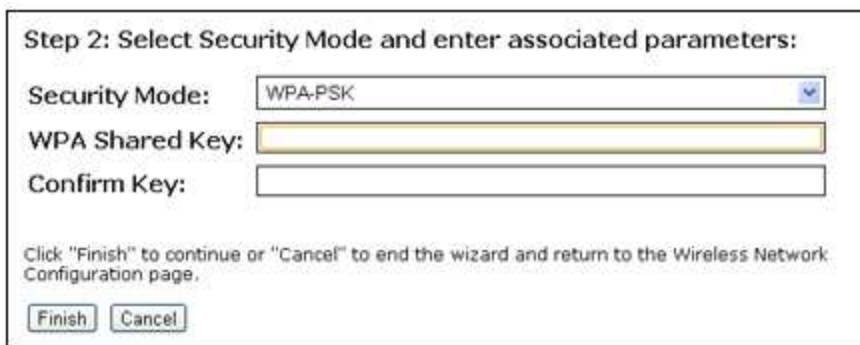   b. Click **Apply**.
5. Select the security mode and enter the associated parameters for the security mode. If you do not know these values, contact your network administrator. The default security mode for the WVA is **WPA-PSK**.

6. When the wizard completes, the WVA connects as a client to the wireless network you selected in step 4. The WVA gets its IP address via DHCP.

Configure WVA for Wi-Fi Direct

To configure the WVA for access by Wi-Fi Direct:
1. Open the web interface.
2. In the web interface, go to **Configuration > Wireless Network**. The **Wireless Network Configuration** page appears.
3. Under **Interface Availability Configuration**, click **Wi-Fi Direct**.

Wireless Network Configuration

Current IP Parameters

Automatic address assignment via DHCP is **enabled**.

IP Address: 10.10.32.234
Subnet Mask: 255.255.255.0
Default Gateway: 10.10.32.1

Interface Configuration

☑ Enable this network interface

| Infrastructure | Configure to connect to an Access Point or Hot Spot |
| Wi-Fi Direct | Configure to connect using Wi-Fi Direct |

4. The Wi-Fi Direct Wizard launches. The wizard prompts you for a device name and the method for establishing the Wi-Fi Direct connection.

    a. In the **Device Name** field, enter an identifier associated with the WVA. The recommended name is the fleet ID for the vehicle, such as **truck326**:

    Device Name: truck326

    WPS Method: Push Button ▾

    ☑ Reconfigure IP addresses for Wi-Fi Direct

    Click "Finish" to continue or "Cancel" to end the wizard and return to the Wireless Configuration page.

    Finish   Cancel

    b. In the **WPS Method** field, select the Wi-Fi Protected Setup (WPS) method that Wi-Fi Direct users will use to connect to the WVA. Options are:

        ▪ **Push Button**: Configures the Wi-Fi Direct connection to be established by a user pressing the WVA button. The **Push Button** method establishes the Wi-Fi Direct connection from the phone/tablet side with no data entry required. Because most phone/tablet devices remember the connection, the connection needs to be established only once. However, users must locate the WVA in the vehicle to press the button, which can be difficult to do in some vehicles.

        ▪ **Enter PIN**: Configures the Wi-Fi Direct connection to be established by a user entering a PIN on the connecting device (phone or tablet). Using the **Enter PIN** method eliminates the need to locate the WVA in the vehicle to press the button. However, it requires users to enter the PIN from the connecting device every time the user accesses the WVA.