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Jennic Serial Tools Guide

In Sedona Framework Workbench 1.1, and in NiagaraAX Workbench (3.6 or later) enabled for Sedona Framework TXS 1.1, there are *two* Tools for working with serial connections to Jennic-based devices:

• **Jennic Serial Port Tool** — to reconfigure a previously installed Sedona Framework Jennic USB adapter (USB coordinator), or to "flash" the firmware of such a USB coordinator—or to flash the firmware in any Jennic-based Sedona Framework device that is directly serial-cabled to the Workbench computer.

• **New Jennic Wireless Adapter** — a wizard to install/configure a new USB coordinator with Workbench, using the COM port assigned to the coordinator by Windows with the FTDI driver.

Sedona Framework Workbench	Niagara Workbench with Sedona Framework TXS
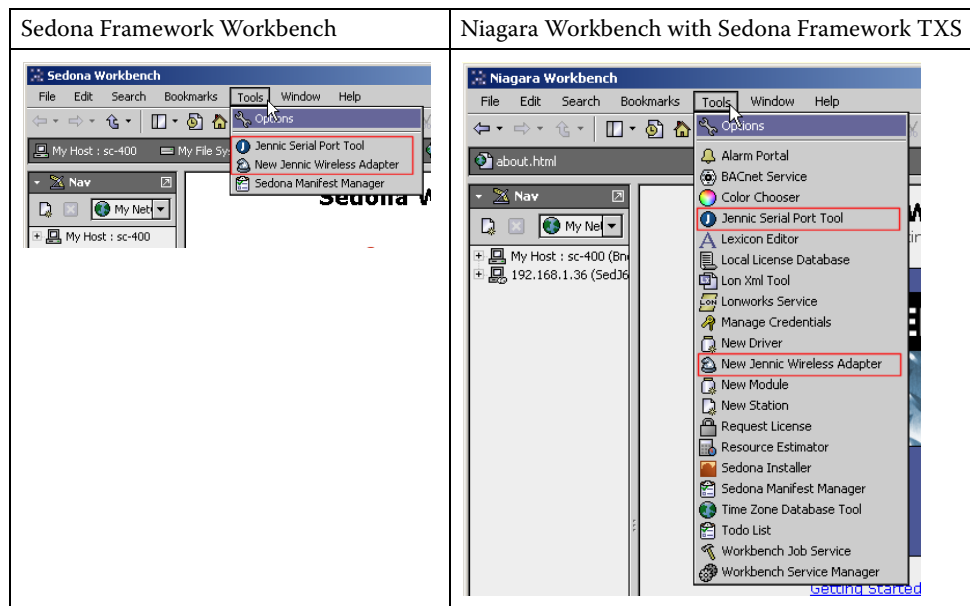
Except where a difference must be noted, both Workbench types (Sedona Framework, NiagaraAX enabled for Sedona Framework TXS) are simply referred to as "Workbench" in this document, which describes working with these two tools in the following sections:

Installing a new USB coordinator (New Jennic Wireless Adapter)

A wireless Jennic-based USB adapter with built-in Sedona Framework VM and 6LoWPAN support is included with the Sedona Framework Developer Board Kit, and is also known as "Jennic wireless adapter", or simply "USB coordinator". A special tool in Workbench allows you to add and configure one.

Before inserting the USB coordinator (or using this tool), you must *install a VCP driver* (virtual com port) driver on your Workbench PC. This driver is *from FTDI* (Future Technology Devices International). The driver is included in the Sedona Framework Workbench distribution (zip file or CD), and is also included the Sedona Framework TXS bundle (zip file). To ensure the latest driver version, you can download it from FTDI. At the time of this document, the URL is: http://www.ftdichip.com/Drivers/VCP.htm

The process to use a new USB coordinator is as follows:

- Install and verify the FTDI driver
- Use the New Jennic Wireless Adapter wizard

Install and verify the FTDI driver

The FTDI driver enables Windows to assign the USB coordinator a "virtual COM port" when first inserted in your PC. You can verify this from the Windows Device Manager on your PC. You specify that COM port when you use the New Jennic Wireless Adapter tool to configure the USB coordinator.

Installing the FTDI driver

Step 1   Look in the Windows Device Manager to see what Ports (COM & LPT) already exist.

Access the **Device Manager** quickly from the command prompt, or from the **Start > Run** command by entering: devmgmt.msc

Expand the **Ports** node and note existing COM*n* numbers.

Step 2   Open the Sedona Framework distribution in Windows Explorer, and navigate to the FTDI folder.

Step 3   Open the FTDI subfolder that matches your OS, and double-click the executable file.

For example: CDM 2.08.02.exe

Step 4   The FTDI install briefly opens a command prompt window, during which the driver is installed.

Verifying the FTDI driver

Step 1   Insert the USB coordinator into an available USB 2.0 port.

You should see a "Hardware found" alert or similar message(s) in the system tray of your PC. The LED on the USB coordinator should be blinking about twice a second.

Step 2   Look in the Windows **Device Manager** to see what *new* COM port was created. (Expand the **Ports** node and note the new COM*n* port.)

It should be listed similar to: USB Serial Port (COM7)

Note: *If you have the Sedona Framework Developer Board Kit, you also have a "USB to RS-232" serial cable that uses the FTDI driver. In this case only (otherwise skip to Step 3):*

1.   Insert the "USB to RS-232" serial cable into another available USB 2.0 port.

Again, you should see a "Hardware found" alert or similar message(s) in the system tray of your PC.

2.   Look again in the Windows **Device Manager** to see what *new* COM port was created.

It should be listed similar to: USB Serial Port (COM8)

Step 3   Your COM port assignment(s) will likely differ. Make a note of these new COM port assignments—you will need to identify or use them in the related **Jennic Serial Port Tool** view in Workbench.

Note: *If the "Niagara AX Serial Tunneling" client application was previously installed on your PC, be aware of a possible COM port conflict with the "virtual COM port" defined by that application. By default, installation of Niagara AX Serial Tunneling creates a virtual port with COM6 assignment. You cannot see this port from the Windows Device Manager; however, it can be seen as an unknown port from the Workbench view that manages Jennic serial port access.*

To prevent conflict with the FTDI devices used with Workbench and the Sedona Framework, open up the "Niagara AX Serial Tunneling" applet in the Windows Control Panel, and verify the "Serial Port" shown (top field) does not duplicate one of the COM ports created and shown in the Windows Device Manager for the FTDI devices (USB coordinator, and if applicable, the "USB to RS-232" adapter cable). Select another unused virtual COM port if it does. Otherwise, you will see a "port in use by Windows" error when attempting to use that port in Workbench.

If you do not see a "Niagara AX Serial Tunneling" applet in your Windows Control Panel, this does not apply to your installation.

Use the New Jennic Wireless Adapter wizard

After installing and verifying the FTDI driver to determine the virtual COM port for the USB coordinator, you can use the **New Jennic Wireless Adapter** tool (wizard) in Workbench to add and configure the coordinator (see "Install and verify the FTDI driver" on page 2).

Running the New Jennic Wireless Adapter wizard

You should only do this for a *new* USB coordinator—if the USB coordinator was previously added using this tool, use the **Jennic Serial Port Tool** to reconfigure it as necessary (or upgrade its firmware).

Step 1   Insert the USB coordinator into a USB 2.0 port on your Workbench PC.

Step 2   If you have not restarted Workbench since installing and verifying the FTDI driver, close Workbench now, then restart Workbench.

Step 3   From the menu bar, select **Tools > New Jennic Wireless Adapter**

The New Jennic Wireless Adapter wizard dialog appears, as shown in Figure 1.

Figure 1   *New Jennic Wireless Adapter wizard*
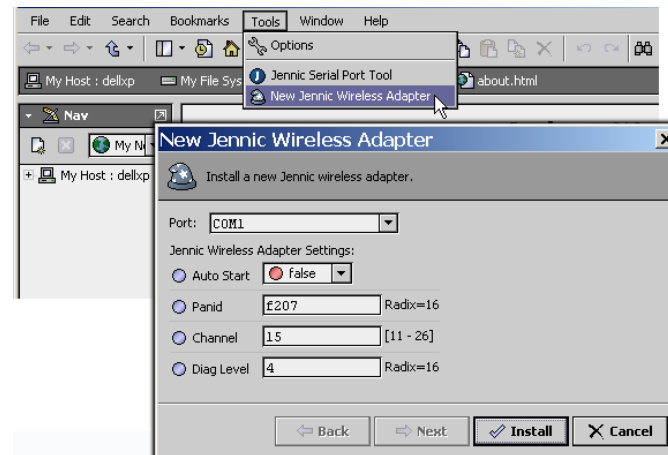
Step 4   In the **Port** field, select the COM*n* port that Windows previously assigned to the USB wireless adapter when inserted into your PC, for example, COM7.

Step 5   Change **Auto Start** from `false` to `true`.

Step 6   In the **Panid** field, enter the Jennic PAN ID of the target Jennic-based device.
For example, the Sedona Framework "Dev Board" is shipped with a demo app using Panid: `db00`

⚠️

Caution   *Do not use the identical Panid as any other nearby Jennic coordinator, for example a JACE with Sedona Jennic option card. This applies if using Niagara Workbench enabled for Sedona Framework TXS, and you have such a JACE as well as a USB coordinator. Each coordinator must use a unique Panid.*

Step 7   In the **Channel** field, enter the appropriate Jennic channel to use, from 11 to 26. For example, for the shipped demo app in a Sedona Framework "Dev Board", you can specify Channel: `17`

Step 8   Click the **Install** button.

The wizard configures Workbench to use this COM port as the USB coordinator, and configures the coordinator with the Panid and Channel specified.

A progress bar appears near the dialog's bottom, as shown in Figure 2

***Figure 2*** *Installing new Jennic wireless adapter*
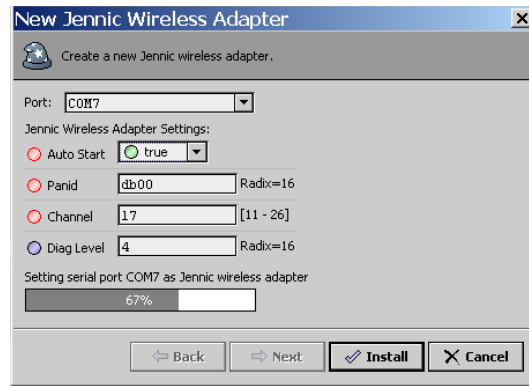
When Done, the wizard automatically starts the USB wireless adapter's connection to its network.

Note: *Now the LED on the USB coordinator should be blinking green, at a one second rate.*

Step 9   Click the **Exit** button to close the wizard, leaving Workbench open.

Step 10   From the menu bar, select **Tools > Jennic Serial Port Tool**

The Jennic Serial Port Tool view appears, as shown in Figure 3.

Figure 3 *Jennic Serial Port Tool*
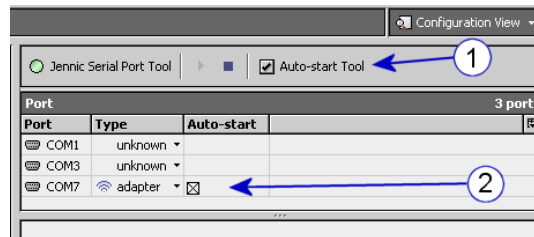
Typically for Sedona Framework Workbench, you configure the tool to auto-start (1) and for the coordinator to also auto-start (2). If necessary, click these options to be set as shown in Figure 3.

On your Workbench PC, you do *not* need to run the **New Jennic Wireless Adapter** wizard again, unless you physically *replace* your USB coordinator with another one. In that case, note that Windows assigns a *different* COM*n port number* to the new coordinator.

To reconfigure the network settings of your USB coordinator, use the **Jennic Serial Port Tool**, by selecting the adapter's COM port. For a procedure, see "Reconfiguring a USB coordinator" on page 5.

Note: *If using a USB coordinator with older firmware, say unchanged since unboxing from the Sedona Framework Developer Board Kit, you should upgrade (flash) it now, using the* **Jennic Serial Port Tool***. I n addition, Sedona FrameworkWorkbench 1.1 (and the Sedona Framework TXS 1.1 bundle) contains upgraded firmware for the Dev Board— if you have one, you should should also upgrade (flash) it now too. For a procedures, see "Flashing the firmware in a USB coordinator" on page 6 and "Flashing the firmware in a Sedona Framework Dev Board" on page 7.*

Using the Jennic Serial Port Tool

Use the **Jennic Serial Port Tool** to change properties of a wireless USB coordinator (wireless Sedona Framework Jennic USB adapter), such as its Panid, channel, or debug level in the Workbench console. This view also provides a "flasher" utility to serially download firmware from your Workbench PC to an attached Jennic-based Sedona Framework device. This can either be a USB coordinator, or any Jennic-based Sedona Framework device that is properly cabled to a serial port on your Workbench PC.

Successful use of the "flasher" to download (upgrade) firmware in a device requires these items:

• The appropriate firmware archive (.zip) file for the device. References are provided in this document for the USB coordinator and the Sedona Framework Developer Board. For Jennic-based devices from other vendors, refer to their technical documentation for firmware archive details.
• For any device besides the USB coordinator, the proper serial cable connected between the Workbench PC (either RS-232 port, or USB port using an adapter) and the Jennic-based device. You need physical access to the device, including a method to put it into "program mode".

See the following related procedures and topics:

- Reconfiguring a USB coordinator
- Flashing the firmware in a USB coordinator
- Flashing the firmware in a Sedona Framework Dev Board
- About the Jennic Serial Port Tool (reference)

Reconfiguring a USB coordinator

This procedure is to *reconfigure* a USB coordinator (wireless Sedona Framework Jennic USB adapter) that was previously added using the **New Jennic Wireless Adapter** tool in Workbench (see "Installing a new USB coordinator (New Jennic Wireless Adapter)" on page 2 for related details). The **Jennic Serial Port Tool** lets you change its Jennic PAN Id and channel, as well as its Diag Level (level of debug messaging output to Workbench's console window).

Reconfigure USB coordinator

You may need to reconfigure a USB coordinator's Panid and/or channel so it can communicate to some new Jennic-based device, or to a device with its Panid changed (perhaps from loading its "fallback app").

Step 1   Insert the USB coordinator into a USB 2.0 port on the Workbench PC, if not already inserted.

Step 2   From the Workbench menu bar, select **Tools > Jennic Serial Port Tool**.

The tool's "Configuration View" displays, with Ports shown in the top pane "Port table".

Note: *If no ports are listed, the tool is stopped. Click the start control ▸ to start it, so ports list in the table. The USB coordinator LED remains blinking blue at a fast rate if it is stopped (not ready to run a network), or else blinks green, at a one second rate if it is ready and available for network connections from Jennic-based Sedona Framework devices.*

Step 3   Click the COM port row of type ⊚ **adapter**.

The firmware version number and (editable) configuration of the coordinator appears in the view.

Step 4   As needed, change one or more properties, described as follows:

- **Panid**
  Jennic PAN ID (Personal Area Network identifier), in hexadecimal, range 0x0000 to 0xFFFE for the network. The wireless USB adapter acts as the Jennic coordinator for this network.

⚠
Caution   *Do not use the identical Panid as any other nearby Jennic coordinator, for example a JACE with Sedona Jennic option card. This applies if using Niagara Workbench enabled for Sedona Framework TXS, and you have such a JACE as well as a USB coordinator. Each coordinator must use a unique Panid.*

- **Channel**
  RF 2.4GHz channel number to use, from 11 to 26.
- **Diag Level**
  Level of Jennic/Sedona-related debug messaging to include in the Workbench console window, where value of 0 provides the smallest level. See the *Getting Started with the Sedona Framework Developer Kit* document for related details.

Note: *Changing the value of the coordinator's Panid or Channel, after a save, causes a restart of the coordinator.*

Step 5   Click the 🖫 **Save** button to make changes effective.

A popup **Writing Jennic Network Config** dialog briefly appears, showing progress in writing to and then (typically) restarting the coordinator. During this time, LED activity on the USB coordinator changes color (blue, red) and blink pattern before returning to green, at one second rate.

Step 6   When the coordinator restarts, it sends a beacon message out on the wireless network. Devices that are configured to use that PAN ID (and include that channel in their channel map) should respond within a minute or so—and appear "ghosted" in Workbench's Nav tree, listed by IPv6 address.

To Sox connect to such a device, right-click it and select 🗐 **Open Sedona (sox)**, and in the **Open Sedona** popup dialog, enter its credentials (Username and Password).

Note other buttons are available in the **Configuration View** of the **Jennic Serial Port Tool**. For related details, see "Buttons" on page 11.

Flashing the firmware in a USB coordinator

This procedure is to *upgrade firmware* in a USB coordinator (wireless Sedona Framework Jennic USB adapter) that was previously added using the **New Jennic Wireless Adapter** tool in Workbench (see "Installing a new USB coordinator (New Jennic Wireless Adapter)" on page 2 for related details).

### Flash the firmware in a USB coordinator

It is recommended to upgrade the firmware in your USB coordinator when upgrading to Sedona Framework TXS, to whatever firmware is delivered within a new release.

Step 1   Insert the USB coordinator into a USB 2.0 port on the Workbench PC, if not already inserted.

Step 2   Start Workbench (or if already started, restart Workbench).

Step 3   From the Workbench menu bar, select **Tools > Jennic Serial Port Tool**.

The tool's "Configuration View" displays, with Ports shown in the top pane "Port table".

Note: *If no ports are listed, the tool is stopped, with the USB coordinator 's LED blinking blue at fast rate. Click the start control ▸ to start it, so ports list in the table.*

Step 4   Click the COM port row of type 📶 **adapter**. If not started, click the 🔵 **Start** button.

The firmware version number and (editable) configuration of the coordinator appears in the view.

Step 5   Click the ⚡ **Flash** button (bottom far right). A popup **Firmware Archive** dialog appears.

Note: *The figure below shows a default Firmware Archive popup example for Sedona Framework Workbench 1.1. If using Niagara Workbench enabled for Sedona Framework TXS 1.1, the default path will be longer (including "sedonaBundles"), but will end the same: sedona/jennic/firmware*

In addition, more firmware archive files will be listed. However, you still select one of the two files mentioned below.
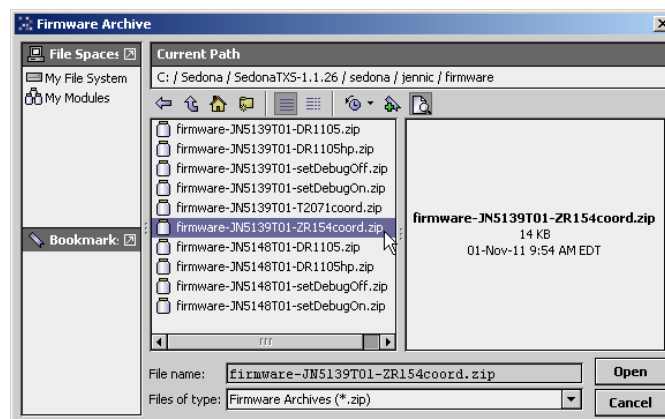

Depending on USB coordinator model, select either:

- Early model (ZR154), black oval shaped design: `firmware-JN5139T01-ZR154coord.zip`
- Later model (T2071), putty color rect. design: `firmware-JN5139T01-T2071coord.zip`

Where the newer T2071 (putty colored rectangular design) USB device is more common. Note that either coordinator will function properly with the other's firmware; however, LEDs will not blink properly.

Step 6   In the **Firmware Archive** dialog, click the **Open** button to start the flash download.

A popup **Flash** dialog appears, showing progress in writing.
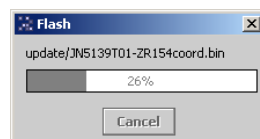
While updating the firmware, there is no LED activity on the USB coordinator.

Step 7   When the firmware update is done, if the coordinator is not already started, click the 🔲 **Start** button.
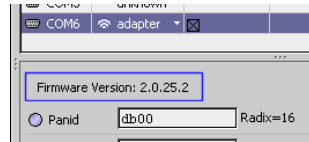
The firmware version appears above the Panid property setting, as shown above (`2.0.25.2`).

The USB coordinator LED remains blinking blue at a fast rate if it is stopped (not ready to run a network), or else blinks green, at a one second rate if it is ready and available for network connections from Jennic-based Sedona Framework devices.

Flashing the firmware in a Sedona Framework Dev Board

This procedure is to *upgrade firmware* in a Sedona Framework Developer Board (Dev Board), using the Jennic Serial Port tool, along with the supplied DB-9 serial cable, and if necessary, the supplied USB to RS-232 adapter cable. The same basic procedure applies to any serially-attached Sedona Jennic device.

Flash the firmware in a Sedona Framework Dev Board

It is recommended to upgrade the firmware in your Dev Board to the same level included in firmware archives of your Sedona Framework 1.1 distribution.

Step 1   Open a Sox connection to the Dev Board and use the Sedona Sox Tools to make a backup of the device. For related details, refer to "About the Backup / Restore Tool" in the *Sox Tools Guide*.

Step 2   From the Workbench menu bar, select **Tools > Jennic Serial Port Tool**.

The tool's "Configuration View" displays, with Ports shown in the top pane "Port table".

Note: *If no ports are listed, the tool is stopped. Click the start control ▶ to start it, so ports list in the table.*

Step 3   In the row for COM port with attached serial cable (to Dev Board), click in **Type** and select 📶 **flasher**.
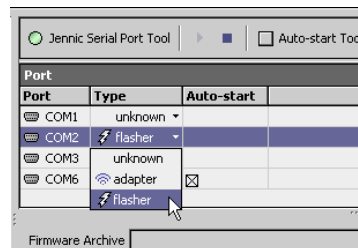
The bottom of the view changes to a single field for **Firmware Archive**.

Step 4   Click the open folder 📂 icon at the end of the **Firmware Archive** field.

A popup **Firmware Archive** dialog appears.
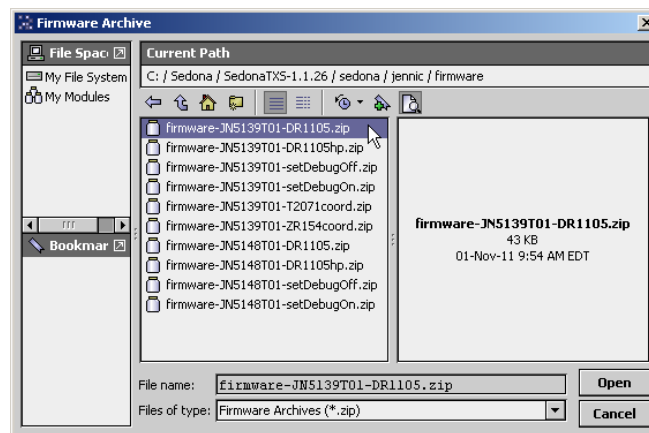
Select the appropriate *DR1105* firmware archive for your Sedona Framework Dev Board, where:

•   `firmware-JN5139T01-DR1105.zip` if the Dev Board has the *JN5139 low power* module. This is the firmware archive shown selected above.
•   `firmware-JN5139T01-DR1105hp.zip` if the Dev Board has the *JN5139 high power* module.
•   `firmware-JN5148T01-DR1105.zip` if the Dev Board has the *JN5148 low power* module.

- `firmware-JN5148T01-DR1105hp.zip` if the Dev Board has the *JN5148 high power* module.

If following this procedure to install a firmware archive for another vendor's Jennic-based Sedona Framework device, refer to the vendor's instructions on firmware archive selection.

Note: *The figure above shows a default Firmware Archive popup example for Sedona Framework Workbench 1.1. If using Niagara Workbench enabled for Sedona Framework TXS 1.1, the default path will be longer (including "sedonaBundles"), but will end the same:* `sedona/jennic/firmware`

In addition, more firmware archive files will be listed. However, for the Sedona Framework Dev Board, you still select the appropriate DR1105 firmware archive file, as described above.

Step 5   In the **Firmware Archive** dialog, click the **Open** button.

The view changes to configure Jennic communication parameters for the two apps in the device.
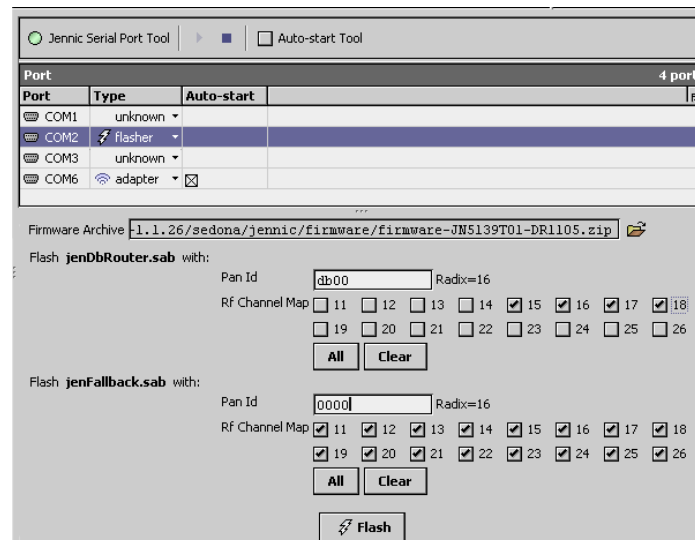
The main Sedona Framework app in the device is listed at top, and the fallback app is listed below it. Both apps include fields to let you independently set:

- **Pan Id**
  Change (or accept) the Jennic PAN ID (Personal Area Network identifier), in hexadecimal, range 0x0000 to 0xFFFE for the network.
  The Pan Id must match the PAN ID of whatever Jennic network the device will be connecting to.
- **Rf Channel Map**
  As needed, click to set or clear individual Jennic RF channels for monitoring/usage. Note the **All** and **Clear** buttons can be useful when doing this.
  You can select as many channels as you like, but you must select the channel being used by the Jennic network the device will be connecting to. If you don't know which channel you need, you can select all of them for now.

Set these values as needed (you may wish to have the same or different parameters for the two apps).

Step 6   Click the **Flash** button. A popup **JenFlasher** dialog asks to put the device in program mode. *Do not click **OK** yet*—put the device in program mode first.


Note: *On the Sedona Framework Dev Board, press and hold the **Program** switch, then press and release the **Reset** switch to put it in program mode.*

Step 7   With the serial-cabled device in program mode, click **OK** in the dialog to begin the download.

A popup **Flash** dialog provides progress on the different stages of the flash download.
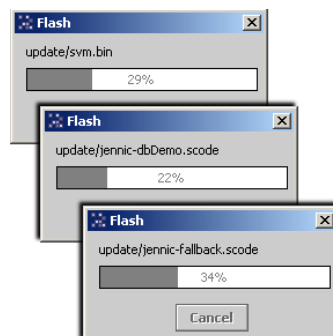
Step 8   A popup **Message** tells you when the flash download is complete.
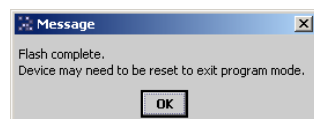
Click **OK** to close, and reset the device if necessary (it is required with Dev Board; push its **Reset** switch).

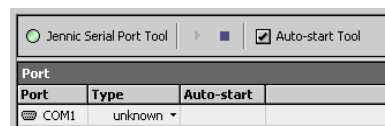# About the Jennic Serial Port Tool

(Reference) Use the Jennic Serial Port Tool to change properties of a wireless USB Jennic/Sedona Framework adapter (USB coordinator), such as its Panid, channel, or debug level in the Workbench console. You also use this tool to upgrade (flash) firmware in the USB coordinator, or the firmware in any other Jennic-based Sedona Framework device that is direct serial-cabled to the Workbench PC.

This view is divided into a top start banner and two halves below: Port table and Port details.

start banner

The start banner at the top of Jennic Serial Port Tool enables or disables all Jennic/Sedona Framework related communications from Workbench to the configured serial ports.

Figure 4   *Jennic Serial Port Tool "start banner" at top of view*

- When started ○ , the other areas of the view (port table, port details) are active. A stop control ■ is available to toggle the Jennic Serial Port Tool off.
- When stopped ● , other view areas remain blank. A start control ▶ is available to toggle the tool on.

As shown, a checkbox "Auto-start Tool" is available.

Note: *Whenever using Sedona Framework Workbench, it is typically recommended you enable the "Auto start Tool" checkbox, so that the tool starts when Sedona Framework Workbench starts.*

Port table

The port table lists the Workbench PC's COM ports, by COM*n* assignment (Figure 5).

Figure 5   *Example Port table in Jennic Serial Port Tool*

Each port specifies the "type" of Jennic/Sedona Framework configuration for that port, which is either:

- unknown — (default) no usage by Jennic/Sedona Framework.
- adapter — the wireless Jennic USB coordinator with Sedona Framework firmware.
- flasher — an available PC COM port to use in a "flasher" serial firmware download routine to a se-

rially cabled Sedona Framework device (e.g., the Sedona Framework Dev Board).

Note: If a port is already set to "adapter", the "flasher" option is not available in the Type drop-down menu. Instead, a "Flash" button is provided among the Buttons in the lower pane.

Initially all ports are "unknown", but after running the `New Jennic Wireless Adapter` wizard, one port remains as adapter. See "Installing a new USB coordinator (New Jennic Wireless Adapter)" on page 2.

Port details

Below the Port table in the `Jennic Serial Port Tool` are details for any selected port row, if type "adapter" or "flasher".

adapter port details

Figure 6   *Example port details (adapter) in Jennic Serial Port Tool*
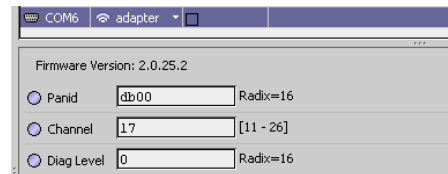
As shown in Figure 6, properties for an "adapter" include:

- Firmware Revision level, for example `2.0.25.2`
- Panid — the Jennic PAN ID (Personal Area Network identifier), in hexadecimal, range 0x0000 to 0xFFFE for the network. The wireless USB adapter acts as the coordinator for this network.
- Channel — the RF 2.4GHz channel number to use, from 11 to 26.
- Diag Level — level of Jennic/Sedona-related debug messaging to include in the Workbench console window, where value of 0 provides the smallest level.

Note: Changing the value of a coordinator's Panid or Channel, after a save, causes a restart of that coordinator.

For a procedure, see "Reconfiguring a USB coordinator" on page 5. Also note an adapter's details includes a row of *Buttons* at the bottom of the view. See "Buttons" on page 11.

flasher port details

Details for a port set to "flasher" change the view significantly, as shown in Figure 7.

Figure 7   *Default flasher details in Jennic Serial Port Tool*
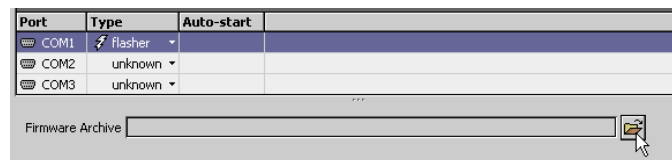
Flasher utility items include:

- **Firmware Archive**
  Workbench file path (ord) to the appropriate firmware archive file to download serially to the attached device in this utility. The open 📂 folder icon produces a `Firmware Archive` dialog that works like the standard Workbench `File Chooser` dialog, so you can browse to the needed location of this file.
- **Jennic communication parameters**
  After you select a firmware archive file, the view adds Jennic parameters for both apps in the device.

Figure 8   *Jennic communication parameters (independent for both apps)*
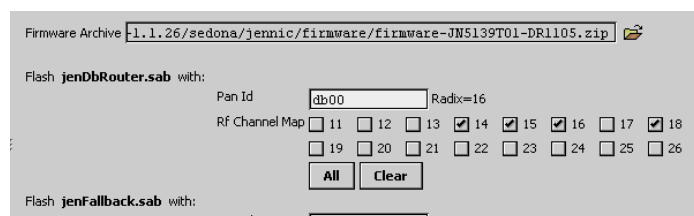
You can set the same or different Panid and RF Channel Map values in the top (main) app as in the lower (fallback) app. When the firmware download completes, and after the device is reset, it becomes reachable using these Jennic communication parameters.

- ⚡ **Flash**
  Button to initiate the download—only after connecting the appropriate serial cable (and adapter, if necessary) between the Workbench PC and the Jennic-based Sedona Framework device, and setting the device in "program mode".

When in this flasher utility mode, no other buttons are available in the **Jennic Serial Port Tool**. For an example procedure, see "Flashing the firmware in a Sedona Framework Dev Board" on page 7.

Buttons

Buttons at the bottom of the Jennic Serial Port Tool are available only when a COM port of type "adapter" is selected, for the USB coordinator.

Figure 9   *Buttons at bottom of Jennic Serial Port Tool (when adapter port selected)*

These buttons are described as follows:

- **Refresh**
  Refreshes values in this view; this button is always available.
- **Save**
  Becomes enabled if a change is made in any of an adapter's three properties. Note that any saved change to Panid or Channel also causes a restart of the wireless USB coordinator. However, changes to Debug Level are applied without a restart.
- **Stop**
  To stop the coordinator. Communications to other devices stop; its LED blinks blue at a fast rate. Click the **Start** 🔘 button to restart the coordinator with the three properties as shown (for example, after changing one or of them).
- **Restart**
  To restart the USB coordinator, with a popup dialog that displays progress during this period.
- **Refresh PAN**
  To silently refresh the network tables maintained in the wireless USB adapter.
- **Flash**
  To load a firware update in the wireless USB coordinator. A Firmware Archive dialog (file chooser style) results—you typically navigate to the `!sedona/jennic/firmware` folder to select either `firmware-JN5139T01-T2071coord.zip` or `firmware-JN5139T01-ZR154coord.zip`.

  For a procedure, see "Flashing the firmware in a USB coordinator" on page 6.

Document change log

Updates (changes/additions) to this *Jennic Serial Tools Guide* document are listed below.

- Publication: November 11, 2011
  Initial document.