FREEWAVE

Tool Suite

Release v2.11.2

User-Reference Manual

Part Number: LUM0030AB
Revision: Oct-2019

Safety Information

The products described in this manual can fail in a variety of modes due to misuse, age, or malfunction and is not designed or intended for used in systems requiring fail-safe performance, including life safety systems. Systems with the products must be designed to prevent personal injury and property damage during product operation and in the event of product failure.

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2. If Product is used outside of FreeWave specifications as stated in the Product's data sheet.
3. If Product has been modified, repaired, or altered by Customer unless FreeWave specifically authorized such alterations in each instance in writing. Where applicable, this includes the addition of conformal coating.

FreeWave Technologies, Inc.
5395 Pearl Parkway, Boulder, CO 80301
303.381.9200
Toll Free: 1.866.923.6168
Fax: 303.786.9948

www.freewave.com

Table of Contents

Preface **7**
1. Tool Suite Overview **9**
2. Installing and Upgrading Tool Suite **11**
2.1. Install Tool Suite 12
2.1.1. Recommended Computer Display Settings 14
2.2. Installing the Microsoft .NET Framework 15
2.3. Installing Microsoft SQL Server Compact 17
2.4. Connecting Radios to a Computer 20
3. Tool Suite Navigation **21**
3.1. Ribbons and Toolbars 22
3.2. File Drop-down Menu 23
3.3. Field Tool Tips 24
3.4. Access Individual Device Options 24
4. Network Files and Settings **25**
4.1. Create Configuration and Network Diagnostics Networks 26
4.1.1. Create a Serial Network 26
4.1.2. Create a TCP Terminal Server Network 26
4.1.3. Create an Ethernet Network 27
4.2. Configure Network Settings 28
4.2.1. Recommended Polling Intervals 30
4.3. Delete Devices From Networks 31
4.3.1. Delete an Individual Device from a Network 31
4.3.2. Delete All Devices from a Network 31
4.3.3. Delete a Network 31
4.4. Export Networks 32
4.4.1. Export a FreeWave Network (.fwn) 33
4.4.2. Export a Network Settings Report (.csv) 34
4.4.3. Export a FreeWave Network Design (.fwt) 34
4.4.4. Export Network Data to a SQL Server Database (.fwn) 34
4.5. Import Networks 36
4.6. View Networks 37
5. Configuration Application **38**
5.1. Devices Tree 40
5.1.1. Add Template Devices to the Network 42
Add a Radio Template to the Device Tree 42
Add a Serial Base Template to a Serial Network Device Tree 42
5.1.2. Filter Devices in the Device Tree 43

5.1.3. Organize Devices in Folders in the Device Tree 43
5.1.4. Program Devices from the Device Tree 43
5.1.5. Read Current Settings From a Device 45
5.2. Device Parameter Settings 46
5.2.1. Ethernet Device Parameter Tabs 47
5.2.2. I/O Serial Base and I/O Expansion Device Parameter Tabs 49
5.2.3. Serial / TCP Terminal Network Device Parameter Tabs 50
5.3. Network Designs 52
5.3.1. Connect Devices to Master Templates in Network Designs 53
Connect a Serial Device 53
Connect an Ethernet Device 55
5.3.2. Create an Ethernet Network Design Using the Design Wizard 56
5.3.3. Create a Serial Network Design Using the Design Wizard 58
5.3.4. Edit Settings for Devices in Network Designs 59
5.3.5. Export and Import Network Designs 60
Export a Network Design 60
Import a Network Design 60
5.3.6. Print Network Designs 60
5.3.7. Program Devices from Network Designs 61
5.3.8. Remove Devices From Network Designs 62
5.3.9. Rename Devices in Network Designs 62
5.4. Update a Device to the Latest Firmware Version 63
6. Local Diagnostics Application 65
6.1. Run, Stop, and Print Local Diagnostics 66
6.1.1. Run Local Diagnostic 66
6.1.2. Stop a Local Diagnostic 66
6.1.3. Print the Local Diagnostics Graph 67
7. Network Diagnostics Application 68
7.1. Network Diagnostics Best Practices 69
7.2. Discovering and Reading Devices 69
7.2.1. Discover Ethernet Devices 70
7.2.2. Reading Ethernet Device Settings 71
Read an Ethernet Device for Settings 71
Read an Ethernet Device for its Name and Firmware Version 71
7.3. Path View 72
7.3.1. Searching for Devices in the Network 73
7.4. Alerts, Warnings, and Alarms 74
7.4.1. Acknowledge Individual Alerts on a Device 75
7.4.2. Acknowledge All Alerts on a Device 75

7.4.3. Clear an Alert 75
7.4.4. Create Alert Reports 76
7.4.5. Polling Devices With Alerts 77
7.4.6. Setting Alert Definitions 77
7.4.7. Showing Only Devices With Alerts 79
7.5. Run and View Network Diagnostics 80
7.5.1. Poll Devices for Diagnostics 81
7.5.2. Poll Ethernet Devices for Diagnostics 82
7.5.3. Poll Serial Devices for Diagnostics 82
7.6. Graph View 83
7.6.1. Show the Graph View 84
7.6.2. Change the Data Shown in the Graph 84
7.6.3. Zoom In and Out in the Graph 85
7.7. History View 86
7.8. Summary View 87
Serial and TCP/IP Summary View 87
Plus Ethernet Summary View 87
7.8.1. Show the Summary View 87
7.8.2. Copy Data to a Microsoft® Excel Spreadsheet 87
7.9. Trend Analysis View 88
7.9.1. Show the Trend Analysis View 88
7.9.2. Zoom In and Out in the Trend Analysis 89
7.10. Parameter Definitions and Recommended Values 90
7.11. Change Settings Over the Air 92
8. Setup Terminal Application 93
8.1. Configuring Devices Using Setup Terminal 95
9. Spectrum Tool Application 96
9.1. Run a Spectrum Analysis 97
9.2. Stop a Spectrum Analysis 98
9.3. Print a Spectrum Analysis Graph 98
10. Updates Application 99
10.1. Back Up Tool Suite Data 100
10.2. Manually Backup Tool Suite 101
10.3. Restore Tool Suite Data from a Backup 101
10.4. Update Tool Suite at Program Startup 102
10.5. Update Tool Suite From an Open Session 102
10.6. Update Tool Suite Locally 103
10.7. Update Tool Suite from Versions 2.0.1.2 and Earlier 104
11. Release Notes 106

11.1. Version 2.11.2 107
11.2. Version 2.11.1 107
11.3. Version 2.11.0 107
11.4. Version 2.10.0 108
11.5. Version 2.9.2 108
11.6. Version 2.9.1 109
11.7. Version 2.9.0 109
11.8. Version 2.8.7.5 110
11.9. Version 2.8.7.3 110
11.10. Version 2.8.7.2 110
11.11. Version 2.8.7.1 111
11.12. Version 2.8.7.0 111
11.13. Version 2.8.6.0 111
Appendix 12: Legal Notices 113

Preface

Contact FreeWave Technical Support

For up-to-date troubleshooting information, check the **Support** page at www.freewave.com.

FreeWave provides technical support Monday through Friday, 8:00 AM to 5:00 PM Mountain Time (GMT -7).

- Call toll-free at 1.866.923.6168.
- In Colorado, call 303.381.9200.
- Contact us through e-mail at support@freewave.com.

Additional Information

Note: Use the support.freewave.com website to download the latest documentation for the Tool Suite.
Registration is required to use this website.

Document Styles

This document uses these styles:

- Products and applications appear as: **FreeWave**.
- Parameter setting text appears as: **[Page=radioSettings]**
- File names appear as: **configuration.cfg**.
- File paths appear as: **C:\Program Files (x86)\FreeWave Technologies**.
- User-entered text appears as: **xxxxxxxxx**.

Caution: Indicates a situation that **MAY** cause damage to personnel, the radio, data, or network.

Example: Provides example information of the related text.

FREEWAVE Recommends: Identifies FreeWave recommendation information.

Important!: Provides crucial information relevant to the text or procedure.

Note: Emphasis of specific information relevant to the text or procedure.

Provides time saving or informative suggestions about using the product.

Warning! Indicates a situation that **WILL** cause damage to personnel, the radio, data, or network.

1. Tool Suite Overview

FreeWave Tool Suite provides easy, reliable, and repeatable programming and monitoring tools for FreeWave serial and Ethernet wireless data radios, I/O Serial Base devices, and Expansion Modules.

These are the applications available in **Tool Suite**:

Tool Suite consists of applications used to configure devices and run diagnostics to determine how well the devices in the network are performing.

- Configuration Application (on page 38)
  - Use to program devices according to specific network requirements.
- Network Diagnostics Application (on page 68)
  - Use to view performance data in real-time from the network.
- Local Diagnostics Application (on page 65)
  - Use to view a real-time snapshot of MultiPoint setups that measure the signal-to-noise level of a device .
- Spectrum Tool Application (on page 96)
  - Use to monitor the ambient noise at various points in the spectrum as a serial device hops through them. The Spectrum Tool is available for 900 MHz, 2.4 GHz, and 1.3 GHz serial devices only.
- Setup Terminal Application (on page 93)
  - Use to configure device using a terminal window.
  - The **Setup Terminal** application mirrors the menu structure seen using **HyperTerminal**.
- Updates Application (on page 99)
  - Use to review the changes in the latest version of **Tool Suite** and to verify the latest **Tool Suite** version is installed.

Important!: If changes are made to radio settings, the changes are NOT made on the device until they are **sent to the device**.
For more information, see Program Devices from the Device Tree (on page 43).

Notes

- Changes made in **Tool Suite** are saved automatically.
- For information about configuration settings for each FreeWave device, see that device's user manual or addendum.

2. Installing and Upgrading Tool Suite

Tool Suite is compatible with these operating systems:

- Windows 2003 Service Pack 1
- Windows XP Service Pack 2
- Windows Vista
- Windows 7 or higher

Continue with:

- Install Tool Suite (on page 12)
- Updates Application (on page 99)

Note: The images in this document and/or procedure are for **Windows**® 7 and/or **Windows**® 10 and **Firefox**®.
Use the support.freewave.com website to download the latest documentation for the Tool Suite. Registration is required to use this website.

2.1. Install Tool Suite

Note: The images in this document and/or procedure are for **Windows®** 10 and/or **Firefox®**.

1. Login to the support.freewave.com site.

   Note: Registration is required to use this website.

2. Click **Software** > **Tool Suite**.
3. Click the **Tool Suite v2.11.2 - Web Based** link to download the **Tool Suite** install **.zip** file to the computer.
4. Locate the downloaded software and double-click the ..**zip** file to extract the installation **.exe** file.

   Important!: If this is the first time **Tool Suite** is installed on the computer, the installer verifies the **Microsoft .NET Framework 3.5** and **Microsoft SQL Server Compact 3.5** required files are installed.
   If they are not on the computer, **Tool Suite** installer installs them.
   See Installing the Microsoft .NET Framework and Installing Microsoft SQL Server Compact (on page 17) for information.

   The installation wizard starts. Figure 1

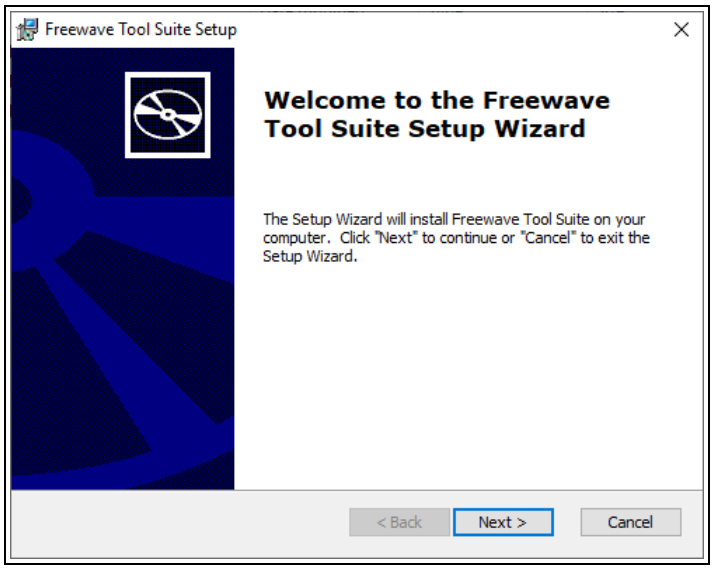


Figure 1: Tool Suite Install Wizard - Welcome

5. Click **Next** to continue.
   The **Tool Suite Install Wizard - Choose Setup Type** dialog box appears. Figure 2

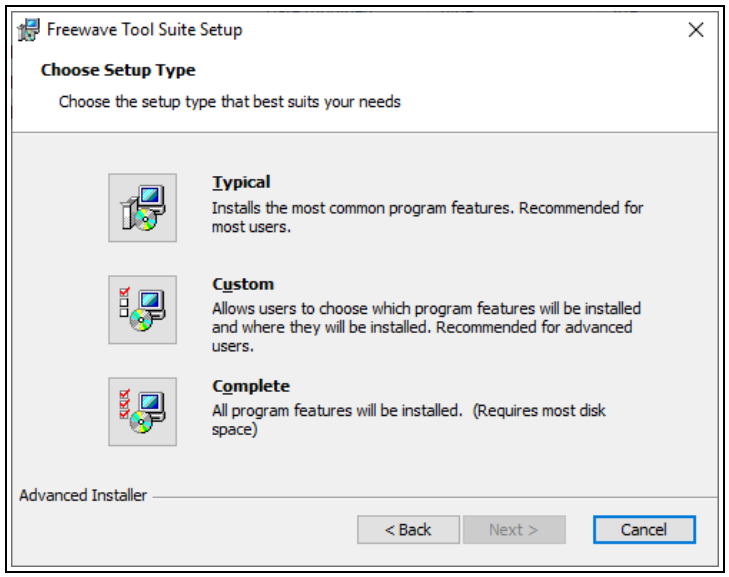


Figure 2: Tool Suite Install Wizard - Choose Setup Type

6. Click the **Complete** setup button to run and click **Next**.
   The **Tool Suite Install Wizard - Ready to Install** dialog box appears. Figure 3

> **Note**: If this is the first time Tool Suite is installed, select **Complete** and click **Next**.

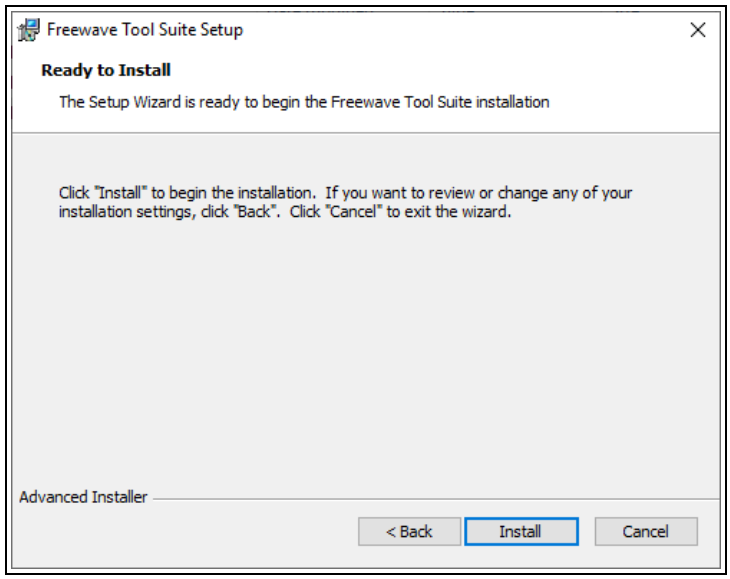


Figure 3: Tool Suite Install Wizard - Ready to Install

7. Click **Install** to continue.
   Tool Suite is installed.
   The **Tool Suite Install Wizard - Finish** dialog box appears when the installation is completed. Figure 4

Note: **Microsoft Report Viewer Redistribution 2008 SP1** is automatically installed with **Tool Suite**.

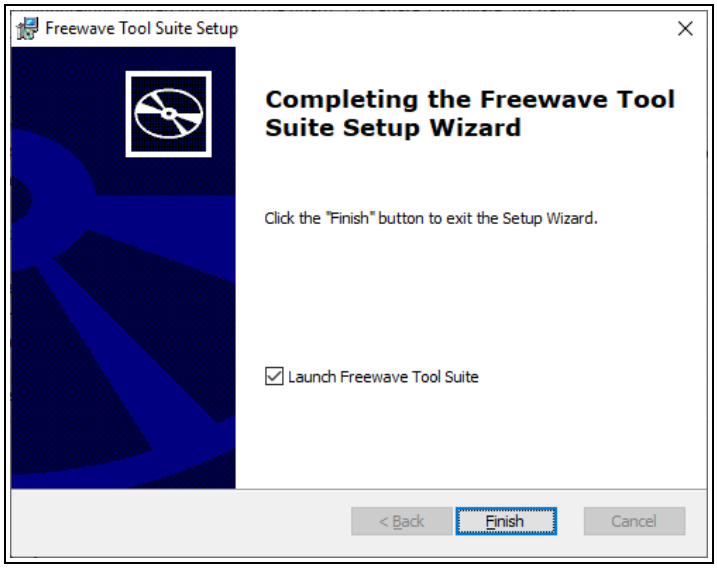


Figure 4: Tool Suite Install Wizard - Finish

8. Click **Finish** to exit and launch **Tool Suite**.
9. Optional: Continue with Connecting Radios to a Computer (on page 20).

2.1.1. Recommended Computer Display Settings

When running **Tool Suite**, use a **minimum** resolution of 1024 x 768 to achieve optimal visual performance on the computer.

Note: Depending on the system setup, Administrative rights to the computer may be required to make these changes.

Important!: A 120 DPI setting is **not** supported (graphics may not align and some text may be partially hidden).

2.2. Installing the Microsoft .NET Framework

This procedure assumes **Microsoft .NET Framework** is being installed from the **Tool Suite** installer.

See Install Tool Suite (on page 12).

Note: The images in this document and/or procedure are for **Windows**® 7 and/or **Windows**® 10 and **Firefox**®.

Procedure

The **Microsoft .NET Framework** is missing message appears. Figure 5

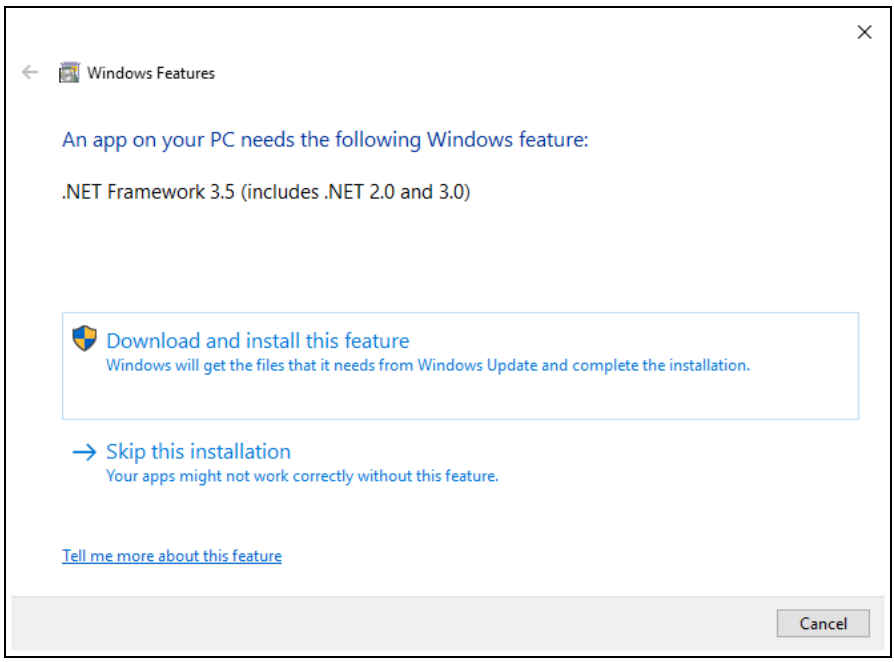


Figure 5: Microsoft .NET Framework 3.5 Missing Message

3. Click the Download and install this feature link.
   The software is downloaded and installed. Figure 6

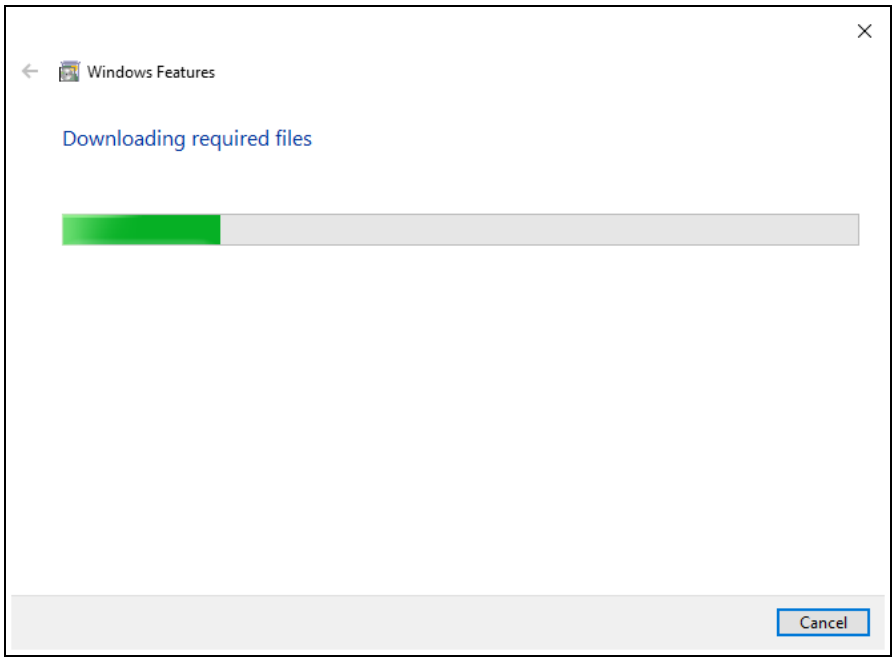


Figure 6: Microsoft .NET Framework 3.5 Downloaded and Installed

The Installation Complete message appears. Figure 7

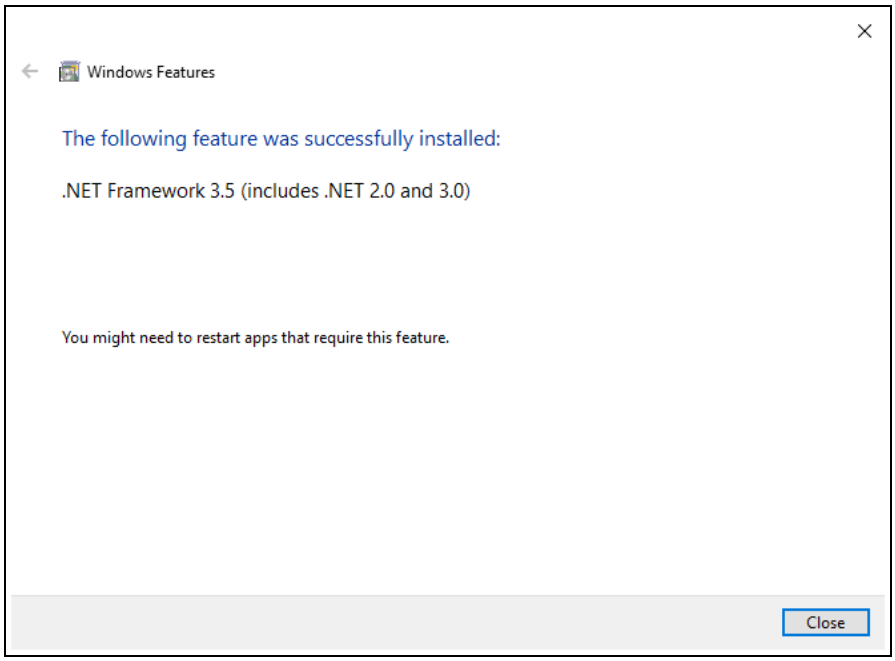


Figure 7: Microsoft .NET Framework 3.5 Installation Complete message

4. Click **Close** to exit.

2.3. Installing Microsoft SQL Server Compact

This procedure assumes **Microsoft SQL Server Compact** is being installed from the **Tool Suite** installer.

See Install Tool Suite (on page 12).

Note: The images in this document and/or procedure are for **Windows**® 7 and/or **Windows**® 10 and **Firefox**®.

Procedure

The installation wizard starts. Figure 8

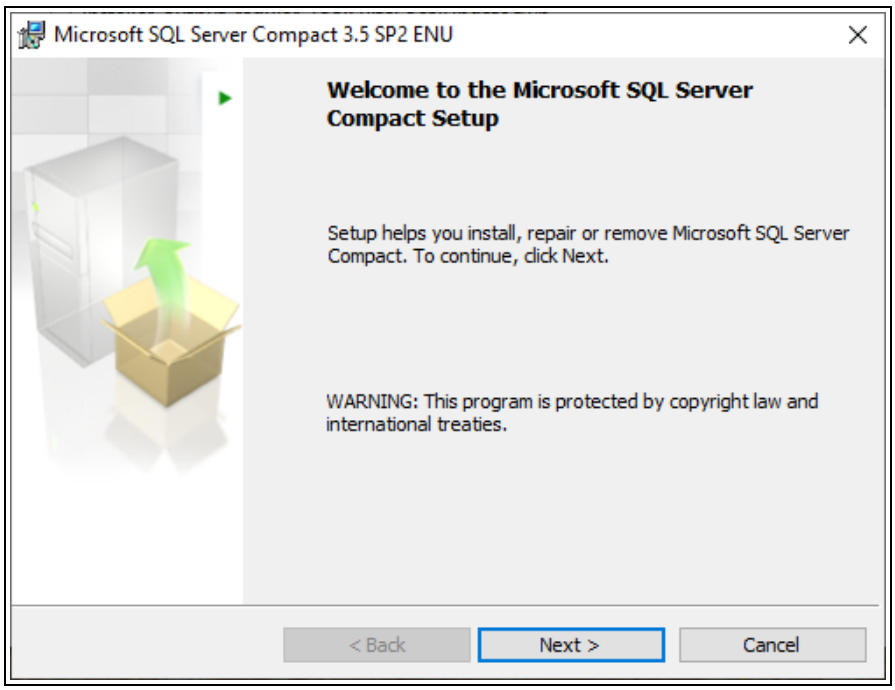


Figure 8: Microsoft SQL Server Compact 3.5 SP2 ENU Wizard - Welcome

1. Click **Next** to continue.
   The **License Agreement** dialog box opens. Figure 9

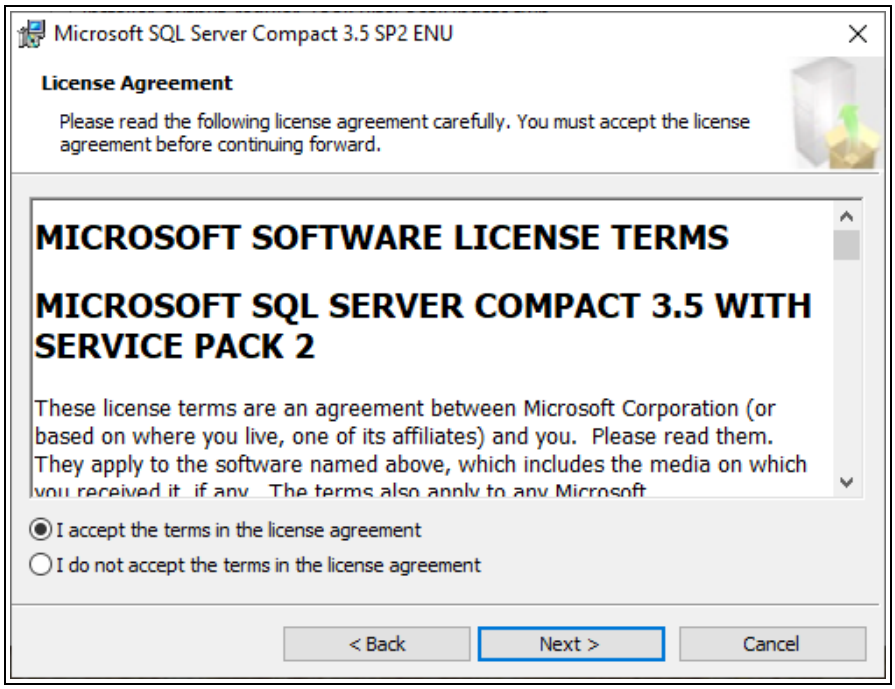


Figure 9: Microsoft SQL Server Compact 3.5 SP2 ENU Wizard - License Agreement

2. Read the license agreement, select the **I accept the terms of the license agreement** option button and click **Next**.
   The **Ready to Install** dialog box opens. Figure 10

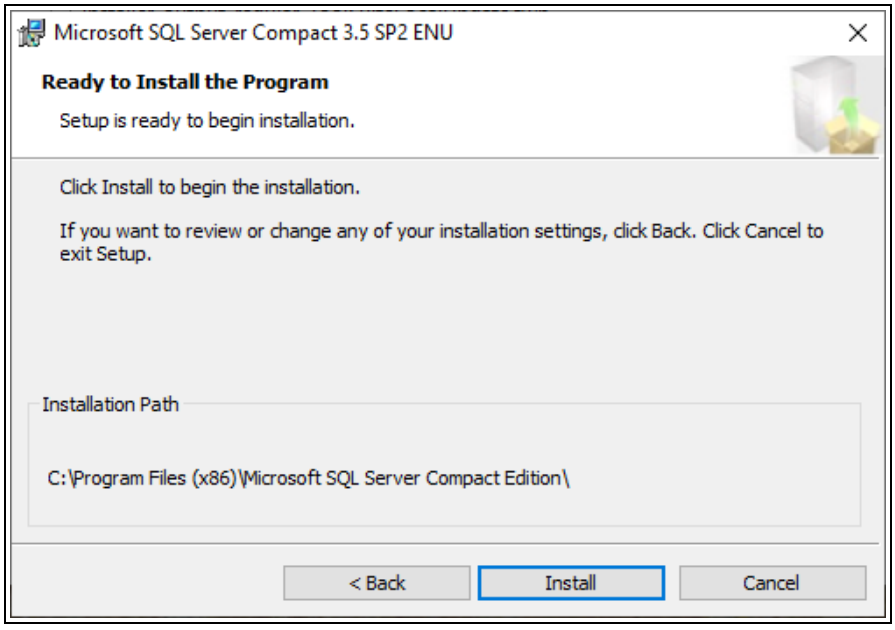


Figure 10: Microsoft SQL Server Compact 3.5 SP2 ENU Wizard - Ready to Install

3. Click **Install** to continue.
   The **Microsoft SQL Server Compact** is installed.
   The **Finish** dialog box appears when the installation is completed. Figure 11

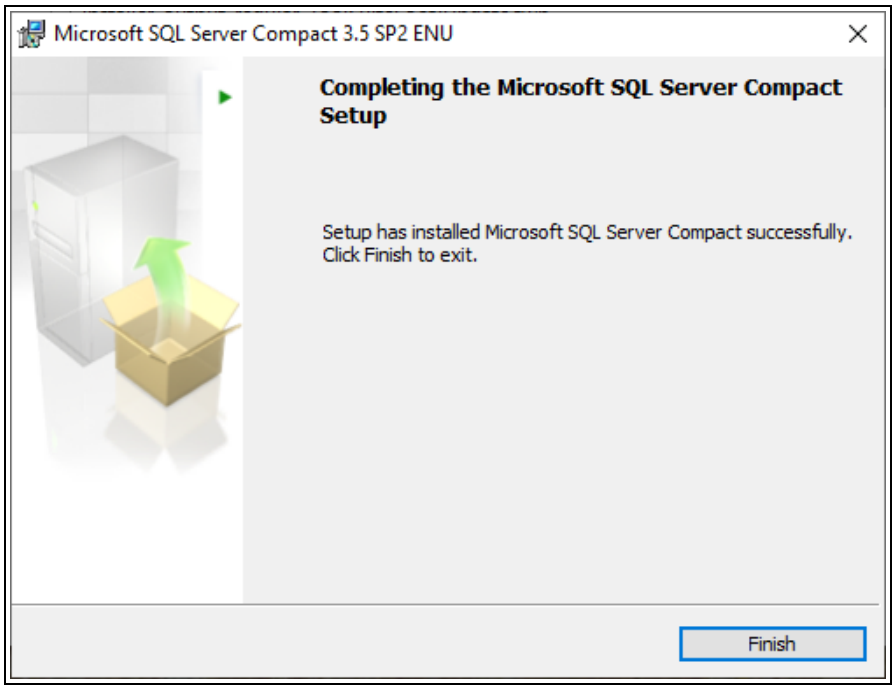


Figure 11: Microsoft SQL Server Compact 3.5 SP2 ENU Wizard - Finish

4. Click **Finish** to exit.

2.4. Connecting Radios to a Computer

To read and program a radio using **Tool Suite**, connect the radio to a computer that runs **Tool Suite** software.

1. Connect a serial or diagnostic cable between the computer's COM port and the radio. Using a diagnostic cable is recommended.
2. Connect the power supply to the radio and place the radio into **Setup** mode.

Use a serial cable for both Configuration and Setup Terminal applications.
However, a Diagnostics cable is required to run diagnostics using the Network or Local Diagnostics applications.
For Diagnostics **only**, functionality is available via TCP/IP if routing through a Terminal server to reach the serial Master radio.

3. Tool Suite Navigation

The buttons, ribbons, and toolbars in **Tool Suite** are used to navigate to different areas of **Tool Suite**. Options are also available using the right-click and left-click buttons on the mouse.

These sections describe the navigation tools available and when to use them.

- Recommended Computer Display Settings (on page 14)
- Ribbons and Toolbars (on page 22)
- File Drop-down Menu (on page 23)
- Field Tool Tips (on page 24)
- Access Individual Device Options (on page 24)

3.1. Ribbons and Toolbars

Note: The images in this document and/or procedure are for **Windows**® 7 and/or **Windows**® 10 and **Firefox**®.

- Ribbons refer to the toolbars that have either the FreeWave logo on them or the title bars underneath that show the network name.
- The sections are used to group buttons with like functionality together on these ribbons and are specific to the application open in **Tool Suite**.

Note: The terms “ribbon” and “toolbar” are used interchangeably throughout this documentation.

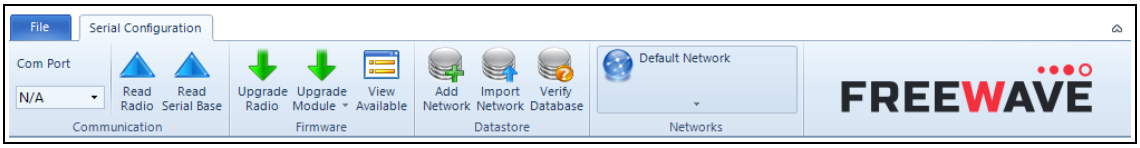


Figure 12: Configuration Application Ribbon

Below the main ribbon is a smaller **Network Title** ribbon that shows the name of the network that is currently selected. Figure 13 and Figure 14

Important!: This smaller ribbon only appears in the Configuration Application (on page 38) and Network Diagnostics Application (on page 68).
It includes additional options that apply to those applications.

Figure 13: Configuration Application with Network Title Ribbon

Figure 14: Network Diagnostics Application with Network Title Ribbon

3.2. File Drop-down Menu

Note: The images in this document and/or procedure are for **Windows**® 7 and/or **Windows**® 10 and **Firefox**®.

The **File** drop-down menu in the main ribbon functions similar to a **File** menu in most **Windows**® software programs.

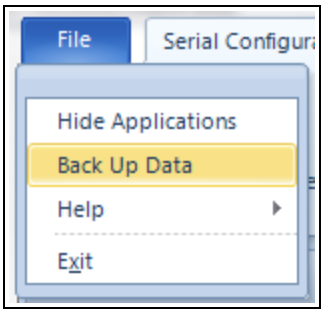


Figure 15: File Drop-down Menu

Use the **File** menu to access this functionality:

- **Hide Applications** - Shows or hides the Application pane that displays on the left side of **Tool Suite**.
- **Back Up Data** - Use to save a backup copy of the **ToolSuite.sdf** file, which contains all **Tool Suite** data.

  Note: For more information, see Back Up Tool Suite Data (on page 100).
- **Help > About** - Shows the **Tool Suite** software version information.
- **Exit** - Closes **Tool Suite**.

3.3. Field Tool Tips

Use the mouse to hold the cursor over a parameter setting to view a brief description about that parameter's function. Figure 16

Note: The images in this document and/or procedure are for **Windows**® 7 and/or **Windows**® 10 and **Firefox**®.

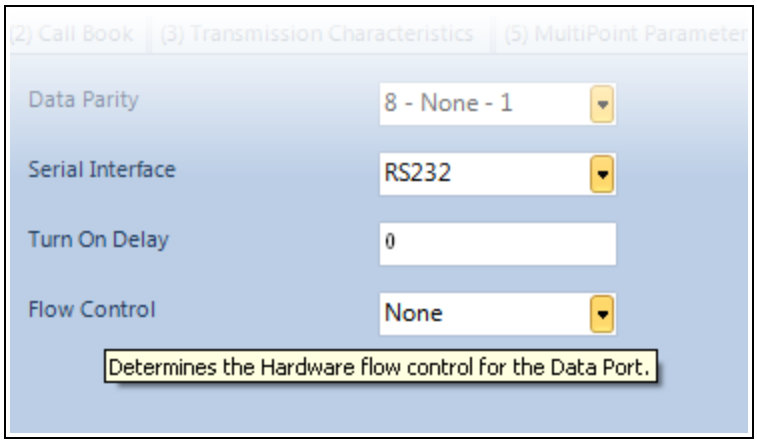


Figure 16: Example: Field Tool Tip

Note: This feature does not apply to I/O Expansion menus.

3.4. Access Individual Device Options

A device's options depends on its operation mode (e.g., Master or Slave).

Right-click the device to access specific options for that device. Figure 17

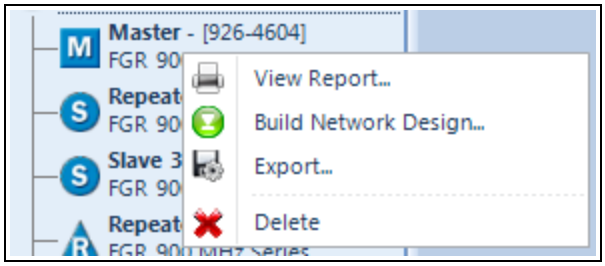


Figure 17: Example: Device Tree in the Configuration Application

4. Network Files and Settings

In **Tool Suite**, devices can be set up that are programmed and monitored using networks that mirror the devices setup in the actual network.

- Devices can be grouped into serial, TCP Terminal Server, and Ethernet networks.
- Networks can be setup by geographic region, by customer, or whatever grouping that helps identify the devices.

Each network has its own set of devices and configuration settings to connect to the devices within it.

These applications in **Tool Suite** use networks:

- Configuration Application (on page 38)
  - Networks defined in this application are shared with the **Network Diagnostics** application.
- Network Diagnostics Application (on page 68)
  - Networks defined in this application are shared with the **Configuration** application.

For more information, see:

- Create Configuration and Network Diagnostics Networks (on page 26)
- Configure Network Settings (on page 28)
- Delete Devices From Networks (on page 31)
- Export Networks (on page 32)
- Import Networks (on page 36)
- View Networks (on page 37)

4.1. Create Configuration and Network Diagnostics Networks

Setup a network prior to configuring serial or Ethernet devices in the Configuration Application (on page 38) or running diagnostics in the Network Diagnostics Application (on page 68).

Tool Suite supports multiple networks and network types that can run simultaneously.

> **Important!**: The TCP terminal server network is only useful in the **Network Diagnostics** application to gather diagnostics for a serial network through a TCP/IP connection to a terminal server.

- Create a Serial Network (on page 26)
- Create a TCP Terminal Server Network (on page 26)
- Create an Ethernet Network (on page 27)

4.1.1. Create a Serial Network

1. In either the **Configuration** or the **Network Diagnostics** application, click **Add** in the **Datastore** section of the ribbon to open the **Add Network** window.
2. In the **Network Name** text box, enter a name that identifies the network's purpose.
3. Optional: In the **Company** field, enter a company name associated with the network.
4. Click **Next**.
5. Click the **Network Type** list box arrow and select **Serial**.
6. If creating a network in the **Configuration** application, click **Finish** to save the network to the database.

   > **Note**: If creating a network in the **Network Diagnostics** application, click **Next** and continue with the next step.

7. Optional: In the **Are you using 1.4 GHz** field, select **Yes** if there are any 1.4 GHz devices in the network.
   If not, leave the field set to **No**.
8. In the **Com Port** field, select the port the device is connected and click **Next**.
9. Click **Finish** to save the network to the database.
10. For additional network options, see Configure Network Settings (on page 28).

4.1.2. Create a TCP Terminal Server Network

1. In either the **Configuration** or the **Network Diagnostics** application, click **Add** in the **Datastore** section of the ribbon to open the **Add Network** window.
2. In the **Network Name** text box, enter a name that identifies the network's purpose.
3. Optional: In the **Company** text box, enter a company name associated with the network.
4. Click **Next**.
5. Click the **Network Type** list box arrow and select **TCP Terminal Server**.

> **Note**: If creating a network in the **Network Diagnostics** application, click **Next** and continue with the next step.

6. In the **IP Address** field, enter the IP address of the terminal server used to read the network.
7. In the **Port** text box, enter the port number on the terminal server used to read the network and click **Next**.
8. Click **Finish** to save the network to the database.
9. For additional network options, Configure Network Settings (on page 28).

4.1.3. Create an Ethernet Network

1. In either the **Configuration** or the **Network Diagnostics** application, click **Add** in the **Datastore** section of the ribbon to open the **Add Network** window.
2. In the **Network Name** text box, enter a name that identifies the network's purpose.
3. Optional: In the **Company** field, enter a company name associated with the network.
4. Click **Next**.
5. Click the **Network Type** list box arrow and select **Plus Ethernet**.
6. If creating a network in the **Configuration** application, click **Finish** to save the network to the database.

> **Note**: If creating a network in the **Network Diagnostics** application, click **Next** and then click **Finish** to add the network to the database.

7. For additional network options, Configure Network Settings (on page 28).

4.2. Configure Network Settings

- The network's settings must be defined before connecting devices to the network.
- The network settings provide **Tool Suite** with the information it needs to connect to the devices in the network.

Procedure

1. In either the **Configuration** application or the **Network Diagnostics** application, in the **Networks** section of the ribbon, select the network to configure settings in.
2. In the **Network Title** ribbon, on the **Options** menu, select **Network Settings**.
   The **Network Settings** window opens.
3. Complete these settings for the network:

Field	Description
Name	Enter an identifying name for the network. If this field is left blank, the network name is **Default Network**.
Company	Optional: Enter the company name associated with the network.
Interface	Enter the network type (serial or TCP). 1. If setting a serial or TCP network set the COM port or whether 1.4 GHz radios are in use in the network. 2. Make the necessary changes and click **Update** in the **Change Interface** window before returning to the **Network Settings** window.

Polling Interval (ms)	Enter the amount of time **Tool Suite** waits between each time it pools the radios.
	• The default **Polling Interval** is:
	  • 200 ms for Serial and TCP/IP networks and
	  • 500 ms for Ethernet networks.
	• To poll automatically when a polling interval has completed, select the **Auto** check box.
	• See Recommended Polling Intervals (on page 30) for intervals based on whether serial Repeaters are used in a network.

Field	Description

Polling Mode	Select from one of these polling modes:
	• **Discovery** - During the first diagnostic run of a new network and to discover radios more quickly, set the polling mode to **Discovery** to allot 9 out of 10 polls to discovering new radios in the network, and 1 out of 10 polls to populating settings information.
	  • This is the default mode when a new network is added.
	  • **Discovery** mode is not available for Ethernet networks.
	• **Sequential** - After all radios have been discovered in the network, change to **Sequential** mode.
	  • This mode allots 1 out of 10 polls to discovering new radios and 9 out of 10 polls to populating settings information.

Clear Diagnostics After	Select the amount of time **Tool Suite** waits before clearing data for the specified network. To keep the history data intact, select the **Exclude History** check box.
Notes	Enter any additional information about the network that is not highlighted in the settings.

4. Click **Update** to change the network settings.

4.2.1. Recommended Polling Intervals

The default **Polling Interval** field setting is 200 ms for serial and TCP/IP networks, and 500 ms for Ethernet networks.

This table provides recommended polling intervals if the network includes serial Repeaters.

Network Type	Default Polling Interval	Minimum Polling Interval	Repeaters turned OFF in Master	1 Repeater (add 50 ms)	2 Repeaters (add another 50 ms)	Add 50 ms for each additional Repeater
Serial	200 ms	100 ms	100 ms	150 ms	200 ms	250 ms
TCP/IP	200 ms	100 ms	100 ms	150 ms	200 ms	250 ms
Ethernet*	500 ms	100 ms	100 ms	150 ms	200 ms	250 ms
455 MHz	200 ms	300 ms	300 ms	600 ms	600 ms	Not supported

Note: * In Ethernet networks, customer data is not given polling priority over diagnostic data.

4.3. Delete Devices From Networks

Devices can be removed from a defined network without deleting the network and the network settings. All devices and settings associated with a network, the network name, and any stored diagnostic data can be deleted.

4.3.1. Delete an Individual Device from a Network

1. In either the **Configuration** application or the **Network Diagnostics** application, in the **Networks** section of the ribbon, select the network to change.
2. Select the device to delete.
3. Right-click and select **Delete**.
4. Click **Yes** at the prompt to delete the device from the network.

4.3.2. Delete All Devices from a Network

1. In either the **Configuration** application or the **Network Diagnostics** application, in the **Networks** section of the ribbon, select the network to change.
2. In the **Network Title** ribbon, on the **Options** menu, select **Clear Network**.

Right-click in an empty area in the tree view and select **Clear Network**.

3. Click **Yes** at the prompt to remove all the devices from the network.

4.3.3. Delete a Network

1. In either the **Configuration** application or the **Network Diagnostics** application, in the **Networks** section of the ribbon, select the network to delete.
2. In the **Network Title** ribbon, on the **Options** menu, select **Remove Network**.

Right-click in an empty area in the tree view and select **Remove Network**.

3. Click **Yes** at the prompt to remove the network and all its data from **Tool Suite**.

4.4. Export Networks

Use the **Export** functions to save a network data for transferring to a different **Tool Suite** instance, or for viewing in a spreadsheet or database.

> **Important!**: If there are multiple networks to export, they **must be** exported individually.

Data in a network in **Tool Suite** can be exported to one of these file types:

- Export a FreeWave Network (.fwn) (on page 32)
- Export a Network Settings Report (.csv) (on page 33)
- Export a FreeWave Network Design (.fwt) (on page 33)
- Export Network Data to a SQL Server Database (.fwn) (on page 33)

Export a FreeWave Network (.fwn)

> **Note**: See Export a FreeWave Network (.fwn) (on page 33).

- In the Configuration Application, this exports the settings for the discovered and template devices in a network that can be imported into another **Tool Suite** instance.

  Use this option to make a copy of a network file and then import it to use as a base for a different network.

- In the Network Diagnostics Application, this exports the network file, the historical diagnostic data, and the Path View into the network.
- Use the exported network configuration file to:
  - Load an existing radio configuration when radios are added to an existing network.
  - Reload the configuration of any radio in the network when replacing a failed or damaged radio.
  - Send the exact network configuration to someone for review or troubleshooting.
  - Ensure the network configuration is always available at the Master radio site.
  - If you need to program a radio in the network, you have the needed configuration files at hand.
  - Ensure there's always a saved version of the latest configuration settings for the network.

Export a Network Settings Report (.csv)

Note: See Export a Network Settings Report (.csv) (on page 34).

- In the Configuration Application, this exports the settings for the discovered devices in the network to a file that is opened in a spreadsheet application.
- In the Network Diagnostics Application, this exports the network file, the historical diagnostic data, and the Path View information to a file that is opened in a spreadsheet application.
  - Viewing the network data in a spreadsheet can offer better clarity about settings across the network.

Export a FreeWave Network Design (.fwt)

Note: See Export a FreeWave Network Design (.fwt) (on page 34).

- Exports the virtual network map in the **Network Design** tab of the **Configuration** application that can be imported into another **Tool Suite** instance.

Use this option to make a copy of a Network Design and then import it to use as a base for a different network.

Export Network Data to a SQL Server Database (.fwn)

Note: See Export Network Data to a SQL Server Database (.fwn) (on page 34).

Important!: Read/Write permission to the server is required and the server must be accessible to **Tool Suite**.

4.4.1. Export a FreeWave Network (.fwn)

1. In either the Configuration Application or the Network Diagnostics Application, in the **Networks** section of the ribbon, select the network to export from.
2. In the **Network Title** ribbon, on the **Options** menu, select **Export > FreeWave Network File**.

Right-click in an empty area in the tree view and select **Export > FreeWave Network File**.

3. If exporting a network file from the **Network Diagnostics** application, enter the date range of the historical diagnostic data to include in the export and click **Export**.

> **Example**: To see historical data for the last month, enter the first and last days of that month in the corresponding fields.

4. Optional: Select the **Exclude Diagnostic History** check box to complete the export without any historical diagnostic data and click **Export**.
5. In the **Export Network** window, select the directory location to save the file in.
6. In the **File name** text box, enter the file name and click **Save**.
   The file is saved in the directory location with a **.fwn** extension.

4.4.2. Export a Network Settings Report (.csv)

1. In either the Configuration Application or the Network Diagnostics Application, in the **Networks** section of the ribbon, select the network to export from.
2. In the **Network Title** ribbon, on the **Options** menu, select **Export > Network Settings Report**.

   Right-click in an empty area in the tree view and select **Export > Network Settings Report**.
3. In the **Export Network** window, select the directory location to save the file in.
4. In the **File name** text box, enter the file name and click **Save**.
   The file is saved in the directory location with a **.csv** extension.

4.4.3. Export a FreeWave Network Design (.fwt)

1. In the Configuration Application, in the **Networks** section of the ribbon, select the network to export from.
2. In the **Network Title** ribbon, on the **Options** menu, select **Export > FreeWave Network Design**.

   Right-click in an empty area in Network Design and select **Export > Design**.
3. In the **Export Network** window, select the directory location to save the file in.
4. In the **File name** text box, enter the file name and click **Save**.
   The file is saved in the directory location with a **.fwt** extension.

4.4.4. Export Network Data to a SQL Server Database (.fwn)

1. In either the Configuration Application or the Network Diagnostics Application, in the **Networks** section of the ribbon, select the network to export from.
2. In the **Network Title** ribbon, on the **Options** menu, select **Export > SQL Server DB**.

   Right-click in an empty area in the tree view and select **Export > SQL Server DB**.

3. In the **Database Connection Form** window, complete this information about the SQL Server database to save the network data from:

Field	Description
Database Server	Enter the location of the server that runs the SQL database to save the network data from. • This database must be within the IT network. • The computer must have access to the location.
Database Name	Read Only • The network data is saved to a table in the SQL Server database called FreeWaveNetwork. • If the table already exists in the database, when you export **Tool Suite** adds lines to the existing table.
Use Windows Authentication	Select this check box to use the Windows user name and password to access the SQL Server database. **Note**: If the database access credentials are different from the Windows user name and password, do not select this check box and use the **Data User Name** and **Password** fields.
Database User Name	Enter the user name to access the server in the **Database Server** field.
Password	Enter the user password to access the server in the **Database Server** field.

4. Click **Test Connection** to verify access to the database and that the entered user name and password are correct.
   - If **Tool Suite** can connect to the database, a **Success** message appears.
   - If **Tool Suite** cannot connect to the database, an error message appears.
     - Verify that the information entered in the **Database Connection Form** window is correct and the server is running and test the connection again.
5. Click **OK** to export the network data to the **SQL Server** database.

4.5. Import Networks

Use a FreeWave network file exported from **Tool Suite** to import the content of that network.

These file types can be imported:

- **FreeWave Data File (.sdf)** - A file that was exported from **Tool Suite** v2.0.1.2 and earlier.
- **FreeWave Network File (.fwn)** - A file that was exported from **Tool Suite** v2.2 and later.
- **FreeWave Network Design (.fwt)** - A file that was exported from the **Network Design** tab in **Tool Suite**.
- **EzConfig File (.fws)** - A file that was exported from the FreeWave **EZConfig** application, which preceded **Tool Suite**.
- **Comm Control File (.nwf)** - A network design file that was exported from the FreeWave **Comm Control** application, which preceded **EZConfig** and **Tool Suite**.
- **Comma Separated Value (.csv)** - A comma separated values (**.csv**) file saved from a spreadsheet application such as Microsoft Excel.
  - These files must be formatted in this order: **Serial Number**, **Name**, and if applicable, **IP Address**.
  - If the file is not in this format, an error is received when importing the file.

Important!: Ethernet networks only have the option to import **Tool Suite .fwn** and Comma Separated Value **.csv** file types.

Procedure

1. In either the **Configuration** application or the **Network Diagnostics** application, click **Import** in the **Datastore** section of the ribbon to display the **Add Network** window.
2. Click the **Options** list box arrow in **Network Title** ribbon and select **Import**
3. Select the file type to import.

   Select **Import** from the **Datastore** section of the ribbon to import a **Tool Suite** v2.2 and later file type (**.fwn**).
4. In the **Import** window, locate the file to import and click **Open** to import the file. **Tool Suite** processes the file and opens it.
5. Access the network from either the Configuration Application (on page 38) or Network Diagnostics Application (on page 68).

4.6. View Networks

- You can view a single network at a time. When you open a network to view in one application, that network is also displayed in the other applications that use networks. For example, if you open Network A in the Configuration application, if you move to the Network Diagnostics application, Network A is open and displays in that application as well.

1. In either the **Configuration** or the **Network Diagnostics** application, click the list box arrow in the **Networks** section in the ribbon.
2. Select the network to view.
   The selected network appear in the application.

> **Note**: Networks are grouped into Serial and Plus (Ethernet) groups.

5. Configuration Application

Use the **Configuration** application to program parameters on devices in the network and to:

- Use the Devices Tree (on page 40) to define templates that contain the settings to send to a device.
- Create Network Designs (on page 52) diagrams that are a virtual version of the device network.
- Define Device Parameter Settings (on page 46)
- Update a Device to the Latest Firmware Version (on page 63)

Note: The images in this document and/or procedure are for **Windows**® 7 and/or **Windows**® 10 and **Firefox**®.

Click **Configuration** in the **Applications** pane. Figure 18

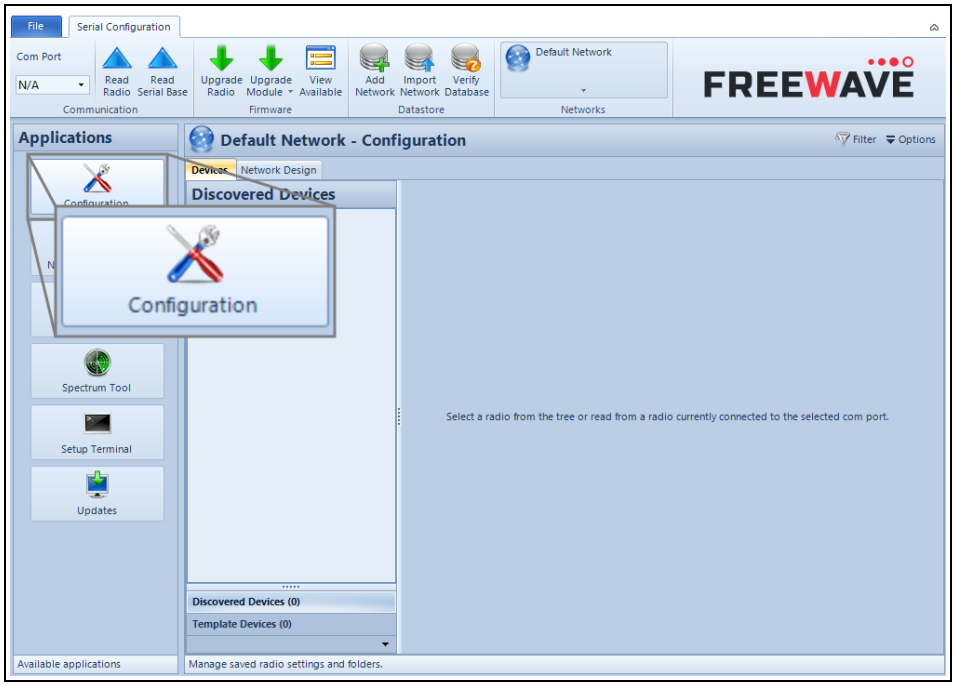


Figure 18: Applications > Configuration

5.1. Devices Tree

Tool Suite maintains a database of all radios that are read, programmed, or in some way manipulated in the software.

- This database is used to check settings for a defined device without being connected to the device.
- View the devices stored for a selected network in the **Devices** tab.
- The devices in the network appear in a tree format, similar to directories in **Windows® File Explorer**.

In the **Devices** tab, devices are grouped into one of these views:

- **Discovered Devices** - Lists devices that have a serial number.
  - A device is found when it is read through the **Network Diagnostics** application or programmed in the **Configuration** application.
- **Template Devices** - Lists any radio created manually through the template wizard and **EZConfig** imported files.

Note: The images in this document and/or procedure are for **Windows**® 7 and/or **Windows**® 10 and **Firefox**®.

- To change between the two views, click the corresponding accordion button at the bottom of the pane. Figure 19
- To hide or show the accordion buttons, click the arrow at the bottom of the window pane and select which buttons to hide or show.

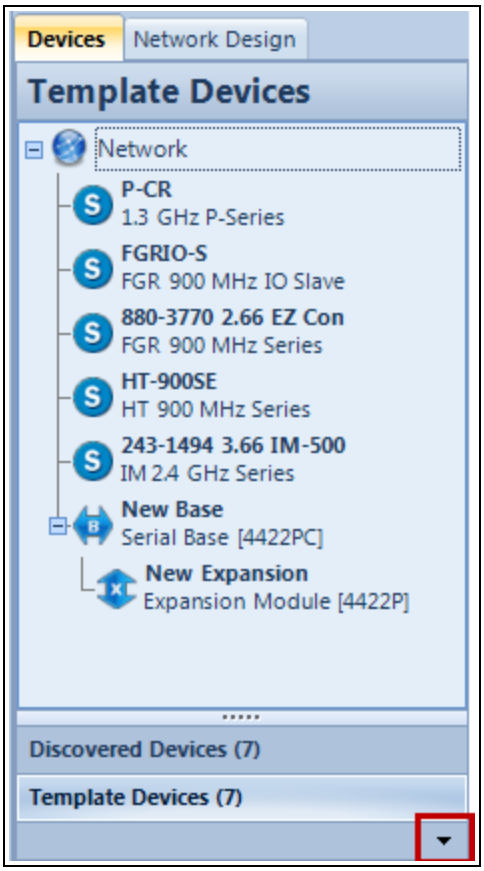


Figure 19: Device tab - Accordion button

After **Tool Suite** successfully reads a device (after clicking **Read Radio** or **Read Serial Base**), the list updates to include the read device's serial number, name, and a symbol to indicate the operation mode:

-  - Indicates a Master in the network.
-  - Indicates a Slave in the network.
-  - Indicates a Repeater in the network.
-  - Indicates a Serial Base in the network.

Note: **Tool Suite** refreshes the right side of the window to show the selected device's settings. Selecting a device listed in the **Discovered Devices** or **Templates** view refreshes the **Device Information** and other settings for that selection.

5.1.1. Add Template Devices to the Network

Use templates to define a device in the network.

- Settings in a template are defined and then used to program all the radios in the network with that configuration.
- Templates save time by not having to define each individual device in the network if the devices share the same settings and helps to ensure that devices that require the same settings across the network are programmed identically.
- A template for a device can be added to the Device tree, which adds it to the network database for any network type.
  - The device is added with the factory default settings.
  - This feature functions as a single radio template and is added to the Template Devices view in the Device tree.

Add a Radio Template to the Device Tree

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, select the network to add a device to.
3. Right-click in a blank area of the **Device** tree and select **Add > Radio Template**.
4. In the **Name** text box, enter a name to identify this device.
5. Click the **Radio Type** list box arrow and select the type of device to add to the network.

   Note: The lists includes all the supported devices for the network type.

6. Click **Add** to add the device to the **Device** tree.

Add a Serial Base Template to a Serial Network Device Tree

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the Networks section of the Configuration ribbon, select the network to which you want to add a device.
3. Right-click in a blank area of the **Device** tree and select **Add > Serial Base Template**.
4. In the **Name** text box, enter a name to identify the base.
5. Click the **Module Type** list box arrow and select the type of serial base to add to the network.
6. Click **Add** to add the device to the **Device** tree.

5.1.2. Filter Devices in the Device Tree

Filter the contents of the tree to view specific devices in a large network

and only want to see devices in the tree of a certain modem mode you can filter the contents of the tree to display only those devices.

For example, if you only want to see the Slave devices.

Note: Devices can be filtered in the Network Design view.

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, select the correct network.
3. Click the **Filter** menu in the **Network Title** ribbon and select the device type to view.

   Note: Select **Show All** to view all devices.

5.1.3. Organize Devices in Folders in the Device Tree

If the network contains a large number of devices, use folders in the Device tree to organize the network.

Example: Create folders to store like devices together, or you might choose to organize the network by geographic region.

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, select the network to add a folder to the Device tree.
3. Right-click in a blank area of the Device tree and select **Add > Folder**.
   A new folder is added to the tree.
4. Right-click the folder in the tree and select **Rename** and enter a name that describes the content of the devices in the folder.
5. To move the folder in the tree, select the folder and drag and drop it to the correct location in the tree.
6. To move devices in to the folder, select the device and drag and drop it onto the folder.

5.1.4. Program Devices from the Device Tree

When changes are defined for a device in the network in the **Configuration** application, they can be sent to the device when it is connected to the computer running **Tool Suite**. The device can also be returned to its factory default settings.

Note: For radios in a Terminal Server network, it is not currently possible to read a serial radio in the **Configuration** application connected locally to the computer running **Tool Suite**.
The TCP terminal server network is only useful for network diagnostics where you want to gather diagnostics of a serial network through a TCP/IP connection to a terminal server.

Programming options are located above the tabs in the main **Configuration** application window and appear when **Tool Suite** is reading a device. Figure 20

Figure 20: Programming Options

Note: The images in this document and/or procedure are for **Windows**® 7 and/or **Windows**® 10 and **Firefox**®.

Procedure

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, select the network that contains the devices to program.
3. Connect to the device and click **Read Radio** to poll the device for its settings.
4. Make changes to the settings, as necessary.
5. In the **Network Title** ribbon, select one of these programming options to send the settings to the device:

Programming Options	Description
All	Sends all the settings to the device, even if no changes have been made to any settings. **Note**: If programming an Ethernet device, the settings can be sent to another device in the network. Enter that device's IP address when prompted.
Quick	Sends only the settings that have changed. **Important!**: The **Quick** programming option is only available for changes made in the current session. If **Tool Suite** is closed or a different device is selected, the **Quick** option is no longer applicable.
Default	Sends the factory default settings for all parameters to the device. Answer **Yes** at the prompt to set the radio back to its factory default settings.

Note: When the device is programmed, the device's Carrier Detect (CD) LED shows Solid Green and the Clear to Send (CTS) LED shows Solid Red (Bright) .

5.1.5. Read Current Settings From a Device

A device can be polled for its current parameter settings. Upon a successful read of a device, the **Device** tree updates to include the device's serial number, name, and a symbol to indicate the operation mode. **Tool Suite** also refreshes the right side of the window displaying the device settings. Selecting a device listed in the **Discovered Devices** or **Templates** view refreshes the **Device Information** and other settings for that device.

Note: If an older version of firmware is loaded that **Tool Suite** does not support, the software prompts a launch for **EZConfig** to read the device's settings.

1. Connect the device to the computer using either the serial port or the diagnostics port and open **Tool Suite**.
2. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
3. In the **Networks** section of the **Configuration** ribbon, select the network to add a device to.
4. If the device is serial, verify the correct COM port is selected in the **Com Port** field.

   Note: To find the correct port on the computer, look in the **Windows® Control** panel under **System > Hardware > Device Manager >Ports**.

   - **Tool Suite** pulls its COM port settings from the **Windows®** operating system when **Tool Suite** is opened.
   - If the COM port was configured after opening **Tool Suite**, or a device was connected to **Tool Suite** after opening the application, the application might need to be closed and reopened to select the correct COM port.

   Important!: If a COM port is not configured in **Windows®**, it is not available in **Tool Suite**.
5. If the device is an Ethernet device, verify the correct IP address for the device is entered in the **IP Address** text box.
6. Click **Read Radio** to read the settings from the device that is currently connected or click **Read Serial Base** if reading the settings from a Serial Base device.
   - If reading an Ethernet device, a prompt appears to enter the device's password if the password has changed since the last time the device was read from the current instance of **Tool Suite**.
   - If reading a Serial Base with Expansion Modules in a stack, **Tool Suite** reads the Serial Base plus all Expansion Modules connected in the stack.
     - A stack consists of one I/O Expansion Serial Base or serial device (e.g., FGR2-IO-IOE) and up to 15 Expansion Modules (e.g., IOEX-4422).

   Note: If reading a serial device's settings using the diagnostics cable, the device is placed into **Setup** mode automatically and all three LEDs on the device turn Solid Green .
   If reading a serial device's setting using the serial port, **Tool Suite** prompts to place the device into **Setup** mode before it can read the settings.

5.2. Device Parameter Settings

- The serial or Ethernet network type determines the device templates that can be added to the network.
- Each set of devices has a set of parameters to configure and then send to the device.
- The parameters are grouped together in tabs that appear in the **Configuration** application's main pane.

  Note: The template parameter settings in a serial or TCP network are identical.

- Each device contains a different set of tabs and parameters; however, most devices in a serial network contain the same parameter settings and most devices in an Ethernet network contain the same parameter settings.
- In addition, the mode assigned in the **Modem Mode** field in the **Operations Mode** tab can display a different set of tabs.

  Note: The tab names correspond to the menus as they appear in Setup Terminal and other terminal emulators.

- These sections provide a brief overview of the contents of each tab in the different network types.
- For details about how the parameters apply to the connected device and recommended values for each, refer to the documentation for that device.

  Note: Parameters that appear with a double asterisk (**) are parameters that **must be the same for all devices** across the network.

See:

- Ethernet Device Parameter Tabs (on page 47)
- I/O Serial Base and I/O Expansion Device Parameter Tabs (on page 49)
- Serial / TCP Terminal Network Device Parameter Tabs (on page 50)

5.2.1. Ethernet Device Parameter Tabs

The parameters for Ethernet network devices are shown here: Figure 21

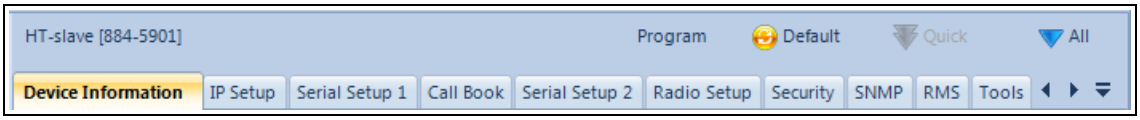


Figure 21: Ethernet Device Parameter Tabs

Note: The images in this document and/or procedure are for **Windows**® 7 and/or **Windows**® 10 and **Firefox**®.

This table provides an overview of the contents of each tab.

Note: For details about how the parameters apply to the connected device and recommended values for each, refer to the documentation for that device.

Ethernet Device Parameter Tabs	
Tab	**Description**
Device Information	Includes basic device identification information such as the device name, model number, and serial number. Common diagnostics information is also available on this tab if reading a device.
IP Setup	Contains communication information such as the IP address and default Gateway address for the device. **Important!**: Check with the Network Administrator before changing any settings on this tab.
Serial Setup 1	Contains data settings for serial port 1 on the device. • These settings need to match the serial device connected to this port. • Serial ports 1 and 2 are independent of each other; they can have different baud rates, parity, protocol, etc.
Call Book	Includes: • the call information to incorporate up to 10 FreeWave radios, • designate 1 to 4 Repeaters for use with each radio, and • designate which specific Endpoint the Gateway calls, by serial number. **Important!**: The Call Book is required in Point-to-Point networks. It is NOT recommended in Point-to-MultiPoint networks.

Ethernet Device Parameter Tabs	
Tab	**Description**
Serial Setup 2	Contains the data settings for serial port 2 on the device. • These settings need to match the serial device connected to this port. • Serial ports 1 and 2 are independent of each other; they can have different baud rates, parity, protocol, etc.
Radio Setup	Contains all the settings regarding general radio setup such as Operation Mode and transmission characteristics.
Security	Contains security settings such as RADIUS authentication, passwords, and encryption keys. **Note**: In Release v2.11.2, MAC filtering is not supported in **Tool Suite**.
SNMP	Contains all SNMP management features, such as the SNMP version. • All of the SNMP manageable objects for the FreeWave Ethernet devices are contained in a single MIB file called FREEWAVE-TECHNOLOGIES-MIB. • Contact FreeWave Technical Support (on page 7) to request this file.
RMS	Contains settings for enabling a Redundancy Master Station (RMS) and settings for the main and back up devices.
Users	Contains the group permissions to view and change settings.
Tools	Contains free-form fields used to define site information.

5.2.2. I/O Serial Base and I/O Expansion Device Parameter Tabs

The parameters for I/O Serial Bases and Expansion Modules are shown here: Figure 22

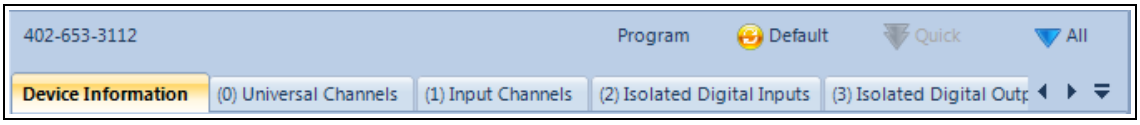


Figure 22: I/O Serial Base and I/O Expansion Device Parameter Tabs

Note: The images in this document and/or procedure are for **Windows**® 7 and/or **Windows**® 10 and **Firefox**®.

This table provides an overview of the contents of each tab.

Note: For details about how the parameters apply to the connected device and recommended values for each, refer to the documentation for that device.

I/O Serial Base and I/O Expansion Device Parameter Tabs	
Tab	**Description**
Device Information	Includes basic device identification information such as the device name, model number, and serial number.
(0) Universal Channels	Corresponds and programs channels 1, 2, 3, and 4 of the I/O Serial Base and Expansion Module devices.
(1) Input Channels	Corresponds and programs channels 5, 6, 7, and 8 of the I/O Serial Base and Expansion Module devices.
(2) Isolated Digital Inputs	Corresponds and programs channels 9 and 10 of the I/O Serial Base and Expansion Module devices.
(3) Isolated Digital Output	Corresponds and programs channels 11 and 12 of the I/O Serial Base and Expansion Module devices.
(4) Stack Settings	Applies to the I/O Serial Base and programs how the stack communicates with external Modbus devices.

5.2.3. Serial / TCP Terminal Network Device Parameter Tabs

The parameters for most devices available in a serial and TCP terminal devices are shown here: Figure 23

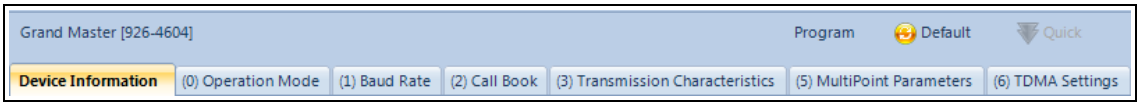


Figure 23: Serial / TCP Terminal Network Device Parameter Tabs

Note: The images in this document and/or procedure are for **Windows**® 7 and/or **Windows**® 10 and **Firefox**®.

This table provides an overview of the contents of each tab.

Note: For details about how the parameters apply to the connected device and recommended values for each, refer to the documentation for that device.

Serial / TCP Terminal Network Device Parameter Tabs	
Tab	**Description**
Device Information	Includes basic device identification information such as the device name, model number, and serial number. Common diagnostics information is also available in this tab if you are reading a device.
(0) Operation Mode	Operation Mode defines the device function (e.g., Master, Repeater, or Slave). • FreeWave radios operate in a Master to Slave configuration. • For radios to operate together, proper communication setup is required. • Ethernet options for Ethernet devices are also configured in this tab.
(1) Baud Rate	Includes communication settings between the radio and the device it is connected to.
(2) Call Book	Includes the call information to incorporate up to 10 • FreeWave radios, designate one to four Repeaters for use with each radio, and designate which specific Slave the Master calls, by serial number. • The Call Book is required in Point-to-Point networks; however, is not recommended in Point-to-MultiPoint networks.

Serial / TCP Terminal Network Device Parameter Tabs	
Tab	**Description**
(3) Radio Transmission Characteristics	Includes parameters that change how a radio sends data (e.g., frequency keys and low power settings). • Many of the parameters in this tab must be maintained across the network for proper functionality. • The options in this tab determine the RF characteristics of the network. • Default settings are **NOT recommended** for the network critical settings. • However, an understanding of the settings in this menu is recommended prior to changing any of the values.
(5) MultiPoint Parameters	Includes settings used to control how data is handled in situations requiring retries and the settings to control the behavior of a MulitPoint Slave or Repeater. • When installing MultiPoint networks it is important to do some initial planning. • Unlike Point-to-Point networks, a Point-to-MultiPoint network requires several parameters to be set consistently on all radios in the network. • This includes RF Data Rate, Min and Max Packet Size, Network ID, and Frequency Key.
(6) TDMA Settings	Includes Time Divisible Multiple Access (TDMA) settings, which allow radios to complete various operations in specific time slots. • This option is used only for peer-to-peer communications or when applications are very time specific and must be enabled on the device at the factory. • If it is not enabled at the factory, this tab does not display. • For additional information about TDMA, Contact FreeWave Technical Support (on page 7).

5.3. Network Designs

Use the **Network Design** feature to design and configure a virtual network prior to programming devices.

- Create network designs for either serial or Ethernet networks.
- The **Network Design** provides a visual representation of the devices connected in the network.
- Use the **Network Design** feature without previously adding devices to a network using the Devices tree.

See:

- Connect Devices to Master Templates in Network Designs (on page 53)
- Create an Ethernet Network Design Using the Design Wizard (on page 56)
- Create a Serial Network Design Using the Design Wizard (on page 58)
- Edit Settings for Devices in Network Designs (on page 59)
- Export and Import Network Designs (on page 60)
- Print Network Designs (on page 60)
- Program Devices from Network Designs (on page 61)
- Remove Devices From Network Designs (on page 62)
- Rename Devices in Network Designs (on page 62)

5.3.1. Connect Devices to Master Templates in Network Designs

After creating a template for a Master radio in the network, the next step is to connect Slaves, Repeaters, and Slave/Repeaters for programming to the Master in the network design. Devices connected to the Master inherit the master's settings.

- Connect a Serial Device (on page 53)
- Connect an Ethernet Device (on page 55)

Connect a Serial Device

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, select the serial network to design and click the **Network Design** tab.
3. Right-click the **Master** icon and select **Connect**.
4. Select the modem mode of the device to attach. Figure 24

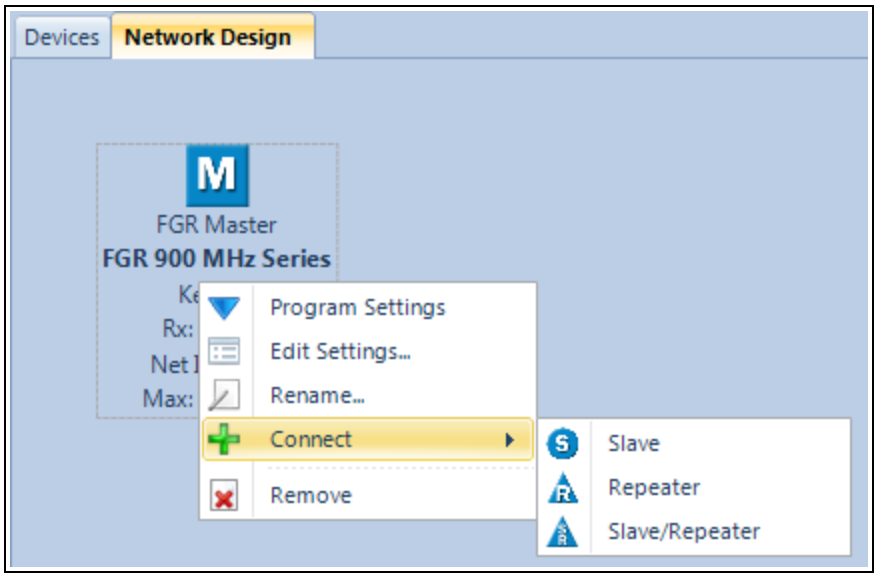


Figure 24: Connect > Select Modem Mode Options

5. In the **Name** field, enter a name that identifies the device.
6. Click the **Radio Type** drop-down list and select the device type.
   All possible types that can connect to the Master are listed.
7. Click **Add**.
   An icon for the device appears with the inherent critical settings. Figure 25

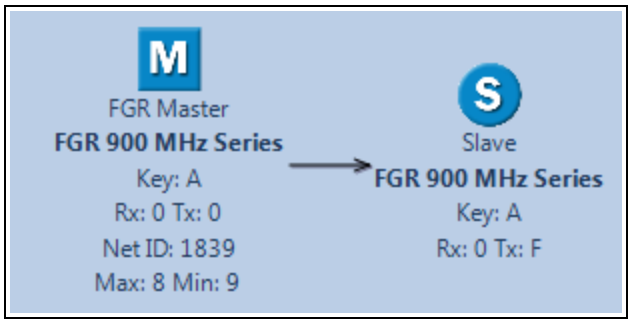


Figure 25: Example: Device Icons

8. Optional: To connect another radio to a Repeater or Slave/Repeater, right-click the device icon to add a connection to and repeat the Steps 1 to 7 to add the device.

   Figure 26 is an example of a Repeater or Slave/Repeater Network.

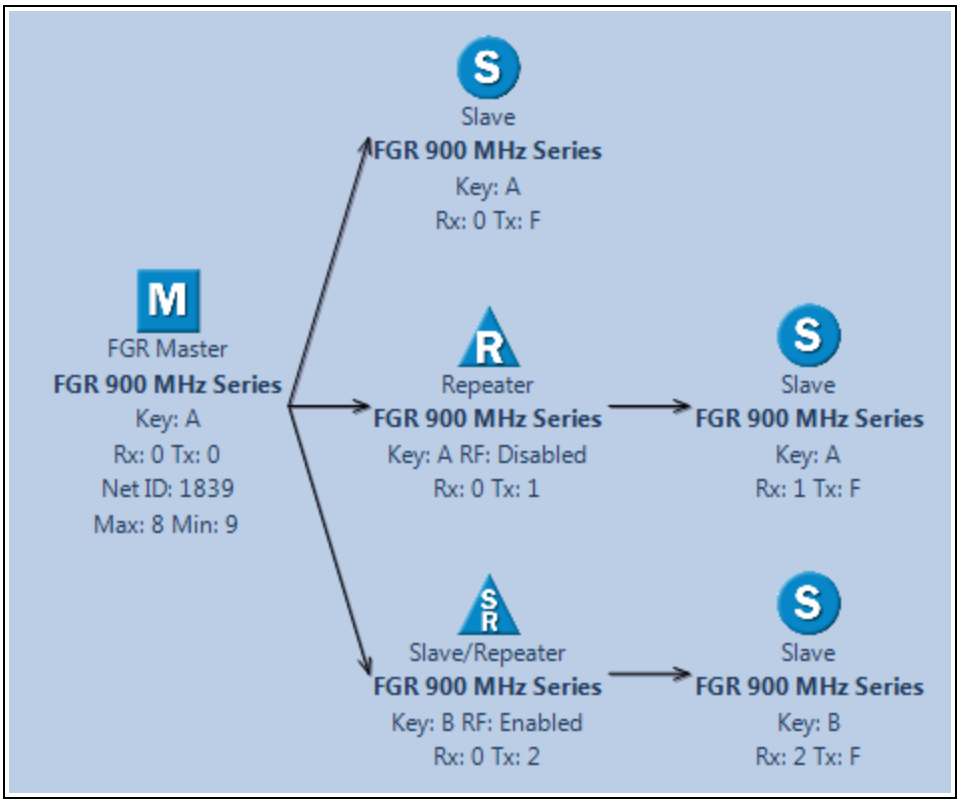


Figure 26: Example: Repeater or Slave/Repeater Network

Note: If multiple Repeaters or Slave/Repeaters are connected, **Tool Suite** automatically enables **Repeater Frequency** and assigns a unique frequency key for each subsequent Repeater or Slave/Repeater connected.

Connect an Ethernet Device

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, select the Ethernet network to design and click the **Network Design** tab.
3. Right-click the **Master** icon and select **Connect**.
4. Select the modem mode of the device to attach. Figure 27

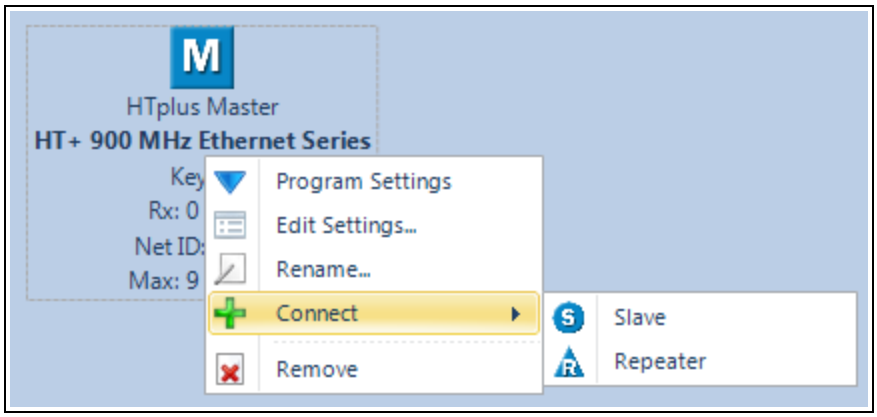


Figure 27: Connect > Select Modem Mode Options

5. In the **Name** field, enter a name that identifies the device.
6. Click the **Radio Type** drop-down list and select the device type.
   All possible types that can connect to the Master are listed.
7. Click **Add**.
   An icon for the device appears with the inherent critical settings. Figure 28

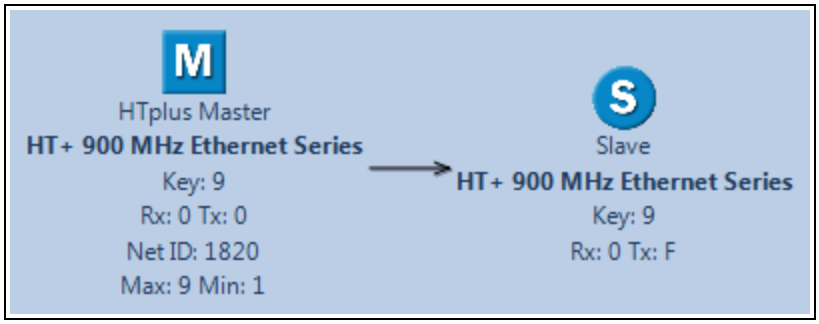


Figure 28: Example: Device Icons

> **Note**: One Slave node can be programmed for many radios. There is no need to connect multiple Slaves together, when programming. Simply change the Radio Name when prompted for the subsequent Slave(s) as you program them.

8. Optional: To connect another radio to a Repeater, right-click the radio to add a connection to and repeat Steps 1 to 7 to add a Slave connection.

5.3.2. Create an Ethernet Network Design Using the Design Wizard

Use the **Create Network Design** wizard to define an Ethernet network where a Master radio connects to the other devices in the network design.

Note: When the **Network Design** tab is selected in a network, **Tool Suite** prompts to add a Master using the **Create Network Design Wizard**.

Important!: A Plus Ethernet network **MUST BE** created before access to the Network Design feature is available.

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, select the Ethernet network to design.
3. Click the **Network Design** tab.

   Note: If the **Create Network Design** wizard does not appear, right-click anywhere in the **Network Design** pane and select **Template Wizard**.
4. On the **Radio Type** drop-down list, select the **Gateway** radio type and click **Next**.
5. On the **Network Structure** drop-down list, select the network type and click **Next**.

   Note: As of **Tool Suite** version 2.8.5, Point-to-Point and TDMA network structures are **not supported** in the **Create Network Design** feature.
6. When prompted, set these eight critical settings or accept the default settings and click **Next**.

   Important!: For radios to successfully communicate with one another in a network, these critical settings that must be the same across all radios in the network.
   Any Endpoint or Repeater connected to the Gateway template inherits these settings.

Setting	Description
Subnet Mask	Typically assigned by the Network Administrator.
Default Gateway	Typically assigned by the Network Administrator.
Frequency Key	Select from numbers 0 to 9 and letters A to E.
Max Packet Size	Select from numbers 0 through 9.
Min Packet Size	Select from numbers 0 through 9.

Setting	Description
RF Data Rate	Select 115 kbps for a low RF data rate or 154 kbps for a high data rate. **Note**: Different rates are available if a high throughput device is selected as the Master.
Master Tx Beacon	Select from numbers 0 through 9.
Network ID	Select from 0 through 4095. **Note**: 255 enables the **Call Book** and disables the **Network ID**.

Note: For more information regarding settings, see the user manual for the radio to configure.

7. In the **Template Name** text box, enter a name for the Gateway device template.
8. Click **Finish** to save the template.

   After the initial creation of the Gateway, the radio template is complete.

   A Master icon appears in the **Network Design** tab with the previously selected network parameters. Figure 29

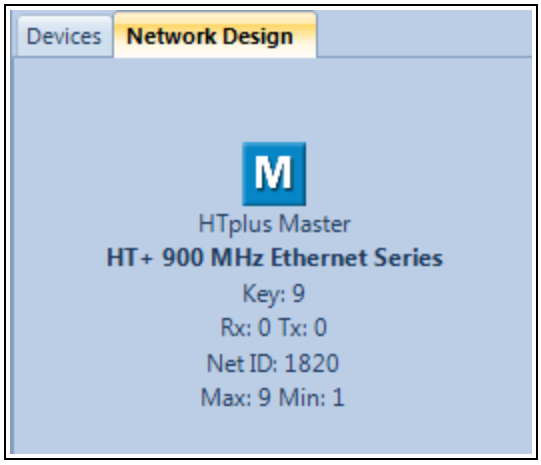


Figure 29: Network Design tab with Master Icon

Note: To connect devices to the master, see Connect Devices to Master Templates in Network Designs (on page 53).

5.3.3. Create a Serial Network Design Using the Design Wizard

Use the **Create Network Design** wizard to define a Serial network where a Master template radio connects to the other devices in the network design.

> **Note**: When the **Network Design** tab is selected in a network, **Tool Suite** prompts to add a Master using the **Create Network Design Wizard**.
> When creating **Network Designs**, the devices are applied to the current network that is selected. If there is no unique network, the **Network Design** applies to the Default Network.

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, select the serial network to design.
3. Click the **Network Design** tab.

   > **Note**: If the **Create Network Design** wizard does not appear, right-click anywhere in the **Network Design** pane and select **Template Wizard**.

4. On the **Radio Type** drop-down list, select the **Master** type and click **Next**.
5. On the **Network Structure** drop-down list, select the network type and click **Next**.

   > **Note**: As of **Tool Suite** version 2.8.5, Point-to-Point and TDMA network structures are **not supported** in the **Create Network Design** feature.

6. When prompted, set these five critical settings or accept the default settings and click **Next**.

   > **Important!**: For radios to successfully communicate with one another in a network, these critical settings that must be the same across all radios in the network.
   > Slaves, Repeaters, or Slave/Repeaters connected to the Master template inherit these settings from the Master.

Setting	Description
Frequency Key	Select from numbers 0 to 9 and letters A to E.
Max Packet Size	Select from numbers 0 through 9.
Min Packet Size	Select from numbers 0 through 9.
RF Data Rate	Select the RF data rate. Depending on the device, this could be a selection such as Normal or High, or 1, 2, or 3.
Network ID	Select from 0 through 4095. **Note**: 255 enables the **Call Book** and disables the **Network ID**.

7. Configure data port settings, which any connected Slave, Repeater, or Slave/Repeater inherits, click Next.

Note: For more information regarding settings, see the user manual for the radio to configure.

8. In the **Template Name** text box, enter a name that identifies the Master device.
9. Click **Finish** to save the template.

   After the initial creation of the Master, the radio template is complete.

   A Master icon appears in the **Network Design** tab with the previously selected network parameters. Figure 30

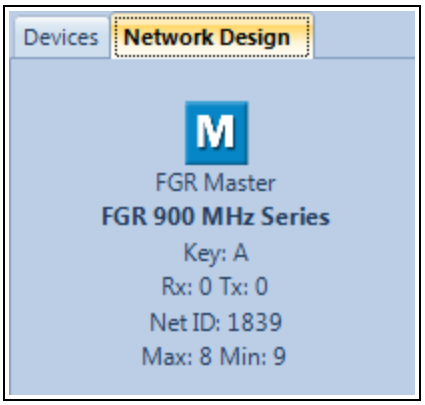


Figure 30: Network Design tab with Master Icon

Note: To connect devices to the Master, see Connect Devices to Master Templates in Network Designs (on page 53).

5.3.4. Edit Settings for Devices in Network Designs

Devices added to a network design can be edited for each device's settings that were not addressed during the wizard setup.

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, select the network to edit and click the **Network Design** tab.
3. Right-click the device to change and select **Edit Settings** to show the parameter tabs.

   Note: The same tabs appear with the same settings as on the **Configuration** main window when the device was selected.

4. Make the necessary changes and click **Update** to save the changes.
   Tool Suite prompts to select whether the setting changes affect just the selected radio or all the radio templates in the virtual network.
5. Click **Yes** to apply the changes to all connected devices in the template,
   No to apply the changes to only the selected device, or
   Cancel to return to the Edit Settings window without applying the changes.

   Tool Suite refreshes the devices with the changes.

5.3.5. Export and Import Network Designs

Export a Network Design to use in another instance of **Tool Suite**.

> **Note**: Network Design files have a **.fwt** extension.

Export a Network Design

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, select the network to export and click the **Network Design** tab.
3. On the **Options** drop-down menu in the **Network Title** ribbon, select **Export > FreeWave Network Design**.

   > Right-click in the **Network Design** window and select **Export Design**.

4. Select the location to save the file in, enter a file name, and click **Save**.

   > **Note**: The file can be sent in an email or added to an external drive.

Import a Network Design

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, select the network to import and click the **Network Design** tab.
3. If a **Network Design** exists, right-click in the **Network Design** window and click **Clear Templates**.
4. After the **Network Design** area is clear, right-click and select **Import Design** and select the **.fwt** file to import.
5. After the file imports, right-click the device for programming and select **Program Settings** while connected to the device to receive those settings

5.3.6. Print Network Designs

You can print a network design for review or to keep on file.

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, select the network to print and click the **Network Design** tab.
3. Right-click in an empty area of the **Network Design** and select **Print**.
   A print preview window with print options opens.
4. Select the printer to print to, make any printing adjustments as needed, and click **Print**.

5.3.7. Program Devices from Network Designs

After the **Network Design** is complete, individual device settings can be programmed.

Important!: Verify the device to program is connected to the computer running **Tool Suite** with the appropriate cable.

Procedure

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, select the network to program and click the **Network Design** tab.
3. Right-click the device in the **Network Design** to program and select **Program Settings**.
4. In either the **Radio Name** text box or the **Site Name** text box for an Ethernet device, enter the name to program to the device.
5. Click **Program** to send the settings and the name to the device.

Note: Entering a name is optional. The device can be programmed without entering a name.

If programming an Ethernet device, send a new IP address by entering the IP address in the **New IP Address** field.
Enter the current IP address in the **New IP Address** field if the address remains the same.

A status bar appears while the device is being programmed. Figure 31

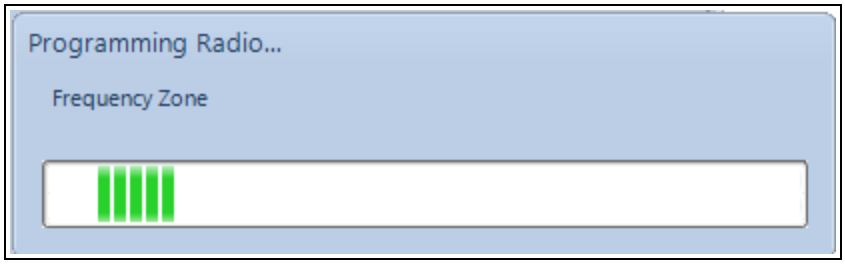


Figure 31: Status bar

- When the device is programmed, the device's:
  - Carrier Detect (CD) LED shows Solid Green and the
  - Clear to Send (CTS) LED shows Solid Red (Bright) .
- After programming is complete, the **Network Design** window opens.
- For each subsequent device in the network to program, connect the serial or diagnostic cable to the radio for programming and repeat Steps 3 to 5.

Note: One Slave node can be programmed for many radios. There is no need to connect multiple Slaves together in the Network Design when programming. Change the Radio Name when prompted for the subsequent Slaves as you program them.

5.3.8. Remove Devices From Network Designs

A group of devices can be deleted or a single device can be deleted as long as it does not have another device connected to it from a **Network Design**.

Example: If a Master or a Repeater is removed from the Network Design, all connected devices are deleted as well.
If removing only a Slave or Endpoint that is at the end of a network, only that device is deleted.

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, select the network to edit and click the **Network Design** tab.
3. Right-click the device to delete and select **Remove**.
4. Click **Yes** at the prompt to complete the deletion.

5.3.9. Rename Devices in Network Designs

A device can be renamed after it's added to a **Network Design**.

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, select the network to edit and click the **Network Design** tab.
3. Right-click the device and select **Rename**.
4. In the **Name** text box, enter the new name and click **Update** to save the change.
   Tool Suite prompts you to verify the change.
5. Click **Yes** to proceed with the change.

5.4. Update a Device to the Latest Firmware Version

Tool Suite can be used to upgrade the firmware on devices from a single location.

- If **Tool Suite** is connected to a device, and a new versions of firmware is available for that device, an indication appears on the **Device Information** tab in the **Configuration** application.
- The firmware releases available for the devices in the network are also visible.

Note: In Release v2.11.2, **Tool Suite** does not support over-the-air firmware upgrades or firmware upgrades to Ethernet devices. is this true?

1. In the **Applications** pane, click **Configuration** to open the **Configuration** application.
2. In the **Networks** section of the **Configuration** ribbon, verify serial networks are visible.
3. Select the network to upgrade.
4. In the **Firmware** section of the **Configuration** ribbon, click **View Available**.
   A list of the latest firmware versions for **Tool Suite** supported products appears. Figure 32

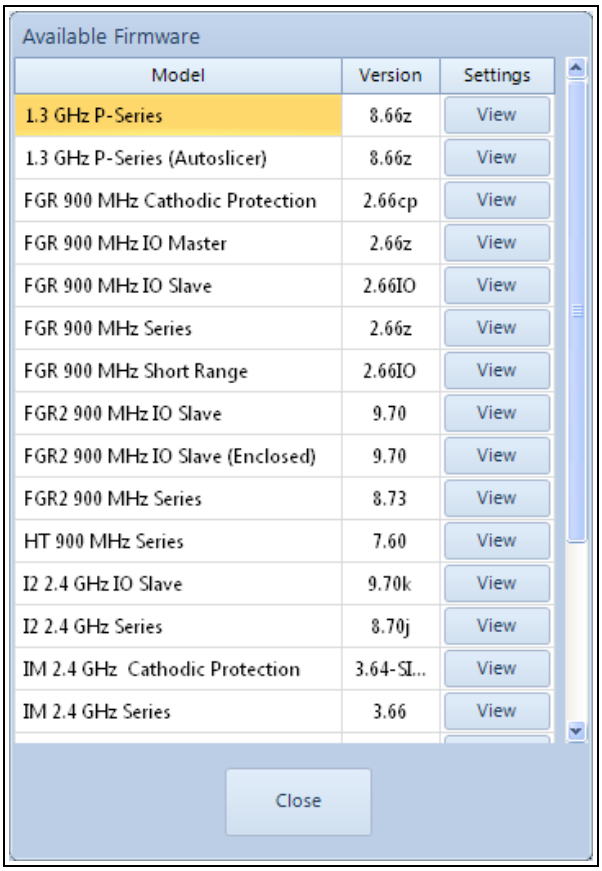


Figure 32: Example: List of Supported Products

5. Click **View** next to the firmware version to view the settings for the model in that version of firmware.
6. Connect to the device to upgrade.

7. In the **Firmware** section of the **Configuration** ribbon, click **Upgrade Radio**.
8. Click **Yes** at the prompt to continue. Figure 33

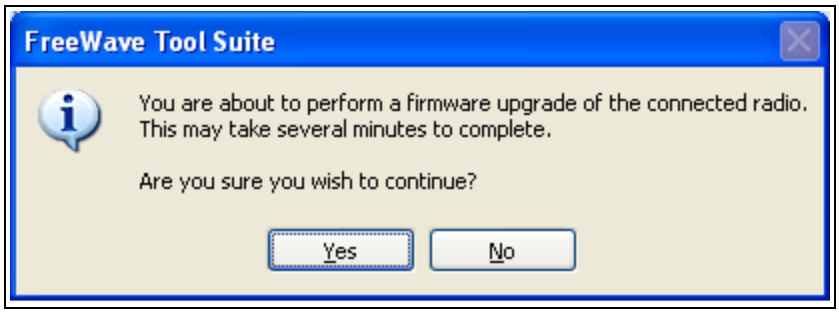


Figure 33: Continue Upgrade Message

Tool Suite identifies and shows the firmware version that is loaded on the connected device and the latest version of firmware available for that model. Figure 34

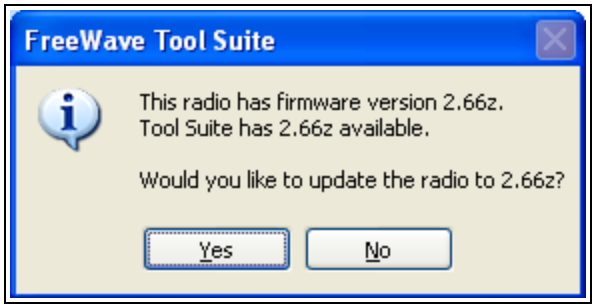


Figure 34: Upgrade Message for Specific Model

9. Click **Yes** to continue with the upgrade.
   The system shows the progress of the firmware upgrade. Figure 35

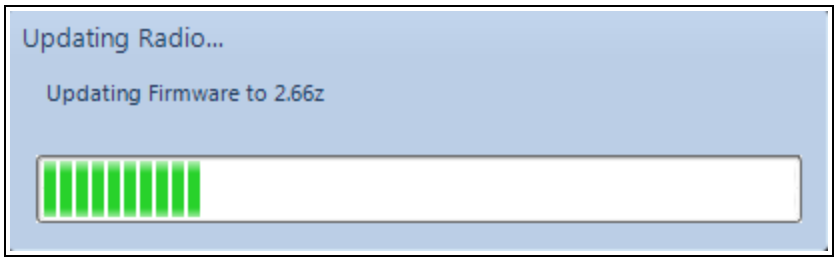


Figure 35: Progress bar

A message appears when the update is completed.

6. Local Diagnostics Application

The **Local Diagnostics** application presents a real-time snapshot of MultiPoint setups that measure the signal-to-noise level of the device.

- This information may be read from a Slave, Repeater, or Slave/Repeater device.
- Use local diagnostic information to help direct a directional antenna of a Slave device by tracking the signal and noise levels as the antenna is aimed back at the Repeater or Master.

Important!: To run **Local Diagnostics** set the connected device's **Diagnostics** parameter (located in the **MultiPoint Parameters** tab) to a value greater than 0 (zero).

- Run Local Diagnostic (on page 66)
- Stop a Local Diagnostic (on page 66)
- Print the Local Diagnostics Graph (on page 67)

Click **Local Diagnostics** in the **Application** pane. Figure 36

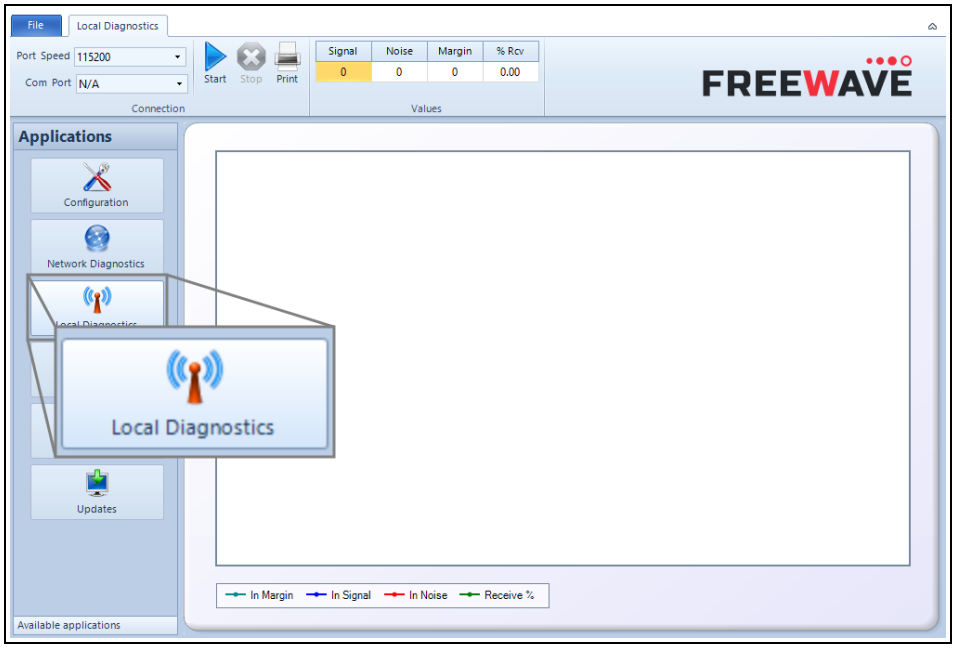


Figure 36: Applications > Local Diagnostics

6.1. Run, Stop, and Print Local Diagnostics

The **Local Diagnostics** application presents a real-time snapshot of MultiPoint setups that measure the signal-to-noise level of the device. It presents the data in both a graph form and with values in a table above the graph.

6.1.1. Run Local Diagnostic

1. Click **Local Diagnostics** in the **Applications** pane to view the **Local Diagnostics** application.
2. In the **Port Speed** field in the **Local Diagnostics** ribbon, select the speed of the port of the device is connected.
3. In the **Com Port** field in the **Local Diagnostics** ribbon, select the COM port the device is connected to.
4. Click **Start** in the **Local Diagnostics** ribbon to begin running the diagnostic.

6.1.2. Stop a Local Diagnostic

1. Click **Local Diagnostics** in the **Applications** pane to view the **Local Diagnostics** application.
2. Click **Stop** in the **Local Diagnostics** ribbon.

6.1.3. Print the Local Diagnostics Graph

1. Click **Local Diagnostics** in the **Applications** pane to view the **Local Diagnostics** application.
2. Click **Print** in the **Local Diagnostics** ribbon to open a print preview of the graph.
3. To print the graph, click the **Printer** icon in the upper left corner of the print preview window. The document is sent to the default printer designated on the computer.

7. Network Diagnostics Application

Network Diagnostics provides a place to view diagnostic data for all the devices connected to the Master in the network in real time. It is **not** meant to replicate the functionality of an NMS system, but rather is a tool that used for diagnostics and troubleshooting in the field.

> **Important!**: The **Network Diagnostics** application is intended for occasional network monitoring or troubleshooting, not for continuous, long-term collection of diagnostic data. Aggressive polling by the **Network Diagnostics** application or polling during periods of heavy data traffic may cause degradation in data throughput.
>
> **Tool Suite** **is not** optimized for the collection and management of large amounts of diagnostic data from continuous polling. Collection of excessive amounts of data results in overall performance degradation in **Tool Suite**.
>
> Polling multiple networks simultaneously is allowed but is NOT recommended. Depending on the number and size of networks being polled, **Tool Suite** may experience performance degradation or instability.
>
> Review the Network Diagnostics Best Practices (on page 69) before using the application.

In this section about the Network Diagnostics application:

- Discovering and Reading Devices (on page 69)
- Path View (on page 72) and what displays in it.
- Use the Alerts, Warnings, and Alarms (on page 74) to determine what flags a device has an alert or warning.
- Run and View Network Diagnostics (on page 80) data.

Click **Network Diagnostics** in the Applications pane to get started. Figure 37

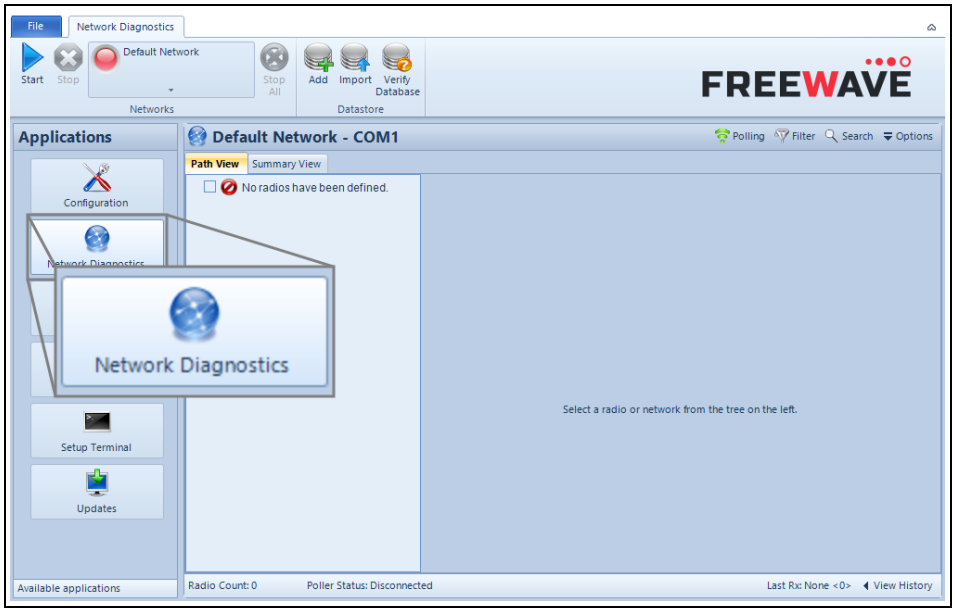


Figure 37: Applications > Network Diagnostics

7.1. Network Diagnostics Best Practices

Because there are several variables involved, FreeWave cannot provide a one-size-fits-all recommendation for all settings when running Network Diagnostics. Each situation is different. FreeWave does recommend these best practices for optimum network stability and performance, as well as **Tool Suite** stability and performance:

- Use Network Diagnostics only for occasional monitoring or troubleshooting, not continuously.
- Poll **only** one network at a time.
- Poll networks at times of low data throughput.
- Turn the polling host off or poll between scheduled SCADA polls.
- Increase polling intervals to reduce the number of diagnostic polls injected into the network and reduce the amount of diagnostic data collected.
- Set networks to clear diagnostics after the shortest acceptable time interval.

7.2. Discovering and Reading Devices

To run diagnostics using the **Network Diagnostics** application, poll the network for the devices that are available and the devices current settings.

- Discover Ethernet Devices (on page 70)
- Reading Ethernet Device Settings (on page 71)

Note: Prior to running diagnostics for the network, define the network to diagnose. For more information, see Create Configuration and Network Diagnostics Networks (on page 26).

7.2.1. Discover Ethernet Devices

To search for Ethernet devices available to add to the diagnostic network, you can run a discovery for all devices available.

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the ribbon, click the drop-down menu select an Ethernet network.
3. In the **Options** drop-down menu in the network title ribbon, select **Discover Radios**. The Plus Radio Discovery window opens.
4. Click **Search** and select a length of time to automatically stop searching for devices.
5. Optional: Click **Search** again to stop searching before the allotted time. Discovered devices in the network appear in the device list. Figure 38

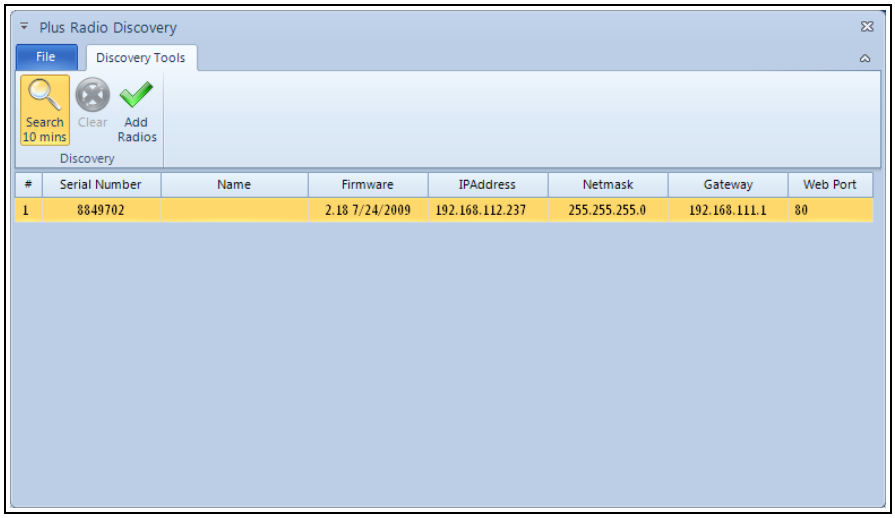


Figure 38: Example: Discovered Device

6. Optional: Click **Add Radios** to add the devices listed to the diagnostic network.
7. Click **Clear** to clear the discovery list.

   The added devices appear in the **Path View** for the network.

Note: For more information, see Path View (on page 72).

7.2.2. Reading Ethernet Device Settings

When running diagnostics on an Ethernet network, poll all devices in the network for settings, name, and firmware versions.

Note: Polling for a device's name and firmware version is only available on Ethernet devices running firmware versions 2.18 and above.

Read an Ethernet Device for Settings

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon, select an Ethernet network.
3. In the **Options** drop-down menu in the **Network Title** ribbon, select **Read > All Radios**.
   Tool Suite reads the settings from all Ethernet devices available in the network.

Read an Ethernet Device for its Name and Firmware Version

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon, select an Ethernet network.
3. In the **Options** drop-down menu in the **Network Title** ribbon, select **Read > Name/Firmware Version**.
   Tool Suite reads the name and current firmware version installed on all Ethernet devices available in the network.

7.3. Path View

The **Path View** tab shows a tree view of devices and their Master / Repeater / Slave hierarchy in the network. The devices appear in the tree whether they were added manually or through a discovery feature.

- The icons next to the devices help identify where they fall in the network hierarchy.
- The icon color indicates whether the device is in an warning or alarm status. Figure 39
  - When the icon is blue, either:
    - there are no alarms / warnings or
    - all alarms / warnings have been acknowledged or cleared for this device.
    - For more information, see Alerts, Warnings, and Alarms (on page 74).

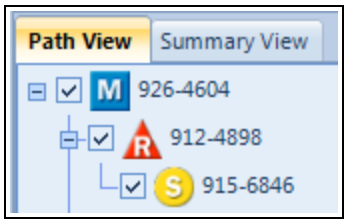


Figure 39: Example: Alerts

The devices in the **Path View** appear with one of these icons:

-  - Indicates a Master in the network.
-  - Indicates a Slave in the network.
-  - Indicates a Repeater in the network.
-  - Indicates a Slave/Repeater in the network.

Each device in the Path View has a check box.

- When a device's check box is selected, the device gets actively polled when the network is set to poll.
- Devices whose check box is not selected are excluded from polling.
- All related devices linked to a Master are selected or unselected when the Master in the hierarchy is selected or unselected.
- Use **Ctrl + left-click** to change the selection for a single device in the tree.

7.3.1. Searching for Devices in the Network

In a large network, use the **Search** option to locate the device in the **Path View** in the **Network Diagnostics** application.

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon, select the network to search.
3. Click the **Search** option in the **Network Title** ribbon.
4. Enter a device name or a serial number.
   If searching in an Ethernet network, search by IP address of the device using the **Enter an IP Address** field.

> **Note**: Enter serial numbers without a dash.

- As text is entered in the search fields, **Tool Suite** searches for devices that match the search criteria and shows the matches in a list. Figure 40
- Select a matching device at any time to jump to it in the Path View.

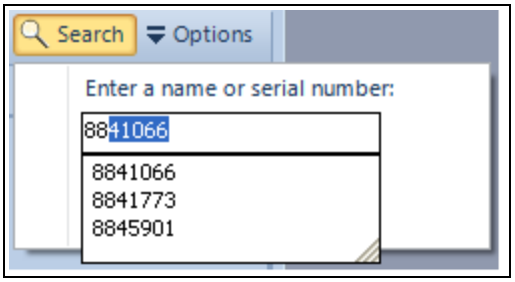


Figure 40: Example: Device Search

> **Note**: If **Tool Suite** finds a single device that matches the entered search criteria, it jumps to the device and highlights it in the **Path View**.

7.4. Alerts, Warnings, and Alarms

When network diagnostics are run, **Tool Suite** polls the devices for the parameters described in Parameter Definitions and Recommended Values (on page 90).

Use alert definitions to enter the parameters and settings to be visually notified about if the condition occurs in the network.

Example: To have **Tool Suite** send and alert when a device's voltage goes above the recommended limit, set up an alert as either a warning or alarm.

When diagnostics are run and devices are polled in the network, if a device has a parameter that sends it into an alert or warning status, the device's icon in the **Path View** reflects the state of the device, providing instant visual that a condition exists.

-  - The device is in a Warning state.
-  - The device is in an Alarm state.

Note: If the device appears with a blue icon, it has no alarms or warnings or all alarms or warning have been marked as acknowledged.
For more information, see Acknowledging and Clearing Alerts

Review each device with an alert state to analyze the details about the alert, the data received during the poll of the device, and the time that poll took place. Use this information to help troubleshoot the device's error.

Alerts

When reviewing devices in an alert state, acknowledge an alert so the device no longer shows an alert state.

Note: Acknowledged alerts still appear in the list of alerts for a device in the Alerts tab.
They do not cause the device's icon to change color in the **Path View**.

- Acknowledge Individual Alerts on a Device (on page 75)
- Acknowledge All Alerts on a Device (on page 75)
- Clear an Alert (on page 75)
- Create Alert Reports (on page 76)
- Polling Devices With Alerts (on page 77)
- Setting Alert Definitions (on page 77)
- Showing Only Devices With Alerts (on page 79)

7.4.1. Acknowledge Individual Alerts on a Device

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon, select the network to acknowledge alerts.
3. Select the device that is an alert state and click the **Alerts** tab at the bottom of the main window to view the list of alerts for device.
4. Select the check box in the **Ack'd** field next to the alerts to acknowledge.
5. Click **Acknowledge Alerts**.
   The alert indicator for the device in the **Path View** is removed.

   > **Note**: The alerts remain in the **Alerts** list for the reference.

6. Optional: Clear an Alert (on page 75).

7.4.2. Acknowledge All Alerts on a Device

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon, select the network to acknowledge alerts.
3. Select the device that is an alert state and click the **Alerts** tab at the bottom of the main window to view the list of alerts for device.
4. In the **Options** drop-down menu in the **Network Title** ribbon, select **Alerts > Acknowledge All Alerts**.
   The alert indicator for the device in the **Path View** is removed.

   > **Note**: The alerts remain in the **Alerts** list for the reference.

5. Optional: Clear an Alert (on page 75).

7.4.3. Clear an Alert

After the condition causing an alert is resolved, clear the alert. Clearing the alert removes the alert from the alert list in the Alert tab.

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon, select the network to clear the alerts in.
3. Select the device to clear alerts and click the **Alerts** tab at the bottom of the main window to view the list of alerts for the device.
4. Click **Clear Alerts**.
   The alert indicator for the device in the Path View is removed and all the alerts are cleared from the Alerts list

7.4.4. Create Alert Reports

- Generate a report by date range of devices in a network that are in alert state.
- Using a report lists the devices by serial number and provides a way to print, save as a PDF file, or to view the devices with alerts in Microsoft Excel.
- Reports can be helpful if troubleshooting multiple devices or comparing a troubled device with others that are not in an alert state.

Procedure

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon, select the network to create an alert report in.
3. In the **Options** drop-down menu in the **Network Title** ribbon, select **Alerts > View Report**.
4. In the **Alert Reporting** window, enter the date range to include alarm data in the report.

   Example: To see alarm data for the last month, enter the first and last days of that month in the corresponding fields.

5. In the **Alert Level** drop-down list, select from one of these options:
   - **All** - Includes all alerts that occurred for the device in the date range you specify.
   - **Alarms** - Includes only alarms that occurred for the device in the date range you specify.
   - **Warnings** - Includes only warnings that occurred for the device in the date range you specify.
6. Click **Report** to generate the report.
   The Report opens in a separate window and is sorted by serial number. Figure 41

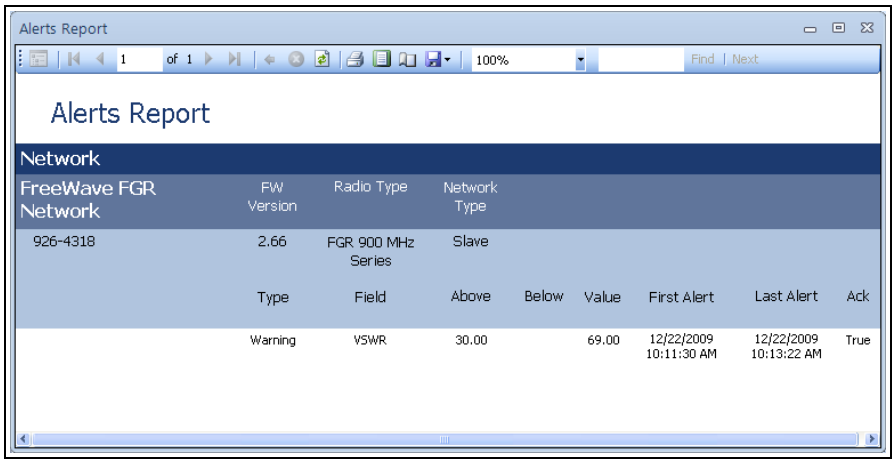


Figure 41: Example: Alerts Report

7.4.5. Polling Devices With Alerts

Use this procedure to poll only the devices in the network that currently have alarms or warnings.

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon, select the network to poll devices with alerts.
3. In the **Polling** drop-down menu in the **Network Title** ribbon, select one of these options:
   - **Poll Radios With Alerts** - Polls only the devices with an alarm or warning condition.
   - **Poll Radios With Warnings** - Polls only devices with a warning condition.
   - **Poll radios With Alarms** - Polls only devices with an alarm condition.

7.4.6. Setting Alert Definitions

Alerts are categorized as either warnings or alarms.

- The set of diagnostic parameters that are set as warnings or alarms is the same.
- Where the alert is activated determines whether **Tool Suite** shows the condition as a warning or an alarm in the **Network Diagnostics** application.

Note: The network must be stopped before the alert definitions can be changed.

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon, select the network to define alert definitions.
3. If necessary, click **Stop** to stop polling the network.
4. In the **Options** drop-down menu in the **Network Title** ribbon, select **Alert > Modify Alert Definitions**.
   The **Alert Definitions** dialog box opens. Figure 42
5. Click either the:
   - **Alarms** tab to define parameters that flag a device with an Alarm  .
   - **Warnings** tab to define parameters that flag a device with a Warning  .
6. Select the check box in the **Active** column for the diagnostic to activate an alarm or warning for a device condition.
7. In the **Warn Below** and **Warn Above** fields for the activated diagnostics, set the range to when something is considered in fault.

Example: **Alarm**:
If the **Warn Below** field for the **In Margin** diagnostic parameter is set to **20.00** dB in the **Alarms** tab, if the device's margin falls below 20.00 dB, the system flags the device with an **Alarm** in the **Network Diagnostics** application and changes the device icon to in the **Path View**

Example: **Warning**:
If the **Warn Below** field for the **In Margin** diagnostic is set to **20.00** in the **Warnings** tab, if the device's margin falls below 20.00 dB, the system flags the device with a **Warning** in the **Network Diagnostics** application and changes the device icon to in the **Path View**.

Figure 42: Alert Definitions dialog box - Warning tab

7.4.7. Showing Only Devices With Alerts

Use the filtering option to view only devices in the **Path View** that are in an alert status.

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon, select the network to view devices with alerts.
3. In the **Filter** drop-down menu in the **Network Title** ribbon, select one of these options:
   - **Show Alerts** - Shows all devices with an alarm or warning in the Path View.
   - **Show Warnings** - Shows only devices with a warning condition in the Path View.
   - **Show Alarms** - Shows only devices with an alarm condition in the Path View.
4. Optional: In the **Filter** drop-down menu, select **Show All** to return to an unfiltered view.

7.5. Run and View Network Diagnostics

Important!: Review the Network Diagnostics Best Practices (on page 69) before running the Network Diagnostics application.

After a network is defined, select the network from the **Networks** section of the **Network Diagnostics** ribbon and click **Start** to begin gathering diagnostic data.

- As **Tool Suite** receives information from the devices in the network, it populates the **Path View** and the graph for the selected device begins to show information about how the device is functioning.
- **Tool Suite** offers multiple ways to review network diagnostic data.

  Note: If running diagnostics on an Ethernet network, broadcasts may be blocked through certain brands of routers. If data is not appearing in **Tool Suite** and other factors have been ruled out, try connecting the Ethernet cable directly to the computer's Ethernet port.

- Poll Devices for Diagnostics (on page 81)
- Graph View (on page 83)
  - Shows all the current data in a chart.
- History View (on page 86)
  - Shows at-a-glance history of the parameters polled in past network diagnostic runs.
  - This view is only available in serial and TCP networks.
- Summary View (on page 87)
  - Shows the most recent diagnostics in summary table format.
- Trend Analysis View (on page 88)
  - Shows a trend analysis of the parameters polled in past network diagnostic runs.

The **Poller Status**, located at the very bottom of the window, indicates if the poller is connected or disconnected. Figure 43

Note: If the poller is connected, but no radios are added to the **Path View**, double check that the diagnostic cable is connected to the Master radio.

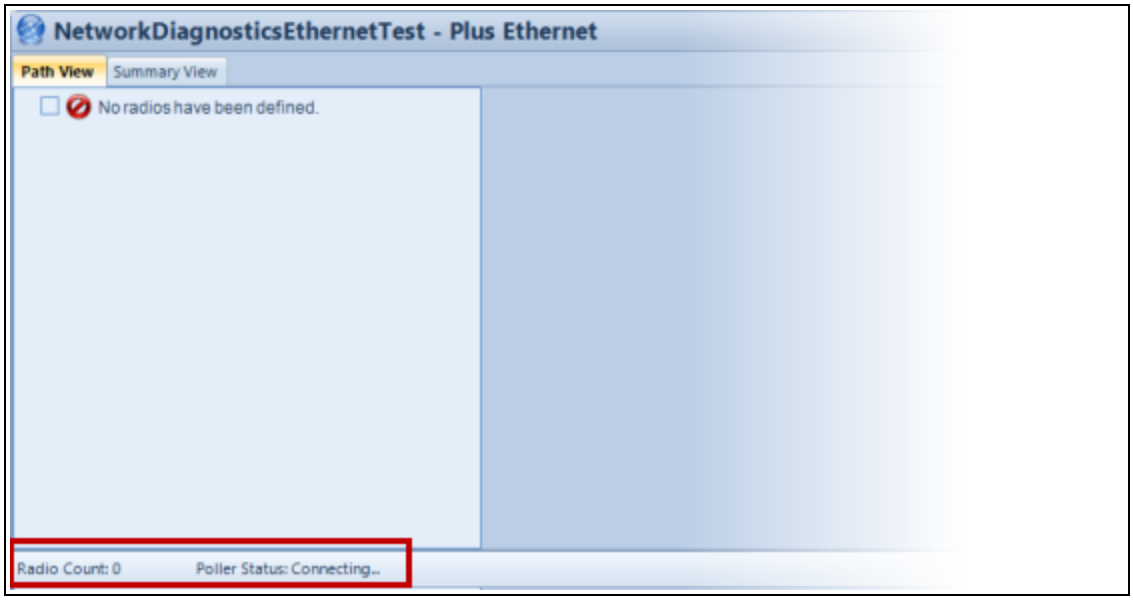


Figure 43: Poll Status

7.5.1. Poll Devices for Diagnostics

If devices are not automatically discovered, or the settings have not populated in the **Network Diagnostics** application, they can manually be polled.

Note: While polling an active Ethernet network, you can poll a range of IP addresses the network spans to discover devices.

- To poll a device, **Tool Suite** must be actively polling the network.
- The polling indicator light appears as a:
  - Solid Green light when **Tool Suite** is polling a network
  - Solid Red (Bright) light if the network is disconnected.

See:

- Poll Ethernet Devices for Diagnostics (on page 82)
- Poll Serial Devices for Diagnostics (on page 82)

7.5.2. Poll Ethernet Devices for Diagnostics

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon, select the network to poll devices.
3. In the **Options** drop-down menu in the **Network Title** ribbon, select **Poll Radio**.
4. In the **Start Address** and **End Address**text boxes, enter the first and last IP addresses in a range of addresses to poll devices.
5. Click **Poll** to poll the range of addresses.

7.5.3. Poll Serial Devices for Diagnostics

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon, select the network to poll devices.
3. In the **Options** drop-down menu in the **Network Title** ribbon, select **Poll Radio**.
4. In the **Serial Number**text box, enter the serial number of the device to poll.
5. Click **Poll** to poll the device.

7.6. Graph View

The data from a network diagnostic can be viewed in graph form. **Tool Suite** charts all the current data for the device on a single graph. Zoom in and out on different parts of the graph for greater magnification.

The graph contains this data across the top of the graph: Figure 44

- **Last Response** - Displays the date and time for the last time the device responded to a poll.
- **Missed Polls** - Tracks the number of times Tool Suite polled the device without a response.
  - After there is a successful poll, the **Missed Polls** number resets to zero.
- **Data Sent** - Only available for Ethernet networks, **Data Sent** tracks the increasing number of polls a device has sent out.
  - When running diagnostics for serial devices, the **Data Sent** number remains at zero.

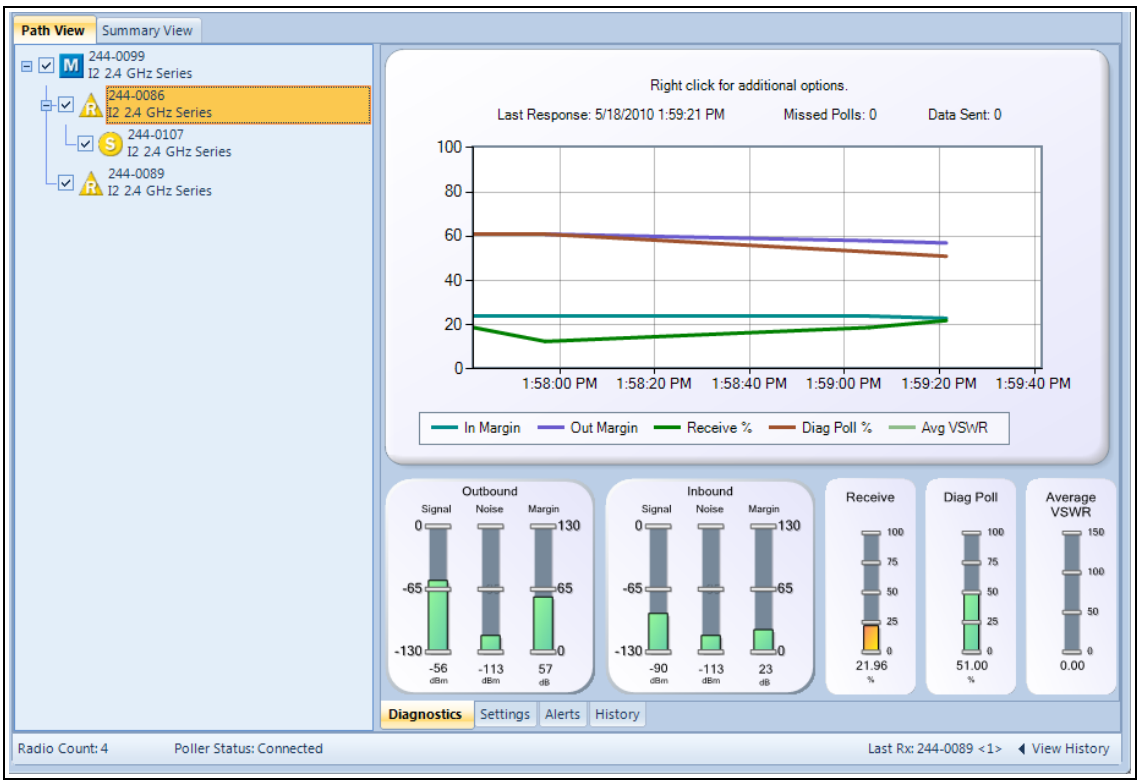


Figure 44: Example: Graph View

See:

- Show the Graph View (on page 84)
- Change the Data Shown in the Graph (on page 84)
- Zoom In and Out in the Graph (on page 85)

7.6.1. Show the Graph View

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon that contains the device to view.
3. In the **Radio** tree view, select the device to review.
4. Click the **Diagnostic** tab at the bottom of the **Network Diagnostics** window.

7.6.2. Change the Data Shown in the Graph

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon that contains the device to view.
3. In the **Radio** tree view, select the device to review.
4. Right-click anywhere in the graph and select or deselect the parameters to view or not. Figure 45

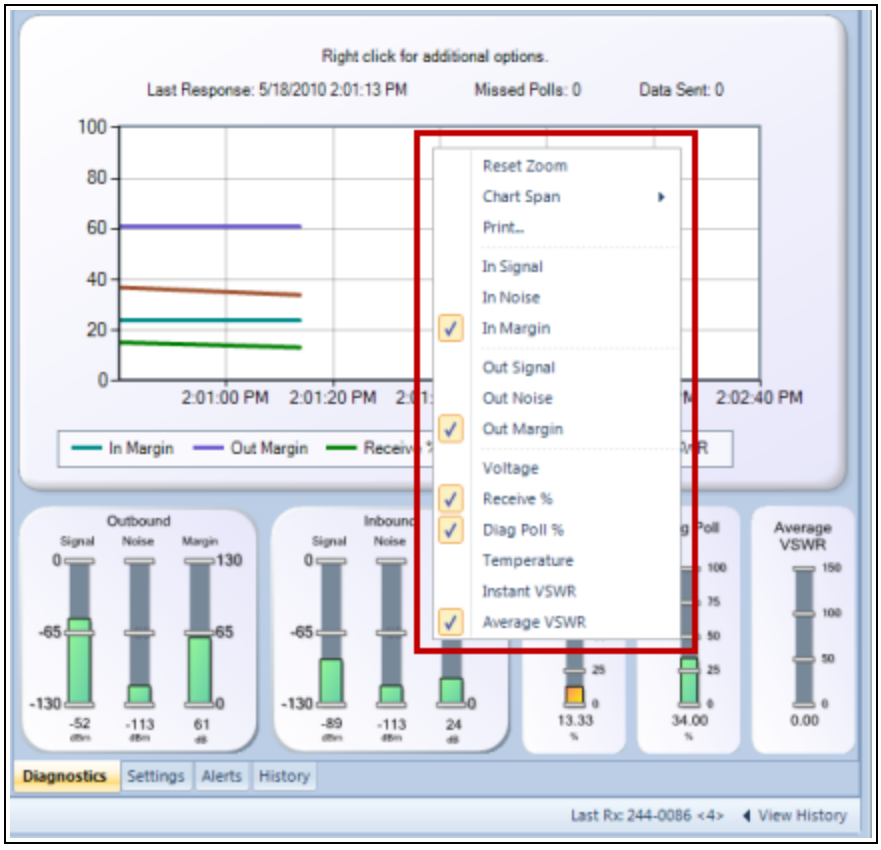


Figure 45: Select Parameters Right-click menu

5. Optional: Select **Chart Span** and the time period to view to change the time period shown in the graph.

7.6.3. Zoom In and Out in the Graph

1. In the visible graph, hold down the left button on the mouse at the uppermost or lowest point of the area on the graph to zoom.
2. Drag the mouse across the entire area to zoom.
3. To zoom out, click the **O** in the top upper left corner (controls zooming out at the Y-axis) and/or the lower left corner (controls zooming out at the X-axis) of the graph. Figure 46

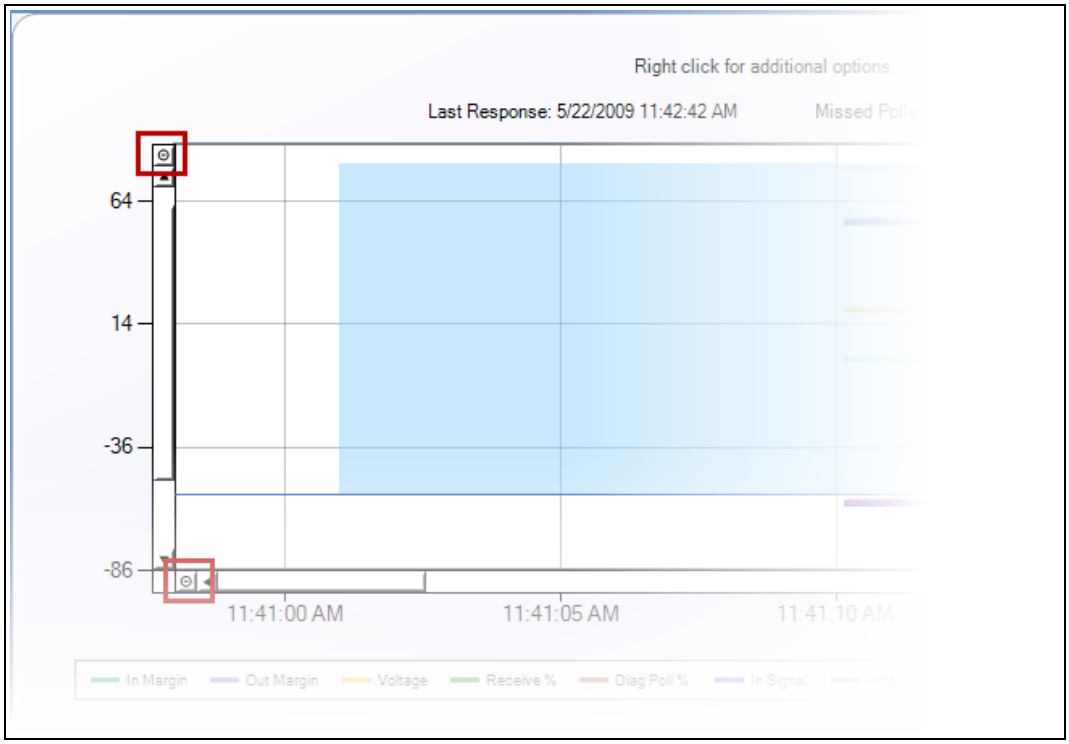


Figure 46: Example: Zoom Out

Note: The number of times the graph is magnified equals the number of times needed to click either one of the reset points to return the graph to the normal view.

7.7. History View

The **History** view displays a log of Slaves/Endpoints that recently transmitted data.

- This view is most useful if the network contains a chatty Slave.
- Use this view to review a pattern of repeated data transmissions.

Important!: This feature is only available in serial and TCP/IP networks.

The last received radio is shown next to the **View History** button.

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon that contains the device to view.
3. in the **Radio** tree view, select the device to review.
4. Click **View History** at the bottom of the **Network Diagnostics** window. Figure 47

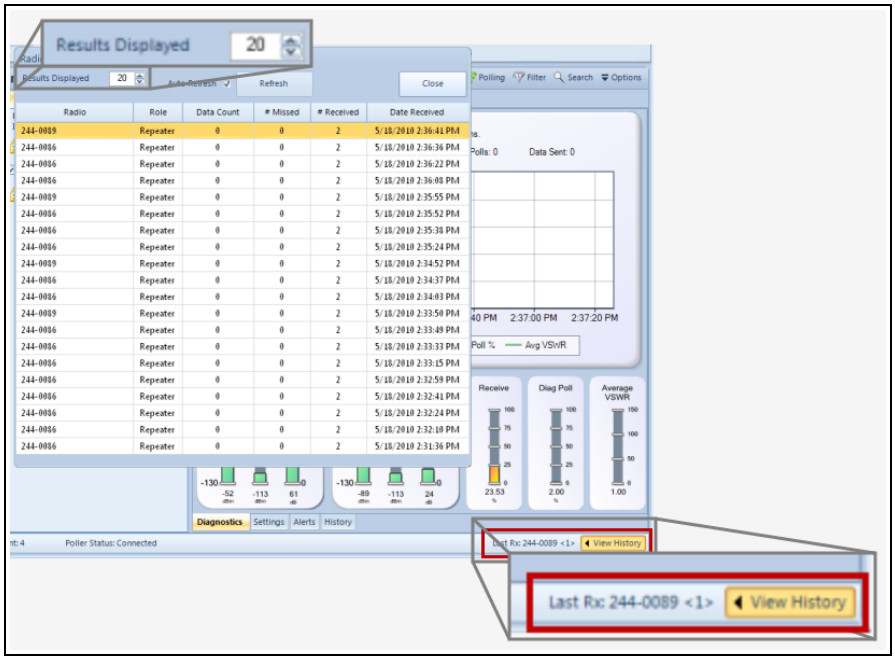


Figure 47: Example: View History

5. In the **Results Displayed** field, select how many results to show in the list (10 to 100).
6. Optional: Click **Refresh** to manually refresh the history list.

Note: If the **Auto Refresh** check box is selected, the list automatically updates.

7.8. Summary View

The **Summary** view shows the most recent polls and provides an overview of all the diagnostics on a single page.

Use the **Summary** view to copy and paste data into a Microsoft Excel spreadsheet.

Serial and TCP/IP Summary View

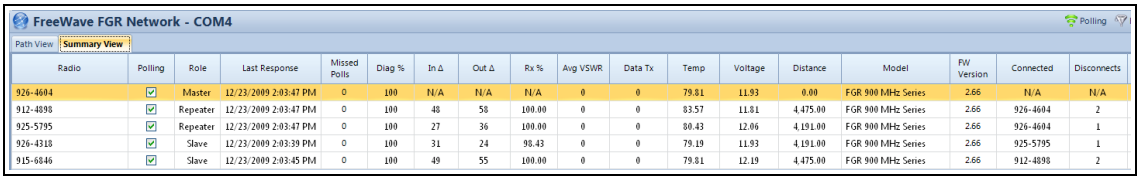


Figure 48: Serial and TCP/IP Summary View

Plus Ethernet Summary View

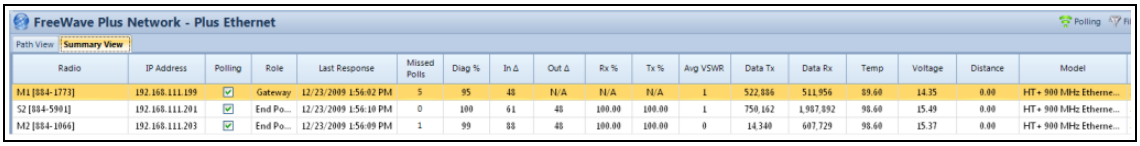


Figure 49: Plus Ethernet Summary View

7.8.1. Show the Summary View

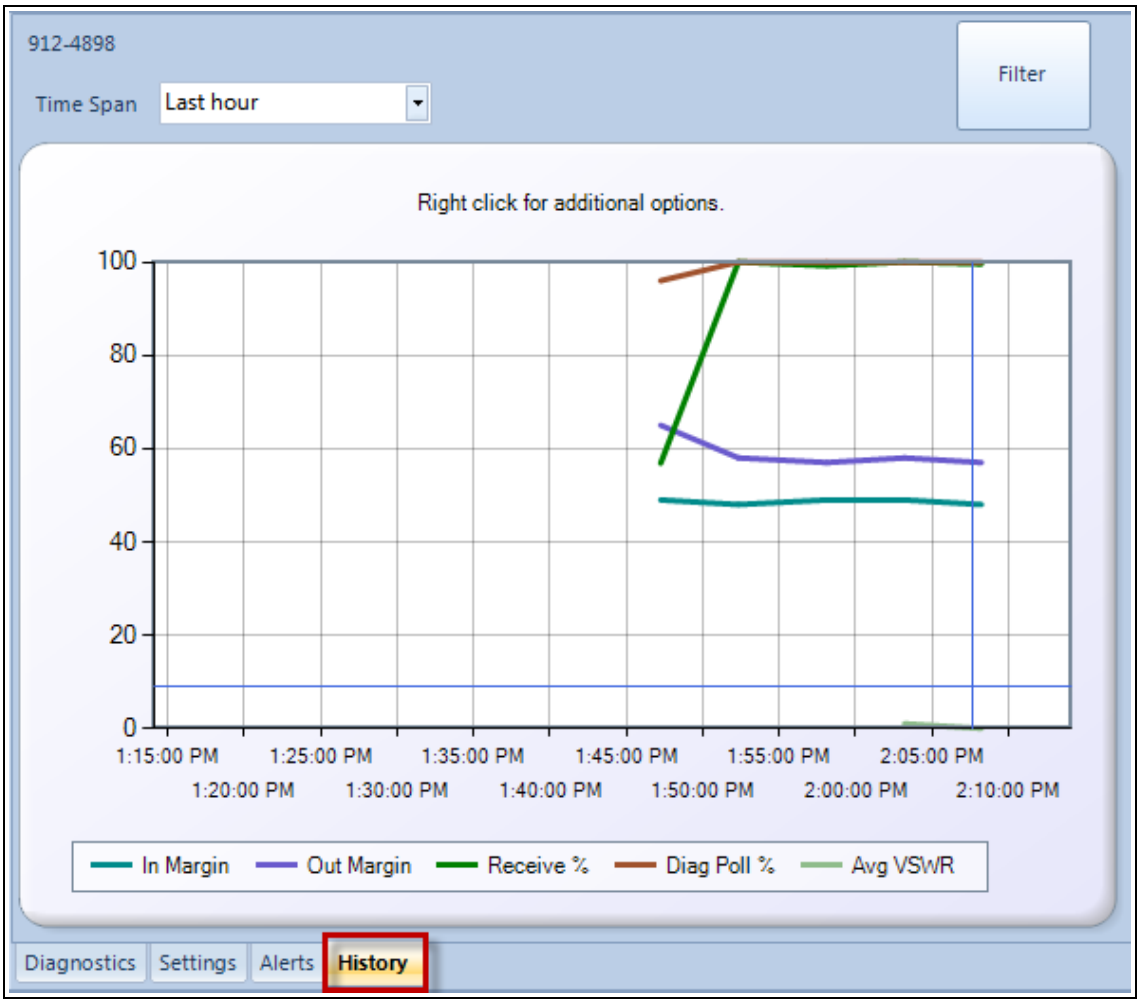
1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon that contains the device to view.
3. In the **Radio** tree, select the device to review and click the **Summary** tab.

7.8.2. Copy Data to a Microsoft® Excel Spreadsheet

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon that contains the device to view.
3. In the **Radio** tree, right-click the device and select **Select All**.
4. Copy and paste the information into an **Microsoft® Excel** spreadsheet.

7.9. Trend Analysis View

The **Trend Analysis** view shows an analysis of time-specified reported data.



7.9.1. Show the Trend Analysis View

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon that contains the device to view.
3. In the **Radio** tree view, select the device to review.
4. Click the **History** tab at the bottom of the **Network Diagnostics** window.
5. In the **Time Span** field, select the time period for to show data.

7.9.2. Zoom In and Out in the Trend Analysis

1. In the visible graph, hold down the left button on the mouse at the uppermost or lowest point of the area on the graph to zoom.
2. Drag the mouse across the entire area to zoom. Figure 50

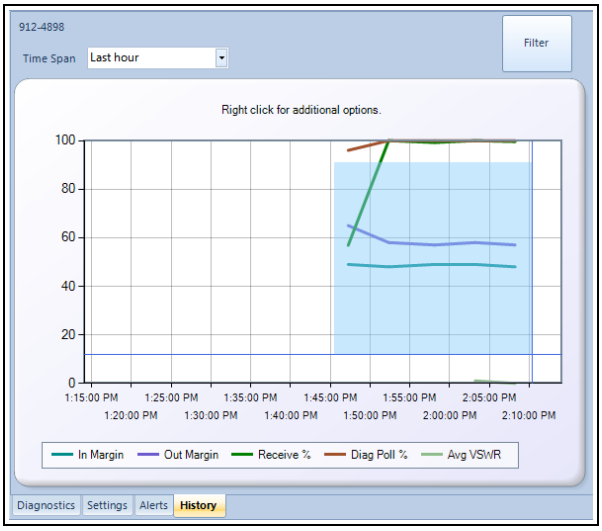


Figure 50: Trend Analysis dialog box

3. To zoom out, click the **O** in the top upper left corner (controls zooming out at the Y-axis) and/or the lower left corner (controls zooming out at the X-axis) of the graph. Figure 51

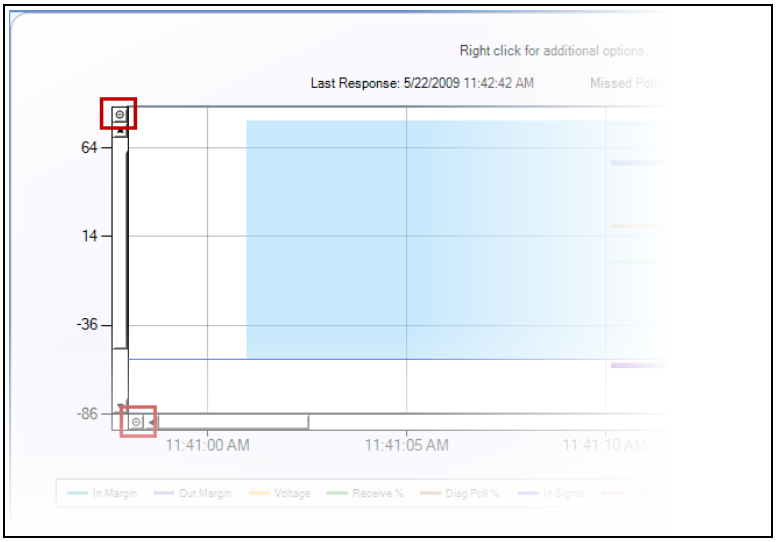


Figure 51: Example: Zoom Out

Note: The number of times the graph is magnified equals the number of times needed to click either one of the reset points to return the graph to the normal view.

7.10. Parameter Definitions and Recommended Values

When using the **Network Diagnostics** application, these parameters are available in each of the views.

- Refer to the parameter definitions and the recommended values for each.
- For more information about each of these parameters in a particular device, see that device's user manual or addendum.

Parameter	Description
Diag Poll % (serial only)	The percentage of the time that the radio reported back diagnostics data when polled. • If the device transmits a lot of data as part of its normal operation, it has less time to respond to the Master polling it for diagnostics data; in that case, the diagnostics response rate decreases. • If this value is 0, it may be because this device is disconnected from the network.
In/Out Margin	The difference between the signal and noise. • **In Margin** is the spread of points between the **Inbound Noise** and **Inbound Signal**. • **Out Margin** is the spread of points between the **Outbound Noise** and **Outbound Signal**. • A spread of 20 dB or greater is considered ideal. **FREEWAVE Recommends**: A minimum of 20 dB. This recommendation means the signal needs to be 20 dB higher than the noise level.
Inbound Noise	The noise at the selected Slave or Repeater.
Inbound Signal	The signal the Slave or Repeater receives from the Master or Repeater to which that device is linked.
Outbound Noise	The noise in the outbound transmission at the Master or Repeater
Outbound Signal	The signal the Master or Repeater receives from the Slave.

Parameter	Description
Receive %	The percentage of data packets that were successfully transmitted from the Master to the Slave on the first attempt. • A number of 75 or higher indicates a robust link that provides very good performance even at high data transmission rates. • A number of 15 or lower indicates a weak or marginal link that provides lower data throughput. • An **Overall Receive Rate** of 100% provides approximately 100 KBaud of bandwidth with an **RF Data Rate** setting of **3** and approximately 150 KBaud of bandwidth with an **RF Data Rate** of **2**. • These numbers are reduced approximately 50% if one or more Repeaters are in the network.
Temperature	The physical temperature of the device.
Transmit % (Ethernet only)	The percentage of packets the device sends sent that successfully reach the upstream device (Gateway or a Repeater). • This statistic shows 0.00% on a Multipoint Gateway or Multipoint Repeater. • This statistic is only valid on Multipoint Endpoint devices. **FREEWAVE Recommends**: A minimum of 75% for proper device operation.
Voltage	The input voltage the device receives. This value should be within the specified range of the device that is being read. **Example**: The FGR series radios should be between the 6 and 30 Volts DC.
VSWR	The amount of signal being reflected back into the device. • A reading between 0 and 5 is considered good; • between 6 and 25 is Fair; • between 26 and 30 or higher is considered Poor and needs attention.

7.11. Change Settings Over the Air

In the **Network Diagnostics** application, view a device's current configuration and change these settings over the air:

- Operation Mode
- Baud Rate
- Transmission Characteristics
- Multipoint Parameters

FREEWAVE Recommends: When making changes, always start at the farthest site in the line (e.g., the Slave farthest from the Master).

1. Click **Network Diagnostics** in the **Applications** pane to view the **Network Diagnostics** application.
2. In the **Networks** section of the **Network Diagnostics** ribbon, select the network that contains the device to change.
3. In the **Radio** tree view, select the device to change.
4. Click the **Settings** tab at the bottom of the **Network Diagnostics** window to view the device's current settings.
5. In the parameter field to change, make the necessary changes.
6. Right-click in the field to change and select **Change**.
7. Answer **Yes** at the prompt to continue.

Note: While the change is being sent to the device, a warning icon appears next to the field that is changing. Figure 52

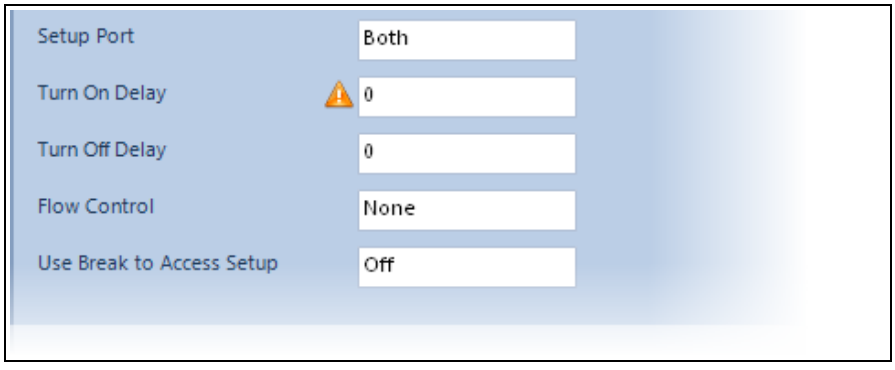


Figure 52: Example: Changing Field

The new value appears in the field and the warning icon is no longer visible when the settings changed.

Tip If the value does not show right away, try polling the device to verify the setting was changed.

8. Setup Terminal Application

Use the **Setup Terminal** application to configure a device using a terminal window that mirrors the menu structure when connected to the device using a terminal emulator.

Use the **Setup Terminal** instead of the **Configuration** application or an external terminal emulator to program devices in the network.

Important!: I/O Expansion Serial Base and Expansion modules are NOT compatible with either terminal emulators or the **Tool Suite** Setup Terminal application.
Configure these devices using the parameters in the **Configuration** application.
For more information, see I/O Serial Base and I/O Expansion Device Parameter Tabs (on page 49).

Click **Setup Terminal** in the **Applications** pane. Figure 53

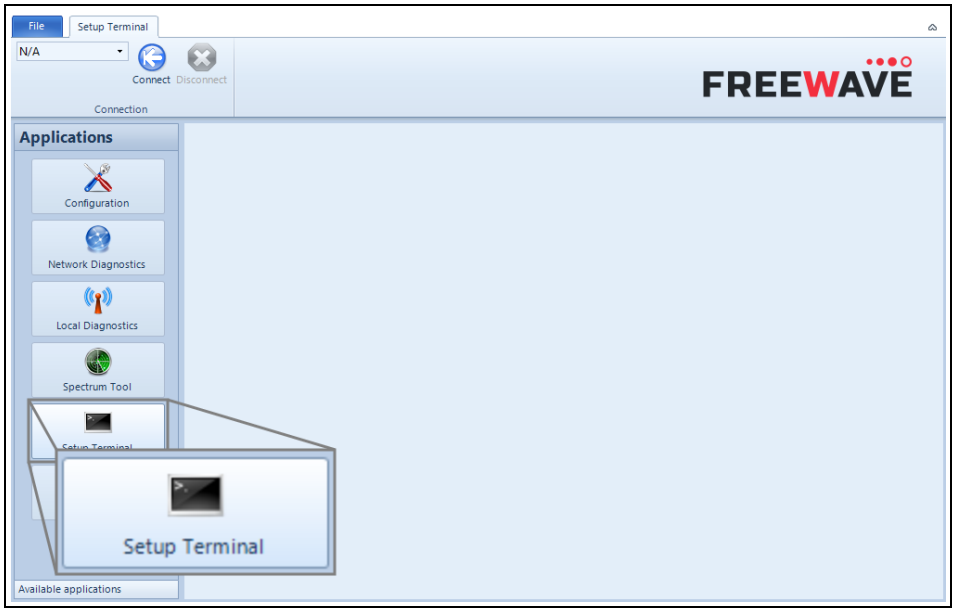


Figure 53: Applications > Setup Terminal

8.1. Configuring Devices Using Setup Terminal

Use the **Setup Terminal** application to configure a device using a terminal window that mirrors the menu structure available in an external terminal emulator.

> **Important!**: All changes made through **Setup Terminal** are sent to the device immediately.
>
> Be sure to disconnect the device after making any changes before running diagnostics for the device.

1. Click **Setup Terminal** in the **Applications** pane to display the **Setup Terminal** application.
2. Verify the device to configure is connected to the computer and that all diagnostics are stopped.
3. Select the COM Port the device is connected to from the drop-down list in the **Setup Terminal** ribbon and click **Connect**.
   The setup menu for the device appears in the Setup Terminal window. Figure 54

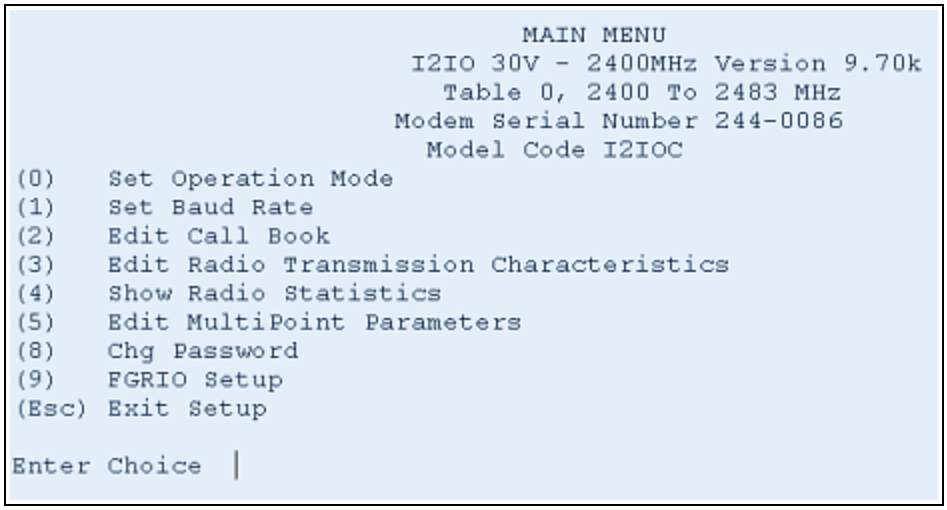


Figure 54: Setup Menu

4. Type the number of the menu to expand and make updates as necessary.
5. Press **Esc** to exit the menu or click **Disconnect** in the **Setup Terminal** ribbon to disconnect the device.

9. Spectrum Tool Application

The **Spectrum Tool** application puts a supported serial device into a listening mode that monitors the ambient noise at various spectrum points as the radio hops through them.

> **Important!**: The **Spectrum Tool** application is only available for 900 MHz, 2.4 GHz, and 1.3 GHz serial devices.

Click **Spectrum Tool** in the Applications pane. Figure 55

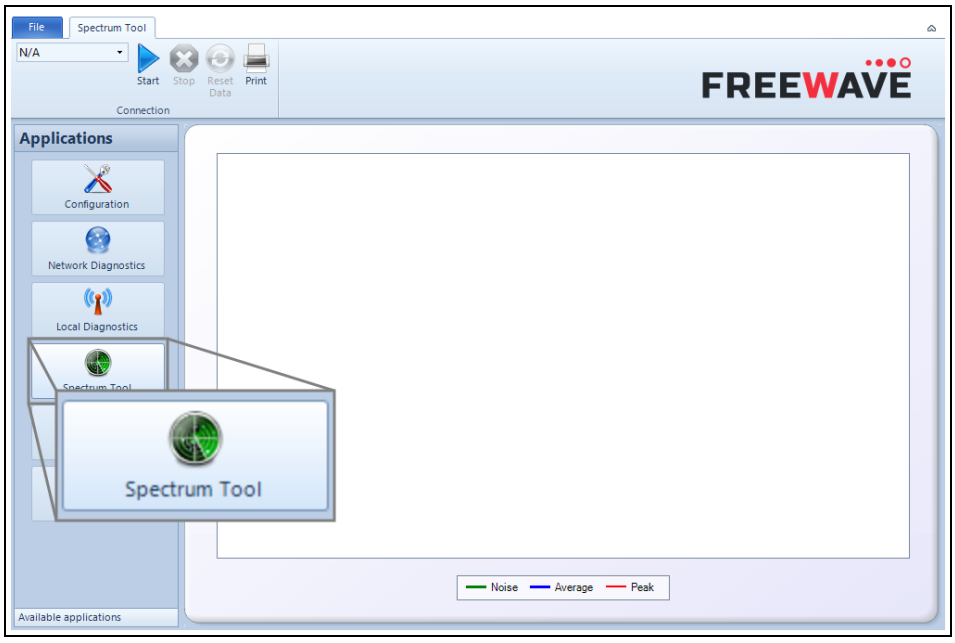


Figure 55: Applications > Spectrum Tool

9.1. Run a Spectrum Analysis

Use the **Spectrum Tool** to monitor the ambient noise at various spectrum points as the radio hops through them.

Note: To run an analysis for a device, the device must be taken offline.

Procedure

1. Click **Spectrum Tool** in the **Applications** pane to show the **Spectrum Tool** application.
2. Connect the device and click **Start** in the **Spectrum Tool** ribbon.
3. Click **Yes** at the prompt to place the device offline and run the analysis. Figure 56

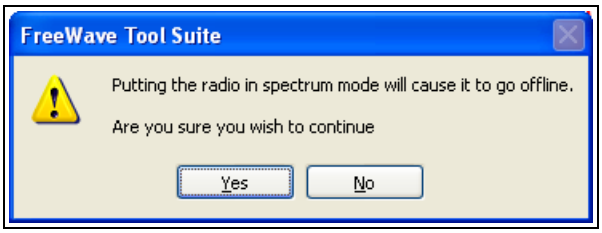


Figure 56: Confirm Offline Mode message

Tool Suite runs the analysis and updates the graph as it receives data from the device. Figure 57

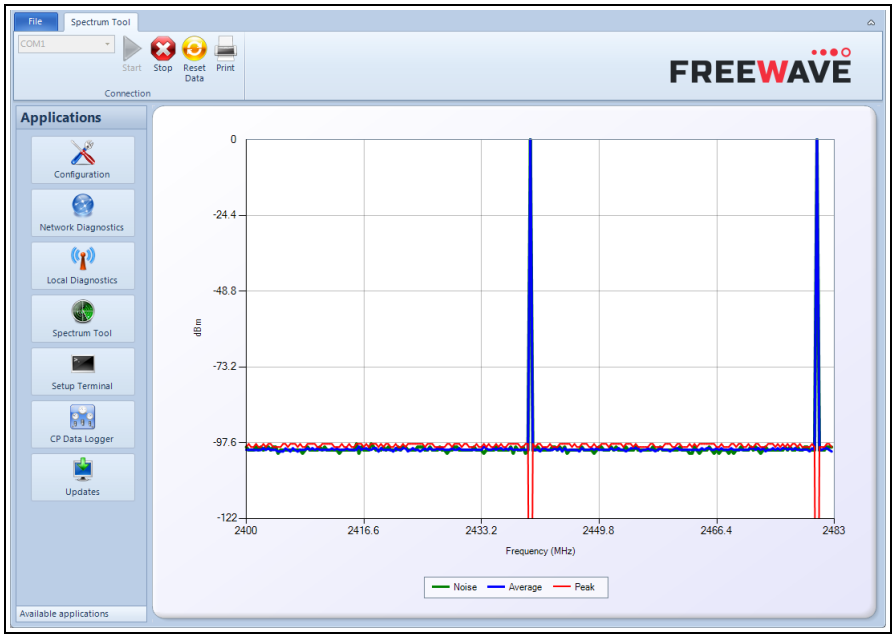


Figure 57: Spectrum Analysis Graph

4. Optional: Click **Reset Data** in the **Spectrum Tool** ribbon to reset the peak and average trend lines in the graph.

9.2. Stop a Spectrum Analysis

1. Click **Spectrum Tool** in the **Applications** pane to show the **Spectrum Tool** application.
2. Click **Stop** in the **Spectrum Tool** ribbon.

9.3. Print a Spectrum Analysis Graph

1. Click **Spectrum Tool** in the **Applications** pane to show the **Spectrum Tool** application.
2. Click **Print** in the ribbon to open a print preview of the graph.
3. Click the **Printer** icon in the upper left corner of the print preview window.
   The document is sent to the default printer designated on the computer.

10. Updates Application

Use the Update application to review the most recent **Tool Suite** updates available and to update the version of the **Tool Suite** software.

Use the **Updates** application to:

- Review the release notes for each upgrade version of the **Tool Suite** software.
  - The **Release Notes** include all the information about additions and changes in each release of the **Tool Suite** application.
- Verify the latest version of **Tool Suite** is running.
- Update to the most recent **Tool Suite** version.

Click **Updates** in the **Applications** pane. Figure 58

Note: After upgrading to **Tool Suite** v2.8.5, any future upgrades make an automatic backup copy of **ToolSuite.sdf** (all Configuration application data) files in the **C:\Program Files\FreeWave Technologies\Freewave Suite\backups** directory.

Figure 58: Applications > Updates

10.1. Back Up Tool Suite Data

In **Tool Suite**, the items created (e.g.,networks and templates), are saved in the **ToolSuite.sdf** file.

- In **Tool Suite** v2.8.5 and later, a backup copy of this file can be created and saved to any location on the computer or network.
- Back up data ensures there is always a copy of the network and device settings in the event of a computer malfunction.

Note: **Tool Suite** issues a prompt to create a data backup seven days after the last backup was completed.

After upgrading to **Tool Suite** v2.8.5, any future upgrades make an automatic backup copy of **ToolSuite.sdf** (all Configuration application data) files in the **C:\Program Files\FreeWave Technologies\Freewave Suite\backups** directory.

- Manually Backup Tool Suite (on page 101)
- Restore Tool Suite Data from a Backup (on page 101)

10.2. Manually Backup Tool Suite

1. From the **File** menu, select **Back Up Data** to display the Select Backup File dialog box.
2. Navigate to the directory where you want to save the backup file.
   By default, the system displays the **C:\Program Files\FreeWave Technologies\Freewave Suite\backups** directory and the file name is **ToolSuite.sdf<date and time stamp>.bak**.

   FREEWAVE Recommends: Accept the default file name.
3. Click **Save** to save the file.

10.3. Restore Tool Suite Data from a Backup

Caution: Restoring data from a backup copy completely replaces the current Tool Suite data with the data in the backup file.

Important!: Save a backup copy of the current Tool Suite data prior to restoring from a backup.

1. In **Windows® File Explorer**, go to **C:\Program Files\FreeWave Technologies\Freewave Suite\backups** and locate the **ToolSuite.sdf<date and time stamp>.bak** file with the date and time stamp to restore data.

   Important!: This may not be the file with the latest date and time stamp.

   Note: If the Tool Suite data was backed up manually to another location, go to that location to locate the file.
2. Rename the file to **ToolSuite.sdf**.
3. Copy the renamed file to the **C:\Program Files\FreeWave Technologies\Freewave Suite\data** directory.
4. Open Tool Suite.
   The data from the copied file is read into Tool Suite.

10.4. Update Tool Suite at Program Startup

Using an active Internet connection, **Tool Suite** automatically connects to the FreeWave network to determine if the latest version of **Tool Suite** is running.

1. If a new update is available, a prompt appears that new updates are available.
2. Click **Yes** to download the update.
   The **Updates** application opens.
   The update downloads and **Tool Suite** prompts to install the update.
3. Click **Apply Updates** in the **Updates Application** ribbon to install the updates.
   Tool Suite installs the updates, and re-launches after the install is complete.

10.5. Update Tool Suite From an Open Session

If currently running **Tool Suite** and to install updates, review the release notes for the updates listed in the Update application and follow the steps below.

1. Click **Updates** in the **Applications** pane to open the **Updates** application.
2. Click **Check Updates** in the **Updates** ribbon.
   A prompt appears indicating whether there are updates available to install.
3. If there are updates, click **Yes** to download the updates.
   When the download process is complete a message appears prompting installation of the updates.
4. Click **OK** to close the prompt.
5. Click **Apply Updates** in the Updates ribbon.
   Tool Suite applies the updates and re-launches after the install is complete.

10.6. Update Tool Suite Locally

To update **Tool Suite** on computers that do not have an active Internet connection, download the latest updates to a computer that has a network connection, and distribute the installation file on a network drive or a drive to take into the field or carry throughout the office.

1. From a computer with an Internet connection, download the latest **Tool Suite** update from support.freewave.com.
2. Save the update file to a folder on a local or network drive or portable drive.
3. After the update file has been saved (if the package has been saved to a jump drive or CD, make sure the hardware is plugged into the computer or the CD with the update package is in the computer's CD-ROM), click Updates in the Application pane.
4. Click **Local Update** in the **Updates** ribbon.
   Tool Suite opens the last folder that was accessed through the software.

   > **Note**: If the update file was saved in a different location, navigate to the correct directory, select the update file, and click **Open**.

   Tool Suite installs the updates and re-launches after the install is complete.

10.7. Update Tool Suite from Versions 2.0.1.2 and Earlier

Due to database changes, if upgrading from Tool Suite version 2.0.1.2 or earlier, the old database must be merged with the new database format.

Important!: Tool Suite databases from versions 2.0.1.2 and earlier are not compatible with Tool Suite version 2.2 and above databases.

Tool Suite versions 1.4.1 and below cannot upgrade to version 2.6 or above from the **Updates** application.
To upgrade to the latest version, first un-install Tool Suite, then download the latest installer from support.freewave.com.

1. Click **Updates** in the **Applications** pane to open the **Updates** application.
   If the system requires updates, a **New updates are now available, would you like to download?** message appears.
2. Click **Yes** to continue the update process.
3. Click **OK** at the prompt that opens after the updates download.
   A **Confirmation of Database Upgrade** message appears asking to merge databases. Figure 59

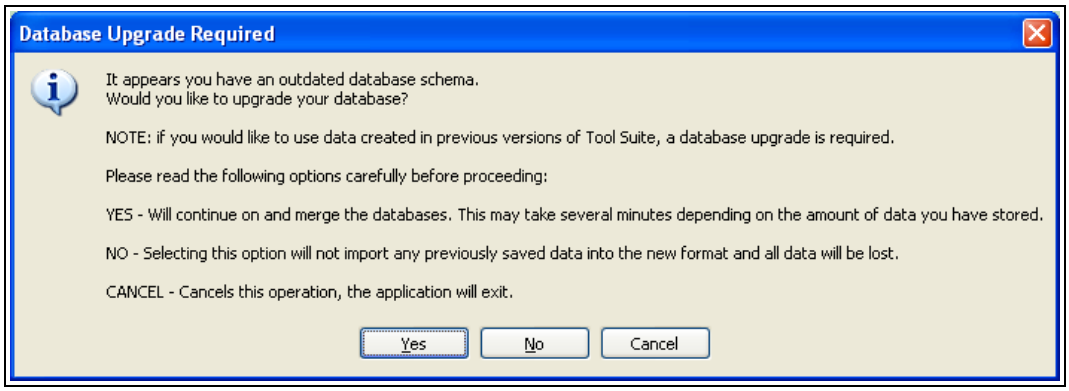


Figure 59: Confirmation of Database Upgrade message

4. Select one of these options in the merge databases prompt:
   - Click **Yes** to merge databases.
   - Click **No** to update Tool Suite without merging databases.

     Caution: If **No** is selected and the update is continued in Tool Suite, all previously saved data is deleted after the update.

     Note: If **No** is selected, Tool Suite restarts automatically.

   - Click **Cancel** to exit without completing the upgrade.

Note: If **Yes** is selected, a progress bar opens while the databases are merging. Figure 60 The merge can take several minutes.

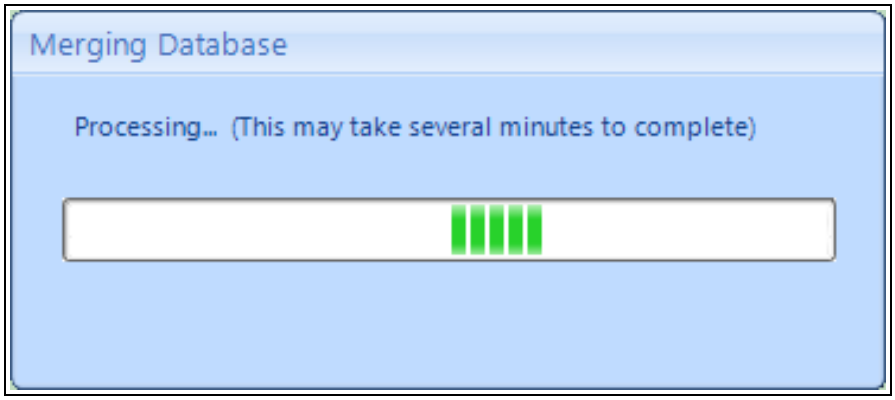


Figure 60: Merging Database Progress bar

After the merge is complete, **Tool Suite** restarts and then reloads automatically.

11. Release Notes

These sections describe the additions, changes, and known limitations in each software version for the FreeWave Tool Suite. The most recent version is listed first.

The latest firmware and software versions and the most recent list of known limitations and workarounds are available on support.freewave.com.

- Version 2.11.2 (on page 107)
- Version 2.11.1 (on page 107)
- Version 2.11.0 (on page 107)
- Version 2.10.0 (on page 108)
- Version 2.9.2 (on page 108)
- Version 2.9.1 (on page 109)
- Version 2.9.0 (on page 109)
- Version 2.8.7.5 (on page 110)
- Version 2.8.7.3 (on page 110)
- Version 2.8.7.2 (on page 110)
- Version 2.8.7.1 (on page 111)
- Version 2.8.7.0 (on page 111)
- Version 2.8.6.0 (on page 111)

11.1. Version 2.11.2

Release Date: 10/8/2019

Version 2.11.2	
Update Type	**Description**
Firmware	Added FGR3 v11.00.11 firmware image.
General	Updated logo.

11.2. Version 2.11.1

Release Date: 9/12/2019

Version 2.11.1	
Update Type	**Description**
Configuration	Resolved issue with reading IOE/IOEX modules.

11.3. Version 2.11.0

Release Date: 3/14/2019

Version 2.11.0	
Update Type	**Description**
Configuration	Fixed issue with Operation Mode tab not displaying on TDMA-enabled radios.
Diagnostics	Fixed issue with closing Plus Ethernet discovery when no discovery sessions were started.
Diagnostics	Fixed issue with Plus Ethernet discovery object reference error that occurred under some Ethernet interface configurations.
Diagnostics	Fixed issue with GX/GXM radios with v9.8.3 firmware being misidentfied.
Firmware	Added FGR3 v11.0.08 firmware image.
Firmware	Added FGR2 / MM2 v1.7.04 firmware image.
Firmware	Added GX / GXM v9.8.3 firmware image.
Firmware	Added I2-IOS 9.81 firmware image.
Firmware	Added LRS-455 1.79 firmware image.
Firmware	Fixed LRS-455-EU 1.73 firmware image.
General	Added FGR3 radio support.
General	Now correctly identifies MM2-9X5W and MM2-9X5W-CC radios.
General	Added COM port autodetection (no longer need to restart to detect new COM ports).
General	Improved feedback if COM port is in use by another component or application.

11.4. Version 2.10.0

Release Date: 05/04/2015

Version 2.10.0	
Update Type	**Description**
Configuration	Removed the (missing or bad snippet) on Plus Ethernet radio discovery form.
Configuration	Fixed false firmware update notification when a radio has newer firmware than is currently available in (missing or bad snippet).
Configuration	Remote LED setting now defaults to (1) Remote and Local on all radio templates that contain it.
Configuration	Local Plus Ethernet radio discovery now uses all network interfaces and supports firmware v3.01 and higher.
Configuration	Removed HT2+ radio support.
Configuration	Added Plus Ethernet firmware v2.34 and v3.01 parameter support.
Firmware	Added LRS-455 v1.77 firmware.
Firmware	Added FGR2 / MM2 v10.6.8 firmware.
General	Fixed startup error due to configuration file corruption. Tool Suite will now reset the configuration file automatically, and will prompt if an application restart is required.
General	Removed CP Data Logger and Modbus Interface tools.
General	Fixed CSV export error that occurred when a discovered radio had not been fully identified using Network Diagnostics.
General	Fixed error recognizing recent FGR2-IOS radios.
Installation	Removed requirement for separate Microsoft Report Viewer installation.
Network Diagnostics	Fixed issue with setting Terminal Server TCP port above 32767 in network settings dialog.
Network Diagnostics	Fixed issue with FGR2/MM2 radios reporting incorrect firmware version number.

11.5. Version 2.9.2

Release Date: 11/13/2013

Version 2.9.2	
Update Type	**Description**
Configuration	Added Clear Counter on Read setting for I/O Expansion modules
Configuration	Added ability to create a template from an existing radio or radio template.
Firmware	Added v2.2.2 firmware for I/O Expansion modules.
General	Resolved occasional BackgroundWorker error when selecting an application mode from the Applications list.

11.6. Version 2.9.1

Release Date: 7/15/2013

Version 2.9.1	
Update Type	**Description**
CP Data Logger	Changed Rectifier Voltage to use VDC instead of mVDC.
Firmware	Added 9.77 firmware for FGR2 900 MHz IO Slave and FGR2 900 MHz IO Slave (Enclosed) radios.
Firmware	Added v10.6.7 firmware for FGR2 900 MHz Series and MM2 900 MHz Series radios.
General	Added support for additional MM2 radios.
Installer	Fixed prerequisite installation issue that caused missing SQL Server Compact error on some systems.
Network Diagnostics	Fixed firmware version identification for Serial radios.
Network Diagnostics	Fixed discovery of Plus Ethernet radios running older firmware.
Updater	Fixed issue that prevented log file from being written after updating to 2.9.0.

11.7. Version 2.9.0

Release Date: 5/1/2013

Note: When polling serial radios using the **Network Diagnostics** tool, Tool Suite may misinterpret the firmware version number of older firmware releases.
Tool Suite always returns the correct firmware version when reading the radio directly using the **Configuration** tool.

Version 2.9.0	
Update Type	**Description**
Configuration	Fixed miscellaneous typographical and validation issues.
Configuration	Resolved issue with copying radio settings from IM template to I2 radio.
Configuration	Now permits multiple repeaters in Plus network design.
Firmware	Added v10.6.6 for FGR2 and MM2 900 MHz series (AES settings excluded).
Firmware	Added v9.7.9 for I2 and GX 2.4 GHz series (AES settings excluded).
General	Resolved form and control scaling issues on Windows 7.
General	Fixed issue that caused network names to be truncated in network selector.
General	Resolved issues with misidentifying radio models.
General	Added support for additional HT 900 MHz series radios.

Version 2.9.0	
Update Type	**Description**
General	Added log file to capture key application events and errors.
General	Added support for LRS 415 MHz series radios
Network Diagnostics	Polling interval value now displays automatic interval when Auto is selected.
Network Diagnostics	Polling engine now automatically reconnects if terminal server connection becomes temporarily unavailable.
Network Diagnostics	Improved overall performance and stability.
Network Diagnostics	Resolved some issues that could lead to duplicate radios being discovered.
Network Diagnostics	Improved overall reliability of serial radio discovery.
Network Diagnostics	Resolved issue that prevented radios from appearing in the Radio Data History.
Network Diagnostics	Can now sort by name and serial number independently on Summary View and Radio Data history views.
Network Diagnostics	Resolved issue with COM ports locking up when stopping network polling.
Updates	Resolved issue that prevented non-US users from updating Tool Suite.

11.8. Version 2.8.7.5

Release Date: 10/5/2012

Version 2.8.7.5	
Update Type	**Description**
General	Added support for additional FGR 900 MHz Series radios.

11.9. Version 2.8.7.3

Release Date: 8/2/2012

Version 2.8.7.3	
Update Type	**Description**
General	Added support for additional FGR2 900 MHz Series radios.

11.10. Version 2.8.7.2

Release Date: 6/25/2012

Version 2.8.7.2	
Update Type	**Description**
General	Added support for additional FGR2 900 MHz Series radios.

11.11. Version 2.8.7.1

Release Date: 6/5/2012

Version 2.8.7.1	
Update Type	**Description**
Updates	Fixed issue with downloading updates.

11.12. Version 2.8.7.0

Release Date: 5/29/2012

Version 2.8.7.0	
Update Type	**Description**
Configuration	Fixed issue with layout of Ethernet radio templates in Network Design.
Configuration	Fixed issue with Long Distance Enabled setting for HTPlus radios not being honored.
Configuration	Fixed issue with Frequency Zones button being enabled for invalid Modem Mode and Network Type combinations.
Configuration	Added support for v2.26 firmware for GX-PE, FGR2-PE, FGRPlus, and HTPlus Ethernet radios.
Configuration	Pre- and Post-Packet Timeout values are now automatically set to appropriate default values when Serial Modbus RTU and Serial Baud Rate settings are changed on Ethernet radios.
Firmware	Fixed issue with IM 2.4 GHz v3.66 firmware image.
Local Diagnostics	Added support for v2.26 firmware on Ethernet radios.
Network Diagnostics	Fixed issue with automatic and manual polling interval selections not being honored.

11.13. Version 2.8.6.0

Release Date: 3/26/2012

Note: Version 2.8.6.0 was a limited release.

Version 2.8.6.0	
Update Type	**Description**
Configuration	Voltage or Current value is automatically set to Current whenever I/O Mode is set to Analog Output for IOE modules.
Configuration	Added detection of invalid characters in Ethernet radio settings.
Configuration	Added support for 2.23 firmware for FGR2-PE radios.
Configuration	Fixed issue with saving Current Span (uA) register value for IOE modules.
Configuration	Added support for upgrading a stack of IOE-X-4422PC / IOE-X-4422P modules to a stack of IOE-4422 / IOEX-4422 modules.
Configuration	Added Counter Debounce setting and renamed other IOE settings for clarity.
Firmware	Added v2.2.0 firmware for IOE modules.
General	Updated user manual.
Network Diagnostics	Fixed issue with polling I2 radios.

Appendix 12: Legal Notices

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