Part Number D301708X012
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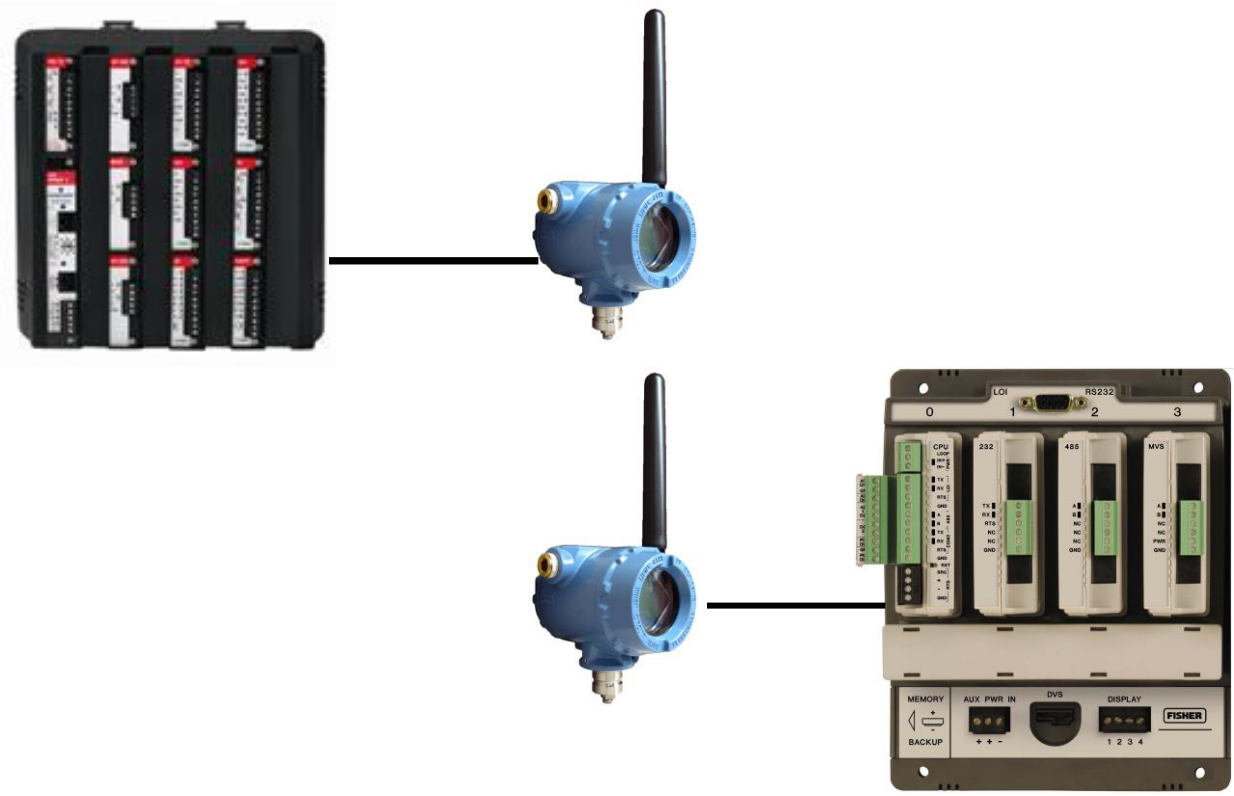
IEC 62591 Wireless Interface Instruction Manual (for ROC800-Series and FloBoss™ 107)



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This manual cover both the hardware – the IEC 62591 Wireless Interface module for the Series 2 ROC800-Series device, the IEC 62591 Wireless Interface module for the FloBoss™ 107 device, and the Emerson™ Wireless 781 Field Link ("Field Link") and the software you need to configure and commission the hardware components.

Note: The IEC 62591 Wireless Interface uses open source software. Refer to *Open Source Software Listing* (Form A6330, included in the same .zip file as this manual) for a complete listing of all components. Source code is available upon request. You may obtain a copy of this source code by contacting Remote Automation Solutions Technical Support.

This chapter details the structure of this manual and provides an overview of the IEC 62591 Wireless Interface and its components.

Overview

The International Electrotechnical Commission's 62591 standard (commonly called WirelessHART®) is a global IEC-approved standard that specifies an interoperable self-organizing mesh technology in which field devices form wireless networks that dynamically mitigate obstacles in the process environment. This architecture creates a cost-effective automation alternative that does not require wiring and other supporting infrastructure.

Remote Automation Solutions IEC 62591implementation consists of an IEC 62591 Wireless Interface module installed in a Series 2 ROC800-Series or FB107 device. The module is wired to a field-installed Field Link. The wiring powers the Field Link and transmits signals between the Field Link and a number of field-installed WirelessHART devices. (*Figure 1-1* shows a ROC809, a Field Link, and several WirelessHART devices). The ROC800 implementation supports up to 60 devices at a 4-second communications rate, while the FB107 implementation supports up to 20 devices at a 2-second communications rate. Refer to the product data sheets for each device for additional device/communication rate values.

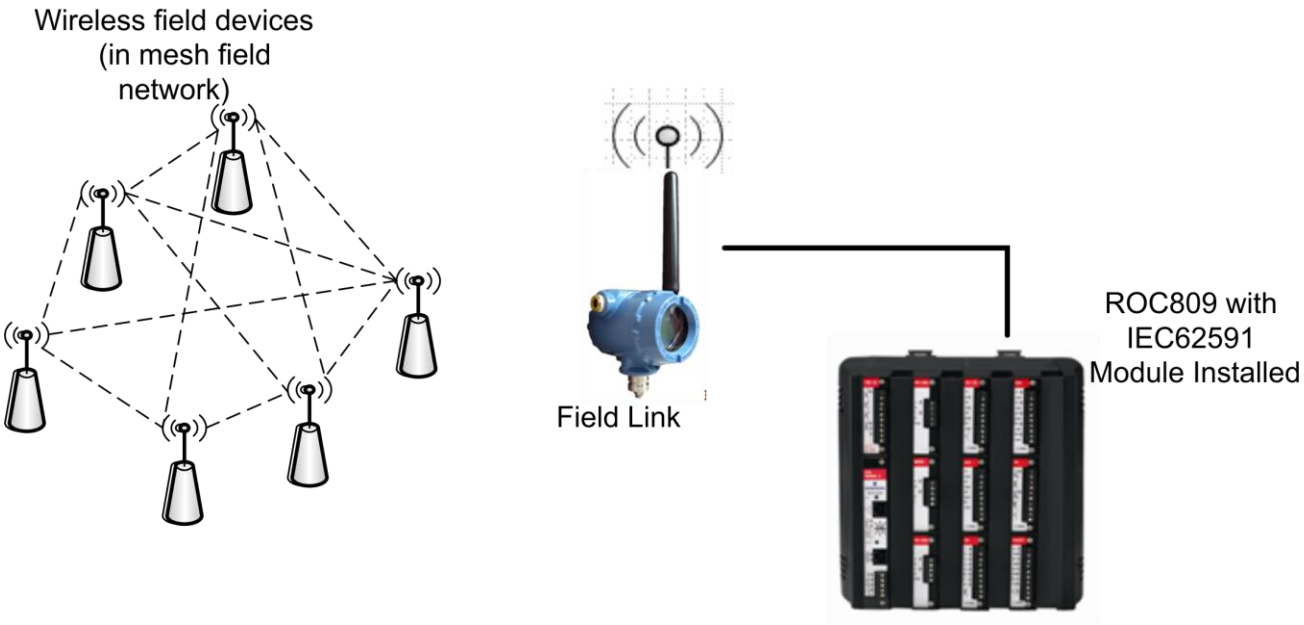

Figure 1-1. IEC 62591 Field Installation

1.1 Scope of Manual

This manual contains the following chapters:

Chapter 1 General Information	Provides an overview of the hardware for the IEC 62591 Wireless Interface.
Chapter 2 Installation	Provides information on installing the IEC 62591 Wireless Interface modules, installing the Field Link, and wiring the Field Link to the module.
Chapter 3 Configuring and Commissioning	Provides information using ROCLINK 800 to configure and commission the Wireless Interface.
Chapter 4 Troubleshooting	Provides information on diagnosing and correcting problems for the IEC 62591 Wireless Interface.
Index	Provides an alphabetic listing of items and topics contained in this manual.

1.2 Hardware

The IEC 62591 Wireless Interface has two basic components: the IEC 62591 Wireless Interface module ("module") and the Field Link.

1.2.1 IEC 62591 Wireless Interface Module

Functionally, there is no difference between the module for the FB107 and the module for the ROC800. They use the same printed circuit board (PCB) but have a slightly different plastic casing. See *Figure 1-2*; the ROC800 module is on the left and the FB107 module is on the right.

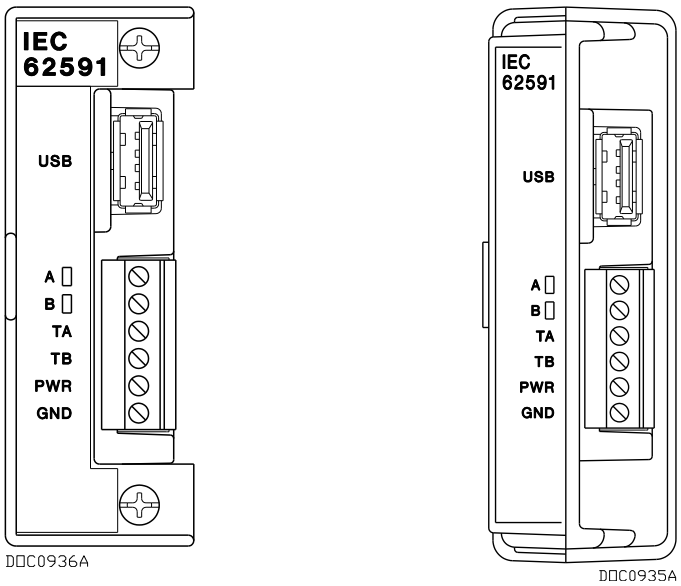

Figure 1-2. IEC 62591 Wireless Interface Module

You can place the module in any available slot on the ROC800 and in any available slot on the FB107. However, each ROC800 or FB107 can support only **one** IEC 62591 Wireless Interface module.

Note: For information on installing modules in the FB107, refer to the *FloBoss™ 107 Flow Manager Instruction Manual* (Part D301232X012). For information on installing modules in the ROC800, refer to the *ROC800-Series Remote Operations Controller Instruction Manual* (Part D301217X012).

USB Port

The module's USB port supports firmware upgrades and provides debug information for product support. For further information, refer to *Chapter 3, Configuration and Commissioning*.

⚠ Caution

Do not use the USB connector unless the area is known to be non-hazardous.

1.2.2 Emerson Wireless 781 Field Link

The second component in the Wireless Interface is the Field Link (see *Figure 1-3*). You install the field link away from controller in the optimal location for best network performance. A 4-wire connection between the module and Field Link provides the 24 Vdc power the field link requires and transmits communication signals sent to the field link from the various WirelessHART field devices.

Figure 1-3. Emerson Wireless 781 Field Link

For instructions on installing the Field Link in the field, refer to *Chapter 2, Installation*.

1.2.3 WirelessHART Field Devices

The two components of Remote Automation Solutions' IEC 62591 Wireless Interface provide you with the ability to manage signals from a network of WirelessHART field devices. The physical configuration of the IEC 62591 Wireless Interface is based on the controller (FB107 or ROC800) and the total number of field devices. A ROC800 implementation supports up to 60 devices, while a FB107 implementation supports up to 20 devices.

Remote Automation Solutions supports transmitters that conform to the WirelessHART protocol. For a current list of the transmitters Remote Automation Solutions has tested with the IEC 62591 Interface, refer to the following product data sheets (available at *www.EmersonProcess.com/Remote*):

- *FloBoss™ 107 IEC 62591 Interface* (part D301713X012)
- *ROC800-Series IEC 62591 Interface* (part D301712X012)

1.3 Configuration/Commissioning Software

Emerson Process Management Field Tools

The release of the IEC 62591 Wireless Interface enables Remote Automation Solutions to introduce Emerson Process Management Field Tools. Field Tools is a comprehensive software solution that folds several Remote Automation Solutions configuration software tools – ROCLINK™, ControlWave Designer, and TechView, among others – into one point-of-access tool. Field Tools simplifies the process of configuring both wired and wireless HART devices.

Once you have installed the IEC 62591 modules and wired them to the Field Link, you use Field Tools to configure and then commission ("activate") the entire network. Refer to *Chapter 3, Configuring and Commissioning*, for specific instructions.

1.4 Additional Technical Information

Refer to the following technical documentation (available at *www.EmersonProcess.com/Remote*) for additional technical and most-current information:

Table 1-1. Additional Technical Information

Name	Form Number	Part Number
ROC800-Series IEC 62591 Interface Product Data Sheet	ROC800:62591	D301712X012
FloBoss™ IEC 62591 Interface Product Data Sheet	FB107:62591	D301713X012
FloBoss™ 107 Flow Manager Instruction Manual	A6206	D301232X012
ROC800-Series Remote Operations Controller Instruction Manual	A6175	D301217X012

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Chapter 2 – Installation

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This chapter describes installing the IEC 62591 module in either a ROC800 or FB107, installing the Field Link, and connecting the Field Link to the IEC 62591 Wireless Interface module.

Note: This chapter covers the physical installation process. To configure and commission the IEC 62591 Wireless Interface, refer to *Chapter 3, Configuring and Commissioning.*

⚠ Caution **Module initialization can take up to five minutes. During this time, module configuration is not possible and the USB port on the module is not recognized. Attempting configuration before initialization is complete may cause errors on your network. The module is initialized when the Status field on the Network tab includes the word Online. If network errors persist after module initialization, power cycle your device and try again.**

2.1 Installing the IEC 62591 Module

You install the IEC 62591 Wireless Interface module in a Series 2 ROC800 or FB107 as you would any other module. However, you can install only one IEC 62591 module in either device.

ROC800 To install a module in the Series 2 ROC800:

⚠ Caution **If any processes require backup, arrange for that before removing power from the device.**

1. Remove power from the device.
2. Remove the wire channel cover.

   Note: Leaving the wire channel cover in place can prevent the module from correctly connecting to the socket on the backplane.

3. Perform one of the following:

- If a module is currently in the slot, unscrew the captive screws and remove that module. Store it in an anti-static bag.
- If the slot is currently empty, remove and store the module cover.

4. Insert the module through the module slot in the front of the ROC800 or EXP housing. Make sure that the label on the front of the module faces right side up (see *Figure 1-2*). Gently slide the module in place until it contacts properly with the connectors on the backplane.

Note: If the module stops and does not go any farther, **do not** force the module. Remove the module and see if the pins are bent. If the pins are bent, gently straighten the pints and re-insert the module. The back of the module must connect fully with the connectors on the backplane.

5. Tighten the captive screws on the front of the module.
6. Wire the module to the Field Link (refer to *Wiring the Modules and Field Link* section in this chapter).
7. Replace the wire channel cover.

Caution **Never connect the sheath surrounding shielded wiring to a signal ground terminal or to the common terminal of an I/O module. Doing so makes the module susceptible to static discharge, which can permanently damage the module. Connect the shielded wiring sheath only to a suitable earth ground.**

FB107 To install a module in the FB107:

Caution **If any processes require backup, arrange for that before removing power from the device.**

1. Remove power from the device.
2. Perform one of the following:
   - If a module is currently in the desired slot, remove the module and store it in an anti-static bag.
   - If the slot is currently empty, remove and store the module cover.

Note: When you install an IEC 62591 module in the FB107's slot 2, the firmware redirects the COM2 communications port on the CPU to the module installed in slot 2. To prevent this from occurring, install the module in slot 3 through slot 7.

3. Close the module cover (the piece with ridged edges) against the body of the module. This enables the locking mechanism to secure the module in the slot.

4. Insert the module in the slot on the base unit or expansion rack, making sure that the module faces the correct direction (see *Figure 1-2*). Gently slide the module into place until it contacts properly with the connectors on the backplane.

   Note: If the module stops and does not go any farther, **do not** force the module. Remove the module and see if the pins are bent. If the pins are bent, gently straighten the pints and re-insert the module. The back of the module must connect fully with the connectors on the backplane.

5. Wire the module to the Field Link (refer to *Wiring the Modules and Field Link* section in this chapter).

⚠ Caution **Never connect the sheath surrounding shielded wiring to a signal ground terminal or to the common terminal of an I/O module. Doing so makes the module susceptible to static discharge, which can permanently damage the module. Connect the shielded wiring sheath only to a suitable earth ground.**

6. Proceed to *Installing the Field Link*.

2.2 Installing the Field Link

This section covers where and how to install the Field Link.

2.2.1 Optimizing the Location

Mount the Field Link in a location that provides convenient access to the host system network (wireless I/O devices) and the network of wireless field devices. Find a location where the Field Link has optimal wireless performance. Ideally, this is 4.6 to 7.6 m (15-25 ft) above the ground or 2 m (6 ft) above obstructions or major infrastructures. See *Figure 2-1*.

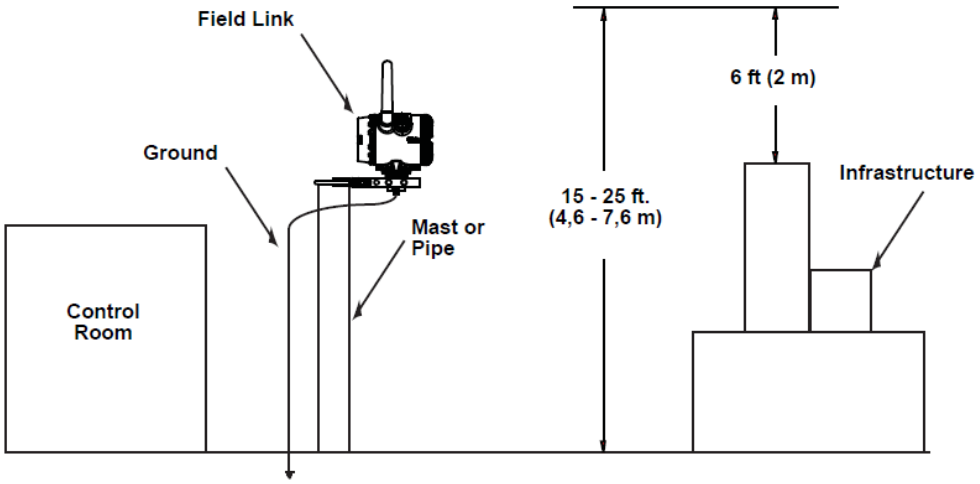


Figure 2-1. Mounting the Field Link

2.2.2 Positioning the Antenna

Position the antenna vertically, either straight up or straight down, approximately 1 m (3 ft) from any large structure, building, or conductive surfaces to allow clear communication with other devices. See *Figure 2-2*.

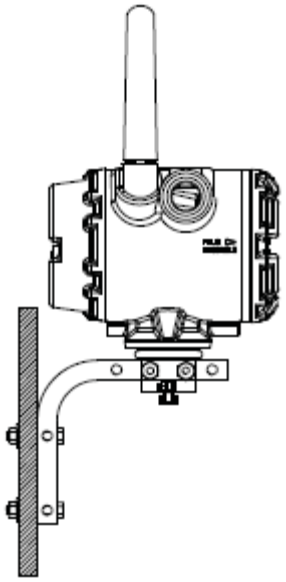


Figure 2-2. Antenna Position

2.2.3 Mounting the Field Link

You typically mount the Field Link on a pipe or mast using the clamps provided in the kit (see *Figure 2-3*).

1. Attach the L-shaped bracket to the pipe or mast.
   - For **pipe** installations, insert the larger U-bolt around the 2-in. pipe, through the L-shaped bracket, and through the washer plate (see the left side of *Figure 2-3*). Use a ½-in. socket-head wrench to secure the nuts to the U-bolt.
   - For **mast** installations, bolt the L-shaped bracket securely to the mast (see the right side of *Figure 2-3*).
2. Insert the smaller U-bolt around the base of the Field Link and through the L-shaped bracket.
3. Use a ½-in. socket-head wrench to fasten the nuts to the U-bolt.

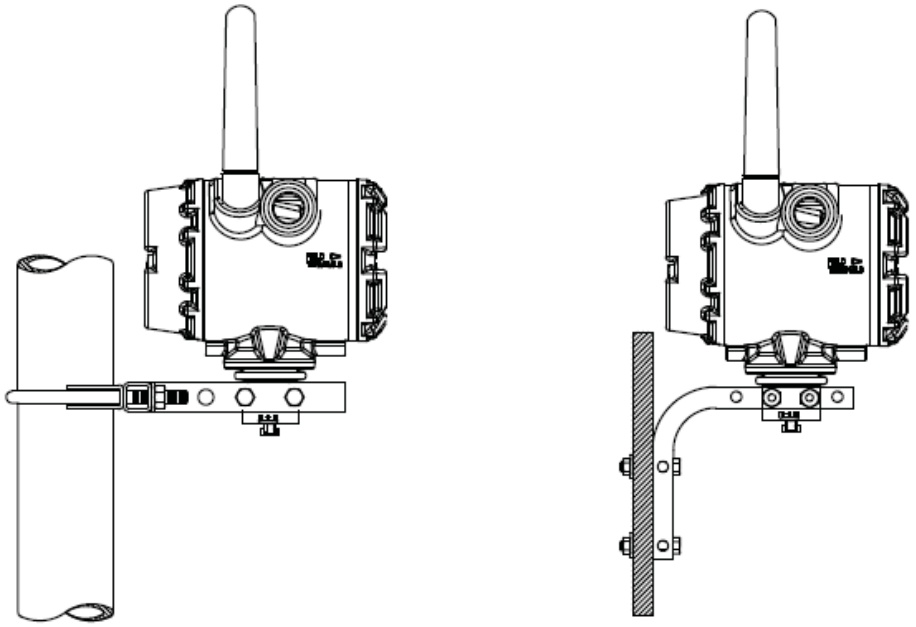


Figure 2-3. Field Link Mounting

2.2.4 Grounding the Field Link

For further information on grounding the field link, refer to the documentation that accompanied the device (*Emerson™ Wireless 781 Field Link Quick Installation Guide*, part 00825-0100-4421)

2.3 Wiring the Module and Field Link

This section assumes you have already successfully installed the IEC 62591 module in either a ROC800 or a FB107 **and** installed the Field Link in its permanent field location.

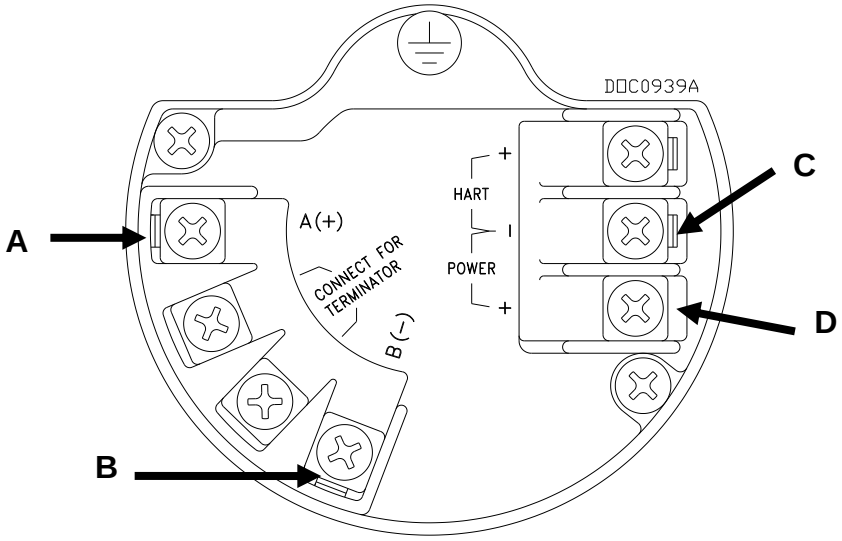
Communications between the IEC 62591 module and the Field Link occur through an RS-485 connection. Remote Automation Solutions recommends that you use shielded, twisted-pair cable for I/O signal wiring. The twisted-pair minimizes signal errors caused by electro-magnetic interference (EMI), Radio Frequency Interference (RFI), and transients. The removable terminal blocks on the module accept wire sizes 16 to 22 AWG.

Note: Ensure that wiring between the ROC800 or FB107 IEC 62591 module and the Field Link meets all appropriate local requirements (use of conduit, etc.).

2.3.1 Wiring the Field Link

1. Power down the IEC 62591 module (if it is currently powered).
2. Remove the housing cover identified on the casing as “Field Terminals.”

3. Connect the positive power lead to the "+" power terminal and the negative power lead to the "–" power terminal.
4. Connect the data + lead to the "A (+)" terminal and the data – lead to the "B (–)" terminal (see *Figure 2-4*).
5. Plug and seal any unused conduit connectors.
6. Replace the housing cover.



A. Data A (+)
B. Data B (–)
C. Return
D. +10.5 to 30 Vdc

Figure 2-4. Field Link Power and Data Wiring

2.3.2 Wiring the IEC 62591 Module to the Field Link

Since the ROC800 and FB107 modules use the same PCB, you wire the modules to the Field Link in the same way. *Figure 2-5* shows wiring for the FB107 IEC 62591 module; *Figure 2-6* shows wiring for the ROC800 IEC 62591 module.

Note: The wire loop between connectors 1 and 3 and between connectors 2 and 4 provides termination for the RS-485 connections between the Field Link and the module.

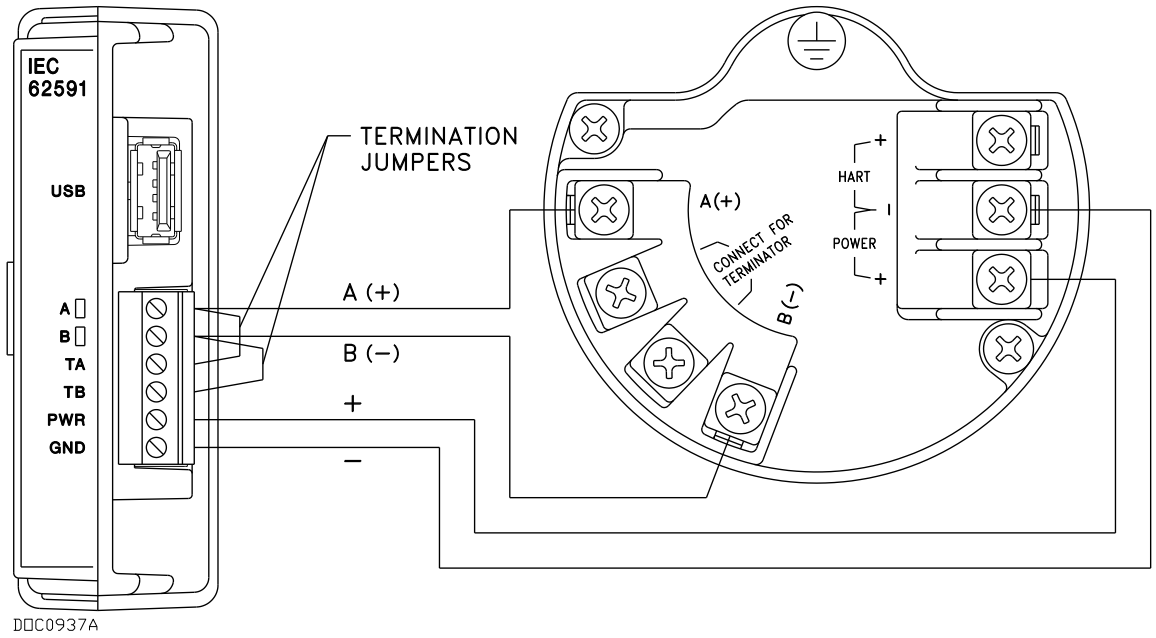


Figure 2-5. FB107 IEC 62591 Module Power and Data Wiring to Field Link

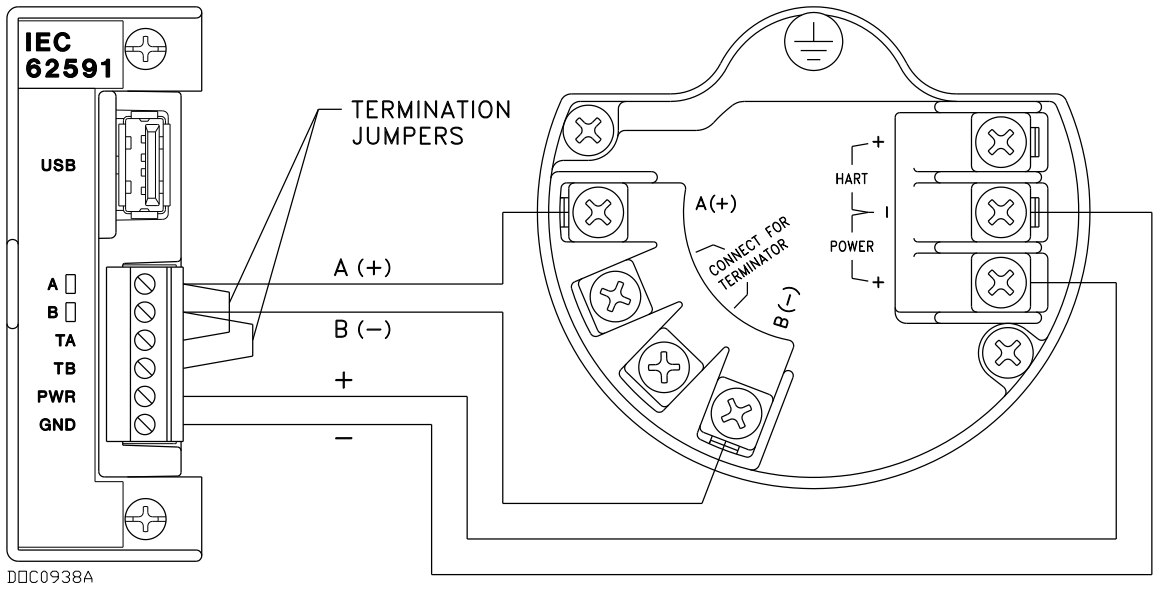


Figure 2-6. ROC800 IEC 62591 Module Power and Data Wiring to Field Link

2.4 Preparing for Configuration and Commissioning

Once you have completed the wiring between the Field Link and the ROC800 or FB107, re-attach the wire covers (on the ROC800) and apply power to the ROC800 or FB107.

Proceed to *Chapter 3*.

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Chapter 3 – Configuration and Commissioning

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After you have wired the Field Link to the IEC 62591 module and applied power to the module, you use the AMS Device Configurator to configure transmitters for the wireless network. You then use ROCLINK 800 to activate (or "commission") each WirelessHART device into the entire network. Both of these software tools are available as part of Field Tools.

Note: Refer to the *Emerson Field Tools Quick Start Guide* (part D301703X412) for complete instructions on using *AMS Device Configurator* to configure the WirelessHART devices with the long tag name, Network ID, and Join Key.

Keep in mind that configuration and commissioning is a two-step process for **each** device:

1. Configure each device using Field Tools' AMS Device Configurator and a HART modem (or you can use a hand-held configuration device such as the Emerson 375 or 475 Field Communicator). During this step you individually add network information (Network ID, Join Key, and long tag name) to the field- based wireless device.
2. Use ROCLINK 800 to configure the network by commissioning the device as a working part of the network.

Note: The commissioning process assumes that you have already placed and powered up a number of WirelessHART devices in the field.

3.1 Overview

As indicated previously, a wireless interface network consists of a number of wireless devices (up to 60 in a ROC800-based network or up to 20 in an FB107-based network), a Field Link, and an IEC 62591 module installed in an FB107 or ROC800. For the configuration and commissioning tasks described in this chapter, we've added a PC running ROCLINK 800 to *Figure 3-1*.

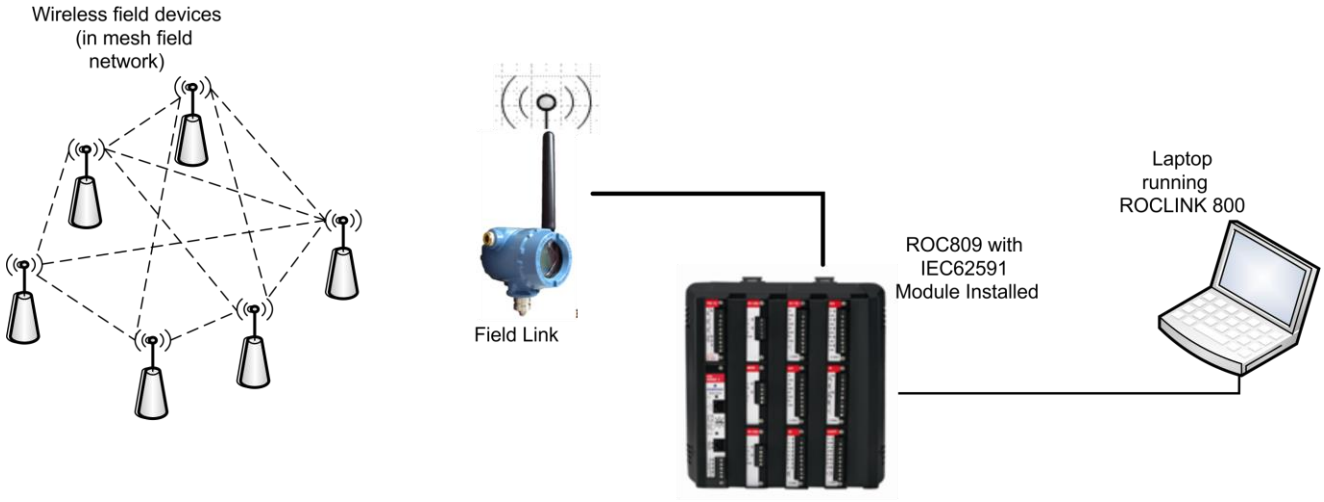

Figure 3-1. Wireless Interface (ROC800-based)

3.1.1 Configuring Devices and Planning the Network

Before you can use a WirelessHART device, you must first configure it. For this task (which is outside the scope of this manual) you may use a hand-held field communicator (such as Emerson's 375 or 475 Field Communicator) or Field Tools' AMS Device Configurator. Ideally, you configure individual devices at a workbench in a protected environment, although you can field-configure a device you might add to the network. During the configuration, you identify the Network ID to which the device eventually belongs and provide the network-specific Join Key (see *Network ID and Join Key*).

During configuration, you also give the wireless device a 32-character tag based on its use or location (such as *PUMP1TEMPORARY*, *PUMP2WESTPRESSURE*, or *WELL02NORTHLEVEL*). The serial number for the device provides further identifiers the configuration software uses. We also suggest you use all capital letters for the tags, which correlates to the way the system stores this information.

Notes:

- Tag names cannot exceed 32 characters, and tag names must be unique to the wireless network.
- Use upper-case (capital) letters for tags names; this corresponds to how the program internally stores tag names.

The individual devices should fit into a general organizational plan for your fields. By identifying logical groups and pre-assigning devices to those groups, you can eliminate guesswork during commissioning, efficiently define networks, and more quickly begin to acquire data.

Note: An important restriction in planning networks is to know that **a** network can have only **one** Network ID, **one** Join Key, **one** Field Link, and **one** controller (a ROC800 supporting up to 60 devices or a FB107 supporting up to 20 devices).

3.1.2 Network ID and Join Key

A Network ID defines one logical grouping of WirelessHART devices, all of which send their information to one Field Link. (You define a device's Network ID when you first configure the device with a 375 Field Communicator or Field Tools' HART Device Configurator.)

Note: A Network ID **cannot** be all zeros (such as 00000).

The Join Key is the password that allows a device to access its defined network. During configuration, you also provide the device with its network-specific Join Key. During configuration and commissioning, ROCLINK 800 uses the Network ID and Join Key to create the network (see *Figure 3-3*).

3.1.3 Rosemount THUM™ Adapter

Note: Each THUM adapter supports only one wired HART device.

Rosemount's THUM™ Adapter provides wireless connectivity to a wired HART device. If you have already commissioned a wired HART device into your network and want to connect it to a THUM Adapter, you must first decommission the device, attach the THUM Adapter, and then re-commission the device. For further information about THUM Adapters, refer to:

- *Emerson™ Wireless 775 THUM™ Adapter Reference Manual*, 00809-0100-4075
- *Emerson™ Wireless 775 THUM™ Adapter Quick Installation Guide*, 00825-0100-4075

The Quick Installation Guide was packed in the box with the THUM; the Reference Manual is available on the Rosemount website (*www.EmersonProcess.com/Rosemount*).

3.2 IEC 62591 Module Interface (FB107)

The FB107 automatically recognizes the IEC62691 module when you install it and adds it to the graphical interface. When you click on the module, ROCLINK 800 displays the main IEC 62591 screen below the image of the FB107:

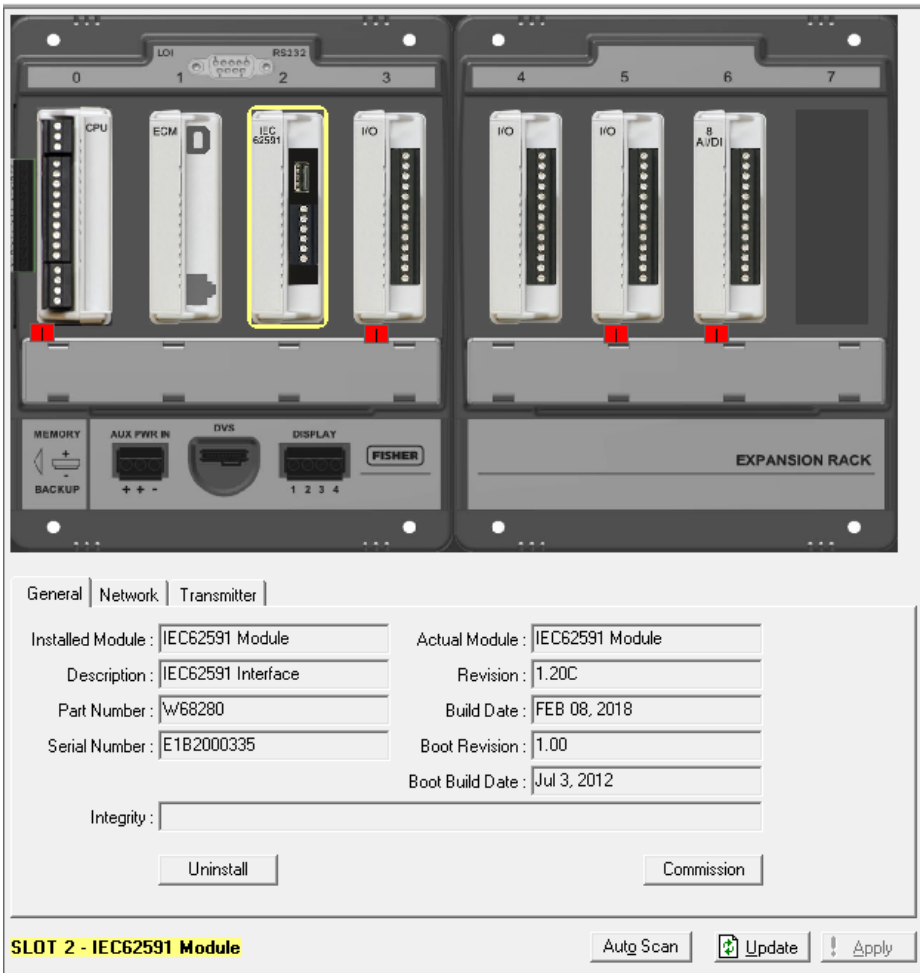

Figure 3-2. FB107 Graphic Interface with IEC 62591 Module

The module screen has three tabs:

Tab	Description
General	Provides **read-only** statistical information about the IEC 62591 module.
Network	Defines the Join Key and Network ID for the network. These values must correspond to the Network ID and Join Key in the devices.
Transmitter	Lists all transmitters defined in the network. Click on a defined device to access the Transmitter screen, which displays statistics and information for that transmitter.

Tab	Description
Integrity	Displays any integrity problems with the wireless network. **Note**: If a transmitter has a problem, this field turns red and displays a message identifying the transmitter at fault (here, the transmitter in logical position 2).
Uninstall	Click to uninstall the IEC 62591 module and restore factory defaults. Since the FB107 automatically recognizes installed modules, it immediately redisplays the module in the graphic interface. **Note**: Click this button to reset all values for the module back to factory default. You must redefine all values for your network.
Commission	Click to access the Commission screen, which displays all devices the Field Link has identified for the network.

To begin to commission the network, select the **Network** tab. The Network screen displays:

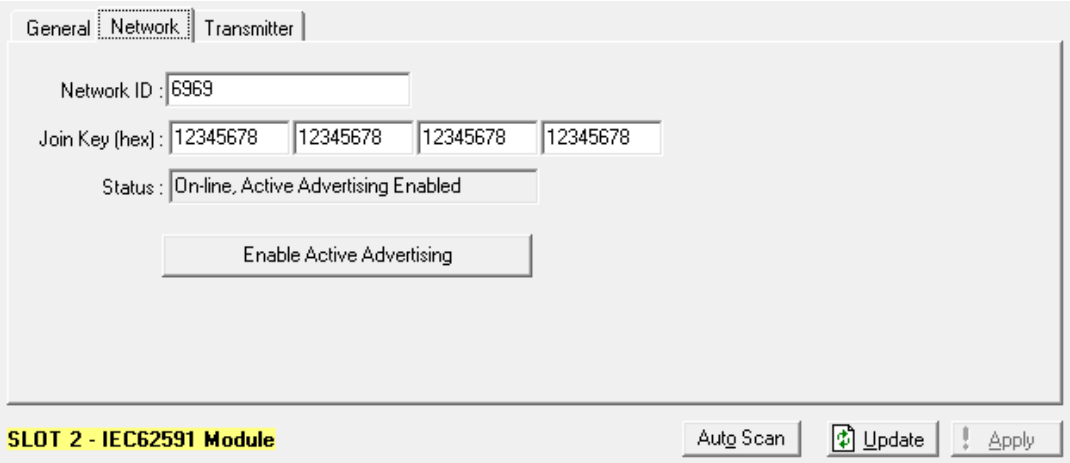

Figure 3-3. Network screen

⚠ Caution **Configure all devices belonging to a site to use the same Network ID and Join Key. To avoid network errors, configure all devices in adjacent networks to us a different Network ID and Join Key.**

Note: The values initially shown in the Network ID and Join Key fields in *Figure 3-3* are **default values**. You must change these to your network-specific ID and join keys **and** save the configuration to flash memory. This prevents the default values from overwriting your network-specific values during a cold start.

Complete the Network ID and Join Key fields with the Network ID and Join Key you have defined for the transmitters.

Field	Description
Network ID	Enter a five-character Network ID. Valid values are 1 to 36863. Should be noted that each IEC62591 Module / RTU can only have a single Network ID. The "grouping" should be related to the control/monitoring network for a given RTU. For example if two RTUs are installed at a site, each grouping should be the set of meter runs each RTU controls. **Note:** A Network ID cannot be all zeros (such as 00000).
Join Key (hex)	Enter a valid Join Key to permit the device to access its defined network. A Join Key is a 128-byte value expressed as four 32-bit portions. As shown in the example, you can use zeros for the first **three** parts of the Join Key.
Status	This **read-only** field shows the current status of the connection between the network and ROCLINK 800.
Enable Active Advertising	Click to enable active advertising, in which the IEC 62591 module continuously broadcasts network information. This enables new devices to quickly join the network. Active advertising broadcasts network information continuously for approximately 30 minutes. Additionally, active advertising occurs automatically when: ▪ You first power up or restart the IEC 62591 module; or ▪ A device leaves the network (which allows communications to re-establish).

Click **Apply**. As the Field Link processes your request to add the device to the network, the value displayed in the Status field changes:

- **Initializing.** The module is in the boot-up sequence. The module sends info (Part Number, firmware version, etc.) to the RTU. During this time, the module is not yet communicating with the RTU. Once the code starts up (usually after 30-60 seconds), the module switches from **Initializing** to **Configuring Network**.

- **Configuring Network.** The code is running and the module is attempting to pull configuration info from the RTU. If the **Initializing** status is taking too long, it means that either
  - the board is not completely booting up, or
  - the application code is not correctly loading. As a result, the sequence cannot complete.
- **Detecting radio.** The Field Link recognizes the network.
- **On-Line**. When the Status field shows **On-line**, you can begin commissioning devices for the network.

Select the General tab, and click **Commission**. The IEC 62591 Module screen displays.

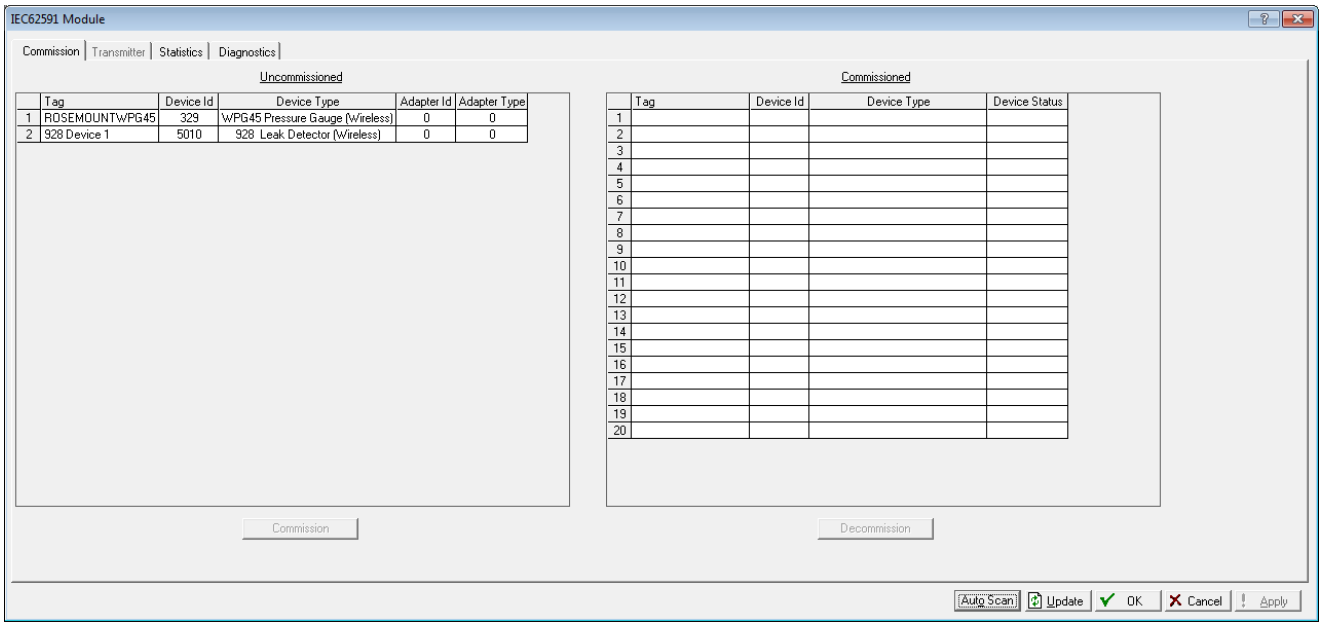

Figure 3-4. IEC 62591Module

The screen has four tabs:

Tab	Description
Commission	Auto-detects available uncommissioned devices and enables you to add them to the defined network.
Transmitter	Accesses both **read-only** statistics and modifiable parameters for a specific device associated with the network. **Note**: You must first commission a device before you can access this tab.
Statistics	Provides **read-only** statistics the Field Link has accumulated for the network. Click **Reset Statistics** to reset these values at any time.
Diagnostics	Describes how to use the module's USB port to generate log information for resolving issues.

The following sections discuss how to use these tabs to manage your network.

3.2.1 Commissioning Devices

You use the Commission tab to individually or collectively commission devices.

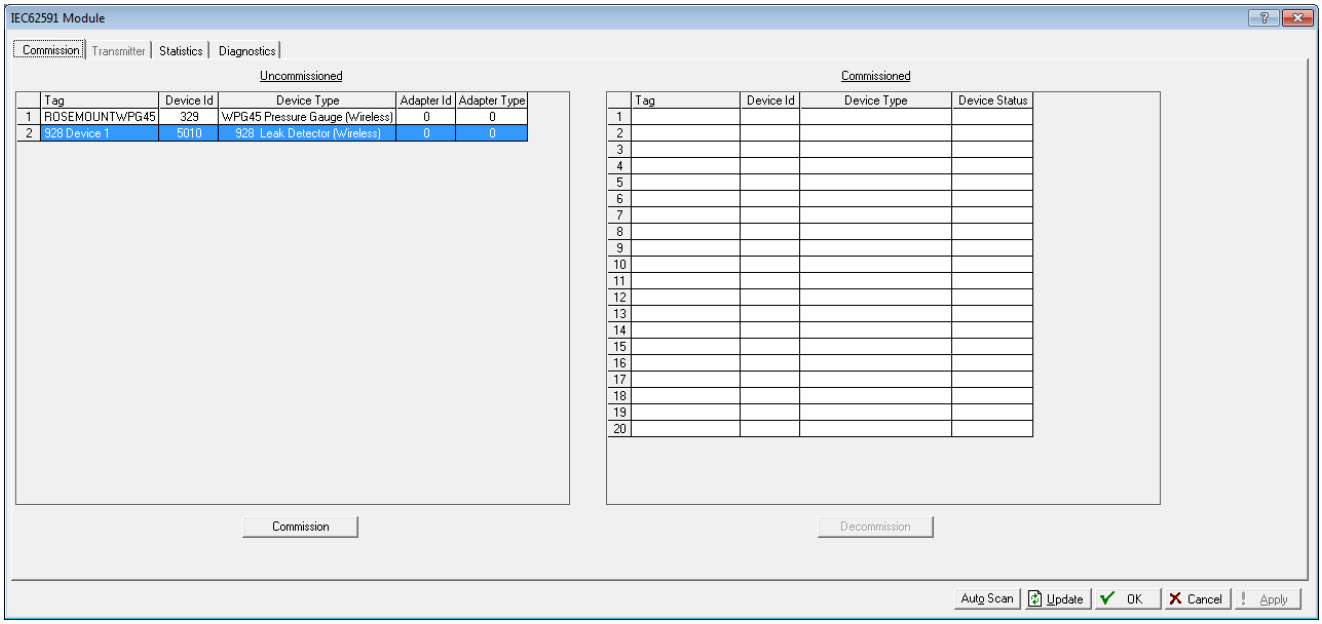

Figure 3-5. Commission tab

This screen has two lists, **Uncommissioned** and **Commissioned**. When the Status field on the Network screen displays **On-line**, the Field Link automatically begins adding devices to the Uncommissioned list. To commission a device, you move it to the Commissioned list in either of two ways:

- Select the device (see *Figure 3.5*) and click **Commission**. ROCLINK 800 places the device in the **first available** empty row on the Commissioned list.

  Notes:

  - To select several devices, press **Ctrl** and left-click each additional device. Click **Commission** when you have finished selecting devices.
  - When commissioning a HART device connected to a Emerson Wireless 775 THUM™ Adapter, the system detects **both** the HART device and the THUM Adapter and places them both in the Uncommissioned list. Commission the device as normal. Commission the THUM Adapter **only** if you need the Adapter's process data.

- Select the device and "drag" it to a position on the Commissioned list.

- The device does not disappear from the Uncommissioned List until communication issues have been resolved.

The number of rows on the Commission screen correlates to the number of wireless devices your controller supports. Each row represents a specific *logical* position. If, during commissioning, you want the controller to store information from a specific wireless device in a specific logical position, you can commission that device to that logical by selecting that device and "dragging" it to the appropriate position on the Commissioned list.

Note: Once you commission a device to a particular logical, you **cannot** drag it another logical position. You must **first** decommission the device and then re-commission it to the new logical position.

After a few minutes, the device moves from the Uncommissioned to the Commissioned list:

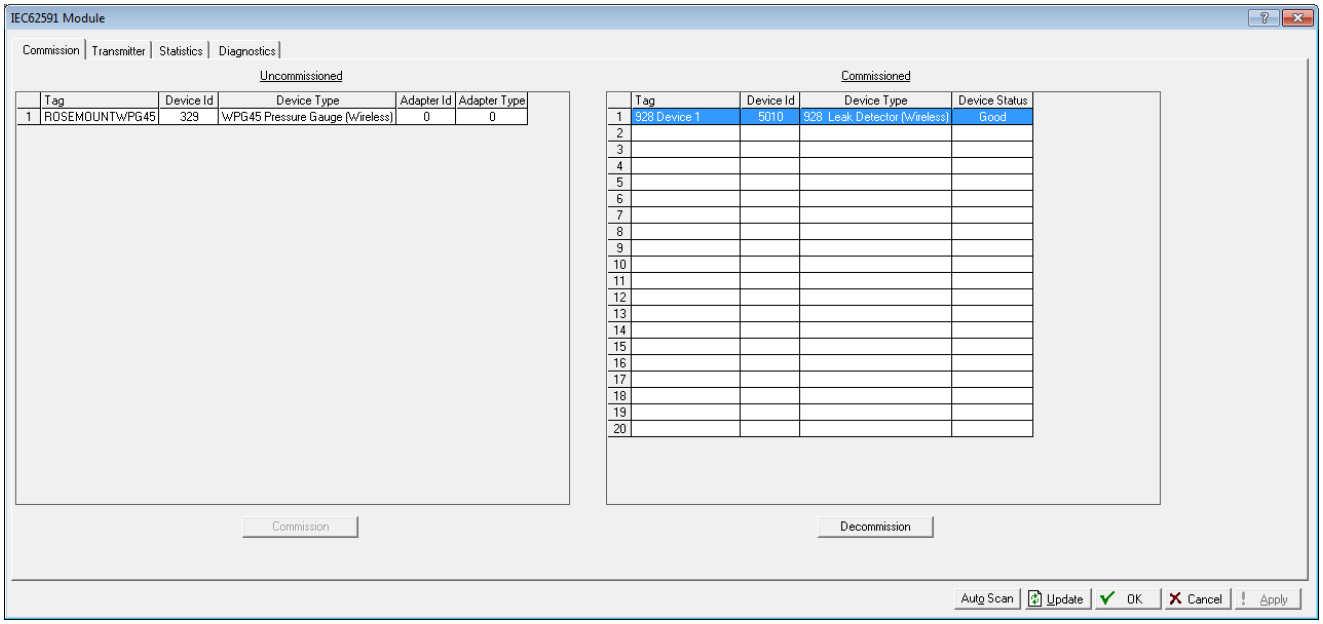

Figure 3-6. Commissioned Device

Another indicator that the device has been successfully commissioned is the activation of the **Transmitter** tab.

Note: If you change the tag for a transmitter using either a hand-held 375/475 device or AMS, the new tag may not display until the device appears on the Commissioned list.

Decommissioning a Device

If you decide to remove a device from your network, use this screen to decommission the device. Select the device and drag it to the Uncommissioned list.

Note: Remember to adjust or redefine any TLPs you have designated to accumulate the information for the decommissioned device's logical position.

Replacing a Device

If a particular wireless device in your network stops working, you can easily replace it with a similar device.

Note: Using this option **does not** require you to adjust or redefine any TLPs you have designated to accumulate the information for the decommissioned device's logical position. The new device assumes all parameters you have defined for the old device.

First, configure the device for the network, assigning it the appropriate Network ID and Join Key. Install the device in the field. Start ROCLINK 800, select the IEC 62591 module, and display the Commission tab. When the replacement device appears on the Uncommissioned list, select it and drag it **on top of** the non-working device. This tells ROCLINK 800 that you want this new device to assume all the defined characteristics of the old device.

ROCLINK 800 displays a verification dialog to prevent you from accidentally replacing a device:

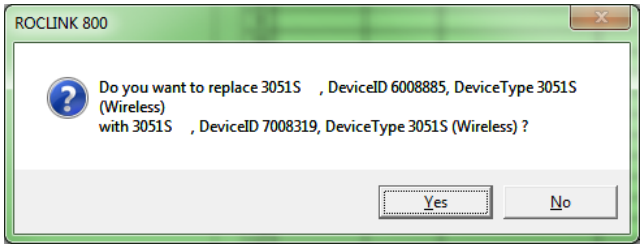

Figure 3-7. Device Replacement Verification Dialog

Click **Yes** to complete the replacement. ROCLINK commissions the new device and automatically decommissions the old device, moving it to the Uncommissioned list.

3.2.2 Managing Device Information

Once you have commissioned a device, the Transmitter tab can provide you with a variety of information on that device. Select the **Transmitter** tab to display the Transmitter screen:

Note: When viewing a transmitter connected to a THUM adaptor, **only** the process variables are returned to the IEC62591 module.

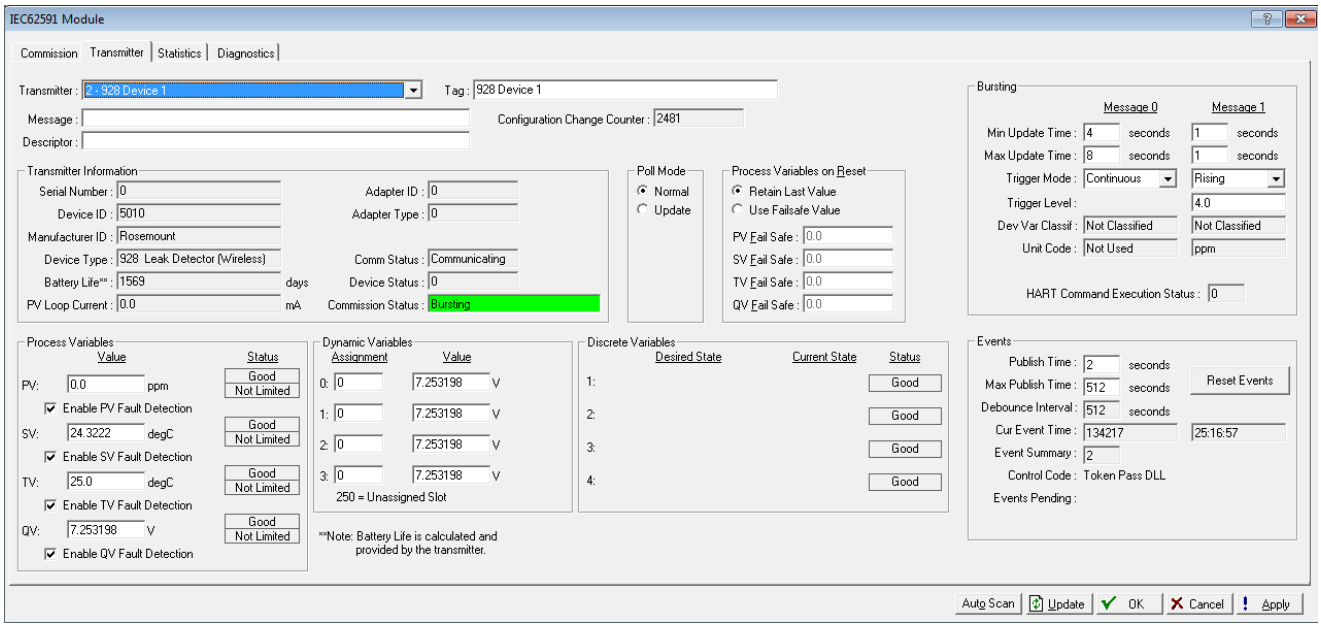

Figure 3-8. Transmitter screen

Notes:

- You can also double-click a commissioned device on the Commission screen to immediately access the Transmitter screen for that device.
- If you use ROCLINK to change transmitter values when the transmitter is busy with other communications tasks, the transmitter may fail to update and reverts to previous values. If this occurs, you can use ROCLINK to re-attempt the update when the transmitter is not busy with other communications tasks. Alternately, avoid this issue entirely by using a 475 Field Communicator to change transmitter values.

Field	Description
Transmitter	Displays the 40-character alphanumeric tag associated with the transmitter. The system adds the logical position (here, **2 -**) to the tag. Click ▼ to display all devices currently defined for this network.
Tag	Defines a 40-character alphanumeric identifier for the transmitter (such as *Tank2Level* or *Pump1NorthTemporary*).
Message	Provides an optional 40-character message associated with the transmitter. Use this field for explanatory or warning messages (such as *Not to exceed 300 psi*).
Descriptor	Provides an optional 20-character alphanumeric descriptor for the transmitter (such as *Casing press*).
Configuration Change Counter	This **read-only** field shows the number of times the configuration of the transmitter has been changed, as reported by the transmitter itself.

Field	Description
Transmitter Information	This section displays **read-only** information **reported by the transmitter**, including serial number, manufacturer ID, type of device, battery life, and other data. **Note:** Battery life is calculated by the transmitter. Refer to the transmitter's manufacturer for further details.
Comm Status	This **read-only** field shows the status of the communications channel.
Device Status	This **read-only** field shows the Field Device Status code to indicate the current communication and operating state of the transmitter. For any value other than 0, the field turns red. **Note**: Hover your mouse over this field to view the meaning of the response code. Response codes are manufacturer-defined. Refer to the documentation provided with the transmitter or to the manufacturer's website for a complete list of response codes, their meanings, and their resolutions.
Commission Status	This **read-only** field shows the current status of the device in the commissioning process. Valid values are: 0 = Idle (not used) 1 = Configuring Burst Command 2 = Configuring Burst Variables 3 = Configuring Burst Rate 4 = Enabling Bursting 5 = Bursting (field highlighted in green) 6 = Data Stale (field highlighted in yellow) 7 = Communication Failure (field highlighted in red) 8 = Disabling Bursting
Poll Mode	Indicates the mode the transmitter uses to acquire information. The default is **Normal**, based on the value in the Burst Rate field. Select **Update** and click **Apply** to immediately perform an on-demand polling and refresh all fields on this screen. The mode reverts to Normal at the next Burst Rate interval.
Process Variables on Reset	Sets the process variables to use after a failure. Valid values are **Retain Last Value** (use the last known values for the process variables) or **Use Failsafe Value** (use the values entered in the PV Failsafe, SV Failsafe, TV Failsafe, and QV Failsafe fields).

Field	Description
Process Variables	Displays the value, health, and status for the primary (PV), secondary (SV), tertiary (TV), and quaternary (QV) dynamic variables. For each variable, two status fields display to the right of the Value field. The upper status field is the Process Data Status, indicating the overall status of the process variable. Possible values for this field are Good, Manual/Fixed, Poor Accuracy, and Bad. The lower status field is the Limit Status, indicating if the process variable is responding to changes. Possible values for this field are Constant, High Limited, Low Limited, and Not Limited. The module returns four additional bits, but these are not displayed through ROCLINK. Bit 3 indicates the More Device Variable Status Available. Bits 2 through 0 indicate the Device Family Specific Status. Use TLPs to retrieve these additional bits for the PV Status (177,x,60), SV Status (177,x,61), TV Status (177,x,62), and QV Status (177,x,63). For more information, refer to the *Command Summary Specification* (HCF_SPEC-99), available from the HART Communication Foundation.
Enable Fault Detection	Check to enable fault detection on the process variables. If enabled and the system detects a fault, the system marks the field in red and displays **NaN** (not a number). **Note**: You enable fault detection individually for each process variable. This field applies **only** to the FB107.
Dynamic Variables	Defines the slot assignment and associated value for up to four slot-based variables. Each wireless transmitter contains up to 250 slots able to store variable information (such as temperature, pressure, scaling factors, altitude, flow, and so on). Each transmitter manufacturer defines which slots contain what information. Refer to the documentation provided with the transmitter or to the manufacturer's website for a complete list of slot assignments. **Note**: WirelessHART conventions require that all manufacturers reserve slots 246 through 249 for the dynamic variables PV, SV, TV, and FV, respectively. Slot 250 is also reserved as permanently unassigned, and does not accumulate values.

Field	Description
Discrete Variables	Sets the configuration and shows the status of connected discrete devices that support discrete variables. The IEC 62591 module can control a maximum of four discrete variables that display in a list in the Discrete Variables field. Refer to the documentation for your specific discrete device for a list of available set points and possible statuses. An example of a discrete device that supports discrete variables is a discrete valve. You can configure the set point of the discrete valve as being Open or Closed. These set points are shown as radio buttons in the Discrete Variables list. The status of the device in relation to the configured set point is displayed in the Discrete Variables list to the left of the set point. In the discrete valve example, the status might show Closed, Open, Closing, or Opening. **Note**: Click **Update** to manually refresh the Status field.
Bursting	Displays the Min Update Time, Max Update Time, Trigger Mode, Trigger Level, Dev Var Classif, Unit Code and HART Command Execution Status.
Min Update Time	Sets the time interval (in seconds) at which the HART device communicates.
Max Update Time	Sets the maximum amount of time (in seconds) without an update before the HART device automatically publishes an update.
Trigger Mode	Sets what conditions cause the HART device to publish an update at the interval set in the Min Update time field. Possible options are:
	Continuous Constantly publishes updates at the Min Update Time.
	Windowed Publishes updates at the interval set in the Min Update Time field when the source deviates from the last communicated source value by more than the value set in the Trigger Level field. If this condition is not met, updates are published at the interval set in the Max Update Time field.
	Rising Publishes updates at the interval set in the Min Update Time field when the source value rises above the value set in the Trigger Level field. Updates are published at the Min Update Time until the value falls below the threshold. If this condition is not met, updates are published at the interval set in the Max Update Time field.

Field	Description	
	Falling	Publishes updates at the interval set in the Min Update Time field when the source value falls below the value set in the Trigger Level field. Updates are published at the Min Update Time until the value rises above the threshold. If this condition is not met, updates are published at the interval set in the Max Update Time field.
	On-Change	Publishes updates at the interval set in the Min Update Time field when any value changes. If this condition is not met, updates are published at the interval set in the Max Update Time field.
Trigger Level	Sets additional data the system needs based on your selection in the Trigger Mode field. If you select **Windowed** in the Trigger Mode field, sets a deadband value that the source value must rise above or fall below the last communicated source value to trigger the change in update frequency. If you select **Rising** in the Trigger Mode field, sets a value that the source value must rise above to trigger the change in update frequency. If you select **Falling** in the Trigger Mode field, sets a value that the source value must fall below to trigger the change in update frequency. **Note:** This field displays **only** if you select **Windowed**, **Raising**, or **Falling** in the Trigger Mode field.	
Dev Var Classif	This **read-only** field shows the device variable classification code that is read at the time of device discovery. **Note:** Refer to HART Communication Foundation document number *HCF Spec 183* for a list of possible values and their meaning.	
Unit Code	The device engineering unit code that is read at the time of device discovery. **Note:** Refer to HART Communication Foundation document number *HCF_Spec 183* for a list of possible values and their meaning.	

Field	Description
HART Command Execution Status	This **read-only** field shows an indicator when the IEC 62591 module sends a HART command to the sensor, and that command is unsuccessful. Each bit of the indicator represents the following HART command: **Bit 0** Command 103 Message 0 **Bit 1** Command 103 Message 1 **Bit 2** Command 104 Message 0 **Bit 3** Command 104 Message 1 **Bit 4** Command 107 Message 0 **Bit 5** Command 107 Message 1 **Bit 6** Command 108 Message 0 **Bit 7** Command 108 Message 1 **Bit 8** Command 109 Message 0 **Bit 9** Command 109 Message 1 **Bit 10** Command 117 **Bit 11** Command 118 **Bit 12** Spare **Bit 13** Spare **Bit 14** Spare **Bit 15** Spare **Note:** This field shows the status of important commands for Bursting and Events. ▪ **Bursting** o Command 103 Write Burst Period – Writes Min and Max burst update periods o Command 104 Write Burst Triggers – Sets burst trigger mode o Command 107 Write Burst Device Variables - Burst device variables returned by device on command 9 or 33 in burst mode o Command 108 Write Burst mode command number o Command 109 Burst Mode Control – Sets bursting ON/OFF ▪ **Event Notification** o Command 117 Write Event notification timing – Sets Event notification retry time, Maximum update time, Event De-bounce interval o Command 118 Event notification control - Enable/ Disable event notification
Events	Displays the Publish Time, Max Publish Time, Debounce Interval, Cur Event Time, Event Summary, Control Code and Events Pending

Field	Description
Publish Time	Sets the time interval (in seconds) at which the HART device publishes its events. **Note:** This value **must** be less than or equal to the value you set in the Maximum Update Time field.
Max Publish Time	Sets the maximum amount of time (in seconds) without publishing its events before the HART device is forced to publish its events. **Note:** This field applies **only** if you select **Windowed**, **Raising**, **Falling**, or **On-Change** in the Trigger Mode field.
Debounce Interval	This **read-only** field shows the amount of time (in seconds) that an event must persist before the HART device sends a notification.
Cur Event Time	This **read-only** field shows the time of the current event as returned from the HART device (the number of seconds that have passed since the start of the day) and the system's interpretation of that value.
Event Summary	This **read-only** field shows any unacknowledged pending events.
Control Code	This **read-only** field shows the Event Notification Control Code returned from the HART device. Possible values are: ▪ Off ▪ Token Pass DLL ▪ TDMA DLL ▪ Both TDMA and Token DLLs
Events Pending	This **read-only** field displays a list of events on the HART device that have not been acknowledged. Possible values are: ▪ Configuration Changed Event ▪ Device Status Event ▪ More Status Available Event
Reset Events	Select this button to acknowledge all pending events on the HART device.

Click **Apply** to save any changes you may make to the values on this screen.

Note: You can also double-click a commissioned device on the Commission screen to immediately access the Transmitter screen for that device.

3.2.3 Viewing Network Statistics

The network accumulates a variety of statistical information you can review to assess system health. This content is returned from the

transmitters and is updated every ten seconds. Select the **Statistics** tab to view this information.

Note: Refer to the transmitter's manufacturer for more information about the fields on this tab.

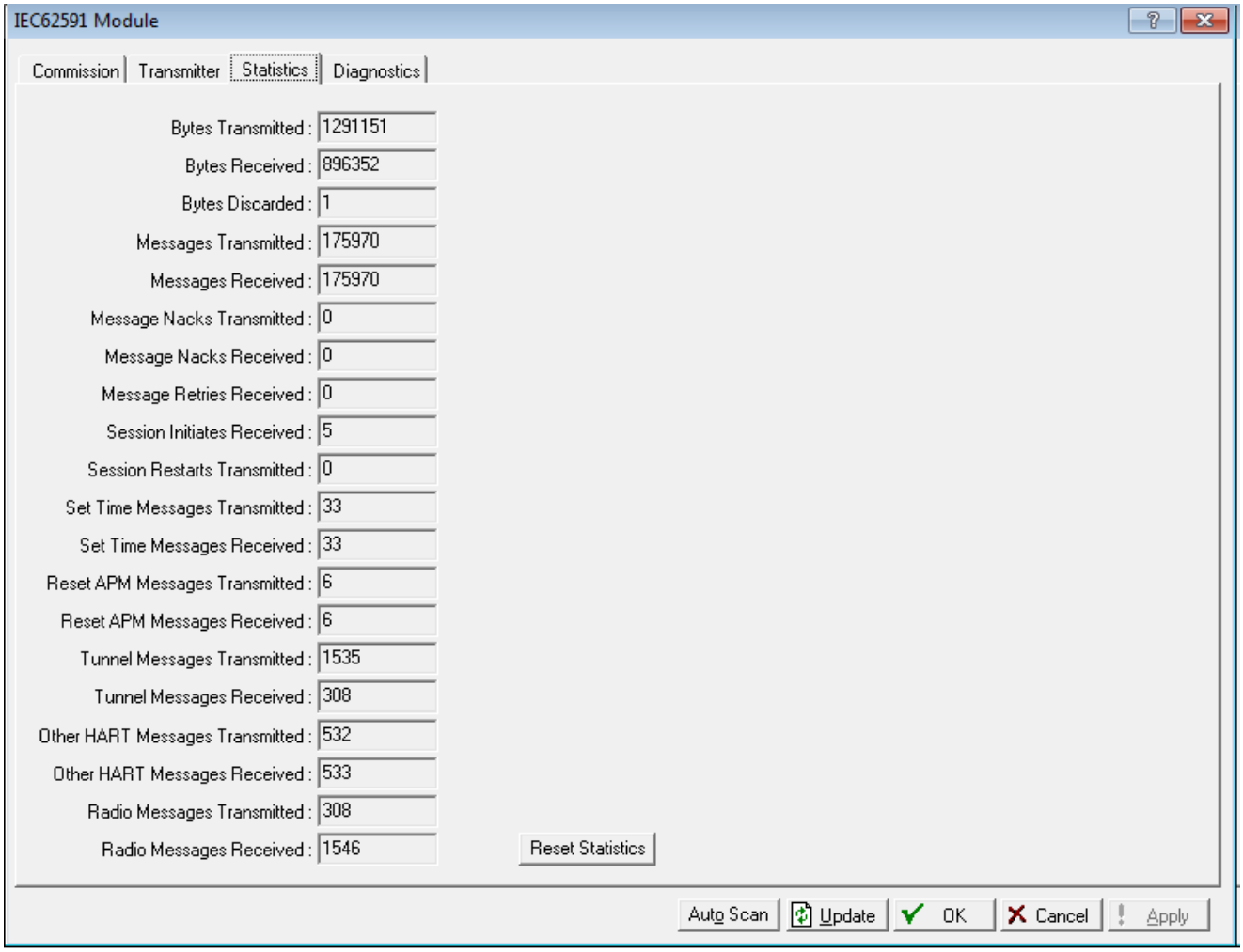

Figure 3-9. Statistics screen

Field	Description
Bytes Transmitted	This **read-only** field shows the number of data bytes the IEC62591 module has sent to the Field Link.
Bytes Received	This **read-only** field shows the number of data bytes the IEC62591 module has received from the Field Link.
Bytes Discarded	This **read-only** field shows the number of bytes discarded by the IEC62591 module. Discarded bytes are usually erroneous and due to noise on the bus.
Messages Transmitted	This **read-only** field shows the number of messages the IEC62591 module has sent to the Field Link.

Field	Description
Messages Received	This **read-only** field shows the number of messages IEC62591 module has received from the Field Link.
Message Nacks Transmitted	This **read-only** field shows the number of NACKs the IEC62591 module has sent to the Field Link. A NACK is typically sent when a received message contains an error and a retransmission request is sent. A high number of NACKs is often an indication of a poor link connection.
Message Nacks Received	Reserved
Message Retries Received	This **read-only** field shows the number of retry requests the IEC62591 module has received from the Field Link. A retry request is sent by the Field Link when it does not receive an acknowledgement from the IEC62591 module. A High number of retries is often an indication of a poor link connection.
Session Initiates Received	This **read-only** field shows the number of Session Initiates the IEC62591 module has received from the Field Link. A Session Initiate is sent by the Field Link when it wants to start and/or restart communications with the IEC62591 module (for example, after the Field Link (first powers up).
Session Restarts Transmitted	This **read-only** field shows the number of Session Restart requests the IEC62591 module has sent to the Field Link. A Session Restart request is sent by the IEC62591 module to request a bus restart of the communications with the Field Link (for example, after the IEC62591 module first powers up).
Set Time Messages Transmitted	This **read-only** field shows the number of Set Time messages the IEC62591 module has sent to the Field Link. A Set Time message is part of the time management process used to keep the WirelessHART network time up to date.
Set Time Messages Received	This **read-only** field shows the number of Set Time messages the IEC62591 module has received from the Field Link.
Reset APM Messages Transmitted	This **read-only** field shows the number of Reset APM messages the IEC62591 module has sent to the Field Link. A Reset APM message is part of the wireless management process used to restart the WirelessHART radio on the Field Link.
Reset APM Messages Received	This **read-only** field shows the number of Reset APM messages the IEC62591 module has received from the Field Link.
Tunnel Messages Transmitted	This **read-only** field shows the number of Tunnel messages the IEC62591 module has sent to the Field Link. A Tunnel message is part of the wireless management process used to send information across the WirelessHART network.
Tunnel Messages	This **read-only** field shows the number of Tunnel

Field	Description
Received	messages the IEC62591 module has received from the Field Link.
Other HART Messages Transmitted	This **read-only** field shows the number of Field Link specific messages the IEC62591 module has sent to the Field Link. These messages are sent to retrieve data from the Field Link.
Other HART Messages Received	This **read-only** field shows the number of Field Link specific messages the IEC62591 module has received from the Field Link.
Radio Messages Transmitted	This **read-only** field shows the number of WirelessHART network messages the IEC62591 module has sent to the Field Link.
Radio Messages Received	This **read-only** field shows the number of WirelessHART network messages the IEC62591 module has received from the Field Link.
Reset Statistics	Click to reset all values on this tab.

3.2.4 Retrieving a Diagnostic Log

The IEC 62591 module has a USB port which you can use to retrieve a diagnostic log to assist in troubleshooting. Select the **Diagnostics** tab to display the Diagnostics screen:

Note: It may take up to three minutes after initial installation or after updating module firmware before the IEC 62591 module recognizes a drive plugged into the module's USB port.

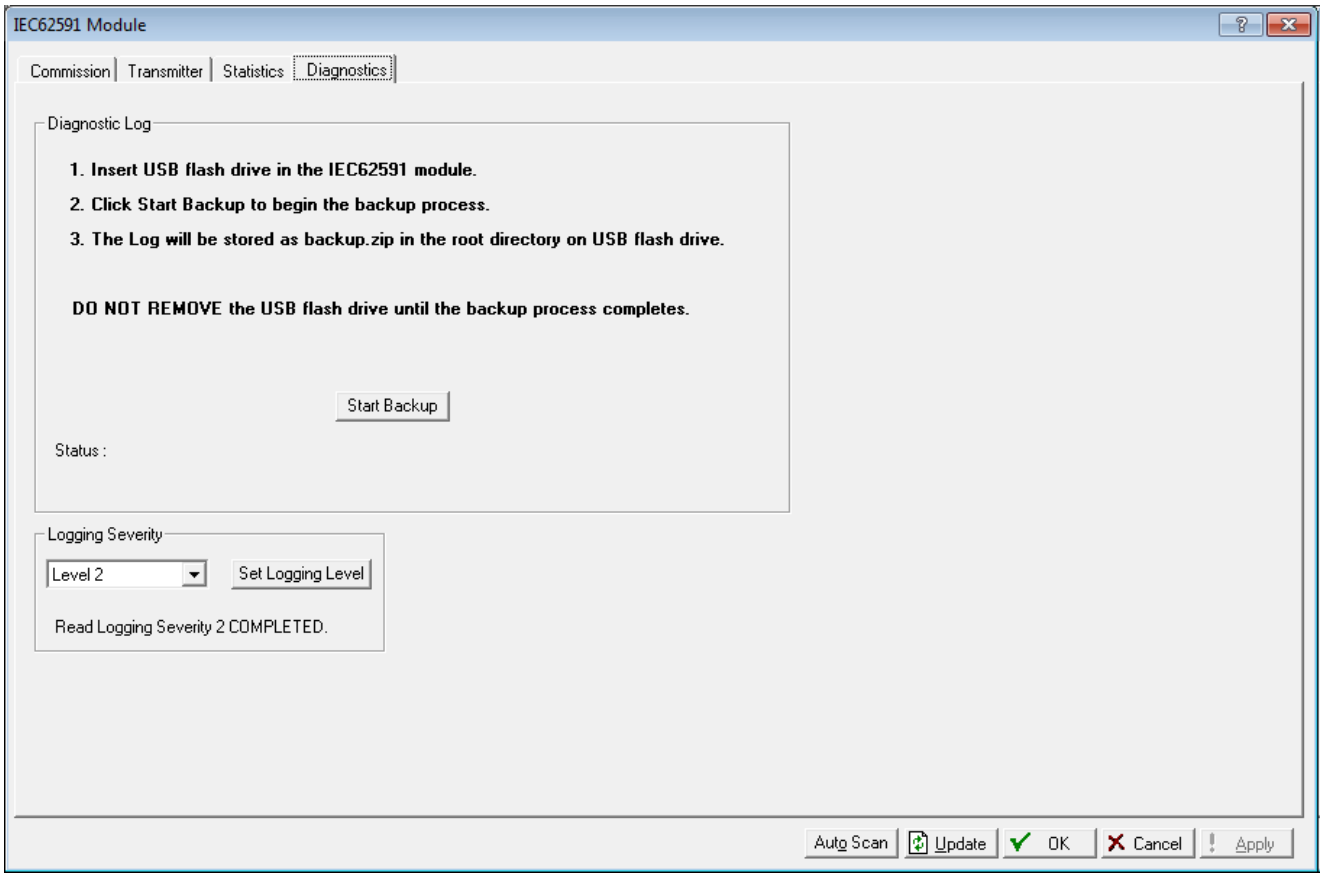

Figure 3-10. Diagnostics screen

The screen provides basic information to create and process the diagnostic log. However, Technical Support personnel can use the Logging Severity frame to more thoroughly identify problems you're your system.

Field	Description
Logging Severity	Sets the amount of accumulated system activity data included in the diagnostic log. **1** is the **most** comprehensive (most logs) and **9** is the **least** comprehensive (fewest logs) setting. The default setting is **4**. **Note**: Use this field **only** under the direction of Technical Support personnel.
Set Logging Level	Click to set the severity of logs. The system validates your selection by displaying the message Set Logging Severity X COMPLETED, where X represents the severity you have selected.

3.2.5 Displaying Commissioned Transmitters

From the main IEC 62591 module screen, you can display and quickly access transmitter-specific information. Select the **Transmitter** tab to display the Transmitter screen.

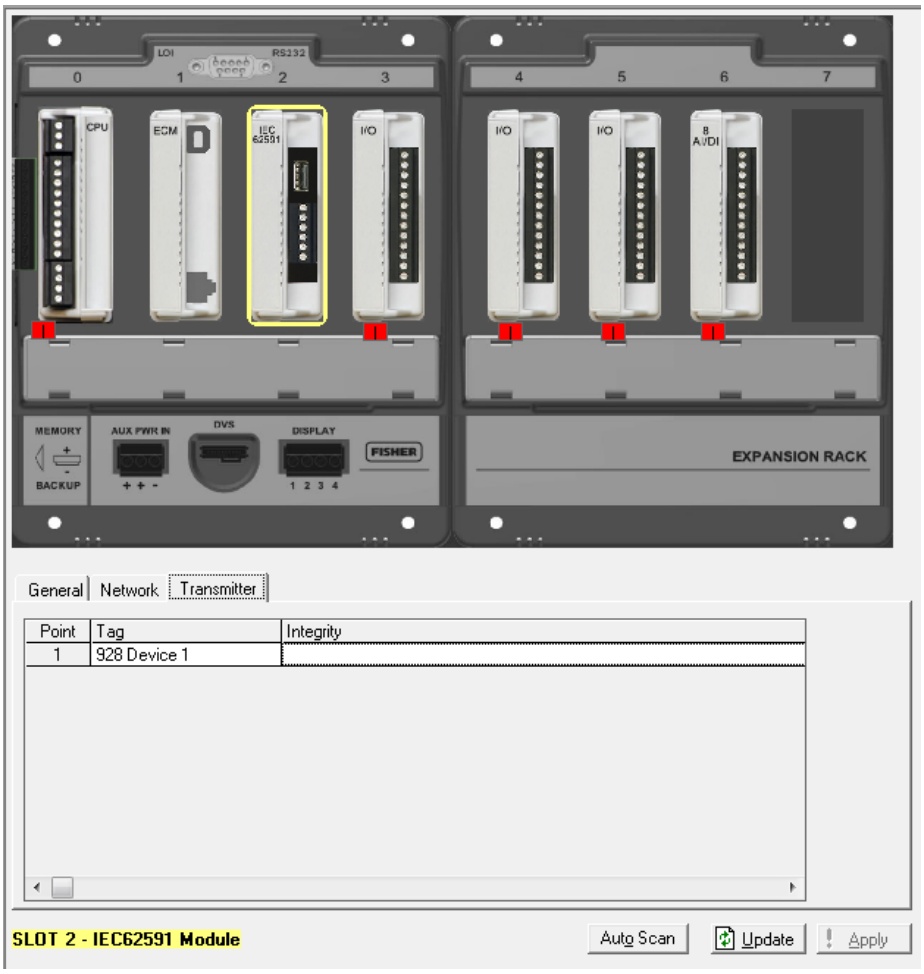

Figure 3-11. Transmitter screen

This screen shows the logical point to which you have installed the device, the device's 23-character alphanumeric (long) tag, and any integrity issues for that device (as shown for the device assigned to point 2). Double-click a device to display the Transmitter screen (see *Figure 3-7*) for that device.

3.3 IEC 62591 Module Interface (ROC800)

To access the screens you use to configure and commission the network:

Start ROCLINK 800 and click the IEC 62591 module on the graphical interface. The IEC 62591 Module screen displays:

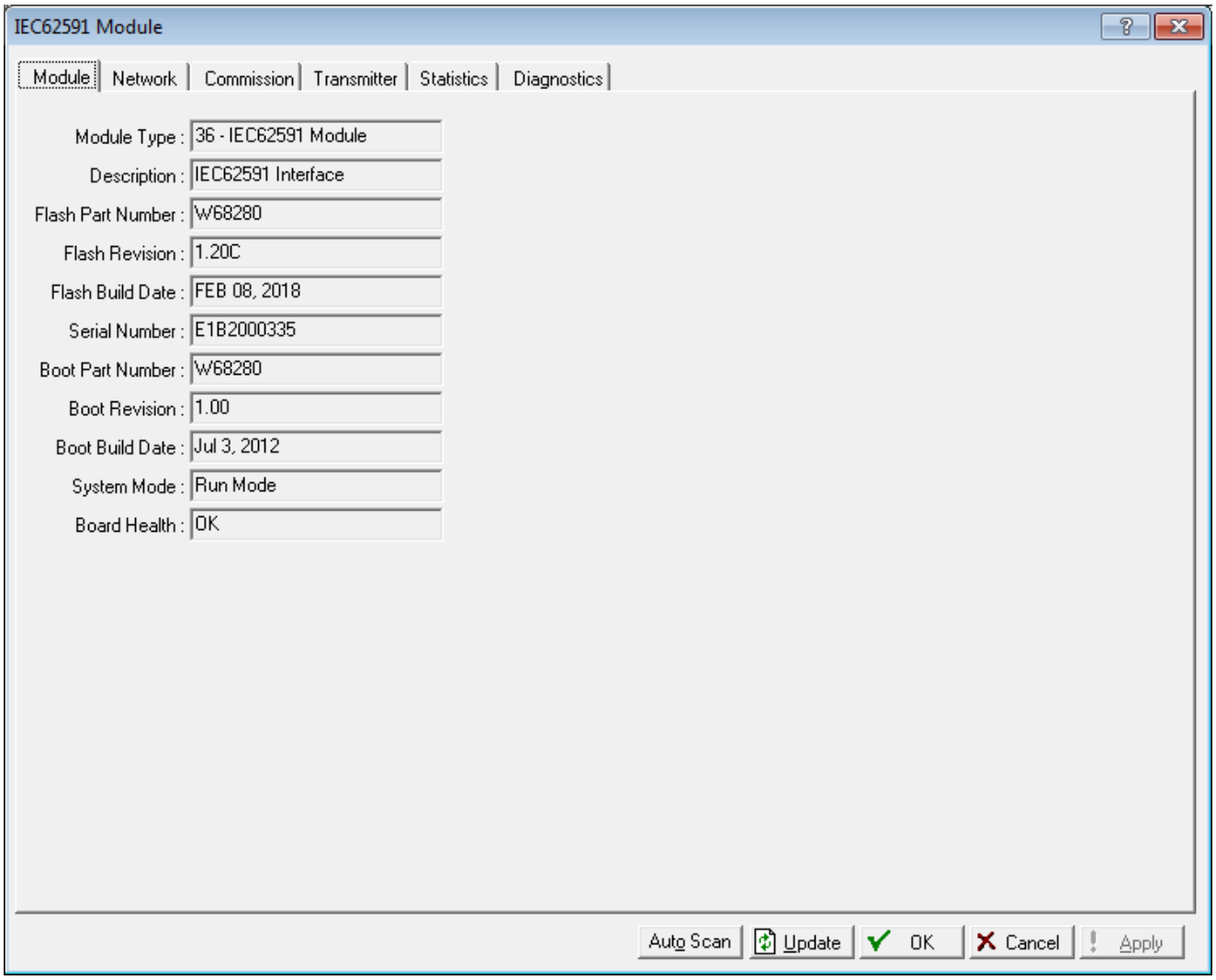

Figure 3-12. IEC 62591Module

The module has six tabs:

Tab	Description
Module	Provides **read-only** statistical information about the IEC 62591 module, such as serial number and part numbers.
Network	Defines the Join Key and Network ID for the network. These values must correspond to the Network ID and Join Key in the devices.
Commission	Auto-detects available uncommissioned devices and enables you to add them to the defined network.
Transmitter	Accesses both **read-only** statistics and modifiable parameters for a specific device associated with the network.
Statistics	Provides **read-only** statistics the Field Link has accumulated for the network. Click **Reset Statistics** to reset these values at any time.

Tab	Description
Diagnostics	Describes how to use the module's USB port to generate log information for resolving issues.

The following sections discuss how to use these tabs to manage your network.

3.3.1 Accessing the Network

Use this screen to identify the Network ID and Join Key for the devices in your network. When you select the **Network** tab, you must complete two fields:

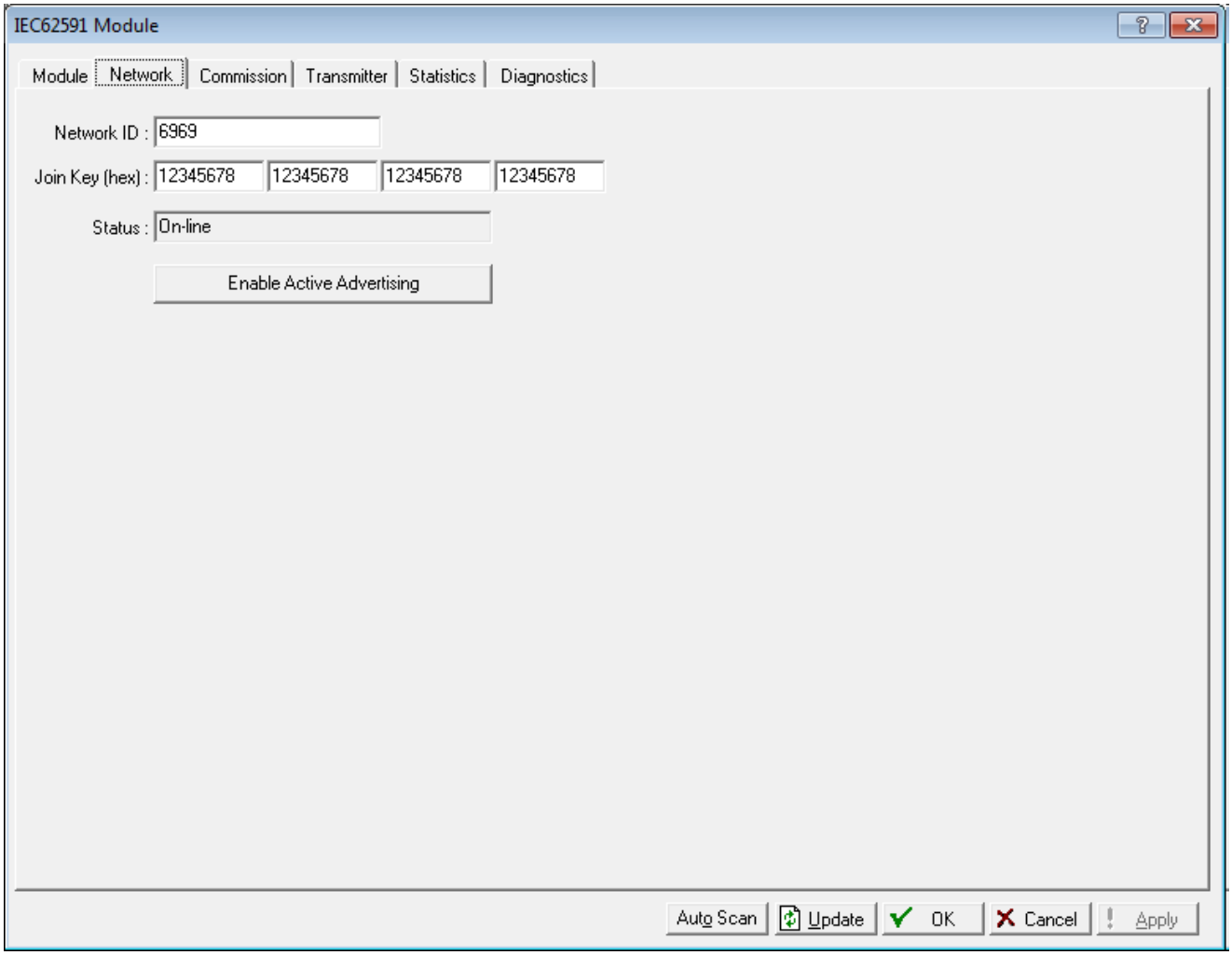

Figure 3-13. Network tab

Field	Description
Network ID	Enter a five-character Network ID. Valid values are 1 to 36863. Should be noted that each IEC62591 Module / RTU can only have a single Network ID. The "grouping" should be related to the control/monitoring network for a given RTU. For example if two RTUs are installed at a site, each grouping should be the set of meter runs each RTU controls. **Note:** A Network ID cannot be all zeros (such as 00000).
Join Key (hex)	Enter a valid Join Key to permit the device to access its defined network. A Join Key is a 128-byte value expressed as four 32-bit portions. As shown in the example, you can use zeros for the first **three** parts of the Join Key.
Status	This **read-only** field shows the current status of the connection between the network and ROCLINK 800.
Enable Active Advertising	Click to enable active advertising, in which the IEC 62591 module continuously broadcasts network information. This enables new devices to quickly join the network. Active advertising broadcasts network information continuously for approximately 30 minutes. Additionally, active advertising occurs automatically when: ▪ You first power up or restart the IEC 62591 module or ▪ A device leaves the network (which allows communications to re-establish).

Click **Apply**. As the Field Link processes your request to add the device to the network, the value displayed in the Status field changes:

- **Initializing.** The module is in the boot-up sequence. The module sends info (Part Number, firmware version, etc.) to the RTU. During this time, the module is not yet communicating with the RTU. Once the code starts up (usually after 30-60 seconds), the module switches from **Initializing** to **Configuring Network**.
- **Configuring Network.** The code is running and the module is attempting to pull configuration info from the RTU. If the **Initializing** status is taking too long, it means that either
  - the board is not completely booting up, or
  - the application code is not correctly loading. As a result, the sequence cannot complete.
- **Detecting radio.** The Field Link recognizes the network.

- **On-Line**. When the Status field shows **On-line**, you can begin commissioning devices for the network.

Proceed to *Commissioning Devices*.

3.3.2 Commissioning Devices

When you select the **Commission** tab, ROCLINK 800 displays the Commission screen (see *Figure 3-16*). You use this screen to individually or collectively commission devices.

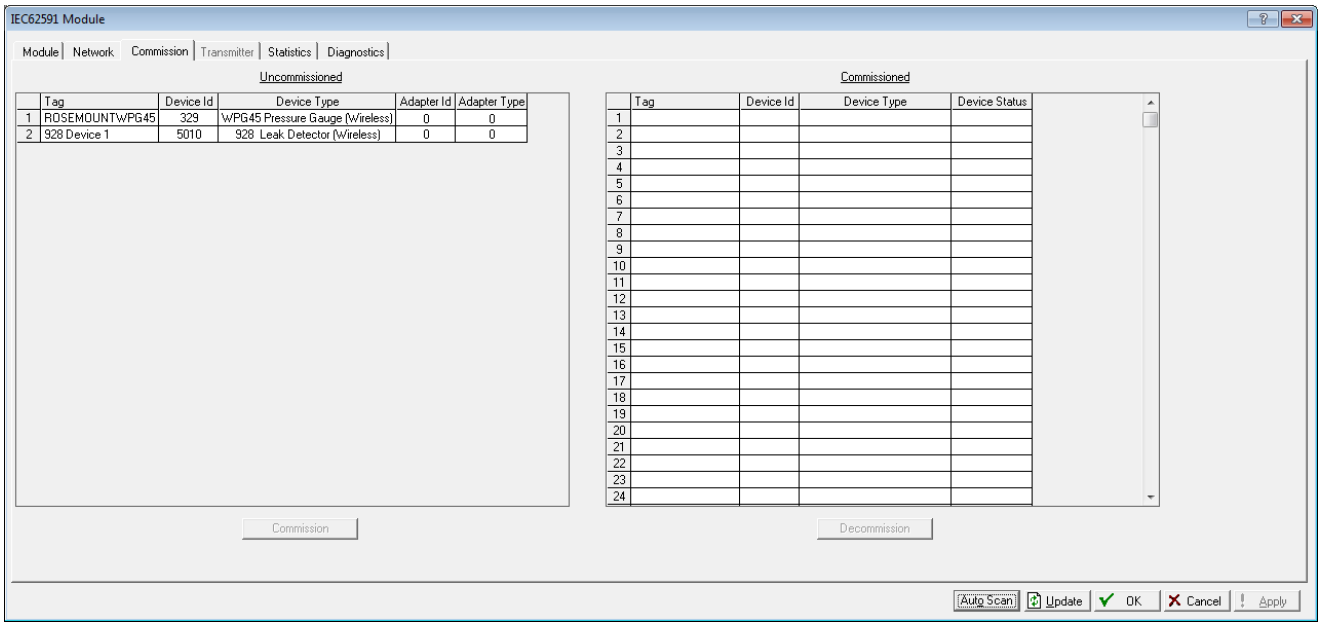

Figure 3-14. Commission tab

This screen has two lists, **Uncommissioned** and **Commissioned**. When the Status field on the Network screen displays On-line, ROCLINK 800 automatically begins adding devices to the Uncommissioned list. To commission a device, you move it to the Commissioned list in either of two ways:

- Select the device and click **Commission**. ROCLINK 800 places the device in the **first available** empty position.

Notes:

- To select several devices, press **Ctrl** and left-click each additional device. Click **Commission** when you have finished selecting devices.
- When commissioning a HART device connected to an Emerson Wireless 775 THUM™ Adapter, the system detects **both** the HART device and the THUM Adapter and places them both in the Uncommissioned list. Commission the device as normal. Commission the THUM Adapter **only** if you need the Adapter's process data.

- Select the device and "drag" it to a position on the Commissioned list.

The number of rows on the Commission screen correlates to the number of wireless devices your controller supports. Each row represents a specific *logical* position. If, during commissioning, you want the controller to store information from a specific wireless device in a specific logical position, you can commission that device to that logical by selecting that device and "dragging" it to the appropriate position on the Commissioned list.

Note: Once you commission a device to a particular logical, you **cannot** drag it another logical position. You must **first** decommission the device and then recommission it to the new logical position.

When you select a device in the Uncommissioned column, the **Commission** button activates:

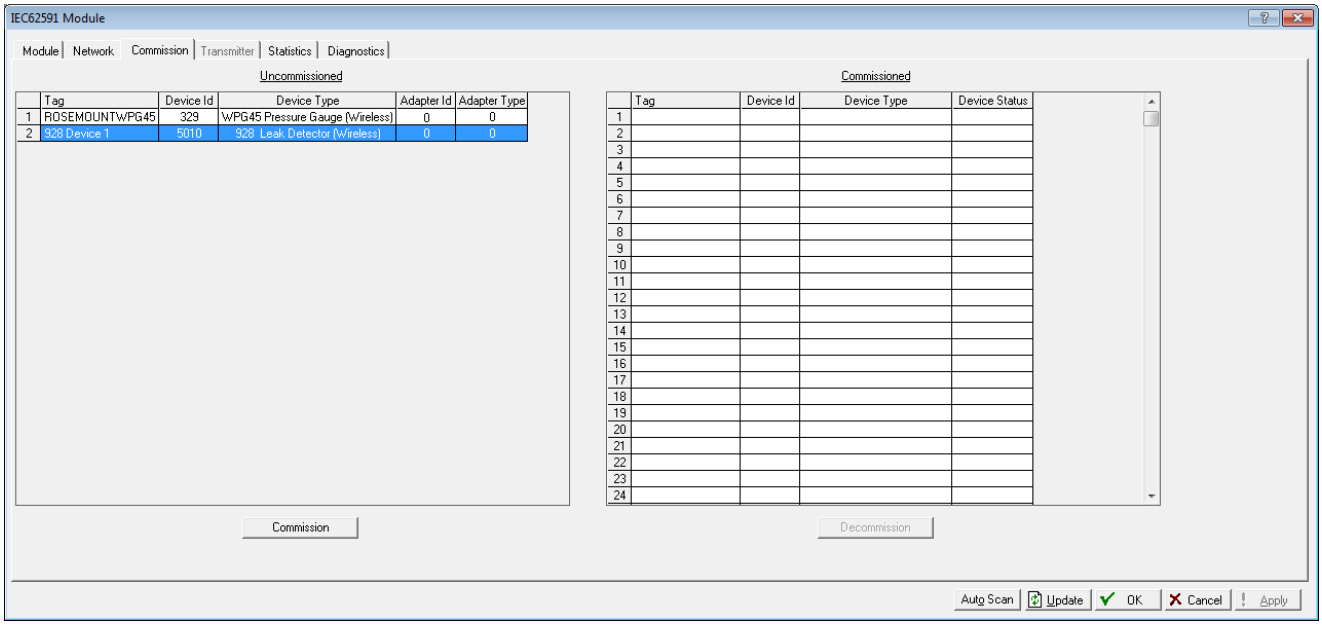

Figure 3-15. Active Commission button

Note: To select more than one device, press the **Ctrl** key and left-click each additional device.

Click **Commission**. After a few minutes, the device moves from the Uncommissioned to the Commissioned list:

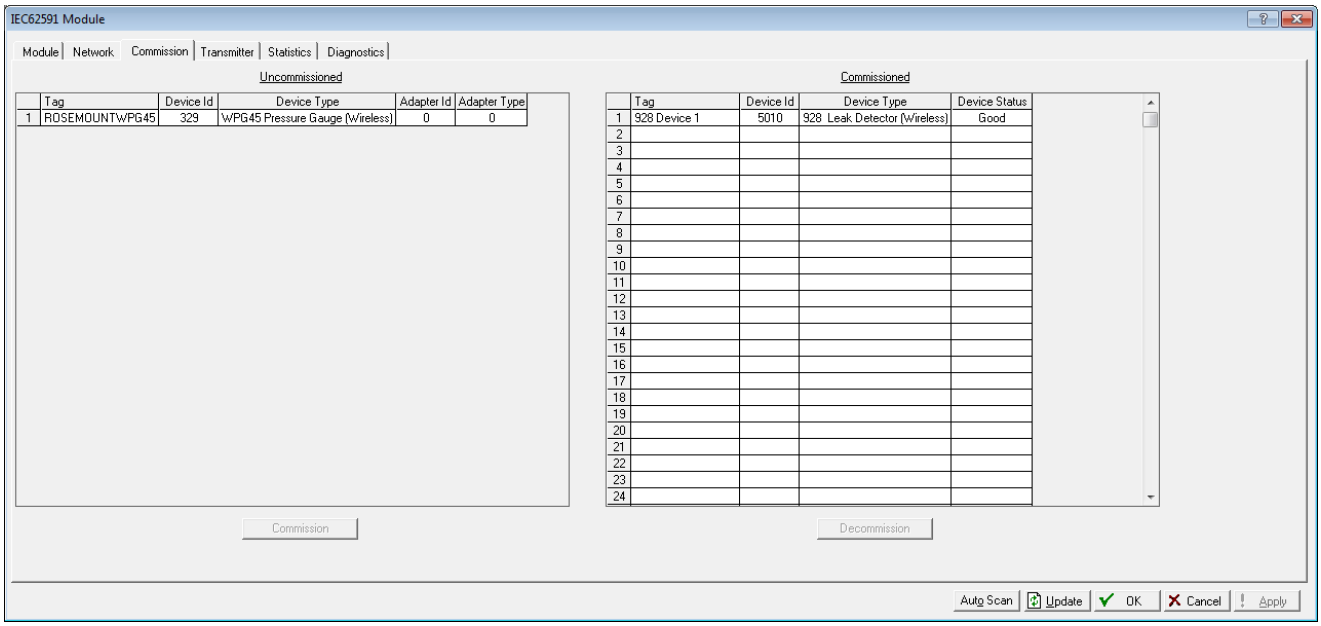

Figure 3-16. Commissioned Device

Another indicator that the device has been successfully commissioned is the activation of the **Transmitter** tab.

Note: If you change the tag for a transmitter using either a hand-held 375/475 device or AMS, the new tag may not display until the device appears on the Commissioned list.

Decommissioning a Device

If you decide to remove a device from your network, use this screen to decommission the device. Select the device and drag it to the Uncommissioned list.

Note: Remember to adjust or redefine any TLPs you have designated to accumulate the information for the decommissioned device's logical position.

Replacing a Device

If a particular wireless device in your network stops working, you can easily replace it with a similar device.

Note: Using this option **does not** require you to adjust or redefine any TLPs you have designated to accumulate the information for the decommissioned device's logical position. The new device assumes all parameters you have defined for the old device.

First, configure the device for the network, assigning it the appropriate Network ID and Join Key. Install the device in the field. Start ROCLINK 800, select the IEC 62591 module, and display the Commission tab. When the replacement device appears on the Uncommissioned list, select it and drag it **on top of** the non-working

device. This tells ROCLINK 800 that you want this new device to assume all the defined characteristics of the old device.

ROCLINK 800 displays a verification dialog to prevent you from accidentally replacing a device:

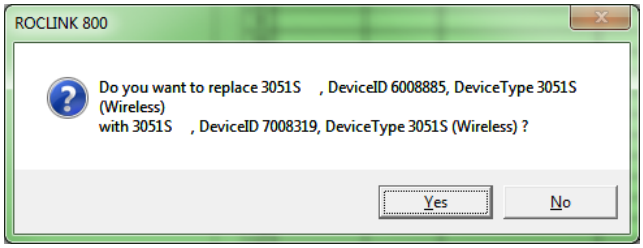

Figure 3-12. Device Replacement Verification Dialog

Click **Yes** to complete the replacement. ROCLINK commissions the new device and automatically decommissions the old device, moving it to the Uncommissioned list.

3.3.3 Managing Device Information

Once you have commissioned a device, the Transmitter tab can provide you with a variety of information on that device. Selecting the **Transmitter** tab displays the Transmitter screen:

Note: When viewing a transmitter connected to a THUM adaptor, **only** the process variables are returned to the IEC62591 module.

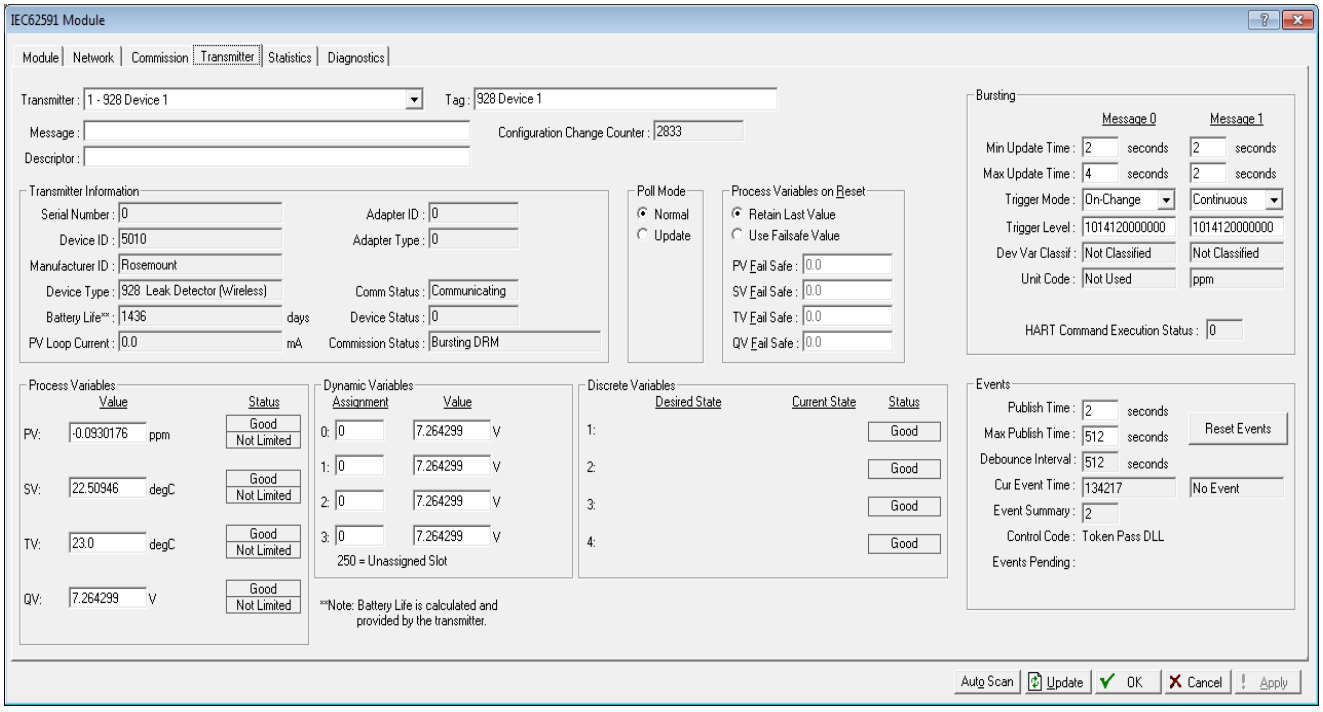

Figure 3-17. Transmitter tab

Notes:

- You can also double-click a commissioned device on the Commission screen to immediately access the Transmitter screen for that device.
- If you use ROCLINK to change transmitter values when the transmitter is busy with other communications tasks, the transmitter may fail to update and reverts to previous values. If this occurs, you can use ROCLINK to re-attempt the update when the transmitter is not busy with other communications tasks. Alternately, avoid this issue entirely by using a 475 Field Communicator to change transmitter values.

Field	Description
Transmitter	Displays the 40-character alphanumeric tag associated with the transmitter. The system adds the logical position (here, **1 -**) to the tag. Click ▼ to display all devices currently defined for this network.
Tag	Defines a 40-character alphanumeric identifier for the transmitter (such as *Tank2Level* or *Pump1Temporary*).
Message	Provides an optional 40-character alphanumeric message associated with the transmitter. Use this field for explanatory or warning messages (such as *Not to exceed 300 psi*).
Descriptor	Provides an optional 20-character alphanumeric description of transmitter (such as *Casing press*).
Configuration Change Counter	This **read-only** field shows the number of times the configuration of the transmitter has been changed, as reported by the transmitter itself.
Transmitter Information	This section displays **read-only** information **reported by the transmitter**, including serial number, manufacturer ID, type of device, battery life, and other data. **Note:** Battery life is calculated by the transmitter. Refer to the transmitter's manufacturer for further details.
Comm Status	This **read-only** field shows the status of the communications channel.
Device Status	This **read-only** field shows the Field Device Status code to indicate the current communication and operating state of the transmitter. For any value other than 0, the field turns red. **Note**: Hover your mouse over this field to view the meaning of the response code. Response codes are manufacturer-defined. Refer to the documentation provided with the transmitter or to the manufacturer's website for a complete list of response codes, their meanings, and their resolutions.

Field	Description
Commission Status	Indicates the current status of the device in the commissioning process. Valid values are: 0 = Logical Not Used 1 = Configuring Burst Command 2 = Configuring Burst Variables 3 = Configuring Burst Rate 4 = Enabling Bursting 5 = Bursting (field highlighted in green) 6 = Data Stale (field highlighted in yellow) 7 = Communication Failure (field highlighted in red) 8 = Disabling Bursting
Poll Mode	Indicates the mode the transmitter uses to acquire information. The default is **Normal**, based on the value in the Burst Rate field. Select **Update** and click **Apply** to immediately perform an on-demand polling and refresh all fields on this screen. The mode reverts to Normal at the next Burst Rate interval.
Process Variables on Reset	Sets the process variables to use after a failure. Valid values are **Retain Last Value** (use the last known values for the process variables) or **Use Failsafe Value** (use the values entered in the PV Failsafe, SV Failsafe, TV Failsafe, and QV Failsafe fields).
Process Variables	Displays the values for the primary (PV), secondary (SV), tertiary (TV), and quaternary (QV) process variables.
Dynamic Variables	Defines the slot assignment and associated value for up to four slot-based variables. Each wireless transmitter contains up to 250 slots able to store variable information (such as temperature, pressure, scaling factors, altitude, flow, and so on). Each transmitter manufacturer defines which slots contain what information. Refer to the documentation provided with the transmitter or to the manufacturer's website for a complete list of slot assignments. **Note**: WirelessHART conventions require that all manufacturers reserve slots 246 through 249 for the dynamic variables PV, SV, TV, and FV, respectively. Slot 250 is also reserved as permanently unassigned, and does not accumulate values.

Field	Description
Discrete Variables	Sets the configuration and shows the status of connected discrete devices that support discrete variables. The IEC 62591 module can control a maximum of four discrete variables that display in a list in the Discrete Variables field. Refer to the documentation for your specific discrete device for a list of available set points and possible statuses. An example of a discrete device that supports discrete variables is a discrete valve. You can configure the set point of the discrete valve as being Open or Closed. These set points are shown as radio buttons in the Discrete Variables list. The status of the device in relation to the configured set point is displayed in the Discrete Variables list to the left of the set point. In the discrete valve example, the status might show Closed, Open, Closing, or Opening. **Note**: Click **Update** to manually refresh the Status field.
Process Variables	Displays the Min Update Time, Max Update Time, Trigger Mode, Trigger Level, Dev Var Classif, Unit Code and HART Command Execution Status.
Dynamic Variables	Sets the time interval (in seconds) at which the HART device communicates.
Max Update Time	Sets the maximum amount of time (in seconds) without an update before the HART device automatically publishes an update.
Trigger Mode	Sets what conditions cause the HART device to publish an update at the interval set in the Min Update time field. Possible options are:
Continuous	Constantly publishes updates at the Min Update Time.
Windowed	Publishes updates at the interval set in the Min Update Time field when the source deviates from the last communicated source value by more than the value set in the Trigger Level field. If this condition is not met, updates are published at the interval set in the Max Update Time field.
Rising	Publishes updates at the interval set in the Min Update Time field when the source value rises above the value set in the Trigger Level field. Updates are published at the Min Update Time until the value falls below the threshold. If this condition is not met, updates are published at the interval set in the Max Update Time field.

Field	Description	
	Falling	Publishes updates at the interval set in the Min Update Time field when the source value falls below the value set in the Trigger Level field. Updates are published at the Min Update Time until the value rises above the threshold. If this condition is not met, updates are published at the interval set in the Max Update Time field.
	On-Change	Publishes updates at the interval set in the Min Update Time field when any value changes. If this condition is not met, updates are published at the interval set in the Max Update Time field.
Trigger Level	Sets additional data the system needs based on your selection in the Trigger Mode field. If you select **Windowed** in the Trigger Mode field, sets a deadband value that the source value must rise above or fall below the last communicated source value to trigger the change in update frequency. If you select **Rising** in the Trigger Mode field, sets a value that the source value must rise above to trigger the change in update frequency. If you select **Falling** in the Trigger Mode field, sets a value that the source value must fall below to trigger the change in update frequency. **Note:** This field displays **only** if you select **Windowed**, **Raising**, or **Falling** in the Trigger Mode field.	
Dev Var Classif	This **read-only** field shows the device variable classification code that is read at the time of device discovery. **Note:** Refer to HART Communication Foundation document number *HCF Spec 183* for a list of possible values and their meaning.	
Unit Code	The device engineering unit code that is read at the time of device discovery. **Note:** Refer to HART Communication Foundation document number *HCF_Spec 183* for a list of possible values and their meaning.	

Field	Description
HART Command Execution Status	This **read-only** field shows an indicator when the IEC 62591 module sends a HART command to the sensor, and that command is unsuccessful. Each bit of the indicator represents the following HART command: **Bit 0** Command 103 Message 0 **Bit 1** Command 103 Message 1 **Bit 2** Command 104 Message 0 **Bit 3** Command 104 Message 1 **Bit 4** Command 107 Message 0 **Bit 5** Command 107 Message 1 **Bit 6** Command 108 Message 0 **Bit 7** Command 108 Message 1 **Bit 8** Command 109 Message 0 **Bit 9** Command 109 Message 1 **Bit 10** Command 117 **Bit 11** Command 118 **Bit 12** Spare **Bit 13** Spare **Bit 14** Spare **Bit 15** Spare **Note:** This field shows the status of important commands for Bursting and Events. ▪ **Bursting** o Command 103 Write Burst Period – Writes Min and Max burst update periods o Command 104 Write Burst Triggers – Sets burst trigger mode o Command 107 Write Burst Device Variables - Burst device variables returned by device on command 9 or 33 in burst mode o Command 108 Write Burst mode command number o Command 109 Burst Mode Control – Sets bursting ON/OFF ▪ **Event Notification** o Command 117 Write Event notification timing – Sets Event notification retry time, Maximum update time, Event De-bounce interval o Command 118 Event notification control - Enable/ Disable event notification
Events	Displays the Publish Time, Max Publish Time, Debounce Interval, Cur Event Time, Event Summary, Control Code and Events Pending

Field	Description
Publish Time	Sets the time interval (in seconds) at which the HART device publishes its events. **Note:** This value **must** be less than or equal to the value you set in the Maximum Update Time field.
Max Publish Time	Sets the maximum amount of time (in seconds) without publishing its events before the HART device is forced to publish its events. **Note:** This field applies **only** if you select **Windowed**, **Raising**, **Falling**, or **On-Change** in the Trigger Mode field.
Debounce Interval	This **read-only** field shows the amount of time (in seconds) that an event must persist before the HART device sends a notification.
Cur Event Time	This **read-only** field shows the time of the current event as returned from the HART device (the number of seconds that have passed since the start of the day) and the system's interpretation of that value.
Event Summary	This **read-only** field shows any unacknowledged pending events.
Control Code	This **read-only** field shows the Event Notification Control Code returned from the HART device. Possible values are: ▪ Off ▪ Token Pass DLL ▪ TDMA DLL ▪ Both TDMA and Token DLLs
Events Pending	This **read-only** field displays a list of events on the HART device that have not been acknowledged. Possible values are: ▪ Configuration Changed Event ▪ Device Status Event ▪ More Status Available Event
Reset Events	Select this button to acknowledge all pending events on the HART device.

Click **Apply** to save any changes you may make to the values on this screen.

Note: You can also double-click a commissioned device on the Commission screen to immediately access the Transmitter screen for that device.

3.3.4 Viewing Network Statistics

The network accumulates a variety of statistical information you can review to assess system health. This content is returned from the

transmitters and is updated every ten seconds. Select the **Statistics** tab to view this information.

Note: Refer to the transmitter's manufacturer for more information about the fields on this tab.

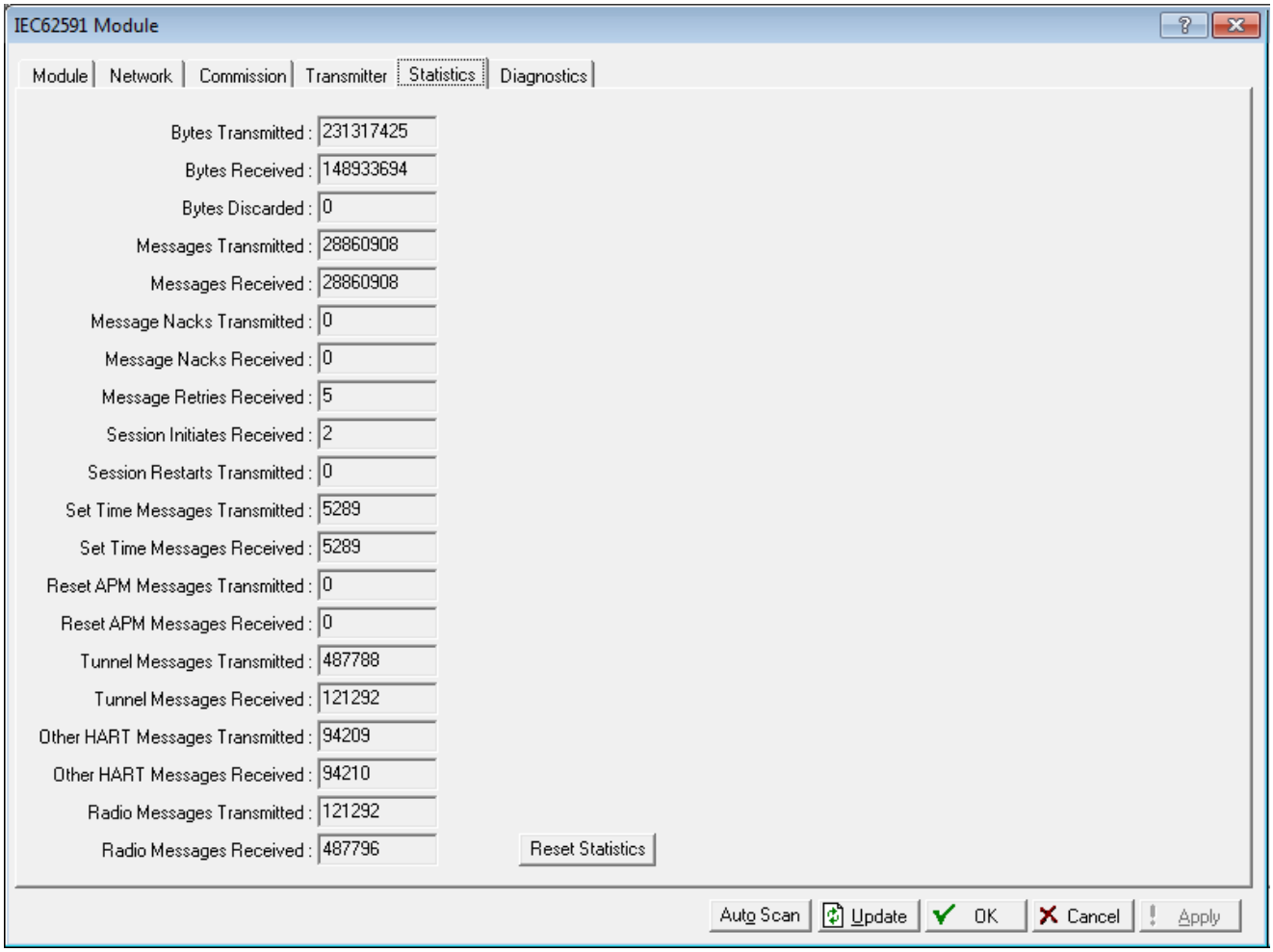

Figure 3-18. Statistics tab

Field	Description
Bytes Transmitted	This **read-only** field shows the number of data bytes the IEC62591 module has sent to the Field Link.
Bytes Received	This **read-only** field shows the number of data bytes the IEC62591 module has received from the Field Link.
Bytes Discarded	This **read-only** field shows the number of bytes discarded by the IEC62591 module. Discarded bytes are usually erroneous and due to noise on the bus.
Messages Transmitted	This **read-only** field shows the number of messages the IEC62591 module has sent to the Field Link.

Field	Description
Messages Received	This **read-only** field shows the number of messages IEC62591 module has received from the Field Link.
Message Nacks Transmitted	This **read-only** field shows the number of NACKs the IEC62591 module has sent to the Field Link. A NACK is typically sent when a received message contains an error and a retransmission request is sent. A high number of NACKs is often an indication of a poor link connection.
Message Nacks Received	Reserved
Message Retries Received	This **read-only** field shows the number of retry requests the IEC62591 module has received from the Field Link. A retry request is sent by the Field Link when it does not receive an acknowledgement from the IEC62591 module. A High number of retries is often an indication of a poor link connection.
Session Initiates Received	This **read-only** field shows the number of Session Initiates the IEC62591 module has received from the Field Link. A Session Initiate is sent by the Field Link when it wants to start and/or restart communications with the IEC62591 module (for example, after the Field Link (first powers up).
Session Restarts Transmitted	This **read-only** field shows the number of Session Restart requests the IEC62591 module has sent to the Field Link. A Session Restart request is sent by the IEC62591 module to request a bus restart of the communications with the Field Link (for example, after the IEC62591 module first powers up).
Set Time Messages Transmitted	This **read-only** field shows the number of Set Time messages the IEC62591 module has sent to the Field Link. A Set Time message is part of the time management process used to keep the WirelessHART network time up to date.
Set Time Messages Received	This **read-only** field shows the number of Set Time messages the IEC62591 module has received from the Field Link.
Reset APM Messages Transmitted	This **read-only** field shows the number of Reset APM messages the IEC62591 module has sent to the Field Link. A Reset APM message is part of the wireless management process used to restart the WirelessHART radio on the Field Link.
Reset APM Messages Received	This **read-only** field shows the number of Reset APM messages the IEC62591 module has received from the Field Link.
Tunnel Messages Transmitted	This **read-only** field shows the number of Tunnel messages the IEC62591 module has sent to the Field Link. A Tunnel message is part of the wireless management process used to send information across the WirelessHART network.

Field	Description
Tunnel Messages Received	This **read-only** field shows the number of Tunnel messages the IEC62591 module has received from the Field Link.
Other HART Messages Transmitted	This **read-only** field shows the number of Field Link specific messages the IEC62591 module has sent to the Field Link. These messages are sent to retrieve data from the Field Link.
Other HART Messages Received	This **read-only** field shows the number of Field Link specific messages the IEC62591 module has received from the Field Link.
Radio Messages Transmitted	This **read-only** field shows the number of WirelessHART network messages the IEC62591 module has sent to the Field Link.
Radio Messages Received	This **read-only** field shows the number of WirelessHART network messages the IEC62591 module has received from the Field Link.
Reset Statistics	Click to reset all values on this tab.

3.3.5 Retrieving a Diagnostic Log

The IEC 62591 module has a USB port which you can use to retrieve a diagnostic log to assist in troubleshooting. Select the **Diagnostics** table to display the Diagnostics screen:

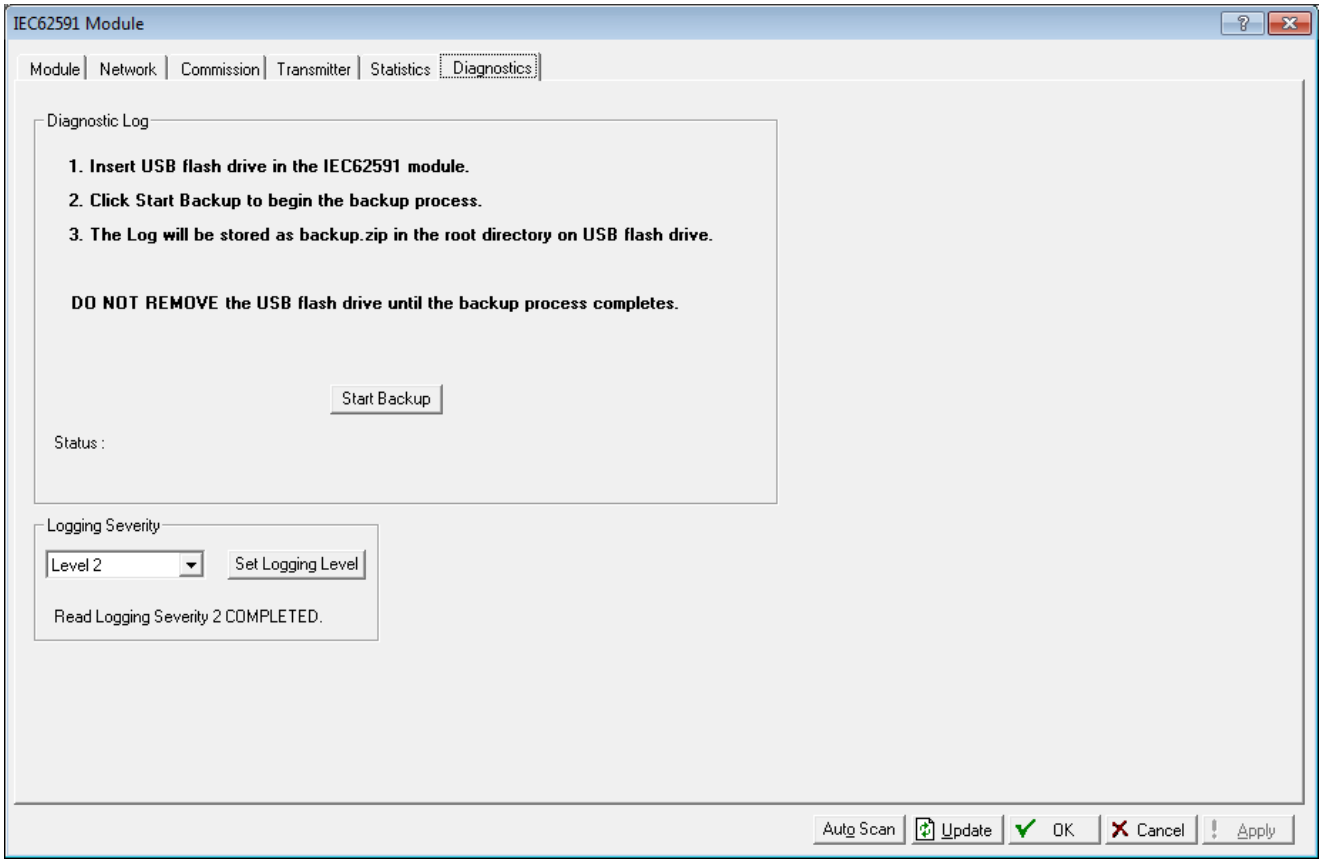

Figure 3-19. Diagnostics tab

The screen provides basic information to create and process the diagnostic log. However, Technical Support personnel can use the Logging Severity frame to more thoroughly identify problems with your system.

Field	Description
Logging Severity	Sets the amount of accumulated system activity data included on the diagnostic log. **1** is the least comprehensive setting and **9** is the most comprehensive setting. The default setting is **7**. **Note**: Use this field **only** under the direction of Technical Support personnel.
Set Logging Level	Click to set the severity of logs. The system validates your selection by displaying the message *Set Logging Severity X COMPLETED*, where X represents the severity you have selected.

3.4 Updating Module Firmware

You can also use the USB port on the IEC 62591 module to upgrade the firmware on the module. To access this option, select **Utilities** > **Update Firmware** on the ROCLINK 800 main menu bar. The Update Firmware screen displays.

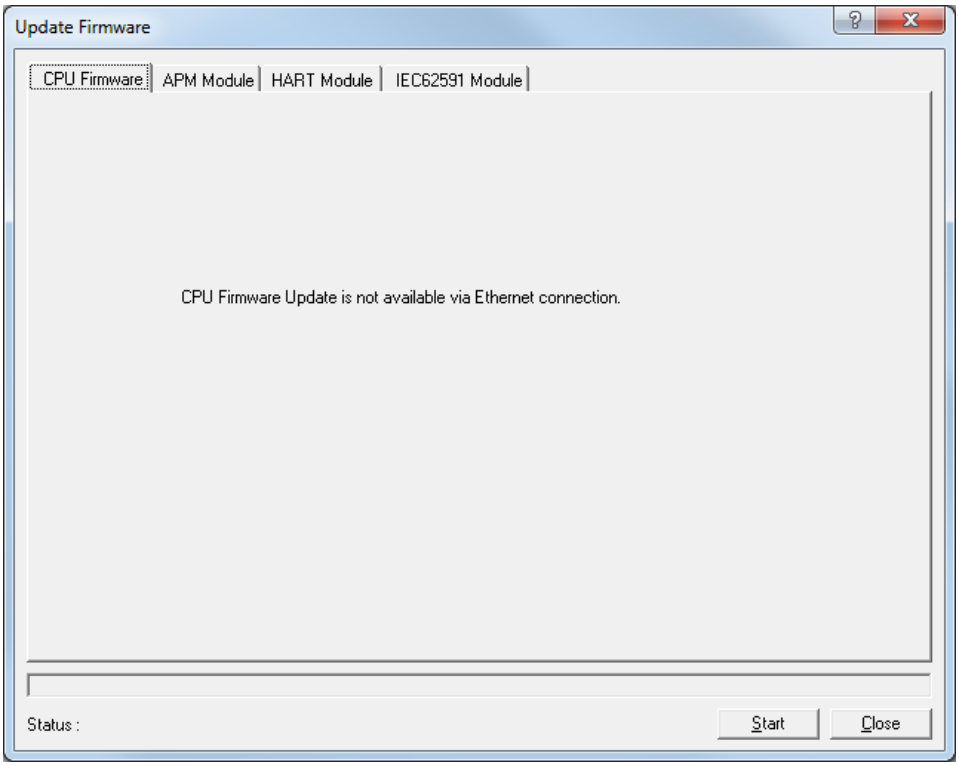

Figure 3-20. Update Firmware tab

Select the **IEC62591 Module** tab. The IEC 62591 Module screen displays:

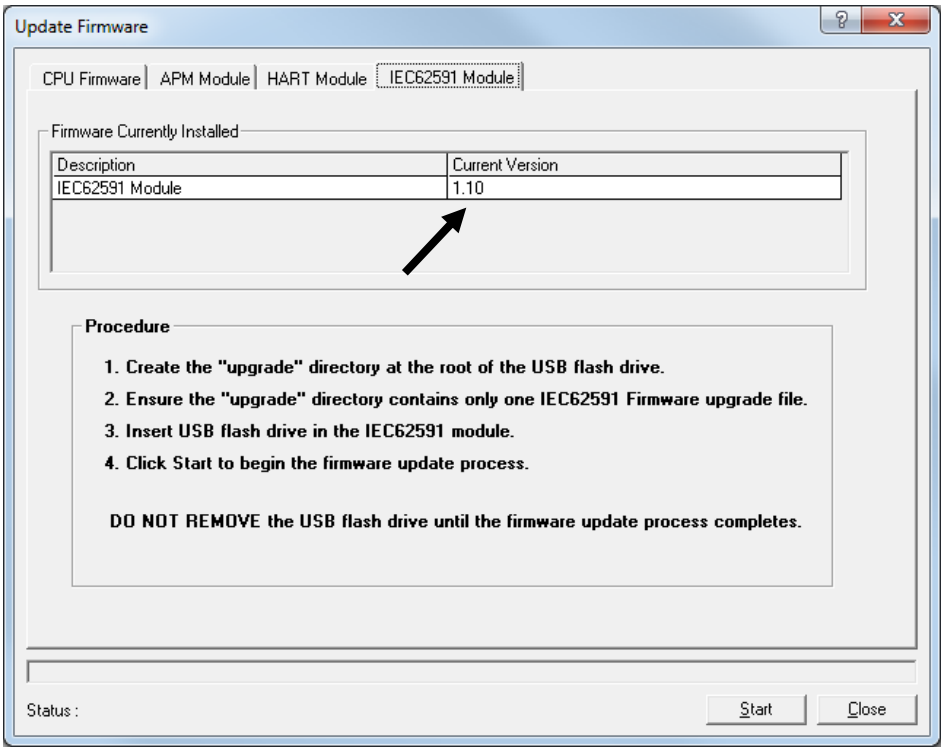

Figure 3-21. IEC 62591 Module Firmware Update screen

Follow the procedures on this screen to update the firmware in the IEC 62591 module.

Note: The value in the Current Version field changes when the firmware update completes.

3.4.1 Updating the IEC 62591 Module Firmware (ROC800/ FloBoss 107)

Follow the procedures on this screen to update the firmware in the IEC 62591 module.

1. Attach a USB drive (with at least 40Mb of free space) to the PC.

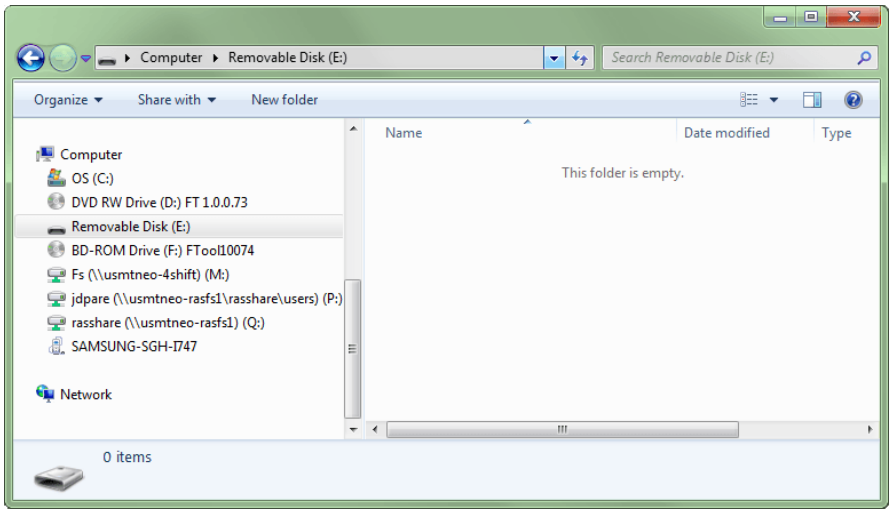

Figure 3-22. Attaching a USB drive

2. Create a folder named “upgrade” in the root directory.

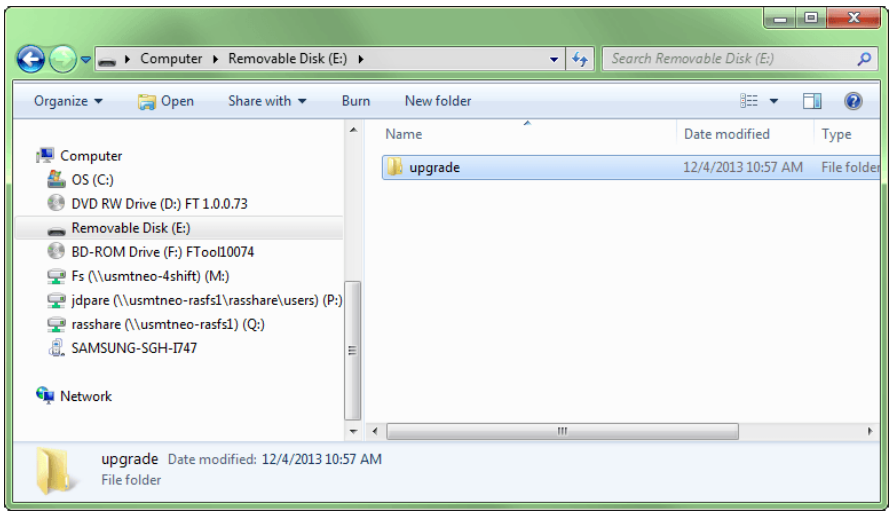

Figure 3-23. Creating the upgrade folder

3. Copy the upgrade file (ras-wihart-1.10-release.zip) to the Upgrade folder on the USB drive.

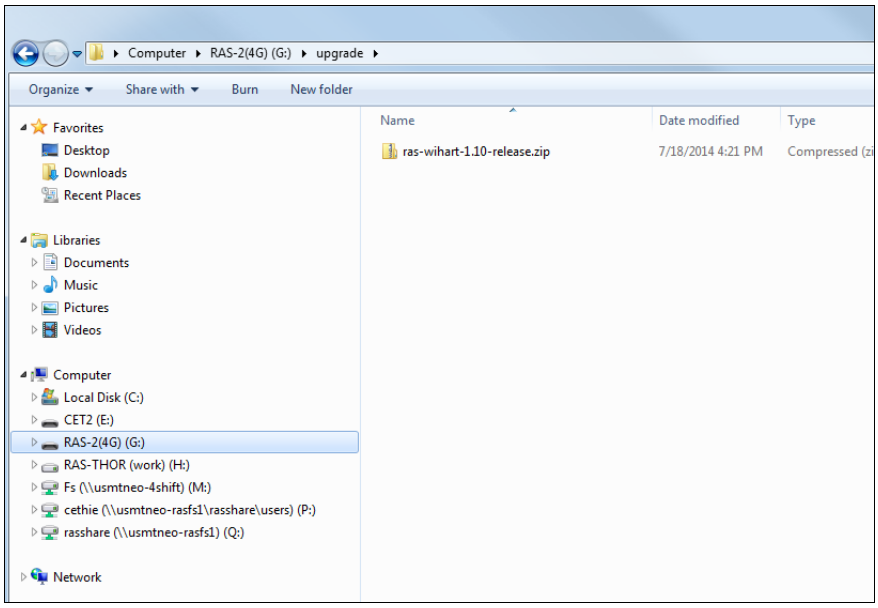

Figure 3-24. Copying the upgrade file

4. Start ROCLINK.

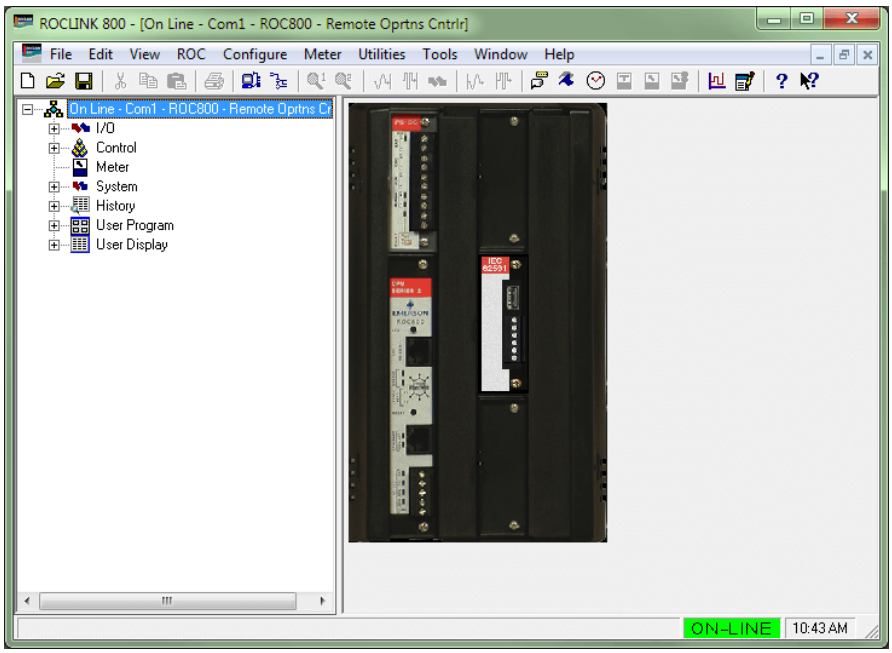

Figure 3-25. Starting ROCLINK

5. Click on the IEC 62591 module to verify that it is running. The System Mode field should contain “Run Mode.”

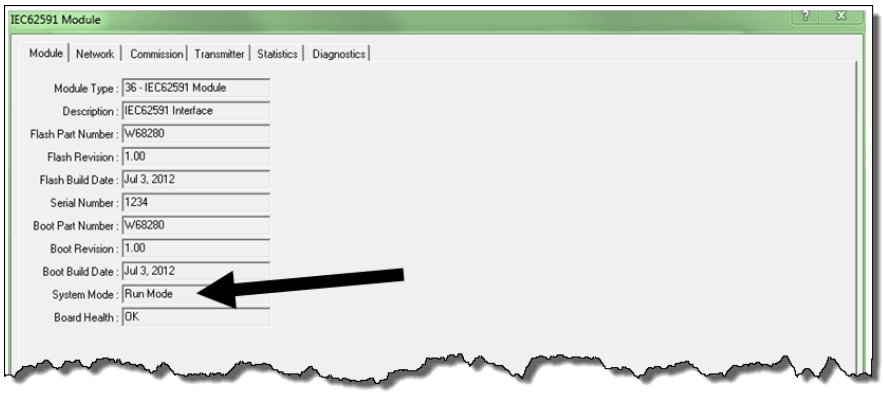

Figure 3-26. Verifying Run Mode

6. Verify that the module is connected to the network and that the module is currently on-line.

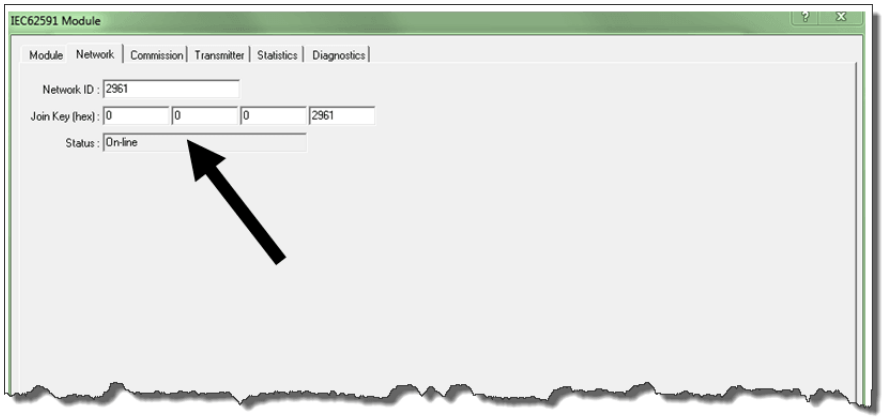

Figure 3-27. Verifying Online status

Remove the USB drive for your PC's USB port and attach it to the USB port on the IEC 62591 module.

7. On the main ROCLINK screen select **Utilities** > **Update Firmware**.

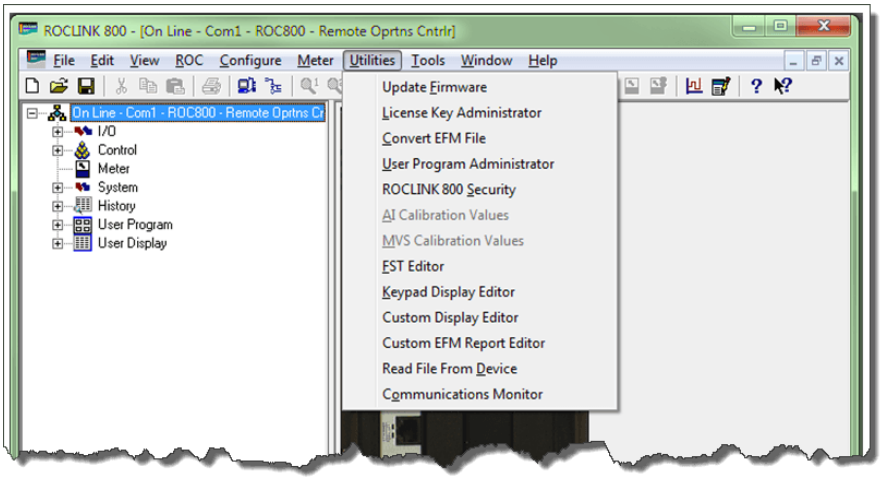

Figure 3-28. Selecting Utilities > Update Firmware

8. Select the IEC 62591 Module tab and verify that the Current Version is 1.00. Click **Start** to begin the update process.

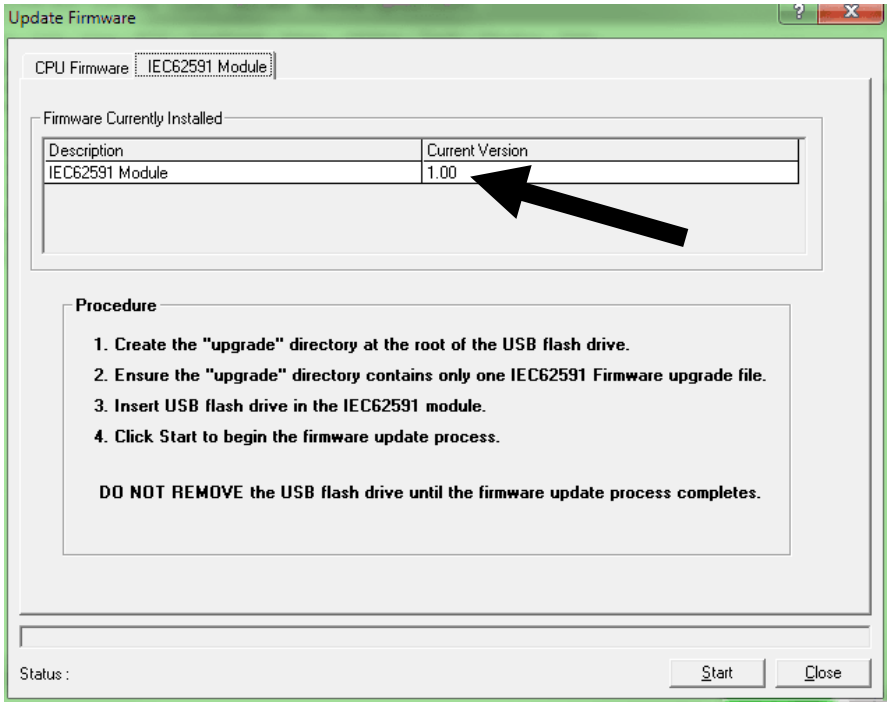

Figure 3-29. Verifying current version

9. When the dialog displays, click **Yes** to start the update process.

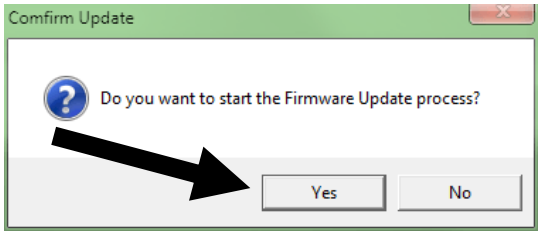

Figure 3-30. Starting the update process

10. ROCLINK begins the firmware update, and displays status messages at the bottom of the screen.

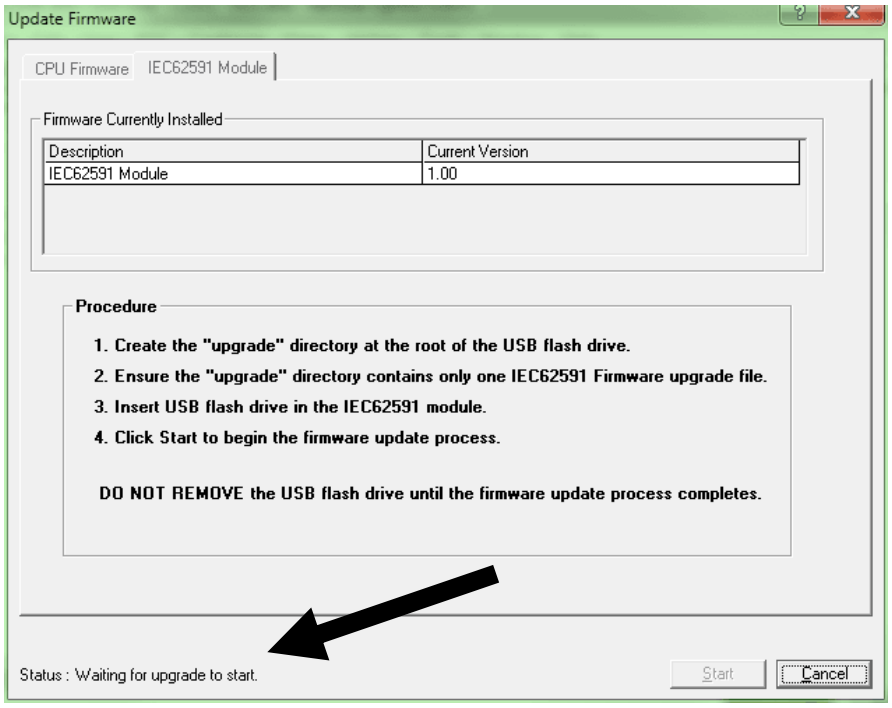

Figure 3-31. Status message: Waiting for upgrade to start

11. Once the update starts, it takes several minutes to complete. Status messages continue to display at the bottom of the screen.

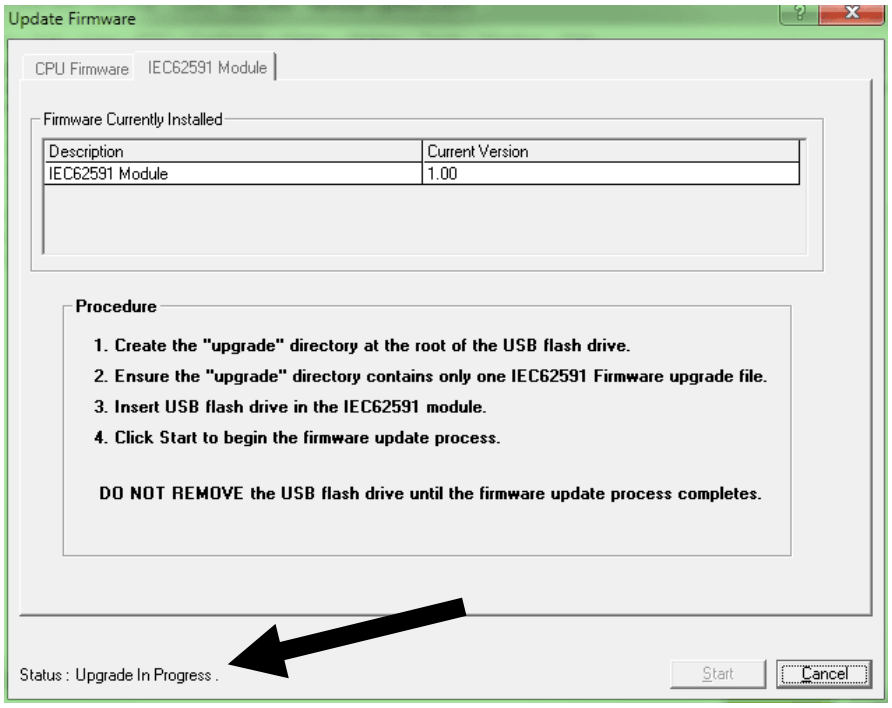

Figure 3-3213. Status message: Upgrade in Progress

12. When the update completes, the program reboots the module.

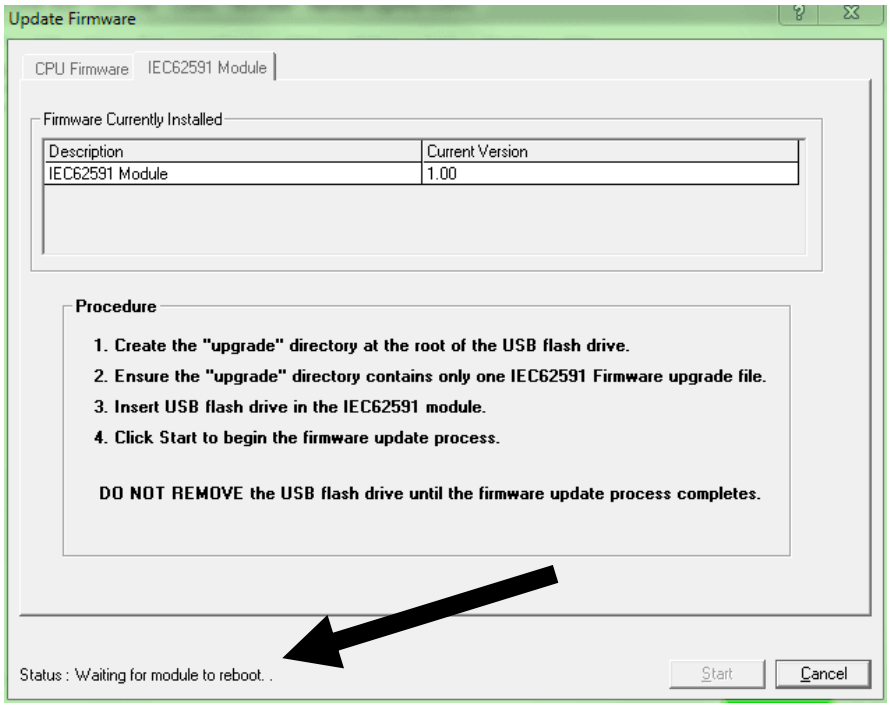

Figure 3-33. Status message: Waiting for module to reboot

13. When the firmware update finishes, a dialog displays. Click **OK** to continue.

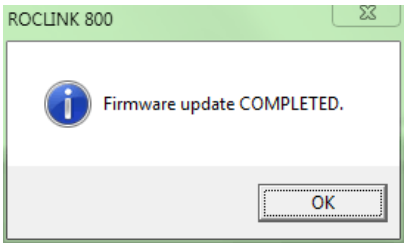

Figure 3-34. Firmware update completed dialog box

14. Verify that the version of firmware for the module is now 1.10.

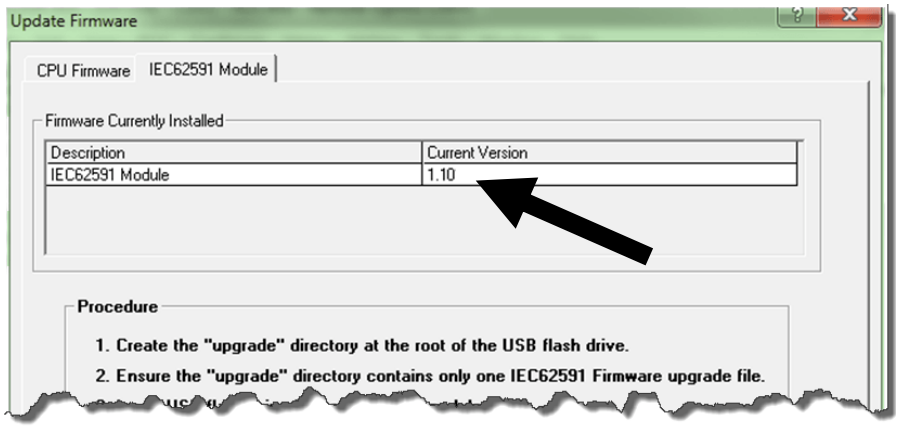

Figure 3-35. Verifying version of upgraded firmware

15. The update process preserves the network settings for your module, but you should still verify that the settings are correct. Click **Cancel** to close the Update Firmware screen, click on the IEC 62591 module, and select the Network tab to review the network settings.

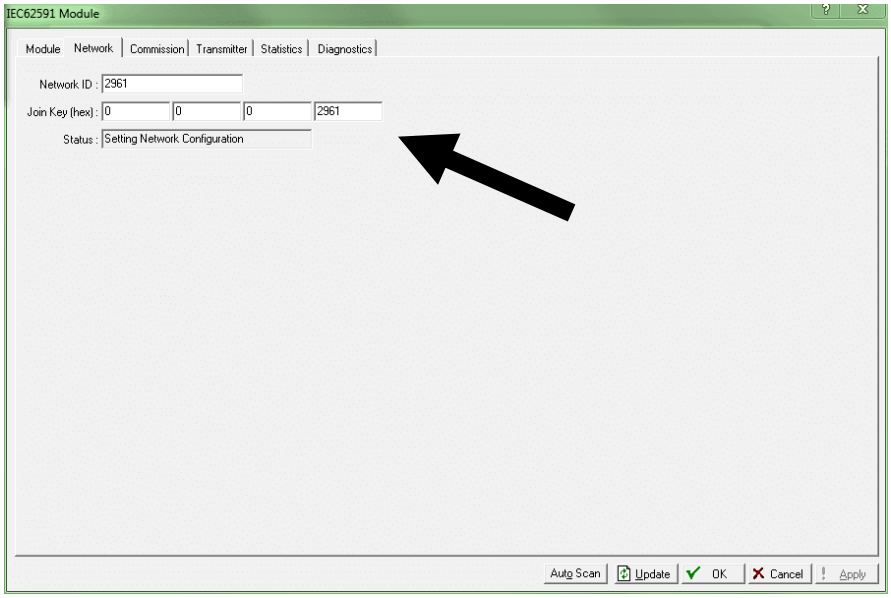

Figure 3-36. Verifying if settings are still correct

16. The update is complete. Remove the USB drive from the port on the IEC 62591 module.

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Chapter 4 – Troubleshooting

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This chapter provides generalized guidelines for troubleshooting the IEC62591 module and the Field Link.

4.1 General Guidelines

Before you begin to troubleshoot the interface, you should observe the following guidelines:

- **Don't overlook the obvious**. With all the activity involved in setting up a wireless network, it is easy to accidentally unplug an antenna or disconnect power from a device. Check those things first. (For a list of common problems, see the *Troubleshooting Checklist* at the end of this chapter.)
- **If something worked previously but has now stopped working, did you change something?** For example, if you re-downloaded the application and now it has stopped working, it's possible that the change you made to the application might have caused a problem.
- **Adopt a systematic approach**. Don't try to solve the problem by changing several different things at once. Change one thing, see if it causes an improvement, and make notes about what you did. Then you can try to make other changes. If you haphazardly begin swapping hardware modules, re-routing cables, and changing software parameters, you may end up in worse shape than when you started, or you may end up masking symptoms of an underlying problem.
- **Try to isolate the problem**. For example, if you can communicate with some wireless devices but not others, then concentrate on what's different with the non-functional wireless devices, or their configuration parameters. If you can't communicate with any wireless devices, you might not have correctly configured network parameters in the application, or there may be a problem at the field link.

- **Use the hardware and software diagnostic tools provided with the product.** The IEC 62591 wireless application includes error codes which you can check; often these will identify configuration problems for you.
- **Collect and save as much relevant information as you can**. If possible, make notes concerning what steps you took leading up to the initial occurrence of the problem. Save printouts, screen captures, error codes, and so on so you can refer to them if you have to call for technical assistance.

4.2 Common Troubleshooting Techniques

Common troubleshooting techniques are given below:

4.2.1 Identifying which System Components are Working

The wireless interface has several different pieces of hardware and software. A failure in any one of them can cause problems, so you should consider all the different pieces to try to identify the source of your problem. For hardware you have:

- FB107/ROC800 controller with IEC 62591 module installed in a slot
- PC or laptop connecting the IEC 62591
- Cable between IEC 62591 module and Field Link
- One or more wireless devices in the wireless network
- Field Communicator (optional)

For software you have:

- The IEC 62591 application running in ROCLINK 800
- IEC 62591 protocol software running in the Field Link and in all of the wireless devices

4.2.2 Conducting Basic Hardware Checks

- Ensure power is connected.
- Check that all modules are properly seated in slots.
- Ensure cable connections are good between the field link and controller, and between the PC/laptop and the controller.
- Check status LEDs on the controller.
- Check for indications on the Field Link. See its accompanying documentation (*Emerson™ Emerson 781 Wireless Field Link Quick Installation Guide*, part 00825-0100-4421) for details.

4.2.3 Looking for Possible Configuration Errors

- Does the IEC 62591 Wireless Interface support your wireless device(s)?

- Did you place the IEC62591 module in the proper slot as specified in the IEC 62591 application?
- Did you assign a unique Long Tag Name to each wireless device and specify the exact same long tag names in the IEC 62591 application?
- Did you assign a Network ID which must be the same in each and every wireless device in this network, and must also match the Network ID defined in the IEC 62591 application?
- Did you assign a Join Key which must be the same in each and every wireless device in this network, and must also match the Join Key defined in the IEC 62591 application?

4.2.4 Rebooting after a Power Loss

In the event of low power or complete power loss, if the IEC module fails to successfully reboot, the FB107 and/or ROC800 raise Communication Failure and Point Failure alarms, indicating that IEC 62591 communications are not functioning. To resolve the issue, remove and re-apply power to the RTU.

4.2.5 USB Flash Drive Not Recognized

Module initialization can take up to five minutes. During this time, the USB port on the module is not recognized. The module is initialized when the Status field on the Network tab includes the word **Online**. If a USB flash drive is not recognized after module initialization, power cycle your device and try again.

4.3 Errors from the IEC 62591 Transmitter Tab

You can use the *Transmitter Tab* in ROCLINK 800 to check if there are errors in configuration:

4.3.1 NaN value

The Transmitter tab shows a **NaN** (Not a Number) warning when the given parameter is currently in a failing state. To further investigate and resolve the issue, use Field Tools, the AMS Device Configurator, or a 475 hand-held.

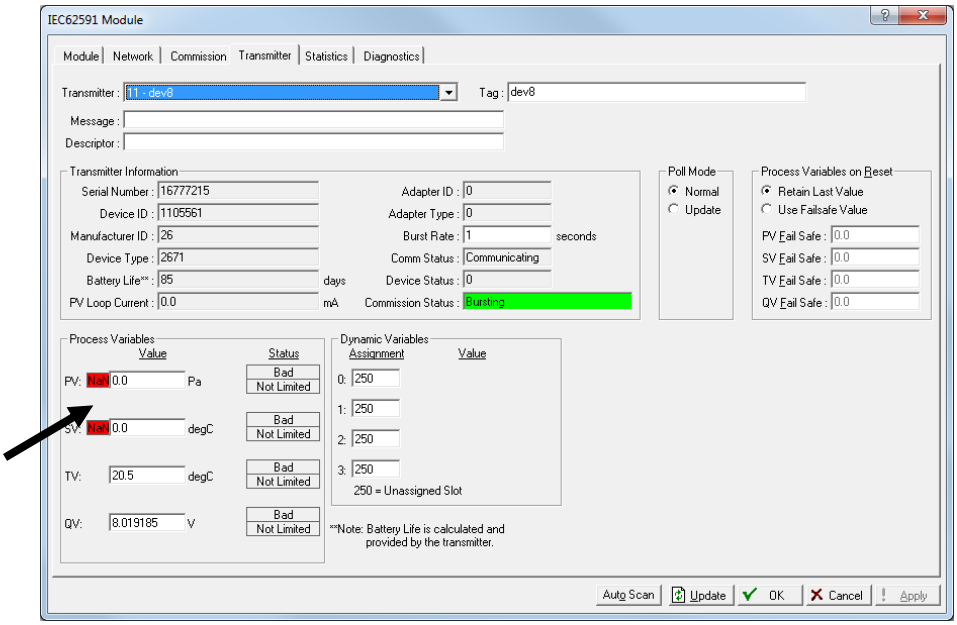

Figure 4-1. NaN warning in Transmitter tab)

When **NaN** is reported, the RTU supports a failsafe operation defined by the user (*Retain Last Value, Use Failsafe Value*).

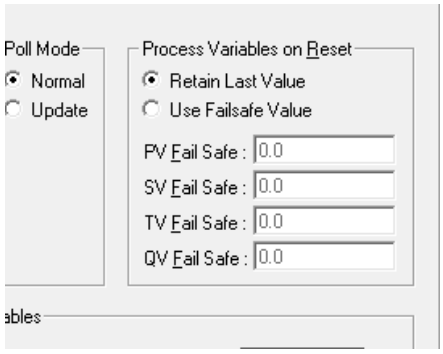

Figure 4-2. User-defined failsafe operation

4.3.2 Stale / Communication Failure

If the RTU reports a *Stale* or *Communication Failure* status in the *Communication Status* field, interrogate the transmitter using 475/AMS/Field Tools. The location of the transmitter's network diagnostics can be found the transmitter's manual.

Additionally, if the RTU reports a *Stale* status, assess the physical layout of the network. The *Stale* status can be triggered if there is any kind of physical anomaly in the network (tanker trucks between transmitter and RTU, transmitter between the end device and the RTU is powered down, etc.).

The RTU supports gathering *Diagnostic Logs* of the wireless network. You can extract these logs and send them to Technical Support for further analysis of the network issue.

Appendix A – Glossary

Note: This is a generalized glossary of terms. Not all the terms may necessarily correspond to the particular device or software described in this manual. For that reason, the term "ROC" is used to identify all varieties of Remote Operations Controllers (including ROC800-Series, ROC300-Series, FloBoss™ 100-Series, FloBoss 300-Series, FloBoss 500-Series, and FloBoss 407 units).

A

A/D	Analog to Digital signal conversion.
ABS	Acrylonitrile Butadiene Styrene.
Active Advertising	A mode in which the IEC 62591 module sends messages to the wireless network to keep radios active for a longer period of time to facilitate quicker detection of new (or replaced) wireless devices. Because leaving radios on consumes power, active advertising is only used on certain conditions.
ADC	Analog to Digital Converter. Used to convert analog inputs (AI) to a format the flow computer can use.
AGA	American Gas Association. A professional organization that oversees the AGA3 (orifice), AGA5 (heating value), AGA7 (turbine), AGA8 (compressibility), AGA9 (Ultrasonic), and AGA11 (Coriolis) gas flow calculation standards. See http://www.aga.org.
AWG	American Wire Gauge.
AI	Analog Input.
AO	Analog Output.
Analog	Analog data is represented by a continuous variable, such as an electrical current signal.
AP	Absolute Pressure.
API	American Petroleum Institute. See http://www.api.org.
Area	A user-defined grouping of database entities.
ASCII	American (National) Standard Code for Information Interchange.
Attribute	A parameter that provides information about an aspect of a database point. For example, the alarm attribute is an attribute that uniquely identifies the configured value of an alarm.

B

BMV	Base Multiplier Value, used in AGA7 (turbine) calculations.
BPS	Bits Per Second, associated with baud rate.
BTU	British Thermal Unit, a measure of heat energy.
Built-in I/O	I/O channels that are fabricated into the ROC and do not require a separate option. Also called "on-board" I/O.
Bursting	The periodic or trigger-based publishing of cyclical process data without any master or host action.

C (continued)

C1D2	Class 1, Division 2 hazardous area
CMOS	Complementary Metal Oxide Semiconductor, a type of microprocessor used in a ROC.
Coil	Digital output, a bit to be cleared or set.
COL	Ethernet Packet Collision.
COM	Communications port on a personal computer (PC).
COMM	Communications port on a ROC used for host communications. . **Note**: On FloBoss 500-Series and FloBoss 407s, COMM1 is built-in for RS-232 serial communications.
Comm Module	Module that plugs into a ROC to provide a channel for communications via a specified communications protocol, such as EIA-422 (RS-422) or HART.
CF	Compare Flag; stores the Signal Value Discrete (SVD).
Configuration	Refers either to the process of setting up the software for a given system or the result of performing this process. The configuration activity includes editing the database, building schematic displays and reports, and defining user calculations. Typically, the software setup of a device that can often be defined and changed. Can also mean the hardware assembly scheme.
Configuration Tree	In ROCLINK 800, the graphical display that appears when a configuration file opens. It is a hierarchical branching ("tree-style") method for navigating within the configuration screens.
CPU	Central Processing Unit.
CRC	Cyclical Redundancy Check error checking.
Crosstalk	The amount of signal that crosses over between the receive and transmit pairs, and signal attenuation, which is the amount of signal loss encountered on the Ethernet segment.
CSA	Canadian Standards Association. See http://www.csa.ca.
CSMA/CD	Carrier Sense Multiple Access with Collision Detection.
CTS	Clear to Send modem communications signal.

D

D/A	Digital to Analog signal conversion.
DB	Database.
dB	Decibel. A unit for expressing the ratio of the magnitudes of two electric signals on a logarithmic scale.
DCD	**Data Carrier Detect** modem communications signal. In addition, **Discrete Control Device** – A discrete control device energizes a set of discrete outputs for a given setpoint and matches the desired result against a set of discrete inputs (DI).
DCE	Data Communication Equipment.
Deadband	A value that is an inactive zone above the low limits and below the high limits. The purpose of the deadband is to prevent a value (such as an alarm) from being set and cleared continuously when the input value is oscillating around the specified limit. This also prevents the logs or data storage location from being over-filled with data.
Device Directory	In ROCLINK 800, the graphical display that allows navigation through the PC Comm Ports and ROC Comm Ports setup screen.
DI	Discrete Input.
Discrete	Input or output that is non-continuous, typically representing two levels (such as on/off).
DMM	Digital multimeter.
DO	Discrete Output.

D (continued)

Download	The process of sending data, a file, or a program from a PC to a ROC.
DP	Differential Pressure.
DSR	Data Set Ready modem communications signal.
DTE	Data Terminal Equipment.
DTR	Data Terminal Ready modem communications signal.
Duty Cycle	Proportion of time during a cycle that a device is activated. A short duty cycle conserves power for I/O channels, radios, and so on.
DVM	Digital voltmeter.
DVS	Dual-Variable Sensor. A device that provides static and differential pressure inputs to a ROC.

E

EDS	Electronic Static Discharge.
EEPROM	Electrically Erasable Programmable Read-Only Memory, a form of permanent memory on a ROC.
EFM	Electronic Flow Metering or Measurement.
EIA-232 (RS-232)	Serial Communications Protocol using three or more signal lines, intended for short distances. Concerning RS232D and RS232C, the letters C or D refer to the physical connector type. D specifies the RJ-11 connector where a C specifies a DB25 type connector.
EIA-422 (RS-422)	Serial Communications Protocol using four signal lines.
EIA-485 (RS-485)	Serial Communications Protocol requiring only two signal lines. Can allow up to 32 devices to be connected together in a daisy-chained fashion.
EMF	Electro-Motive Force.
EMI	Electro-Magnetic Interference.
ESD	Electro-Static Discharge.
EU	Engineering Units. Units of measure, such as MCF/DAY.

F

FCC	Federal Communications Commission. See http://www.fcc.gov.
Firmware	Internal software that is factory-loaded into a form of ROM. In a ROC, the firmware supplies the software used for gathering input data, converting raw input data values, storing values, and providing control signals.
FlashPAC module	ROM and RAM module for a ROC300-Series unit that contains the operating system, applications firmware, and communications protocol.
Flash ROM	A type of read-only memory that can be electrically re-programmed. It is a form of permanent memory (requires no backup power). Also called Flash memory.
FloBoss	A microprocessor-based device that provides flow calculations, remote monitoring, and remote control. A FloBoss is a type of remote operations controller (ROC).
FM	Factory Mutual.
Force	Write an ON/OFF, True/False, or 1/0 value to a coil.
FOUNDATION™ Fieldbus	An open architecture for information integration, managed by the Fieldbus Foundation (www.fieldbus.org).
FPV	Compressibility Factor.
FSK	Frequency Shift Keypad.

F (continued)

Ft	Foot or feet.
FST	Function Sequence Table, a type of user-written program in a high-level language designed by Remote Automation Solutions.

G

GFA	Ground Fault Analysis.
GND	Electrical ground, such as used by the ROC's power supply.
GP	Gauge Pressure.

H

H1	A Foundation Fieldbus protocol operating at 31.25 kbit/s that interconnects field devices (such as sensors or I/O devices).
HART	Highway Addressable Remote Transducer.
Holding Register	Analog output number value to be read.
HSE Protocol	High Speed Ethernet protocol; a communications protocol operating at 100 Mbit/s used to integrate high-speed controllers (or servers) connected via Ethernet.
Hw	Differential pressure.
Hz	Hertz.

I, J

IC	Integrated Circuit. Also, Industry Canada (more recently known as Measurement Canada), an organization that grants custody transfer approvals on certain ROC units.
ID	Identification.
IEC	Industrial Electrical Code or International Electrotechnical Commission. See http://www.iec.ch.
IEEE	Institute of Electrical and Electronic Engineers. A professional organization that, in conjunction with the International Standards Organization (ISO), establishes and maintains the Open System Interconnection (OSI) reference model and an international standard for the organization of local area networks (LANs). Refer to http://www.ieee.org.
IMV	Integral Multiplier Value, used in AGA3 (orifice) calculations.
Input	Digital input, a bit to be read.
Input Register	Input numeric value to be read.
Local Port	Also LOI; the serial EIA-232 (RS-232) port on the ROC through which local communications are established, typically for configuration software running on a PC.
I/O	Input/Output.
I/O Module	Module that plugs into an I/O slot on a ROC to provide an I/O channel.
IRQ	Interrupt Request. Hardware address oriented.
ISO	International Standards Organization. See http://www.iso.ch.
IV	Integral Value.

K

KB	Kilobytes.
KHz	KiloHertz.

L

LCD	Liquid Crystal Display.
LDP	Local Display Panel, a display-only device that plugs into ROC300-Series units (via a parallel interface cable) used to access information stored in the ROC.
LED	Light-Emitting Diode.
Logical Number	The point number the ROC and ROC Plus protocols use for I/O point types are based on a physical input or output with a terminal location; the point numbers for all other point types are “logical” and are simply numbered in sequence.
LNK	Ethernet has linked.
LOI	Local Operator Interface (or Local Port). Refers to the serial EAI-232 (RS-232) port on the ROC through which local communications are established, typically for configuration software running on a PC.
LPM	Lightning Protection Module; a device that provides lightning and power surge protection for ROCs.
LRC	Longitudinal Redundancy Checking error checking.

M

m	Meter.
mA	Milliamp(s); one thousandth of an ampere.
MAC Address	Media Access Control Address; a hardware address that uniquely identifies each node of a network.
Manual mode	For a ROC, indicates that the I/O scanning has been disabled.
MAU	Medium Attachment Unit.
MCU	Master Controller Unit.
Modbus	A popular device communications protocol developed by Gould-Modicon.
MPU	Micro-Processor Unit.
mm	Millimeter.
MMBTU	Million British Thermal Units.
msec	Millisecond, or 0.001 second.
MVS	Multi-Variable Sensor. A device that provides differential pressure, static pressure, and temperature inputs to a ROC for orifice flow calculations.
mV	Millivolts, or 0.001 volt.
mW	Milliwatts, or 0.001 watt.

N

NaN	Not-a-Number. This refers to a value which cannot be expressed as a number, such as a division by zero error condition.
NEC	National Electrical Code.
NEMA	National Electrical Manufacturer’s Association. See http://www.nema.org.

O

OH	Off-Hook modem communications signal.
Off-line	Accomplished while the target device is not connected (by a communications link). For example, “off-line configuration” refers to configuring an electronic file that is later loaded into a ROC.
Ohms	Units of electrical resistance.

On-line	Accomplished while connected (by a communications link) to the target device. For example, “on-line configuration” refers to configuring a ROC800-Series unit while connected to it, so that you can view the current parameter values and immediately load new values.
Opcode	Type of message protocol the ROC uses to communicate with the configuration software, as well as host computers with ROC driver software.
Operator Interface	Also LOI or Local Port; the serial EIA-232 (RS-232) port on the ROC through which local communications are established, typically for configuration software running on a PC.
Orifice meter	A meter that records the flow rate of gas through a pipeline. The flow rate is calculated from the pressure differential created by the fluid passing through an orifice of a particular size and other parameters.

P, Q

Parameter	A property of a point that typically can be configured or set. For example, the Point Tag ID is a parameter of an Analog Input point. Parameters are normally edited by using configuration software running on a PC.
PC	Personal Computer.
Pf	Flowing pressure.
P/DP	Pressure/Differential Pressure.
PI	Pulse Input.
PID	Proportional, Integral, and Derivative control feedback action.
PIT	Periodic Timer Interrupt.
PLC	Programmable Logic Controller.
Point	Software-oriented term for an I/O channel or some other function, such as a flow calculation. Points are defined by a collection of parameters.
Point Number	The physical location of an I/O point (module slot and channel) as installed in the ROC.
Point Type	Defines the database point to be a specific type of point available to the system. The point type determines the basic functions of a point.
Preset	Number value previously determined for a register.
PRI	Primary PID control loop.
Protocol	A set of standards that enables communication or file transfers between two computers. Protocol parameters include baud rate, parity, data bits, stop bit, and the type of duplex.
PSTN	Public Switched Telephone Network.
PT	Process Temperature.
PTT	Push-to-Talk signal.
Pulse	Transient variation of a signal whose value is normally constant.
Pulse Interface module	A module that provides line pressure, auxiliary pressure, and pulse counts to a ROC.
PV	Process Variable or Process Value.

R

Rack	A row of slots on a ROC into which I/O modules can be plugged. Racks are given a letter to physically identify the location of an I/O channel (such as “A” for the first rack). Built-in I/O channels are assigned a rack identifier of “A” while diagnostic I/O channels are considered to be in “E” rack.

R (continued)

RAM	Random Access Memory. RAM is used to store history, data, most user programs, and additional configuration data.
RBX	Report-by-exception. RBX always refers to Spontaneous RBX in which the ROC contacts the host to report an alarm condition.
RR	Results Register; stores the Signal Value Analog (SVA).
RFI	Radio Frequency Interference.
RI	Ring Indicator modem communications signal.
ROC	Remote Operations Controller microprocessor-based unit that provides remote monitoring and control.
ROCLINK 800	Microsoft® Windows®-based software used to configure functionality in ROC units.
ROM	Read-only memory. Typically used to store firmware. Flash memory.
Rotary Meter	A positive displacement meter used to measure flow rate, also known as a Roots meter.
RTC	Real-Time Clock.
RTD	Resistance Temperature Detector.
RTS	Ready to Send modem communications signal.
RTU	Remote Terminal Unit.
RTV	Room Temperature Vulcanizing, typically a sealant or caulk such as silicon rubber.
RS-232	Serial Communications Protocol using three or more signal lines, intended for short distances. Also referred to as the EIA-232 standard.
RS-422	Serial Communications Protocol using four signal lines. Also referred to as the EIA-422 standard.
RS-485	Serial Communications Protocol requiring only two signal lines. Can allow up to 32 devices to be connected together in a daisy-chained fashion. Also referred to as the EIA-485 standard.
RX or RXD	Received Data communications signal.

S

SAMA	Scientific Apparatus Maker's Association.
Script	An uncompiled text file (such as keystrokes for a macro) that a program interprets in order to perform certain functions. Typically, the end user can easily create or edit scripts to customize the software.
Soft Points	A type of ROC point with generic parameters that can be configured to hold data as desired by the user.
SP	Setpoint, or Static Pressure.
SPI	Slow Pulse Input.
SPK	Speaker.
SRAM	Static Random Access Memory. Stores data as long as power is applied; typically backed up by a lithium battery or supercapacitor.
SRBX	Spontaneous Report-By-Exception. SRBX always refers to Spontaneous RBX in which the ROC contacts the host to report an alarm condition.

S (continued)

SVA	Signal Value Analog. Stored in the Results Register, it is the analog value that is passed between functions in an FST.
SVD	Signal Value Discrete. Stored in the Compare Flag, it is the discrete value that is passed down the sequence of functions in an FST.
System Variables	Configured parameters that describe the ROC; set using ROCLINK software.

T

T/C	Thermocouple Input.
TCP/IP	Transmission Control Protocol/Internet Protocol.
TDI	Time Duration Input.
TDO	Time Duration Output.
Tf	Flowing temperature.
TLP	Type (of point), Logical (or point) number, and Parameter number.
TX or TXD	Transmitted Data communications signal.
Turbine meter	A device used to measure flow rate and other parameters.

U

Upload	Send data, a file, or a program from the ROC to a PC or other host.
USB	Universal Serial Bus, a serial bus standard used to connect devices.

V-Z

V	Volts.

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