BANNER ®

more sensors, more solutions

SureCross™ DX80
Wireless I/O Network

Product Manual

BANNER ®

more sensors, more solutions

All specifications published in this document are subject to change. Banner reserves the right to modify the specifications of products, prior to their order, without notice.

P/N 132607

Table of Contents

Introducing the SureCross™ DX80 Wireless System

The SureCross™ DX80 wireless I/O network provides reliable monitoring without the burden of wiring or conduit installation and can operate independently or in conjunction with a PLC and/or PC software.

The SureCross DX80 network is a deterministic system—the network identifies when the radio signal is lost and drives relevant outputs to user-defined conditions. Once the radio signal is reacquired, the network returns to normal operation.

Devices may be all discrete I/O, mixed discrete and analog I/O, or *Flex*Power™. A Gateway device acts as the master device within each radio network and initiates communication and reporting with the Nodes. A radio network contains only one Gateway, but can contain many Nodes. Each Node device can be connected to sensors or output devices and reports I/O status to the Gateway.

The DX80 Gateway Pro combines, in one DX80 unit, the function of a standard Gateway with the ability to interface to Ethernet using Modbus/TCP or EtherNet/IP™ protocols. The Gateway Pro has a serial port as well as an industrial Ethernet port.

To achieve the same functionality with a standard Gateway, add a DX83 Ethernet Bridge to any standard DX80 Gateway device. The DX83 Ethernet Bridge adds the Web page configuration ability to your system as well as the ability to interface to Ethernet using Modbus/TCP or EtherNet/IP protocols. A DX83 Ethernet Bridge connected to a DX80 Gateway functions as a DX80 Gateway Pro while allowing the Gateway to have I/O points.

For more information on specific components, please refer to the data sheets for the SureCross devices:

- Gateways
- Line-Powered Nodes
- *Flex*Power™ Nodes

Additional reference guides are available at www.bannerengineering.com on a variety of topics, including:

Literature Number	Topic
132113	A guide to antenna basics
132114	A guide to using Modbus® with the SureCross products
132033	How to configure I/O parameters using Modbus registers
133601	Samples of SureCross network configurations
133602	Running the Site Survey and interpreting the results

Features

DX80 Gateway and Node

1 **Port, NPT Gland, or Plug** - If unused, install the provided plug into the 1/2 NPT threaded port. Refer to the *Installation* section if an IP67 seal is required.

2 **Rotary Switch 1 (left)** - Sets the Network ID (NID) to a hexidecimal value from 0 to F, for a total of 16 Network IDs. A Gateway and its corresponding Nodes must be assigned the same Network ID.

Rotary Switch 2 (right) - Gateway: Sets the Gateway's LCD viewing device address. The Gateway is predefined as Device Address 0. Node: Sets the Node's Device Address (hexidecimal 1 to F). Each Node within a network must have a unique Node Device Address.

3 **Push Button 1** - Single-click to advance across all top-level DX80 menus.

Single-click to move down interactive menus, once a top-level menu is chosen.

4 **Push Button 2 -** Double-click to select a menu and to enter manual scrolling mode. Double-click to move up one level at a time.

5 **LED 1 and 2** - Provide real-time feedback to the user regarding RF link status, serial communications activity, and the error state.

6 **LCD Display** - Six-character display provides run mode user information and shows enabled I/O point status. This display allows the user to conduct a Site Survey (RSSI) and modify other DX80 configuration parameters without the use of a PC or other external software interfaces. On the Node, after 15 minutes of inactivity, the LCD goes blank. Press any button to refresh the display.

7 **5-Pin M12 Euro-style quick-disconnect serial port**

1 Industrial Ethernet Port, female

2 **Rotary Switch 1 (left) -** Sets the Network ID (NID) to a hexidecimal value from 0 to F, for a total of 16 Network IDs. A Gateway and its corresponding Nodes must be assigned the same Network ID.
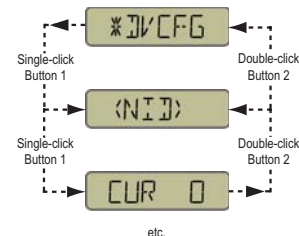
Rotary Switch 2 (right) - Gateway: Sets the Gateway's LCD viewing device address. The Gateway is predefined as Device Address 0. Node: Sets the Node's Device Address (hexidecimal 1 to F). Each Node within a network must have a unique Node Device Address.

3 **Push Button 1 -** Single-click to advance across all top-level DX80 menus.

Single-click to move down interactive menus, once a top-level menu is chosen.

4 **Push Button 2 -** Double-click to select a menu and to enter manual scrolling mode. Double-click to move up one level at a time.

5 **LED 1 and 2 -** Provide real-time feedback to the user regarding RF link status, serial communications activity, and the error state.

6 **LCD Display -** Six-character display provides run mode user information. This display allows the user to conduct a Site Survey (RSSI) and modify other DX80 configuration parameters without the use of a PC or other external software interfaces. On the Node, after 15 minutes of inactivity, the LCD goes blank. Press any button to refresh the display.

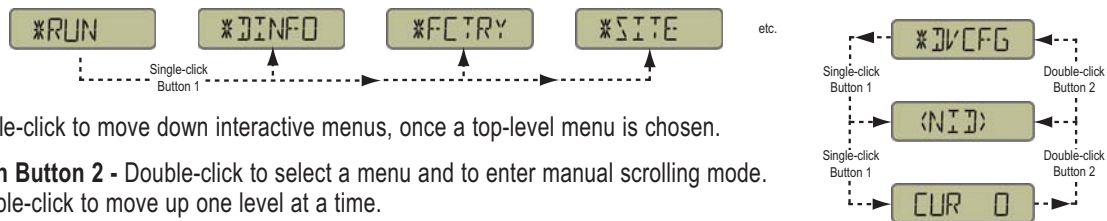**7** **5-Pin M12 Euro-style quick-disconnect serial port**
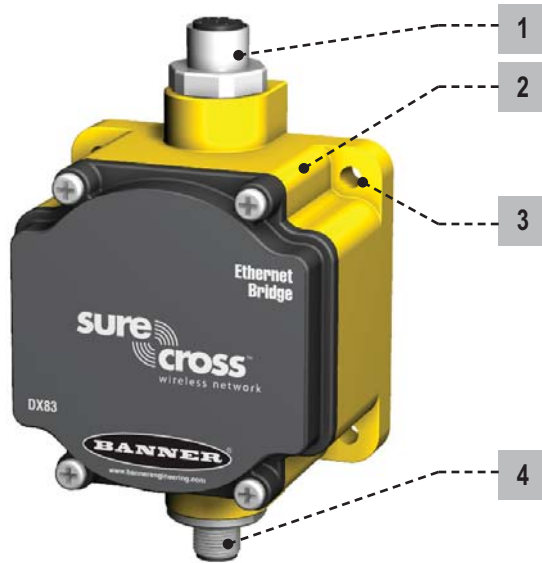
1	**Industrial Ethernet Port, female**
2	**Housing** - The rugged, industrial DX80 housing meets IEC IP67 standards.
3	**Mounting Hole, #10/M5 Clearance** - Mounting Holes accept metric M5 or UNC/UNF #10 hardware -- DIN rail mount adapter bracket available.
4	**5-Pin M12 Euro-style quick-disconnect serial port**

Pinouts

5-pin M12 Euro Hookup

5=Center pin

No.	Color	Description
1	Brown	10 to 30V dc Input
2	White	RS485 / D1 / B /+
3	Blue	dc common
4	Black	RS485 / D0 / A / -
5	Gray	Comms Gnd

NOTE: Terminal block GND = dc common

Industrial Ethernet Hookup

No.	Color	Description
1	White/Orange	+Tx
2	White/Blue	+Rx
3	Orange	-Tx
4	Blue	-Rx
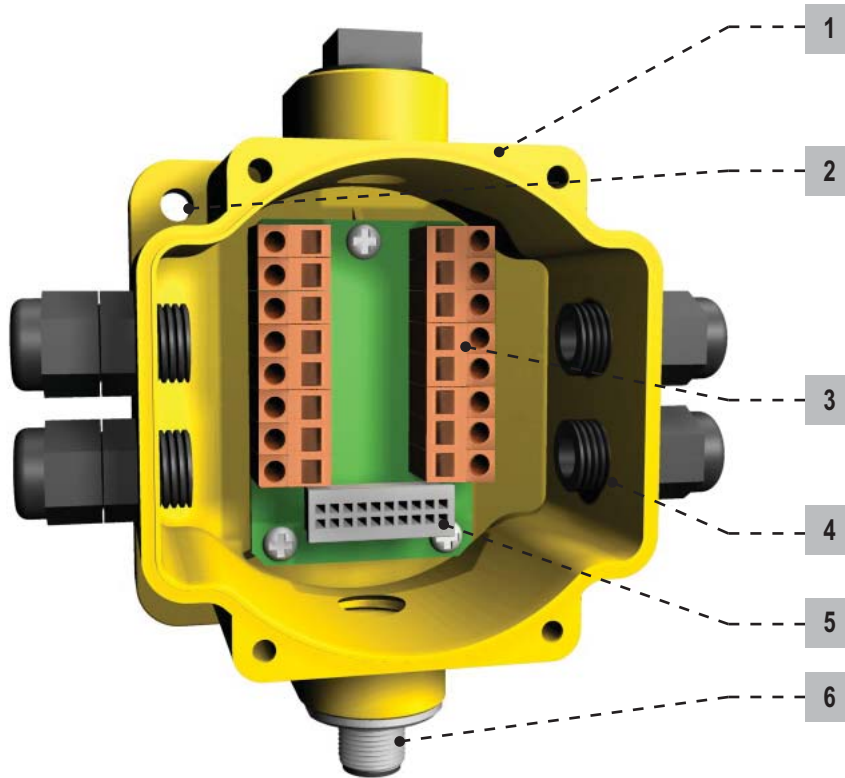
1   **Housing** - The rugged, industrial DX80 housing meets IEC IP67 standards.

2   **Mounting Hole, #10/M5 Clearance** - Mounting Holes accept metric M5 or UNC/UNF #10 hardware -- DIN rail mount adapter bracket available.

3   **Wiring Terminal Strip** - The 16 spring-clip type wiring terminals accept wire sizes: AWG 12-28 or 2.5 mm^2

4   **Port, PG-7 Gland or Blank** - The PG-7 threaded ports can accept provided cable glands or blanks.

5   **Ribbon Connector** - Ribbon cable connects wiring base to LCD/radio.

6   **5-Pin M12 Euro-style quick-disconnect fitting**

The Gateway Pro has no serviceable parts inside the housing and no wiring chamber. During setup or standard operation, there should not be a need to open the Gateway Pro.

65.0 mm
(2.56″)

7.9 mm
(0.31″)

30.65 mm
(1.21″)

19 mm
(0.75″)

80.3 mm
(3.16″)

65.0 mm
(2.56″)

7.65 mm
(0.30″)

22.2 mm
(.875″)

127 mm
(5″)

60 mm
(2.36″)

14.67 mm
(0.578″)

80.8 mm
(3.18″)

120 mm
(4.72″)

65.0 mm
(2.56")

7.9 mm
(0.31")

65.0 mm
(2.56")

80.3 mm
(3.16")

7.65 mm
(0.30")

136mm
(5.35")

60 mm
(2.36")

14.67 mm
(0.578")

80.8 mm
(3.18")
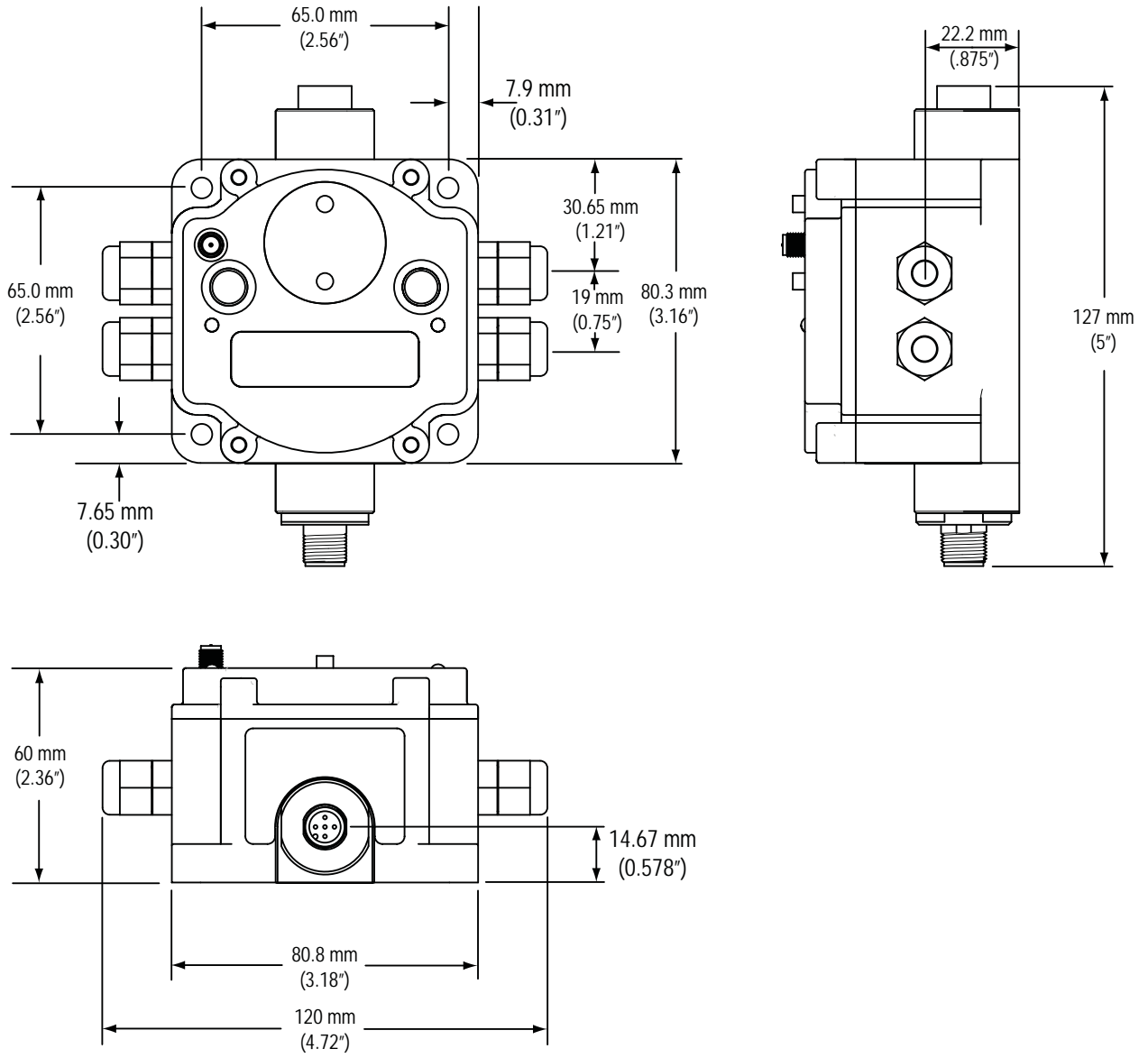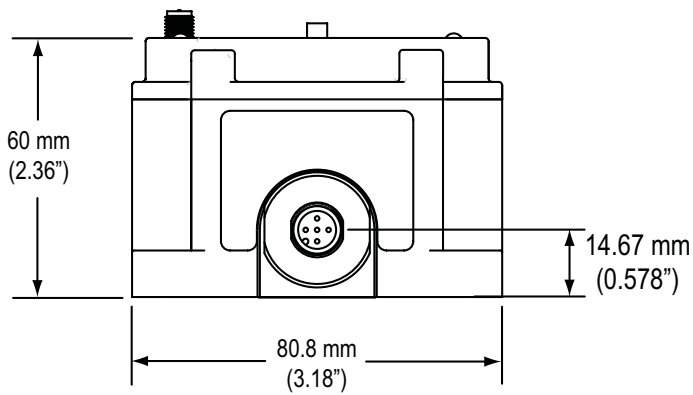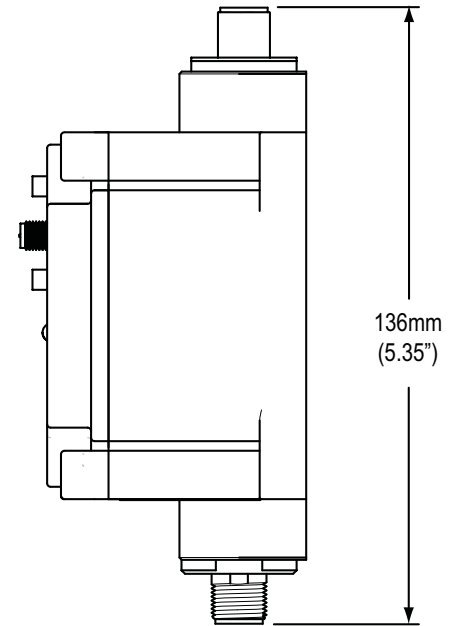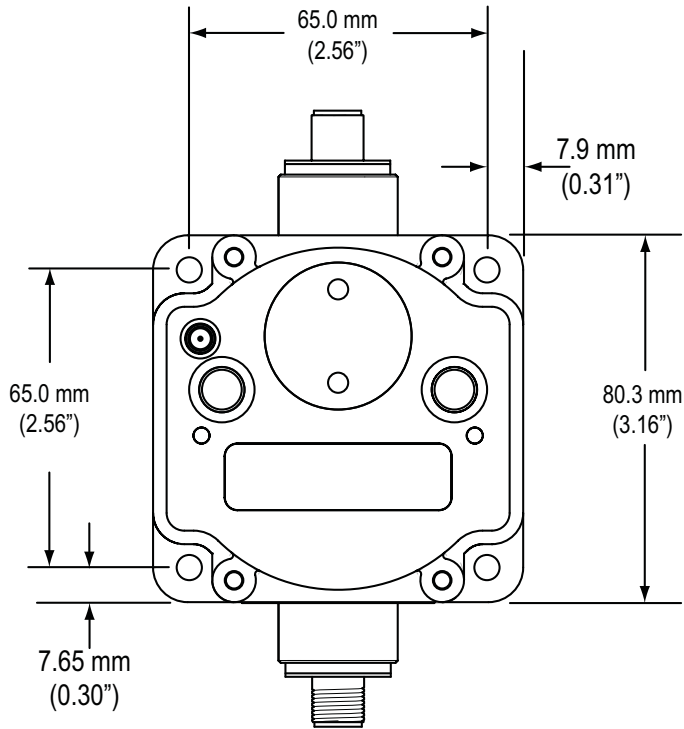
DX83 Ethernet Bridge Dimensions

65.0 mm
(2.56")

7.9 mm
(0.31")

65.0 mm
(2.56")

80.3 mm
(3.16")

136 mm
(5.35")

7.65 mm
(0.30")

60 mm
(2.36")

14.67 mm
(0.578")

80.8 mm
(3.18")
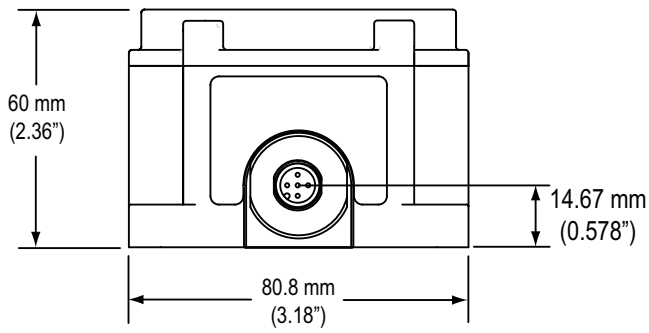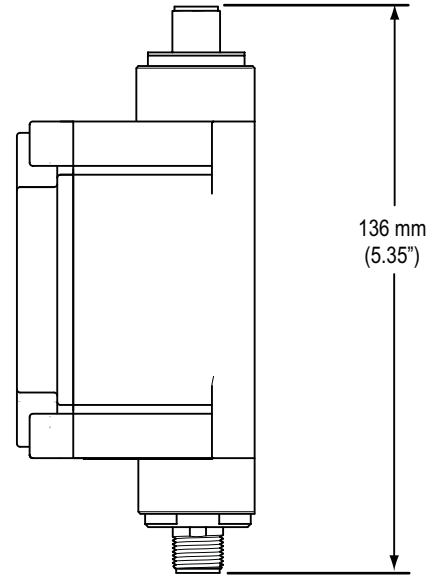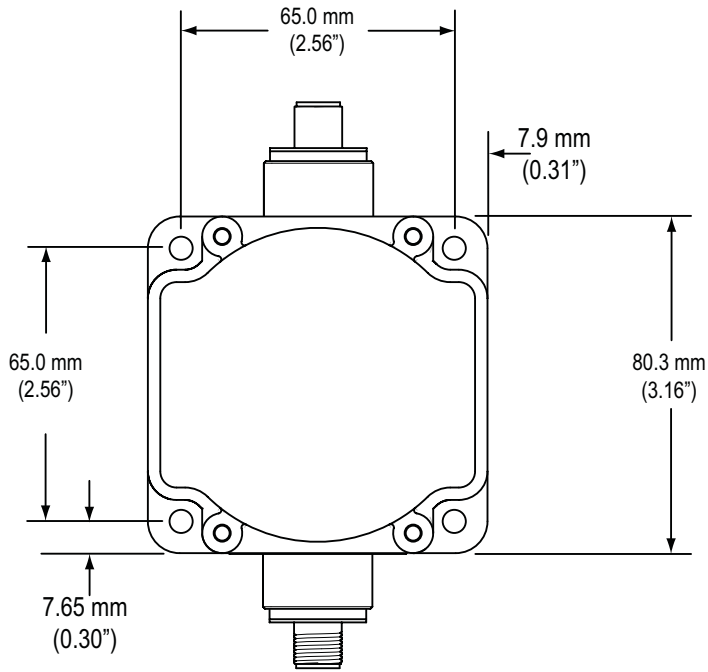
Setup - Wireless Network

DX80 Gateway and Gateway Pro Setup Menu

When power is applied, the DX80 begins running. The display screen auto loops through the *RUN menu and communication begins between the Gateway and Node(s). Auto looping through the *RUN menu is the normal operating mode for all devices on the wireless network.

From the *RUN Menu (or any menu), single-click button 1 to advance through the top-level menus. The device auto display loops through the menu options if either of the *RUN, *DINFO, or *FCTRY menus are selected. If the device is paused on the *SITE, *DVCFG, or *DERR menu options, the display does not auto display loop.

To enter manual scrolling mode, double-click button 2 at the top level menu. Use the instructions shown in the chart below to navigate the menu system. To return to the top level menus and auto display loop mode, double-click button 2 twice.***

** The Network ID (NID) can be set at any time from the left rotary switches. Once changed, allow five seconds for the devices to update to the new NID.

*** At any point in the menu system, double-clicking Button 2 twice returns to the top level menu.

Navigating the menu:
  * indicates a top level menu option
  ( ) indicates a sub-menu item
  No characters indicate the value of the previous item

DX80 Node Setup Menus

When power is applied, the DX80 begins running. The display screen auto loops through the *RUN menu and communication begins between the Gateway and Node(s). Auto looping through the *RUN menu is the normal operating mode for all devices on the wireless network.

From the *RUN Menu (or any menu), single-click button 1 to advance through the top-level menus. The device auto display loops through the menu options if either of the *RUN, *DINFO, or *FCTRY menus are selected. If the device is paused on the *SITE, *DVCFG, or *DERR menu options, the display does not auto display loop.

To enter manual scrolling mode, double-click button 2 at the top level menu. Use the instructions shown in the chart below to navigate the menu system. To return to the top level menus and auto display loop mode, double-click button 2 twice.***

** The Network ID (NID) and Node Address (NADR) can be set at any time from the rotary switches. The left rotary switch sets the Network ID and the right rotary switch sets the Node Address.

*** At any point in the menu system, double-clicking Button 2 twice returns to the top level menu.

Navigating the menu:
  * indicates a top level menu option
  ( ) indicates a sub-menu item
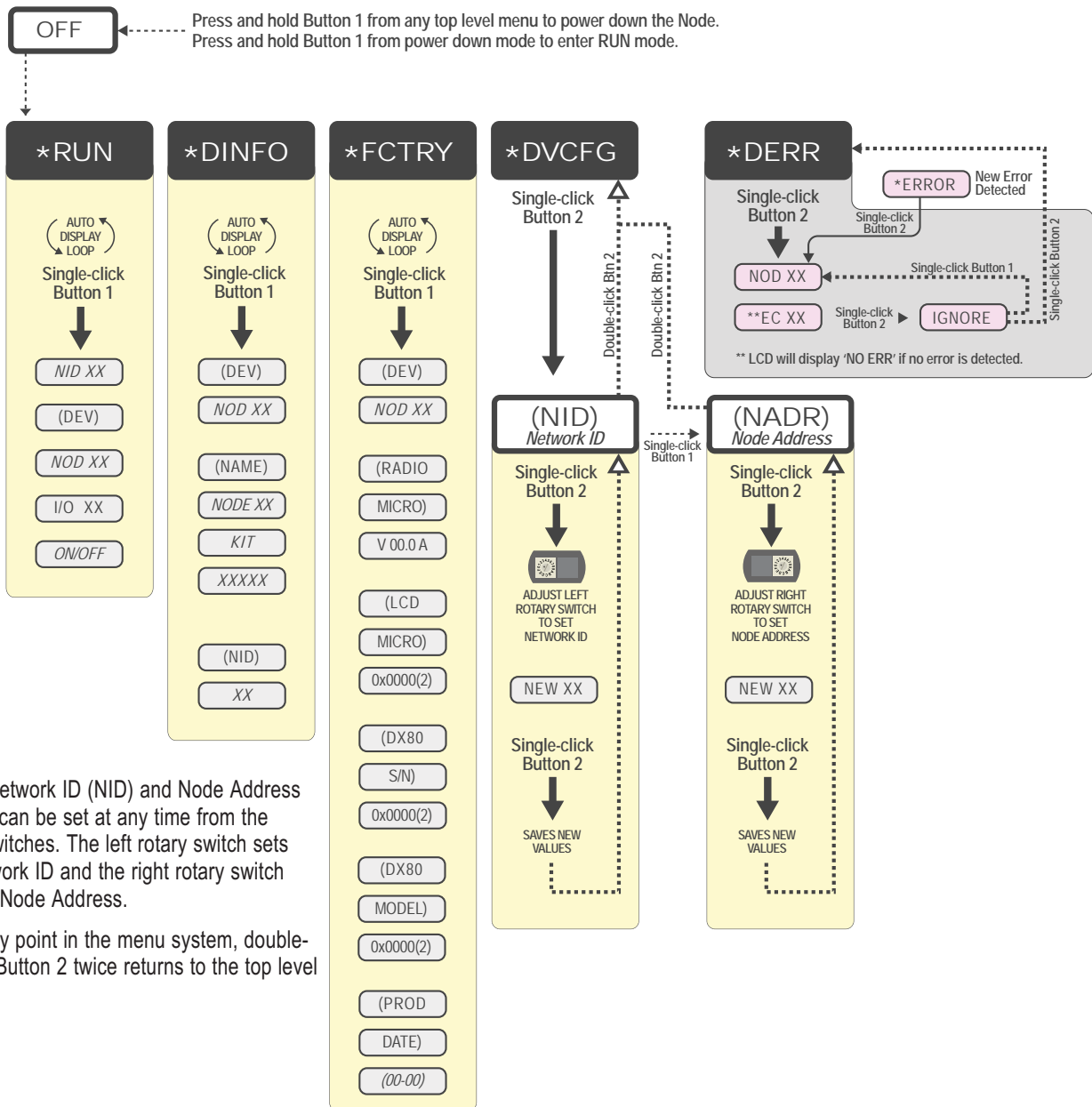 No characters indicate the value of the previous item

Node LCD Timeout: After 15 minutes of inactivity, the LCD screen stops displaying information. Press any button to refresh the display if the Node has entered this energy-saving mode.

Step 1 - Set up the Network ID and Device Address

The wireless RF network is defined by the Network ID (NID) assigned to the Gateway and its Nodes. Each device within this common network must have a unique Device Address assigned.

For factory configured kits, the Network ID and Device Addresses have been assigned. Otherwise, use the Rotary Switches (shown right) to define both the NID and Device Address for each device. Follow the steps below to set up your DX80 network.

Network ID (NID)   **Device Address**

Rotary Switches on Gateway and Node

	User Action	Display / Status	Notes
Set Network ID	Remove rotary switch access covers.		Turn counterclockwise to remove and clockwise to tighten
	On the Gateway, set the left rotary switch to 1.		The factory default NID setting on all devices is 1. Set to another Network ID when operating more than one network in the same area.
	On all Nodes (within the same network), set the left rotary switch to 1.		Assign the same NID to all devices within a single network (hexidecimal 0-F).
Set Device Address	On the Gateway, set the right rotary switch to 0.		A device address of 0 on the Gateway displays settings for the Gateway itself. To view settings for another device on the network, adjust the right rotary switch on the Gateway to the desired device address.
	On the first Node (device address = 1), set the right rotary switch to 1.		
	On the second Node (device address = 2), set the right rotary switch to 2.		Do not change the Device ID for preconfigured kits as this would affect the factory mapping of the I/O.
	Continue setting the device address for each additional Node using a unique number (...3,4,5).		
	Install rotary switch access covers. Please refer to the *Installation* section for IP67 instructions.		A successful RF link is identified by a blinking green LED 1 on each node.

Multiple Networks

When more than one network is operating in the same space, assign a unique Network ID (NID) to each network (shown right).
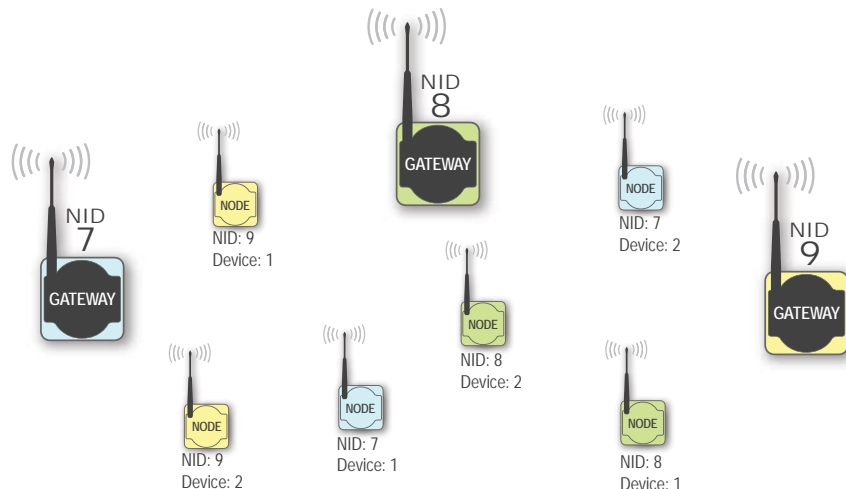
Step 2 - Powering the Devices

To apply power to the **Gateway** or **Gateway Pro**, connect the 10-30V dc cable as shown.

Gateway Pinout Diagram

Wire No.	Color	Description
1	Brown	10-30V dc Input
2	White	RS485 / D1 / B /+
3	Blue	dc common
4	Black	RS485 / D0 / A / -
5	Gray	Comms Gnd

On the Gateway, the other pins are used for RS485 communications

User Action	Display / Status	Notes
Apply power...	POWER	This reading occurs only when power is applied to the Gateway or Gateway Pro.
The LCD display shows the current I/O status of the Gateway.	*RUN	The Gateway and Gateway Pro start in *RUN mode.
	NID 1	Displays current Network ID (NID)
	(DEV)	Device is ...
	GATEWY	... Gateway (Device Address = 0)
	I/O 9 / OFF	Gateway: Indicates the current status of the I/O. The display cycles through each I/O point of the device, then returns to *RUN. Gateway Pro: The Gateway Pro has no I/O points.

To apply power to the **Node**, connect the 10-30V dc cable or DX81 Battery Module as shown.

Line Powered Node Pinout Diagram

Wire No.	Color	Description
1	Brown	10-30V dc Input
3	Blue	dc common

Note: Terminal block GND = dc common

User Action	Display / Status	Notes
Apply power...	POWER	This reading occurs only when power is applied to the Node.
The LCD display shows the current I/O status of the Node.	*RUN	The Node starts in *RUN mode.
	NID 1	Displays current Network ID (NID)
	(DEV)	Device is ...
	NOD 1	... Node 1 (Node Address = 1)
	I/O 1 / OFF	Indicates the current status of the I/O. The display cycles through each I/O point of the device, then returns to *RUN.

Hookup the DX80 Gateway and DX83 Ethernet Bridge using a splitter cable as shown.

Power

Ethernet cable

DX80 Gateway

DX83 Ethernet Bridge
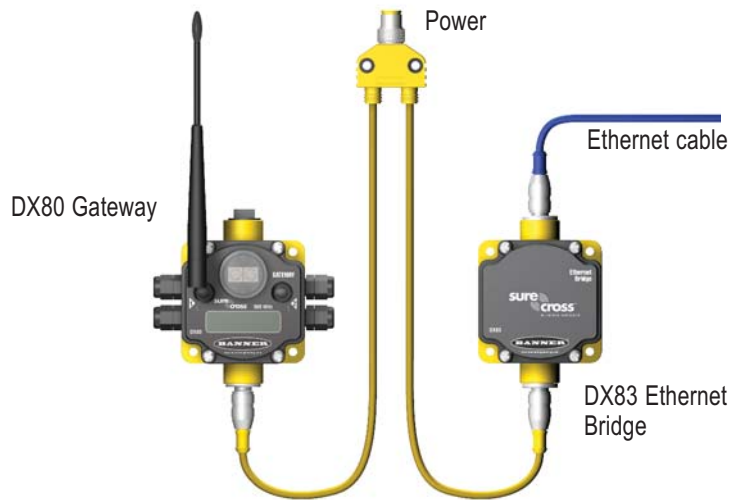
Step 3 - Verify Communications, Gateway and Node

Gateway or Gateway Pro

Verify LED 1 is on and green. The image shown is a Gateway. The Gateway Pro has no side glands.

Status	LED 1	LED 2
Power ON	● Green ON	—
System Error	Red Flash	Red Flash
Modbus Communication Active	—	Yellow Flash
Modbus Communication Error	—	Red Flash

Gateway and Bridge system: Active Modbus communications refers to the communication between the Gateway and the Ethernet Bridge

Gateway Pro system: Modbus communication LED refers to the communication internal to the Gateway Pro.

Gateway only system: Modbus communication LED refers to the communication between the Gateway and the host system.

Node

Verify LED 1 is flashing green and LED 2 is off. Until communication is established with the Gateway, the Node's LED 2 flashes red. When communication is established, the Node's LED 1 flashes green.

Status	LED 1	LED 2
System Error	Red Flash	Red Flash (1 per sec)
RF Link Ok	Green Flash (1 per sec)	—
RF Link Loss	—	Red Flash (1 per 3 sec)

If testing the Gateway or Gateway Pro and Node before installation, verify the Gateway device and Node are at least two meters apart or the communications may fail.

Step 4 - Site Survey

Running Site Survey is optional. Site Survey analyzes the radio signal between a Gateway (or Gateway Pro) and a specified Node, reporting the number of data packets missed or received. To ensure reliable communication, perform the Site Survey before permanently installing your network. Only the Gateway can perform a Site Survey analysis.

For more information on Site Survey and how to interpret the results, please refer to the Site Survey reference guide, Banner document p/n 133602.

	User Action	Display / Status	Notes
Site Survey Menu	Remove Gateway's rotary switch access cover.		
	To check the status of Node 1, change the Gateway's right rotary switch setting to 1	NOD 1	The Gateway is now enabled to read the status of Node 1; the display scrolls through the Node's I/O status.
	Single-click Gateway push button 1	✳DINFO	Device Information menu
	Single-click Gateway push button 1	✳FCTRY	Factory Settings menu
	Single-click Gateway push button 1	✳SITE	Site Survey menu
	Single-click Gateway push button 2	NOD 1	Site Survey will be conducted with Node 1

Survey Readings	Single-click Gateway push button 2	1M 16	The Gateway analyzes the quality of the signal from the selected Node by counting the number of data packets it receives from the Node.
			    M = Percentage of missed packets
			    R = RED marginal signal strength
			    Y = YELLOW good signal strength
			    G = GREEN excellent signal strength
			When possible, install all devices in positions that optimize the percentage of YELLOW and GREEN data packets received.

	Examine reception readings (M,R,Y,G) of the Gateway at various locations. Note that the numbers displayed are a percentage. M displays the percent of missed packets while R, Y, and G display the percent of received packets at specific signal strengths.	1R 0 1Y 0 1G 84	
	Double-click Gateway push button 2	NOD 1	End Site Survey
Return to Run Mode	Change right rotary switch back to 0 (Gateway)	NOD 0	Change the device readings back to the Gateway
	Double-click Gateway push button 2	✳SITE	Move back to the top level menu
	Single-click Gateway push button 1	✳DVCFG	Return to RUN mode
	Single-click Gateway push button 1	✳DERR	
	Single-click Gateway push button 1	✳RUN	
	Install Gateway rotary switch access cover.		Refer to the installation instructions to create an IP67 seal.

Setup - Ethernet Communications

System Layout

The DX80 wireless systems are configured using an Ethernet network connection and a common Web page browser. An Ethernet connection can be established from a DX80 Gateway Pro device or a DX83 Ethernet Bridge device serially connected to the DX80 Gateway.

The Ethernet Bridge and Gateway Pro ship with an Ethernet cable. One end of the cable is a RJ45 connecter and the other end is an industrial Ethernet connector. This cable is designed to be connected to a switch or a hub. To connect directly to a computer, use a crossover cable. The crossover cable can be ordered as an additional accessory. For a list of the accessories, please refer to the *Accessories and Replacements* parts section.

For more examples of system layouts, please refer to *DX80 System Layouts*, Banner document p/n 133601.
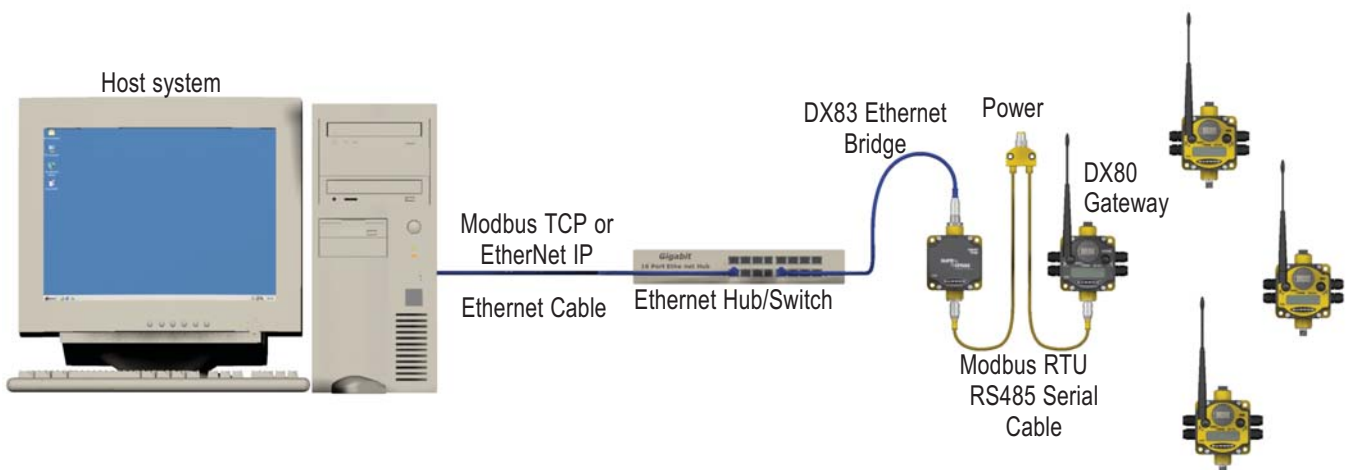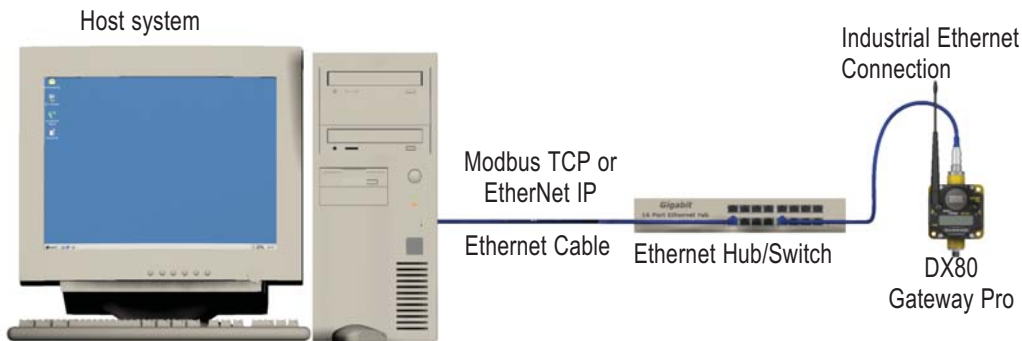
Web Page Access

Browser settings

The Web pages are served from the DX83 Ethernet Bridge or DX80 Gateway Pro device. Internet browsers such as Internet Explorer, Netscape Navigator, or Mozilla Firefox can access the Web pages.

Set up the browser for a direct connection to the Internet. If you are experiencing problems connecting, verify the browser is not set to use a proxy server (see Appendix A for proxy settings.) Note also that a crossover Ethernet cable is required when connecting directly from a host computer to the DX83 Ethernet Bridge or DX80 Gateway Pro.

Network Setup

Default IP address / Host Network Settings:

The factory default IP address for the DX83 Ethernet Bridge or DX80 Gateway Pro devices is:

192.168.0.1

To change the default IP address, set up the host PC with an IP address different from the Ethernet Bridge or Gateway Pro IP addresses.* For example, change the PC host IP address to:

Host IP address: 192.168.0.2

Open a Web browser and log into the Ethernet Bridge or Gateway Pro by typing the IP address in the browser location window.

http://192.168.0.1
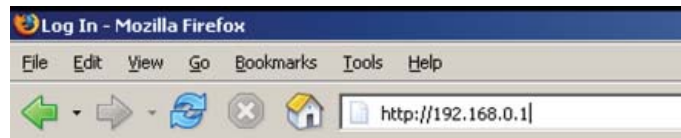
The Web home page for the Ethernet Bridge or Gateway Pro displays. To log in, click on any tab at the top of the page.

Enter the following as the user name and password.

User name: system
Password: admin

* Please refer to Banner document 133116 for detailed instructions on setting up the host computer's network IP address.

Changing the IP address

Once logged into the system, use the page tabs at the top of the page to select the hierarchical path: SYSTEM > SETUP > NETWORK. To change the IP address, type in the new IP address and click the **Change IP** button. The IP address change activates when the Ethernet Bridge or Gateway Pro device reboots (power off, power on.)

IMPORTANT: Verify the new IP address is correct before cycling power to the device. Once the IP address is changed, you must enter in the new IP address to access the Web page-based configuration screens. Write down the new IP address (and any other changed parameters on this screen) or print this page and file for your record.

Communication Protocol

By default the Ethernet Bridge and Gateway Pro systems communicate using Modbus/TCP, but the system can also use EtherNet/IP™. To change the system to EtherNet/IP, log in using the following user name and password:

> **User name: root**
> **Password: sxi**

At the bottom of the SYSTEM > SETUP > NETWORK page is a checkbox to enable EtherNet/IP. Only check this box if the Gateway Pro system is running on an EtherNet/IP network. This change cannot be enabled from a login other than the "root" login.

After checking the **EtherNet/IP Enabled** box, click the **Set Ports** button to save any changes made to the **HTTP Port**, **Modbus Server Port**, **Telnet Port**, and **EtherNet/IP Enabled** box.

As with the IP address change, cycle power to the Ethernet Bridge or Gateway Pro to complete this update. After the device powers up, the changes should be registered.

Installation

Ideal Mounting Conditions

Avoid Direct Sunlight

To minimize the damaging effects of ultra-violet radiation, avoid mounting any SureCross™ device facing intense direct sunlight.

- Mount within a protective enclosure,
- Mount under an overhang or other source of shade,
- Install indoors, or
- Face the devices north when installing outside.

Avoid Collecting Rain

When possible, mount the devices where rain or snow will drain away from the device.

- Mount vertically so that precipitation, dust, and dirt do not accumulate on permeable surfaces.
- Avoid mounting the devices on flat or concave surfaces, especially if the display will be pointing up.

Reduce Chemical Exposure

Before installing any SureCross™ devices in a chemically harsh environment, contact Banner for more information regarding the life-expectancy. Solvents, oxidizing agents, and other chemicals will damage the devices.

Minimize Mechanical Stress

While the SureCross devices are very durable, they are sophisticated electronic devices that are sensitive to shock and excessive loading.

- Avoid mounting the devices to an object that may be shifting or vibrating excessively. High levels of static force or acceleration may damage the housing or electronic components.
- Do not subject the devices to external loads. Do not step on them or use them as handgrips.
- Do not allow long lengths of cable to hang from the DX80 glands on the Gateway or Node. Cabling heavier than 100 grams should be supported instead of allowed to hang from the DX80 housing.

Avoid direct sunlight
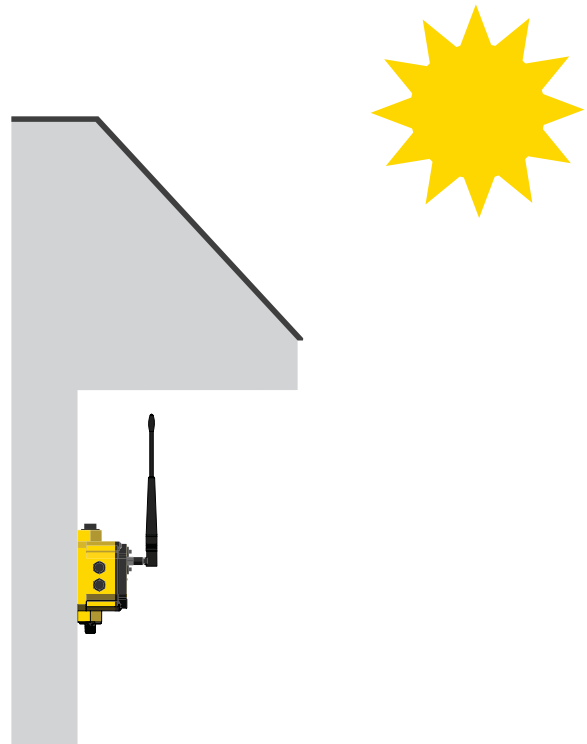
Watertight Glands and Plugs

If the Gateway or Node is mounted outdoors or will be exposed to moisture, dirt, or dust, follow these steps to weatherproof the units.

Watertight Glands

To make the glands watertight:

1. Wrap four to eight passes of polytetrafluoroethylene (PTFE) tape around the threads as close as possible to the hexagonal body of the gland.

2. Manually thread the gland into the housing hole. Never apply more than 10 in-lbf of torque to the gland or its cable clamp nut.

Note, these instructions apply both to the PG-7 glands and the 1/2" NPT gland.

Rotary Switch Access Cover

Check the rotary switch access cover o-ring every time the access cover is removed. Replace the o-ring when it is damaged, discolored, or showing signs of wear. The o-ring should be:

- Seated firmly against the threads without stretching to fit or without bulging loosely, and

- Pushed against the flanged cover.

When removing or closing the rotary switch access cover, manually twist the cover into position. Do not allow cross-threading between the cover and the DX80 face.

Once the cover is in place and manually tightened, use a small screwdriver (no longer than five inches total length) as a lever to apply enough torque to bring the rotary switch access cover even with the DX80 cover surface.

Watertight 1/2" NPT Plug

Seal the 1/2" NPT port if it is not used. To install a watertight NPT plug:

1. Wrap 12 to 16 passes of PTFE tape evenly across the length of the threads.

2. Manually thread the plug into the housing port until reaching some resistance.

3. Using a 9/16" crescent wrench, turn the plug until all the plug's threads are engaged by the housing port.

Watertight PG-7 Plug

Seal any unused PG-7 access holes with one of the supplied black plastic plugs. To install a watertight PG-7 plug:

1. Wrap four to eight passes of PTFE tape around the plug's threads, as close as possible to the flanged surface.

2. Carefully thread the plastic plug into the vacant hole in the DX80 housing and tighten using a slotting screwdriver. Never apply more than 10 in-lbf torque to the plastic plug.

Clear Communication Paths

Wireless communication is hindered by radio interference and obstructions in the path between the transmitter and receiver.

To achieve the best radio performance, carefully consider the installation locations for the Gateways and Nodes.

For more information about antennas, please refer to the Antenna Basics reference guide, Banner document p/n 132113.

A clear path increases separation range and performance
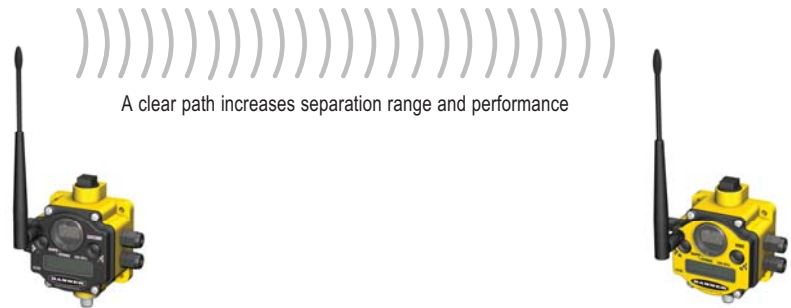
Increase Height of DX80 Units

Position the external antenna vertically for optimal RF communication. If necessary, consider changing the height of the DX80 to improve reception.

Position the DX80 higher for better performance.
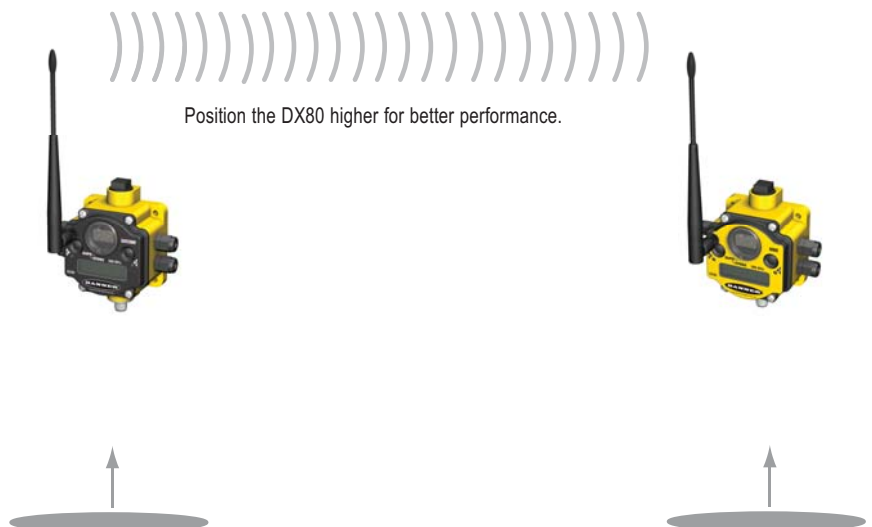
Maintenance and Repairs

Main Body Gasket

Check the main body gasket every time a SureCross™ device is opened. Replace the gasket when it is damaged, discolored, or showing signs of wear. The gasket must be:

- Fully seated within its channel along the full length of the perimeter, and

- Positioned straight within the channel with no twisting, stress, or stretching.

Rotary Switch Access Cover O-Ring

Check the rotary switch access cover o-ring every time the access cover is removed from the Gateway, Gateway Pro, or Node. Replace the o-ring when it is damaged, discolored, or showing signs of wear. The o-ring should be:

- Seated firmly against the threads without stretching to fit or without bulging loosely, and

- Pushed against the flanged cover.

When removing or closing the rotary switch access cover, manually twist the cover into position. Do not allow cross-threading between the cover and the DX80 face.

Once the cover is in place and manually tightened, use a small screwdriver (no longer than five inches total length) as a lever to apply enough torque to bring the rotary switch access cover even with the DX80 cover surface.

Replacing O-Rings

Please refer to replacement parts listed in the *Accessories and Replacement Parts* section and contact Banner Engineering with any questions.

Main Body Gasket (Gateway shown)

Rotary Access O-Ring (Gateway shown)

Battery Replacement

To replace the lithum "D" cell battery in the DX81 *Flex*Power™ battery kit used with a *Flex*Power Node,

1. Remove the four screws mounting the battery pack face plate to the body.

2. Remove the face plate.

3. Remove the discharged battery and replace with a new battery. Verify the battery's positive and negative terminals align to the positive and negative terminals of the battery holder mounted within the case.

4. After replacing the battery, allow up to 60 seconds for the device to power up.

When removing the battery, press the battery towards the negative terminal to compress the spring. Pry up on the battery's positive end to remove from the battery holder.

Properly dispose of your used battery by taking it to a hazardous waste collection site, an e-waste disposal center, or any other facility qualified to accept lithium batteries.

As with all batteries, these are a fire, explosion, and severe burn hazard. Do not burn or expose them to high temperatures. Do not recharge, crush, disassemble, or expose the contents to water.

Troubleshooting - Wireless

RF Link Time-Out and Recovery - Gateway and Node

The SureCross™ DX80 wireless devices employ a deterministic link time-out method to address RF link interruption or failure. As soon as a specific Node/Gateway RF link fails, all pertinent wired outputs are de-energized until the link is recovered (see component data sheet for more information.) Through this process, users of Banner wireless networks can be assured that disruptions in the communications link result in predictable system behavior.

The link time-out feature uses a fully-acknowledged polling method to determine the RF link status of each Node on the network. If after a specified number of sequential polling cycles the Node does not acknowledge a message, the Gateway considers the link with that Node timed out. LCD displays on both the Node and Gateway show *ERROR. Following a time-out, the Node de-energizes outputs and the Gateway sets all outputs linked to the Node in question to a de-energized state. Inputs from the Node mapped to outputs on the Gateway are suspended during a link time-out.

Once a link has failed, the Gateway must receive a specified number of good RF communications packets from the Node in question before the link is reinstated. Outputs are restored to current values when the link is recovered.
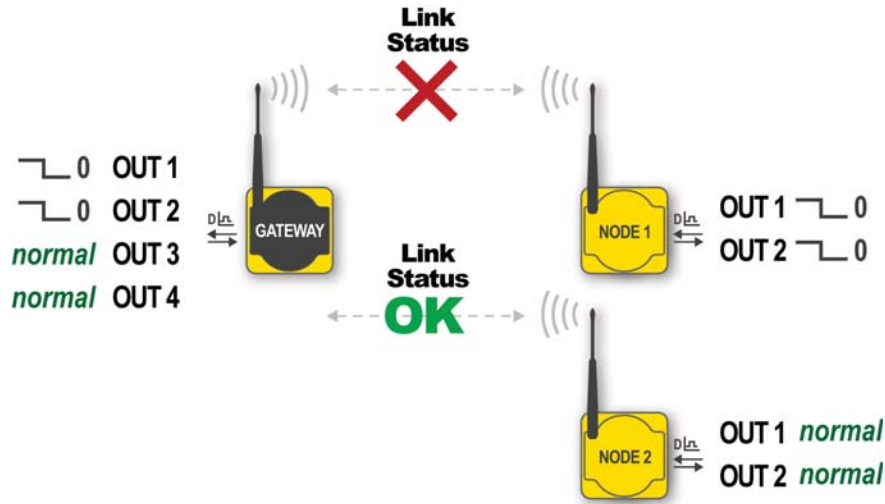
Link between Gateway and Node 1 timed out.
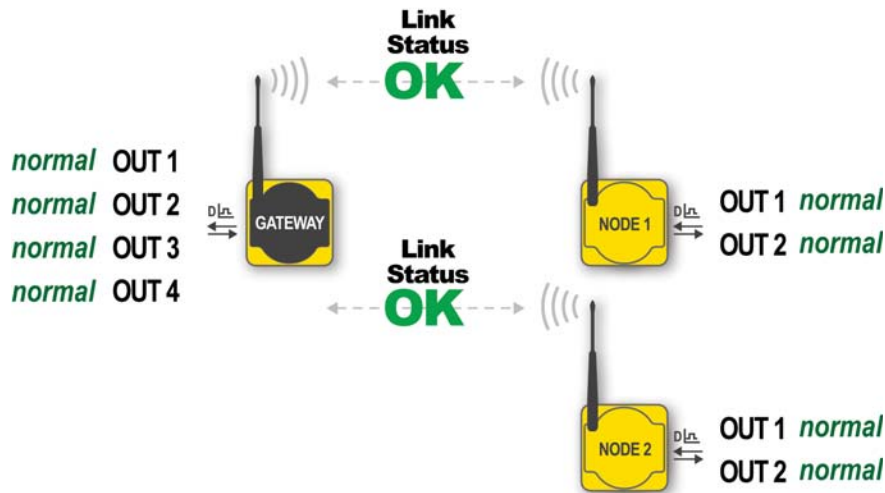
Link between Gateway and Node 1 recovered.

RF Link Time-Out and Recovery - Host-Connected Systems

In a host-connected DX80 system, a link time-out results in an error code (53 or 0x35xx) placed in the Node-specific DEVICE MESSAGE Modbus register (Node 1 = Register 24, Node 2 = Register 40, etc.).

Before the RF link is reinstated, the host must send a control message to clear the device error message. Any Node output registers will be re-populated by the latest Gateway register map.
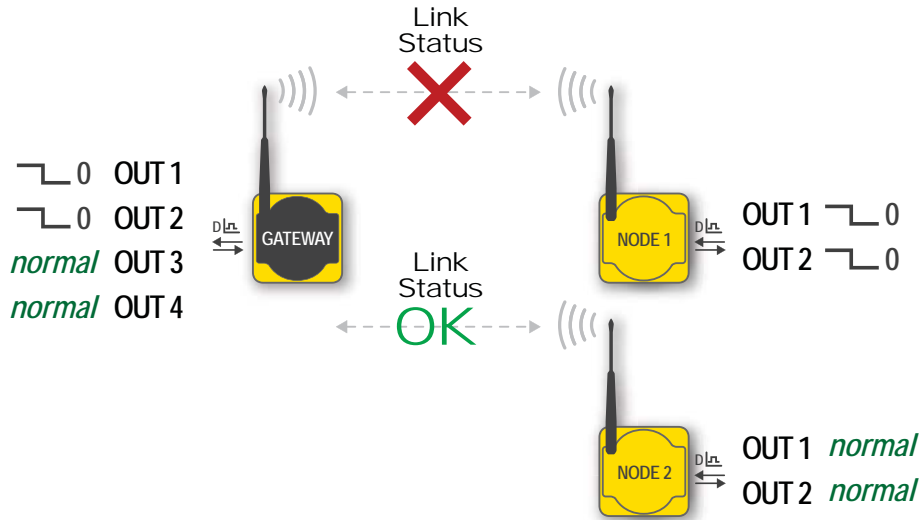
Link between Gateway and Node 1 timed out.
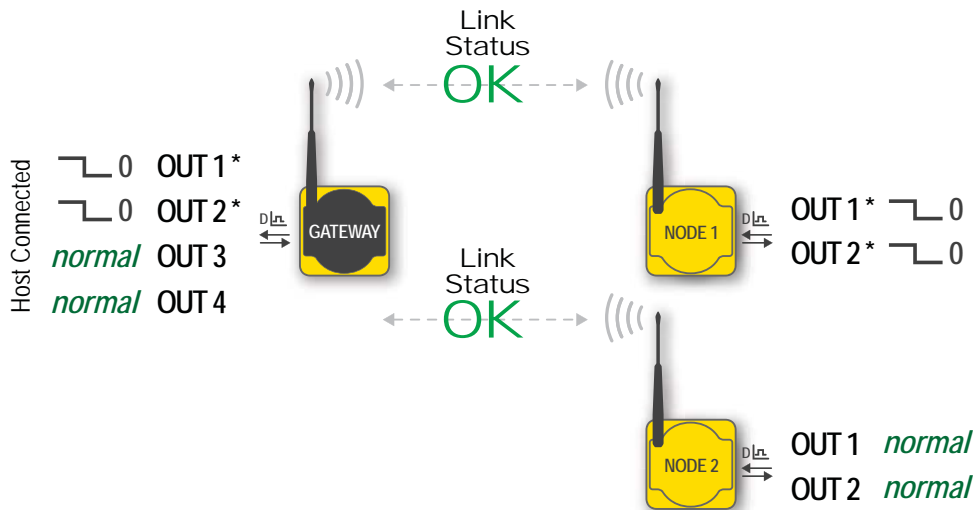
Link between Gateway and Node 1 recovered.
It is the host's responsibility to handle Node device error messages. This results in outputs being reinstated.

A wireless network is hindered by radio interference and by obstructions in the path between the transmitter and receiver. To achieve the best radio performance possible, carefully consider the installation locations for the Gateways and Nodes. The need for a clear path increases as the transmission distance increases. Use Site Survey (RSSI) to confirm signal quality before permanently installing the devices.

Problem	Possible Solutions
Modbus Error Codes	
Message Code: 00 Data Field: 128	Normal operation.
Message Code: 01 Data Field: *Message*	Unknown message. The message was received correctly (correct checksum), but it is not a recognized command.
Message Code: 53	RF device timeout. A Node is not responding. The defined polling interval with allowable missed count was reached.
Message Code: 54	Modbus timeout. A Gateway timeout (time of inactivity on the serial channel) was detected.
Message Code: 254	Modbus register 8 device messages are disabled. The Modbus register 8 clears or disables message using the Gateway's Modbus register 15.
LCD Messages	
BAD EE	System Error. A system error typically represents a failure of the EE PROM. Contact the factory for replacement.
EC *XX*	The *XX* lists the Modbus register 8 message code listed in the Modbus Error Codes section of this table.
DX80 Display shows *ERROR	The Gateway uses fully-acknowledged polling to ensure each Node RF link is robust. If a prescribed number of sequential polling cycles are not acknowledged by a Node, the Gateway considers the radio link with that Node to be timed out. All outputs on the Node in question are set to "OFF" (discrete) or "0" (analog, regardless of type). If the Node's RF link recovers and the Gateway or Gateway Pro determines enough acknowledged polling messages have accumulated, the link is reinstated and outputs are restored to the current values.
No LCD display	All DX80 devices display "POWER" on the LCD for the first five to ten seconds after applying power. A DX80 Gateway always has a green LED 1 on when power is connected. DX80 Node devices flash a red LED 2 every three seconds or a green LED 1 every second depending on the RF Link status. Battery-powered devices turn off the LCD after fifteen minutes (factory default). Push any button to reactivate the LCD. Battery-powered devices may be in power-down mode. To put battery powered devices into power-down mode, hold button 1 for three to five seconds. To return from power-down mode, hold button 1 for three to five seconds. Recheck the power connections and power requirements. Line-powered devices require 10 to 30V dc. Battery-powered devices require 3.6 to 5.5V dc. After replacing the battery, allow up to sixty seconds for the device to power up.
LEDs	
LEDs both flash red and LCD displays BAD EE	System Error. A system error typically represents a failure of the EE PROM. Contact the factory for replacement.
Gateway or Gateway Pro LED 2 flashes red	Gateway system: A Modbus communications error indicates a bad transmission or checksum error between the host and the Gateway device. Gateway Pro system: A Modbus communications error indicates a communications problem internal to the Gateway Pro. Gateway and Ethernet Bridge system: A Modbus communication error indicates a communication problem between the Gateway and the Ethernet Bridge. The default communications settings for the RS485 port are: 1 start bit, 8 data bits, no parity, 1 stop bit, and 19.2k baud. The DX80 Gateway uses Modbus RTU protocol for all communications. Supported Modbus function codes are 3, 6, and 16. Verify the DX80 model supports RS485 serial communications. RS485 termination or biasing is not supplied on the Gateway and should be provided externally to the DX80. (Termination is not required by the Gateway, proper biasing of the serial lines is required.) Bad connection or bad cable.

Problem	Possible Solutions
Node LED 2 flashes red (no sync / link loss)	There are two settings on every Node device used to synchronize to the Gateway device: 1) The Network ID on the Node must match the Gateway Network ID. (1-99) 2) Each Node ID within that network must be set to a unique number (1-99). If the Gateway and Node are less than two meters apart, device communication may fail (radios may saturate). The Gateway and Node may be too far apart to achieve synchronization – consult the factory for options. Use a qualified antenna on both the Gateway and Node devices. After any system parameter change, cycle the power to re-synchronize all devices. When a Node loses synchronization, it is programmed to attempt re-synchronization for five seconds, then sleep for fifteen seconds. Synchronizing may require up to twenty seconds. Re-cycle power on the Gateway and Node devices.
Gateway Pro LED 2 is not blinking yellow	The Gateway Pro's LED 2 should always be blinking yellow to indicate Modbus communication. If the LED 2 does not blink yellow, verify the baud rates, slave IDs, parity, and stop bits are set correctly. Check the cables connecting the Gateway Pro to the host device.
No LEDs	All DX80 devices display "POWER" on the LCD for the first five to ten seconds after applying power. A DX80 Gateway always has a green LED 1 on when power is connected. DX80 Node devices flash a red LED 2 every three seconds or a green LED 1 every second depending on the RF Link status. Put battery powered devices into power-down mode using button 1 on the front panel. To put a battery device into power-down mode, hold button 1 for three to five seconds. To return from power-down mode, hold button 1 for three to five seconds. Recheck the power connections and power requirements. Line powered devices require 10 to 30V dc. Battery-powered devices require 3.6 to 5.5V dc. After replacing the battery, allow up to sixty seconds for the device to power up. The Gateway Pro cannot be attached to another Modbus master device or a Modbus slave ID 1 via RS485. Special configuration using the Web page configuration tool allows the Gateway Pro to become a slave unit when necessary.
DX80 FlexPower Node using switched supply outputs	
The sensor powered from the Node's switched supplies does not get power.	There are several switched power outputs to power sensors (battery-powered devices only). Enable the power supplies using the I/O point parameters for sensor supply #, supply output voltage, and warm-up time.
Site survey (RSSI) returns > 30 MISSED packets	
Marginal Site Survey (RSSI) results	If the distance between devices is greater than about 5,000 meters (3 miles) line-of-sight, objects such as trees or man-made obstructions interfere with the path, and the MISSED packet count exceeds 30 per 100 packets, consider the following steps: 1. Raise the DX80 units to a higher elevation – either by physically moving the devices or installing the antenna(s) remotely at a higher position. 2. Use high-gain antenna(s) such as Yagi and/or Omni (see *Accessories*). 3. Decrease the distance between devices.

Problem	Possible Solutions
DX80 Gateway will not talk with the host system	
No communications with the DX80 Gateway using RS485	The default communications settings for the RS485 port are: 1 start bit, 8 data bits, no parity, 1 stop bit, and 19.2k baud. The DX80 Gateway uses Modbus RTU protocol for all communications. Supported Modbus function codes are 3, 6, and 16.
	Verify the DX80 model supports RS485 serial communications.
	Verify the Slave ID address is set for the bus environment. Factory default Slave ID = 1.
	The factory default for the Modbus timeout is set to zero (disabled). Verify the time is set correctly.
	RS485 termination or biasing is not supplied on the Gateway and should be provided externally to the Gateway. (Termination is not required by the Gateway, proper biasing of the serial lines is required.)
No communications with the DX80 Gateway using the DX83 Ethernet Bridge	Load a properly configured XML file into the DX83 Ethernet Bridge.
	The DX83 Ethernet Bridge can be jumpered for RS485 or RS232 communications; verify the jumpers are set properly. All DX80 devices are RS485 based. Please refer to the *Jumper Configuration* section.
I/O Functionality	
Particular inputs and/or outputs are not working	Use manual scrolling mode within *RUN to freeze the I/O status on the LCD display for the device in question. Verify that when the input device changes state or changes value, the LCD mirrors the behavior.
	Also verify that the LCD on the output side mirrors the linked input's behavior. If the input device state LCD on the origination DX80 and the LCD on the destination DX80 behave the same, there may be a wiring issue or an interfacing problem. Consult the factory.
Web Page Configuration	
No Web page access	The IP address is wrong. The device defaults to 192.168.0.1 and the host system should be set to 192.168.0.x. If the IP addresses were changed from the default settings, verify the first three sections of the address are the same for both the devices and the host.
	Check the proxy settings on the browser. (See Appendix A).
	When the devices are attached directly to a computer without using a hub or switch, use a crossover cable. When using a hub or switch, use a straight cable.
	After changing the IP address to the Gateway Pro or Ethernet Bridge, cycle the power to the device to activate the change.
Unknown IP Address	The device's default IP address is 192.168.0.1. The host should be set to 192.168.0.2. If another address is used, write it down or print out the set-up page and store in a safe place. If the IP address of the device was changed and is unknown, follow the *Restoring Factory Default Settings* instructions.

Restoring Factory Default Settings

Restoring the factory default settings resets the settings for:

Parameter	Default Setting
IP Address	192.168.0.1
Root Login	root
Root Password	sxi
HTTP Port	80
Modbus Server Port	502
Telnet Port	23
EtherNet/IP Protocol	Disabled

To restore these settings, leave the device powered up and running and follow these steps:

1. Open the DX80 Gateway Pro or DX83 Ethernet Bridge housing to access the board
2. Install the initialization (init) jumper on the pins shown
3. Wait 30 seconds
4. Remove the jumper
5. Cycle power to the device

Using the configuration Web page, verify the parameters have returned to the factory defaults listed in the table.

Jumper Configuration

The Gateway Pro and Ethernet Bridge devices use jumpers to select between RS485 and RS232 communications. Since all DX80 devices at this time are RS485 based, verify the jumpers are set correctly. Install the four jumpers across the two top rows of pins for RS485 and across the bottom two rows of pins for RS232.

Initialization pins

Communications pins
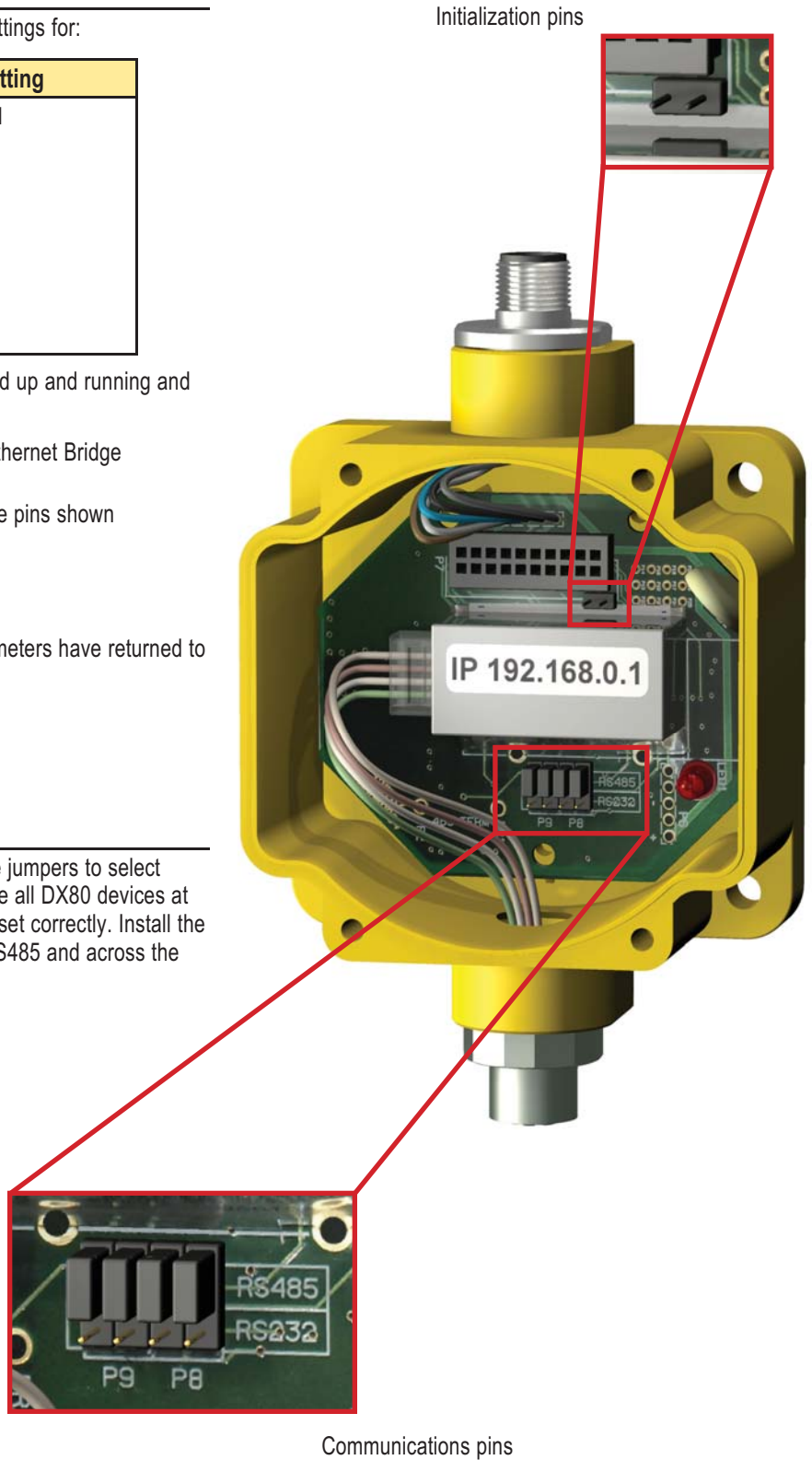
Accessories and Replacement Parts

	Model Number	Description
Antennas	Banner offers a range of omni-directional and directional (Yagi) antennas for use with the SureCross™ DX80 wireless network. For more information on antenna specifications and the options available for your system, please contact the applications engineers at Banner Engineering Corp and Banner document p/n 132113, *Antenna Basics*.	
O-Rings	BWA-ORING-001	O-Ring, Rotary Access Cover, PG21
	BWA-GASKET-001	O-Ring, Body Gasket
Hardware	BWA-HW-001	Mounting Hardware, DX80
	BWA-HW-002	Access Hardware (Plugs, Glands), DX80
	SMBDX80DIN	Bracket Assembly, DIN Rail, for DX80
	BWA-HW-003	Tape, PFTE Sealant
	BWA-HW-004	Screws, Cover Mount, #8-32 x 3/4, 18-8 SS
	BWA-CLRCOVER-001	Rotary Access Cover, Clear Plastic
	BWA-CG.5-10	Cable Glands, 1/2-NPT, Cordgrips for cable diameters 0.17" to 0.45", 10 pieces
	BWA-HP.5-10	Dummy Hole Plugs, 1/2-NPT, 10 pieces
	BWA-QD5.5	Prewired 5-pin Euro Connector for 1/2 NPT Hub entrance
	BWA-QD8.5	Prewired 8-pin Euro Connector for 1/2 NPT Hub entrance
	BWA-QD12.5	Prewired 12-pin Euro Connector for 1/2 NPT Hub entrance
Power	DX81	Battery Pack Kit, DX81, with mounting hardware
	DX121	Battery Pack Kit, DX121, 6 cells
	BWA-BATT-001	Replacement Battery, 3.6V, "D" Lithium Cell
	SPS101Q	DC Power Supply, 120mA, 12-30V dc, 5-pin Euro
	SPS101QP	DC Power Supply, 120mA, 12-30V dc, 5-pin Euro, pigtail
	PS24W	DC Power Supply, 500mA, 24V dc
	EZAC-E-QE5	DC Power Supply, 700mA, 24V dc, 5-pin Euro QD
	EZAC-E-QE5-QS5	DC Power Supply, 700mA, 24V dc, 5-pin M12 Euro QD
Cabling	MQDC1-506	Cable, Quick Disconnect, 5-pin Euro, Straight, 2 Meter
	MQDC1-501.5	Cable, Quick Disconnect, 5-pin Euro, Straight, 0.5 meter
	MQDC-806	Cable, Quick Disconnect, 8-pin Euro with Shield, Straight, 2 meter
	MQDC-1210ST	Cable, Quick Disconnect, 12-pin M16, Straight, 3 meter
	BWA-RIBBON-001	Ribbon Cable, 20 pin DBL socket
	BWC-LFNMN	Lightning Suppressor, 900 MHz, 2.4 GHz
	CSB-M1240M1241	Splitter Cable, 4-pin Euro QD, No truck male, 0.3M female branches
	BWA-E2M	Ethernet Cable, M12 Industrial / RJ45, Straight, 2 M
	BWA-EX2M	Ethernet Cable, M12 Industrial / RJ45, Crossover, 2 M
	BWA-E8M	Ethernet Cable, M12 Industrial / RJ45, Straight, 8 M
	There is a wide range of antenna cabling available. Please contact Banner Engineering Corp. for more information or for specific cable lengths and connectors.	

Agency Certifications

Industry Canada

This Class A digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouiller du Canada. Le present appareil numérique n'emet pas de bruits radioélectriques dépassant les limites applicables aux appareils numeriques de le Classe A préscrites dans le Reglement sur le brouillage radioélectrique édits par le ministere des Communications du Canada.

FCC Certification

The DX80 Module complies with Part 15 of the FCC rules and regulations.

FCC ID: TGUDX80 This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Notices

IMPORTANT: The DX80 Modules have been certified by the FCC for use with other products without any further certification (as per FCC section 2.1091). Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

IMPORTANT: The DX80 Modules have been certified for fixed base station and mobile applications. If modules will be used for portable applications, the device must undergo SAR testing.

IMPORTANT: If integrated into another product, the FCC ID label must be visible through a window on the final device or it must be visible when an access panel, door, or cover is easily removed. If not, a second label must be placed on the outside of the final device that contains the following text: Contains FCC ID: TGUDX80.

Note

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna,
- Increase the separation between the equipment and receiving module,
- Connect the equipment into an outlet on a circuit different from that to which the receiving module is connected, and/or
- Consult the dealer or an experienced radio/TV technician for help.

Antenna Warning WARNING: This device has been tested with Reverse Polarity SMA connectors with the antennas listed in Table 1 Appendix A. When integrated into OEM products, fixed antennas require installation preventing end-users from replacing them with non-approved antennas. Antennas not listed in the tables must be tested to comply with FCC Section 15.203 (unique antenna connectors) and Section 15.247 (emissions).

FCC-Approved Antennas

WARNING: This equipment is approved only for mobile and base station transmitting devices. Antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

DX80 Module may be used only with Approved Antennas that have been tested with this module.

Part Number	Antenna Type	Maximum Gain
—	Integral antenna	Unity gain
BWA-9O1-x	Omni, 1/4 wave dipole	≤2 dBi
BWA-9O2-C	Omni, 1/2 wave dipole, Swivel	≤2 dBi
BWA-9O6-A	Omni Wideband, Fiberglass Radome	≤8.2 dBi
BWA-9O5-B	Omni Base Whip	≤7.2 dBi
BWA-9Y10-A	Yagi	≤10 dBi

Table 1. Type certified Antenna

FCC Certification

The DX80 Module complies with Part 15 of the FCC rules and regulations.

FCC ID: UE300DX80-2400 This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Notices

IMPORTANT: The DX80 Modules have been certified by the FCC for use with other products without any further certification (as per FCC section 2.1091). Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

IMPORTANT: The DX80 Modules have been certified for fixed base station and mobile applications. If modules will be used for portable applications, the device must undergo SAR testing.

IMPORTANT: If integrated into another product, the FCC ID label must be visible through a window on the final device or it must be visible when an access panel, door, or cover is easily removed. If not, a second label must be placed on the outside of the final device that contains the following text: Contains FCC ID: UE300DX80-2400.

Note

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna,
- Increase the separation between the equipment and receiving module,
- Connect the equipment into an outlet on a circuit different from that to which the receiving module is connected, and/or
- Consult the dealer or an experienced radio/TV technician for help.

Antenna Warning WARNING: This device has been tested with Reverse Polarity SMA connectors with the antennas listed in Table 1 Appendix A. When integrated into OEM products, fixed antennas require installation preventing end-users from replacing them with non-approved antennas. Antennas not listed in the tables must be tested to comply with FCC Section 15.203 (unique antenna connectors) and Section 15.247 (emissions).

FCC-Approved Antennas

WARNING: This equipment is approved only for mobile and base station transmitting devices. Antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

DX80 Module may be used only with Approved Antennas that have been tested with this module.

Part Number	Antenna Type	Maximum Gain
—	Integral antenna	Unity gain
BWA-2O2-C	Omni, 1/2 wave dipole, Swivel	≤2 dBi
BWA-2O5-C	Omni, Collinear, Swivel	≤5 dBi
BWA-2O7-C	Omni, Coaxial Sleeve, Swivel	≤7 dBi

Table 1. Type certified Antenna

Appendix A - Recommended Browsers

Recommended Browsers and System Requirements

The listed system requirements are those of the individual browsers.

	Operating System	Minimum Hardware
Microsoft Internet Explorer	Windows XP, 2000, 98, SE, ME	486/66 MHz processor (recommended: 1 GHz processor or greater) 32 MB RAM (recommended: 256 MB RAM or greater) 13 MB hard drive space
Netscape Navigator	Windows XP, 2000, 98, SE, ME	233 MHz processor (recommended: 1 GHz processor or greater) 64 MB RAM (recommended 256 MB RAM or greater) 35 MB hard drive space
Mozilla Firefox	Windows 98, SE, ME, NT4.0, 2000, XP (recommended), Server2003	Pentium 233 MHz (recommended: Pentium 500 MHz or greater) 64 MB RAM (recommended: 128 MB RAM or greater) 52 MB hard drive space

Browser Settings

Configure the browser for a direct connection to the Internet. If the browser cannot connect to the Internet, verify the browser is not set up to use a proxy server.

Microsoft Internet Explorer

To verify a direct connection with Microsoft's Internet Explorer, go to Tools > Options > Connections (tab) > LAN Settings.

Verify the proxy server box is not set. Internet Explorer usually reloads files after they are uploaded so there is usually no need to manually clear the cache.

Netscape

To verify a direct connection with Netscape's Navigator, go to Tools > Options > General - Connection Settings.

When viewing a previously downloaded file, manually clear the cache to view the latest file upload. To clear Netscape's browser cache, go to Tools > Options > Privacy – Cache and clear.

Mozilla Firefox

To verify a direct connection with Mozilla's Firefox, go to Tools > Options > General - Connection Settings.

Click on the button for a direct connection to the Internet. When viewing a previously downloaded file, manually clear the cache to view the latest file upload. To clear the Firefox browser cache, go to Tools > Clear Private Data – Cache and clear.

Appendix B - Ethernet Parameters

Setting up the Network and Device IDs, powering up the devices, and conducting the Site Survey for a host-connected network is the same as for the standard DX80 wireless system. All device I/O for the network is accessed using the host/master device.

To access the Modbus device, you may first need to configure system-level communication parameters on the DX80 Gateway, in addition to the serial hookups shown below. The following procedure is necessary to change the Gateway Slave ID, Baud Rate, and Parity.

Parameter	Description
Slave ID (Default = 1)	Defines the slave number (01-99) for the serial Modbus RTU protocol. When operating more than one network with a Modbus Master device, change the Slave IDs.
Baud Rate (Default = 19200)	Defines communication data rate (19.2, 38.4 or 9.6 kbps) between the Gateway and the Host through the serial interface.
Parity (Default = None)	Defines serial parity (none, even, or odd) between Gateway and Host.

Gateway and Gateway Pro (Host-Connected) Pinout Diagram

5=Center pin

Wire No.	Color	Description
1	Brown	10-30V dc Input
2	White	RS485 / D1 / B /+
3	Blue	dc common
4	Black	RS485 / D0 / A / -
5	Gray	Comms Gnd

Wiring: 5-pin Euro pinouts for 485+, 485- and Comms ground

Setting the Slave ID, Baud Rate, and Parity

Similar to Network ID, the Slave ID, Baud Rate, and Parity parameters can be changed in the Device Configuration (*DVCFG) system menu option.

Follow the top level system menu through *DVCFG to the Slave ID (SLID) parameter. The LCD displays an alternating current value and new value for the parameter.

	User Action	Display / Status	Notes
	On the Gateway or Gateway Pro, single-click button 1 to move across the top level menu options to the *DVCFG (Device Configuration) menu	*DVCFG	To navigate to the *DVCFG (Device Configuration) menu, see the device menu layout in the *Setup - Wireless Network* section.
Set the Slave ID	Single-click Gateway push button 2	(NID)	
	Single-click Gateway push button 1 to move to the Slave ID field.	(SLID)	Default value is 1
	Single-click Gateway push button 2	NEW 1	The new Slave ID is defined by the current position of the rotary switches.
	Using 0-9 on the left rotary switch and 1-9 on the right switch, set the rotary switches to the desired Slave ID	NEW XX	Select between 01 to 99. The factory default is set to 1. Change the Slave ID when running more than one network into the Modbus Master device.
	Single-click Gateway push button 2 to save the new Slave ID.	(SLID)	
Set Baud Rate	Single-click Gateway push button 1 to move to the next menu option, the BAUD rate.	(BAUD)	
	Single-click Gateway push button 2 to display the current setting. Single-click Gateway push button 1 to cycle through the available options. Stop on the desired setting.	19200	The options are 9600, 19200, 38400. The factory default is 19200.
	Single-click Gateway push button 2 to save the new setting.	(BAUD)	
Set Parity	Single-click Gateway push button 1 to move to the next field, the PARITY field.	(PRTY)	
	Single-click Gateway push button 2 to display the current setting. Single-click Gateway push button 1 to cycle through the available options. Stop on the desired setting.	NONE	The options are NONE, EVEN, ODD. The factory default is NONE.
	Single-click Gateway push button 2 to save the new setting.	(PRTY)	
	Adjust the left rotary switch back to NID value.* Adjust the right rotary switch back to zero.		
	Double-click Gateway push button 2 to return to the Device Configuration (*DVCFG) menu.	*DVCFG	
	Click Gateway push button 1 until reaching the *RUN menu option.	*RUN	

* To avoid losing the network connection between the Gateway and Nodes, reset the rotary switches back to their appropriate values before leaving the *DVCFG sub-menus. If the Gateway and Nodes lose their connection, the network may take up to 20 seconds to re-synchronize.

Appendix C - Additional SureCross™ Documents

For more information on specific components, please refer to the data sheets for the SureCross devices:

- Gateways
- Line-Powered Nodes
- *Flex*Power™ Nodes

Additional reference guides are available at www.bannerengineering.com on a variety of topics, including:

Literature Number	Topic
132113	A guide to antenna basics
132114	A guide to using Modbus with the SureCross products
132033	How to configure I/O parameters using Modbus registers
133601	Samples of SureCross network configurations
133602	Running the Site Survey and interpreting the results

Antenna Basics Reference Guide

The Antenna Basics reference guide includes basic information on antenna types, gain, and performing link margin calculations.

Modbus Reference Guide

The Modbus reference guide contains information about using Modbus RTU, Modbus/TCP, and EtherNet/IP™ commands with the SureCross DX80 family of products. This guide includes register maps, control codes, error message handling, supported function codes, and some sample commands to perform specific tasks.

DX80 Configuration Reference Guide

The DX80 Configuration guide lists control codes and sample commands for configuring I/O parameters by writing to Modbus registers.

DX83 System Layouts

Using the DX80 Gateway, DX80 Gateway Pro, DX83 Ethernet Bridge, or DX85 Expanded I/O devices, many different network configurations can be achieved. The DX83 System Layouts documents presents some of the possible configurations and under what conditions they are likely to be used.

Site Survey

The Site Survey reference guide details how to run a Site Survey using either the DX80 Gateway buttons or the Gateway Modbus holding register 15 and how to interpret the results.

Index

All specifications published in this document are subject to change. Banner reserves the right to modify the specifications of products, prior to their order, without notice.

P/N 132607