SureCross DX70 Wireless Point-to-Point Kits

BANNER®
more sensors, more solutions

The SureCross™ DX70 wireless kits include build a point-to-point network using two devices and configured I/O

Features

The SureCross® DX70 wireless series consists of a radio frequency network built around two devices and configured I/O that can operate in most environments and eliminate the need for wiring runs..

- Wireless industrial I/O system with discrete (sourcing or sinking) inputs and outputs, analog inputs and outputs, and a link loss output that may be selected or deselected to be one of the four outputs
- DIP switches for user configuration
- 10 to 30V dc power input
- Site Survey analyzes the network's signal strength and reliability and displays the results on the Gateway's LCD
- Frequency Hopping Spread Spectrum (FHSS) technology and Time Division Multiple Access (TDMA) control architecture combine to ensure reliable data delivery within the unlicensed Industrial, Scientific, and Medical (ISM) band
- Transceivers provide bidirectional communication between the Gateway and Node, including fully acknowledged data transmission
- Lost RF links are detected and relevant outputs set to user-defined conditions
- External or internal antenna

For additional information, the most recent version of all documentation, and a complete list of accessories, refer to Banner Engineering's website, *www.bannerengineering.com/surecross*.

Models

When ordering the SureCross DX70 device, order the kits listed below. The kits include the Gateway, Node, mounting hardware, access hardware, antennas, and cables. Each kit's devices ship from the factory bound and with the inputs and outputs mapped as shown in the I/O mapping tables.

Kit Models	Frequency	Inputs and Outputs
DX70K9M6EM1	900 MHz	**Inputs**: Four selectable discrete, two 0-20 mA analog
DX70K2M6EM1	2.4 GHz	**Outputs**: Four sourcing discrete, two 0-20 mA analog
DX70K9M6ED1	900 MHz	**Inputs**: Eight selectable discrete on the Node, four selectable discrete on the Gateway
DX70K2M6ED1	2.4 GHz	**Outputs**: Four sourcing discrete on the Node, eight sourcing discrete on the Gateway

Internal antenna models are also available, but are not UL Listed. For more information, contact your local Banner Engineering Corp. representative.

⚠ **WARNING: Not To Be Used for Personnel Protection**
Never use this product as a sensing device for personnel protection. Doing so could lead to serious injury or death. This product does NOT include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

Replacement DX70 Devices

| Kit Models	Device	Frequency	Replacement DX70 Device
DX70K9M6EM1	Node	900 MHz ISM Band	DX70N9X6S4P4M2M2
	Gateway		DX70G9X6S4P4M2M2
DX70K2M6EM1	Node	2.4 GHz ISM Band	DX70N2X6S4P4M2M2
	Gateway		DX70G2X6S4P4M2M2
DX70K9M6ED1	Node	900 MHz ISM Band	DX70N9X6S8P4
	Gateway		DX70G9X6S4P8
DX70K2M6ED1	Node	2.4 GHz ISM Band	DX70N2X6S8P4
	Gateway		DX70G2X6S4P8

Device Components
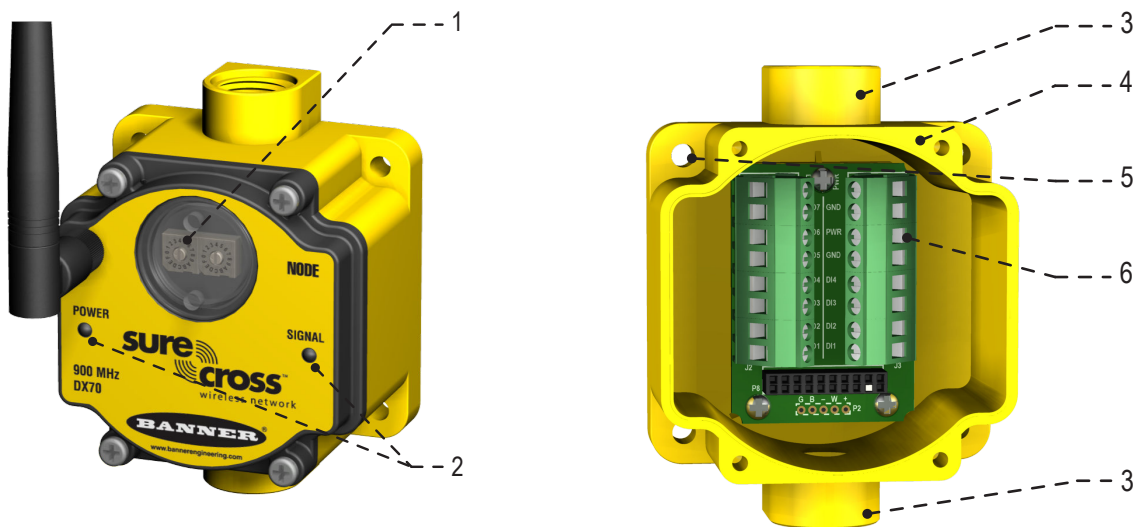
1. **Rotary Dials**. After the DX70 devices are bound, use the rotary dials on the Gateway to set the Network ID (NID) to a decimal value from 1 to 32.

2. **LEDs**. Power LED - Power indicator. A green LED indicates the power is on. Signal LED - Provides real-time feedback regarding RF link status and communications activity.

3. **Port, NPT Gland, or Plug**. If unused, install the provided plug into the 1/2 NPT threaded port. Use PTFE tape if an IP67 seal is required.

4. **Housing**. The rugged, industrial DX70 housing meets IEC IP67 standards.

5. **Mounting Hole, #10/M5 Clearance**. Mounting holes accept metric M5 or UNC/UNF #10 hardware — DIN rail mount adapter bracket available

6. **Wiring Terminal Strip**. The 16 wiring terminals accept wire sizes: AWG 12-28 or 2.5 mm²

DX70 Dimensions

The DX70 Gateway and Node use the same housing, which is also the same in size and mounting holes as the DX80 housing.
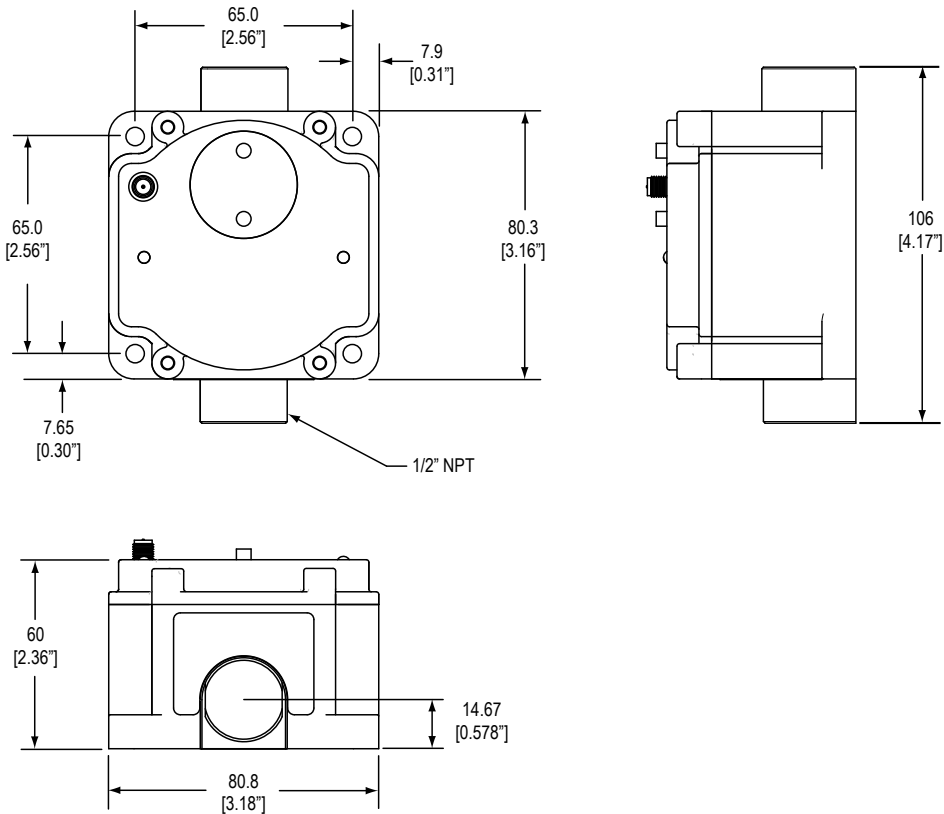
Setting Up and Installing a DX70 Point-to-Point Network

To set up and install DX70 kits, follow these steps. These kits ship from the factory bound together and with their inputs and outputs mapped as shown in the I/O mapping tables.

1. Apply power
2. Verify the devices are communicating to each other
3. Connect the sensors
4. Configure the Gateway and Node
5. Install

Applying Power to a DX70

Connect power to the DX70 Gateway and Node by connecting your 10 to 30V dc power directly to the terminal block PWR. Connect your ground to the GND terminal block.

1. Power (PWR)
2. Ground (GND)

Verify Communication Between Radios

After applying power to the devices, the Power LED is solid green. Until communication is established, the Signal LEDs are solid red. When communication is established, the Signal LED flashes yellow; the frequency of the flash indicates the communication signal strength.

If testing the devices before installation, verify the devices are at least two meters apart to avoid over-driving the link.

Status	Power LED		Signal LED	
Power Applied	🟢	Green solid		-
RF Link Error	🟢	Green solid	🔴	Red solid
RF Link Good	🟢	Green solid	🌤	Yellow flash
Binding Mode	🔆	Red flash	🔆	Red flash
Successful binding	🔴	Red solid (for 3 seconds)	🔴	Red solid (for 3 seconds)

Signal Strength Indicator

The rate at which the Signal LED blinks yellow indicates the signal strength between the Gateway and Node.

Blink Rate	Signal Strength
Every 1/8 second	Fewer than 3% missed packets
Every 1/4 second	Between 3% and 25% missed packets
Every 1/2 second	Between 26% and 50% missed packets
Every 1 second	More than 50% missed packets

I/O Mapping

All DX70 pairs ship from Banner Engineering with the I/O mapped.

DX70...EM1 Kits

Using PNP Inputs	Using NPN Inputs
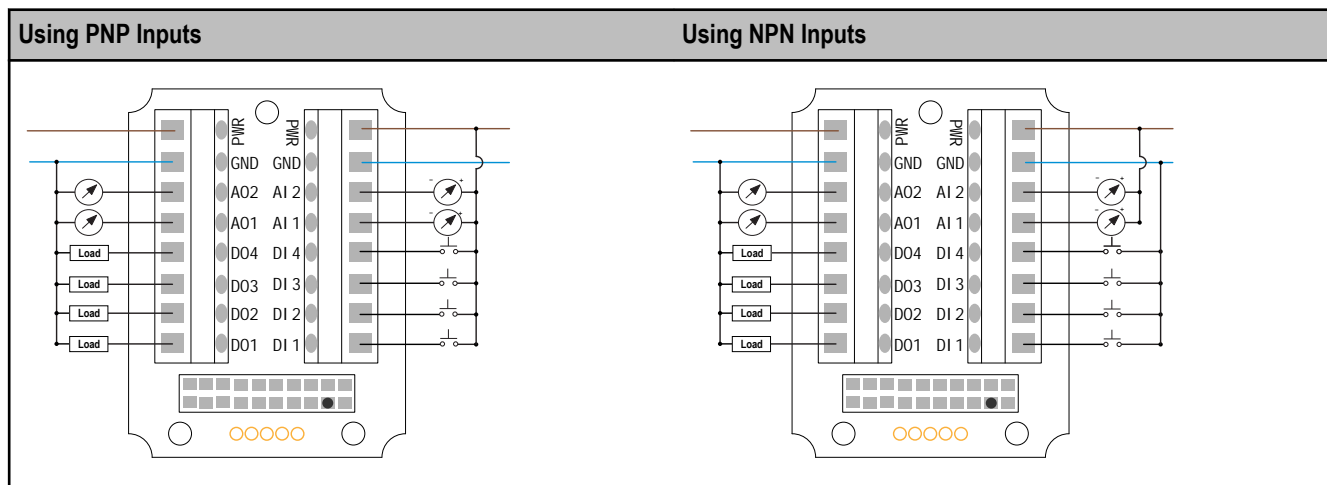
Terminal Label	DX70 Gateway		DX70 Node	Terminal Label
DI1	Discrete IN 1*	to	Discrete OUT 1 or Lost Link Indicator*	DO1

Terminal Label	DX70 Gateway		DX70 Node	Terminal Label
DI2	Discrete IN 2	to	Discrete OUT 2	DO2
DI3	Discrete IN 3	to	Discrete OUT 3	DO3
DI4	Discrete IN 4	to	Discrete OUT 4	DO4
AI1	Analog IN 1	to	Analog OUT 1	AO1
AI2	Analog IN 2	to	Analog OUT 2	AO2
DO1	Discrete OUT 1 or Lost Link Indicator*	from	Discrete IN 1*	DI1
DO2	Discrete OUT 2	from	Discrete IN 2	DI2
DO3	Discrete OUT 3	from	Discrete IN 3	DI3
DO4	Discrete OUT 4	from	Discrete IN 4	DI4
AO1	Analog OUT 1	from	Analog IN 1	AI1
AO2	Analog OUT 2	from	Analog IN 2	AI2

* If discrete OUT 1 is used as a lost link indicator (default) then discrete IN 1 is non-functional. A one (1) in DO1's Modbus register indicates a lost radio link. A zero (0) indicates the radio network is operating normally. Please refer to the *Configuration* section to change this setting.

DX70...ED1 Kits
The lost link indicator is not available on this model.

4P8 Model (Gateway)	8P4 Model (Node)
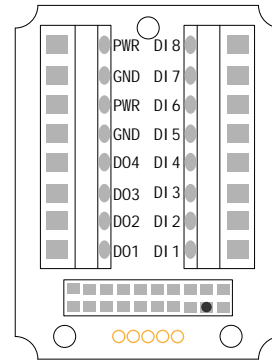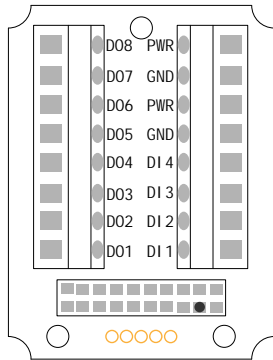
Terminal Label	DX70 Gateway		DX70 Node	Terminal Label
DI1	Discrete IN 1	to	Discrete OUT 1	DO1
DI2	Discrete IN 2	to	Discrete OUT 2	DO2
DI3	Discrete IN 3	to	Discrete OUT 3	DO3
DI4	Discrete IN 4	to	Discrete OUT 4	DO4
DO1	Discrete OUT 1	from	Discrete IN 1	DI1
DO2	Discrete OUT 2	from	Discrete IN 2	DI2
DO3	Discrete OUT 3	from	Discrete IN 3	DI3
DO4	Discrete OUT 4	from	Discrete IN 4	DI4

Terminal Label	DX70 Gateway		DX70 Node	Terminal Label
DO5	Discrete OUT 5	from	Discrete IN 5	DI5
DO6	Discrete OUT 6	from	Discrete IN 6	DI6
DO7	Discrete OUT 7	from	Discrete IN 7	DI7
DO8	Discrete OUT 8	from	Discrete IN 8	DI8

Sensor Connections

Discrete Input Wiring (PNP)
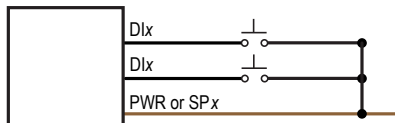
Discrete Input Wiring (NPN)
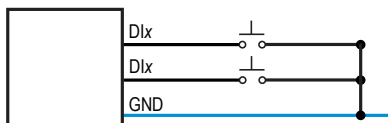
Discrete Output Wiring (PNP)
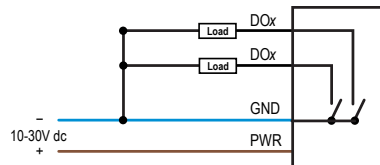
Analog Input Wiring (10 to 30V dc Power)
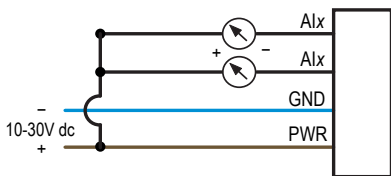
Analog Output Wiring
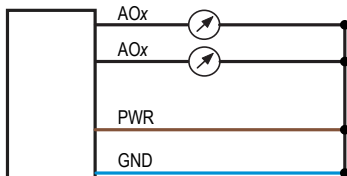
Refer to the sensor device data sheet for a device specific wiring diagram.

Accessing the Internal DIP Switches

To access the internal DIP switches, follow these steps:

1. Unscrew the four screws that mount the cover to the bottom housing.
2. Remove the cover from the housing without damaging the ribbon cable or the pins the cable plugs into.
3. Gently unplug the ribbon cable from the board mounted into the bottom housing. For integrated battery models (no ribbon cable) and Class I, Division 2 certified devices (ribbon cable is glued down), skip this step.
4. Remove the black cover plate from the bottom of the device's cover.
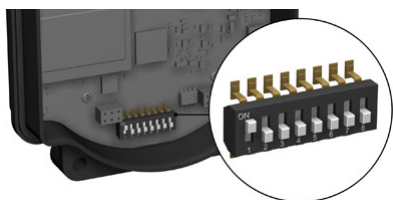
The DIP switches are located behind the rotary dials. After making the necessary changes to the DIP switches, place the black cover plate back into position and gently push into place. Plug the ribbon cable in after verifying that the blocked hole lines up with the missing pin. Mount the cover back onto the housing.

DIP Switch Settings for the DX70 Devices

Use the DIP switches on the circuit board to set the following parameters. Changes made to the DIP switches affect all I/O for this device.

* Default positions.

Link Loss Output State

Use DIP switches 1 and 2 to select the state the outputs are changed to during a link loss.

DIP Switches		
1	**2**	**Link Loss Output State**
OFF *	OFF *	Off (discrete) or 0 mA (analog)
ON	OFF	On (discrete) or 20 mA (analog)
OFF	ON	Hold last stable state
ON	ON	Reserved

Discrete Input Type Selection

Select the discrete input type: sourcing (PNP) or sinking (NPN).

DIP Switch	
3	**Discrete Input Type**
OFF *	PNP
ON	NPN

Use Input/Output 1 or Use Link Loss Indicator (EM1 Kit Only)

The lost link indicator option is only available with the EM1 kit. When DIP switch 4 is OFF (default position), the link loss error indicator uses output 1 and input 1 is not available. When DIP switch 4 is ON, input 1 is mapped to output 1. For the ED1 kit, this DIP switch is ignored.

DIP Switch	
4	**Use Input/Output 1 or Use Link Loss Indicator**
OFF *	Link Loss Error Indicator in Output 1 (Input 1 is unavailable)
ON	Input 1 mapped to Output 1

Link Loss Timeout

The link loss timeout is the length of elapsed time during which there has been no communication between the Gateway and Node. By default, if there has been no communication between the Gateway and Node for four seconds, the radio link has failed.

DIP Switch	
5	**Link Loss Timeout**
OFF *	4 seconds
ON	1 second

Installing Your SureCross™ Radios

The following are some recommendations for installing your wireless network components.

Mounting SureCross Devices Outdoors
Mounting SureCross Devices Outdoors

Use a Secondary Enclosure. For most outdoor applications, we recommend installing your SureCross devices inside a secondary enclosure.

For a list of available enclosures, refer to the *Accessories* list.

Point Away From Direct Sunlight. When you are not using a secondary enclosure, minimize the damaging effects of ultra-violet radiation by mounting the devices to avoid facing intense direct sunlight.

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

For harsh outdoor applications, consider installing your radio inside a secondary enclosure. For a list of available enclosures, refer to the *Accessories* list.

Mount Vertically to 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.
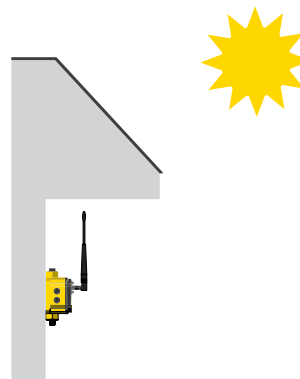
Moisture and Condensation. If condensation is present in any device, add a small desiccant packet to the inside of the radio.

To help vent the radios, Banner also sells a vented plug (model number BWA-HW-031) for the 1/2" NPT port of the SureCross radios.

Vented plug for the 1/2" NPT port.

Watertight Glands and NPT Ports

Watertight Glands and Plugs

To make glands and plugs watertight, use PTFE tape and follow these steps.

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 5 in-lbf of torque to the gland or its cable clamp nut.*

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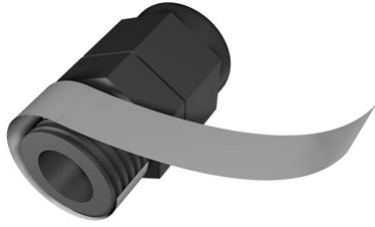2. Carefully thread the plastic plug into the vacant hole in the housing and tighten using a slotting screwdriver. Never apply more than 10 in-lbf torque to the plastic plug.

* This is not a lot of torque and is equivalent to the torque generated without using tools. If a wrench is used, apply only very light pressure. Torquing these fittings excessively damages the device.

Watertight NPT Plugs

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 or until the resistance doubles. Do not overtighten as this will damage the SureCross unit. These threads are tapered and will create a waterproof seal without overtightening.

* This is not a lot of torque and is equivalent to the torque generated without using tools. If a wrench is used, apply only very light pressure. Torquing these fittings excessively damages the device.

Replacing the Rotary Dial Access Cover

Check the rotary dial 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 dial access cover, manually twist the cover into position. Do not allow cross-threading between the cover and the devce's 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 dial access cover even with the cover surface.

Replacing the 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.

Other Installation Requirements

Reduce Chemical Exposure

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

Minimize Mechanical Stress

Although these radio 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 glands on the Gateway or Node. Cabling heavier than 100 grams should be supported instead of allowed to hang from the housing.

It is the user's responsibility to install these devices so they will not be subject to overvoltage transients. Always ground the devices in accordance with local, state, or national regulations.

Installation Quick Tips

The following are some quick tips for improving the installation of wireless network components.

Create a Clear Communication Path

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 and select locations without obstructions in the path.

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

Increase the Height of the Antennas

Position the external antenna vertically for optimal RF communication. If necessary, consider changing the height of the SureCross radio, or its antenna, to improve reception. For outdoor applications, mounting the antenna on top of a building or pole may help achieve a line-of-sight radio link with the other radios in the network.
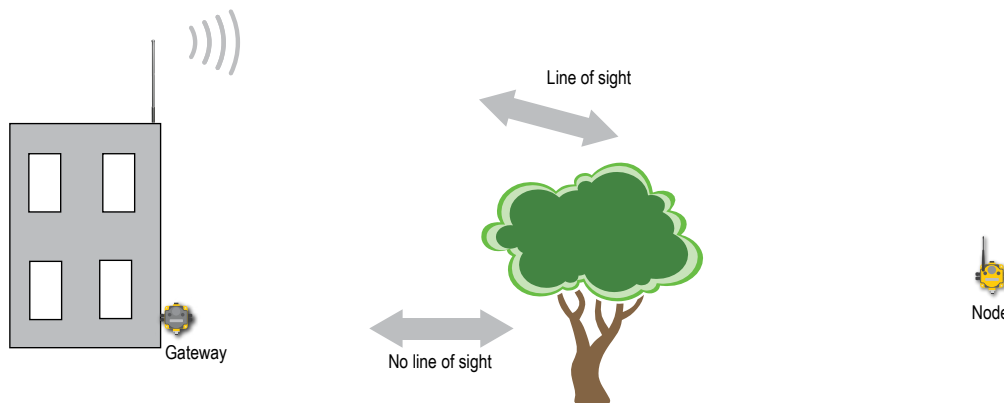
Avoid Collocating Radios

When the radio network's master device is located too close to another radio device, communications between all devices is interrupted. For this reason, do not install a Gateway device within two meters of another Gateway or Node.

Be Aware of Seasonal Changes

When conducting the initial Site Survey, the fewest possible missed packets for a given link is better. However, seasonal changes may affect the signal strength and the total signal quality. Radios installed outside with 50% missed packets in the winter months may have 80% or more missed packets in the summer when leaves and trees interfere with radio reception.

Gateway   Node

A good signal strength in winter doesn't always mean you'll get the same signal strength the rest of the year.

Gateway   Node

During spring and summer, leaves may block more of the radio signal.
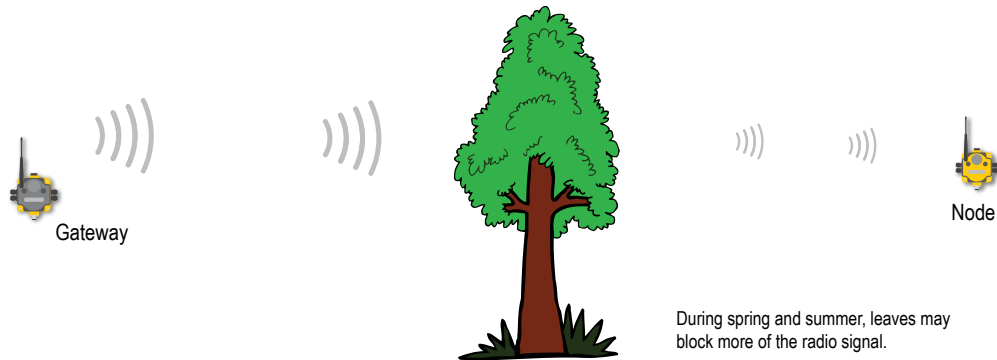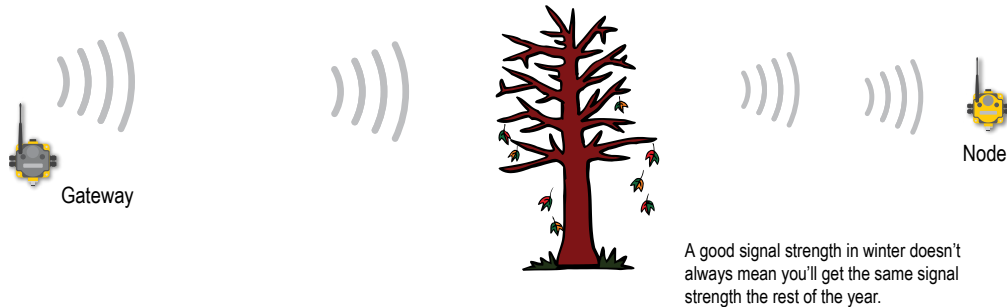
Basic Remote Antenna Installation

A remote antenna system is any antenna system where the antenna is not connected directly to the radio. These systems typically use coaxial cable to connect the antenna to the radio. When installing a remote antenna system, always include a lightning arrestor or coaxial surge suppressor in the system. Remote antenna systems installed without surge protection invalidate the warranty of the radio devices.

Surge suppressors should be properly grounded and mounted at ground level near where the cabling enters a building. Install the surge suppressor indoors or inside a weatherproof enclosure to minimize corrosion or component deterioration. For best results, mount the surge suppressor as close to the ground as possible to minimize the length of the ground connection and use a single-point ground system to avoid creating ground loops.

For more detailed information about how antennas work and how to install them, refer to *Antenna Basics*, Banner document 132113 (also included as a chapter within the product manual).
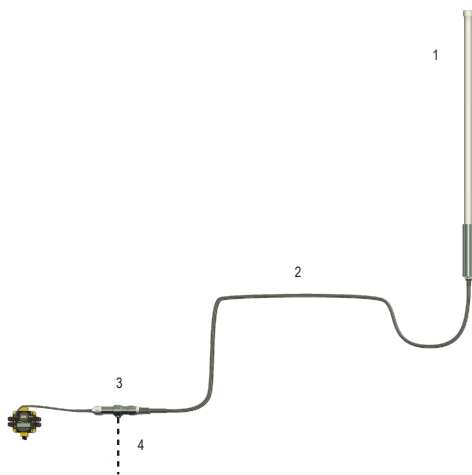
1. Antenna mounted remotely from the radio device.
2. Coaxial cable
3. Surge suppressor
4. Ground wire to a single-point ground system

I/O Isolation. When connecting analog and discrete I/O to external equipment such as VFDs (Variable Frequency Drives), it may be appropriate to install interposing relays and/or loop isolation devices to protect the DX80 unit from transients, noise, and ground plane interference originating from devices or the environment. Contact Banner Engineering Corp. for more information.

Weatherproofing Remote Antenna Installations

Prevent water damage to the cable and connections by sealing the connections with rubber splicing tape and electrical tape.

Step 1: Verify both connections are clean and dry before connecting the antenna cable to the antenna or other cable and hand-tightening.
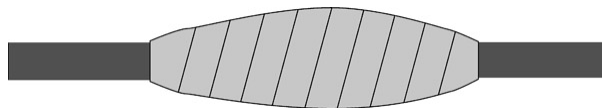
Step 2: Tightly wrap the entire connection with rubber splicing tape.

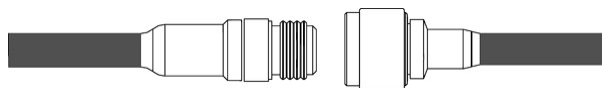Begin wrapping the rubber splicing tape one inch away from the connection and continue wrapping until you are one inch past the other end of the connection. Each new round of tape should overlap about half the previous round.

Step 3: Protect the rubber splicing tape from UV damage by tightly wrapping electrical tape on top of the rubber splicing tape. The electrical tape should completely cover the rubber splicing tape and overlap the rubber tape by one inch on each side of the connection.

Antenna Installation

Always install and properly ground a qualified surge suppressor when installing a remote antenna system. Remote antenna configurations installed without surge suppressors invalidate the manufacturer's warranty.

Always keep the ground wire as short as possible and make all ground connections to a single-point ground system to ensure no ground loops are created. No surge suppressor can absorb all lightning strikes. Do not touch the SureCross™ device or any equipment connected to the SureCross device during a thunderstorm.

Mounting an RP-SMA Antenna Directly to the Cabinet

This antenna mounts directly to the outside of the box, with the SureCross device mounted inside the box.
This situation may be used either inside or outside the building.
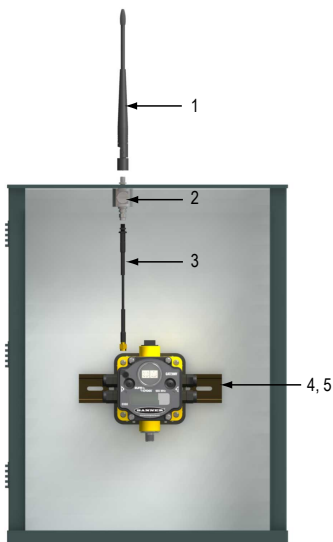
	Model Number	Description
1	BWA-9O2-C	Antenna, Omni, 902-928 MHz, 2 dBd, Rubber Swivel, RP-SMA MALE
	BWA-2O2-C	Antenna, Omni, 2.4 GHz, 2 dBd, Rubber Swivel, RP-SMA MALE
	BWA-2O5-C	Antenna, Omni, 2.4 GHz, 5 dBd, Rubber Swivel, RP-SMA MALE
	BWA-2O7-C	Antenna, Omni, 2.4 GHz, 7 dBd, Rubber Swivel, RP-SMA MALE
2	BWC-LMRSFRPB	Surge Suppressor, Bulkhead, RP-SMA Type, 900 MHz/2.4 GHz
3	BWC-1MRSFRSB02	RG58 Cable, RP-SMA TO RP-SMA Female Bulkhead, 0.2 m
	BWC-1MRSFRSB1	RG58 Cable, RP-SMA TO RP-SMA Female Bulkhead, 1 m
	BWC-1MRSFRSB2	RG58 Cable, RP-SMA TO RP-SMA Female Bulkhead, 2 m
	BWC-1MRSFRSB4	RG58 Cable, RP-SMA TO RP-SMA Female, Bulkhead, 4 m
4	DIN-35-105	DIN Rail section, 105 mm long, 35 mm design
5	SMBDX80DIN	DIN Rail Bracket Assembly for DX70 and DX80 models.

Mounting an RP-SMA Antenna Remotely

This antenna mounts remotely from the box, with the SureCross device mounted inside the box.

This situation may be used either inside or outside the building, though a Yagi antenna is usually used in outdoors applications while an omni-directional antenna may be used either inside a building or outside.

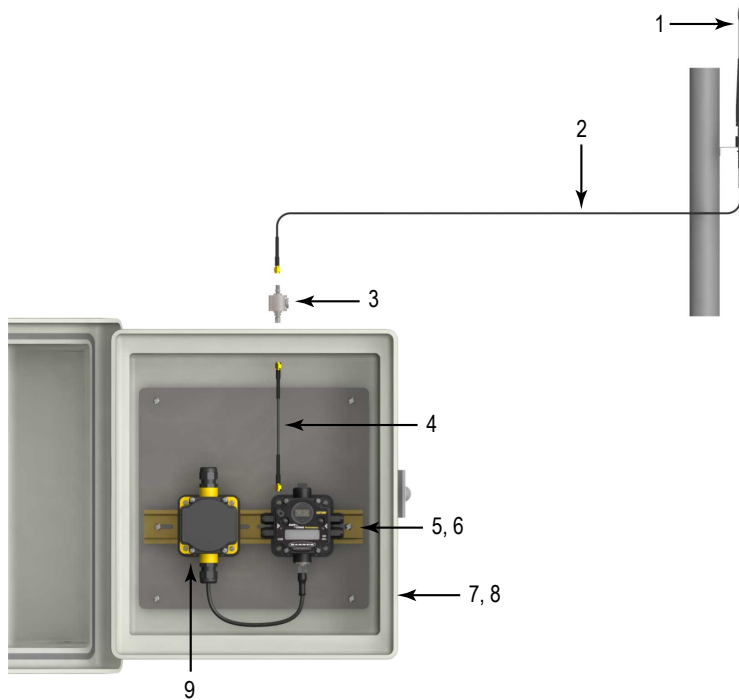|	Model Number	Description
1	BWA-9O2-C	Antenna, Omni, 902-928 MHz, 2 dBd, Rubber Swivel, RP-SMA MALE
	BWA-9O5-C	Antenna, Omni, 902-928 MHz, 5 dBd, Rubber Swivel, RP-SMA MALE
	BWA-2O2-C	Antenna, Omni, 2.4 GHz, 2 dBd, Rubber Swivel, RP-SMA MALE
	BWA-2O5-C	Antenna, Omni, 2.4 GHz, 5 dBd, Rubber Swivel, RP-SMA MALE
	BWA-2O7-C	Antenna, Omni, 2.4 GHz, 7 dBd, Rubber Swivel, RP-SMA MALE
2	BWC-1MRSFRSB02	RG58 Cable, RP-SMA TO RP-SMA Female Bulkhead, 0.2 m
	BWC-1MRSFRSB1	RG58 Cable, RP-SMA TO RP-SMA Female Bulkhead, 1 m
	BWC-1MRSFRSB2	RG58 Cable, RP-SMA TO RP-SMA Female Bulkhead, 2 m
	BWC-1MRSFRSB4	RG58 Cable, RP-SMA TO RP-SMA Female, Bulkhead, 4 m
3	BWC-LMRSFRPB	Surge Suppressor, Bulkhead, RP-SMA Type, 900 MHz/2.4 GHz
4	BWC-1MRSFRSB02	RG58 Cable, RP-SMA TO RP-SMA Female Bulkhead, 0.2 m
	BWC-1MRSFRSB1	RG58 Cable, RP-SMA TO RP-SMA Female Bulkhead, 1 m
	BWC-1MRSFRSB2	RG58 Cable, RP-SMA TO RP-SMA Female Bulkhead, 2 m
	BWC-1MRSFRSB4	RG58 Cable, RP-SMA TO RP-SMA Female, Bulkhead, 4 m
5	DIN-35-105	DIN Rail section, 105 mm long, 35 mm design
6	SMBDX80DIN	Bracket Assembly, DIN Rail, for DX80
7	BWA-EF14128	Fiberglass enclosure, 14"x 12" x 8"
8	BWA-PA1412	Internal panel, 14" x 12"
9 *		

* This example image depicts a DX80 radio with a 10-30V dc power supply. The example installation may also work with the DX70 radios or MultiHop radios. However, the DX81 and DX81P6 FlexPower Battery Supply Modules can only power FlexPower devices. The battery supply modules cannot be used with any 10-30V dc-only powered devices and cannot be used with the DX70 radios.

Mounting N-Type Antennas Remotely

This antenna mounts remotely from the box, with the SureCross device mounted inside the box.

This situation may be used either inside or outside the building, though a Yagi antenna is usually used in outdoors applications while an omni-directional antenna may be used either inside a building or outside.
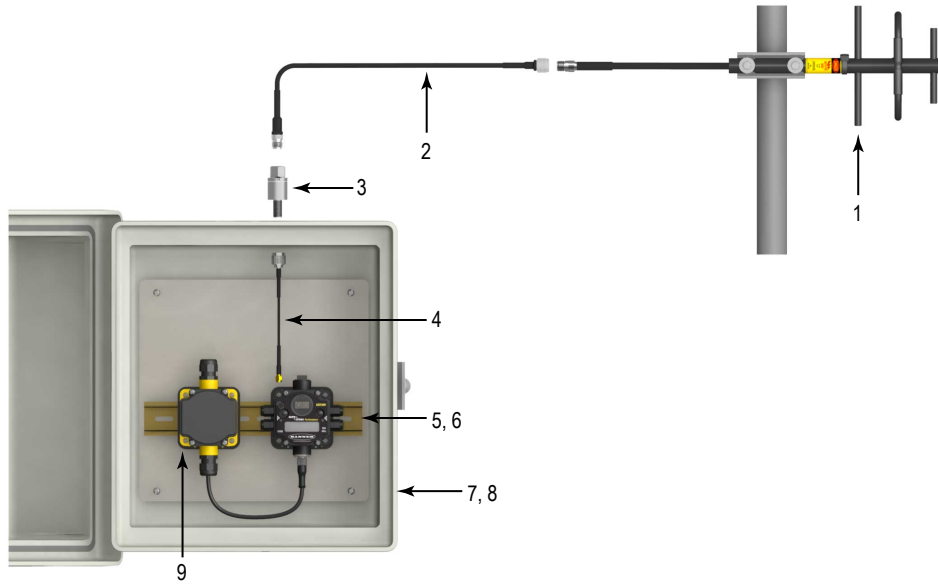

	Model Number	Description
1	BWA-9Y6-A	Antenna, Yagi, 900 MHz, 6.5 dBd, N Female
	BWA-9Y10-A	Antenna, Yagi, 900 MHz, 10 dBd, N Female
	BWA-9O6-A	Antenna, Omni, 900 MHz, 6 dBd, Fiberglass, N Female
	BWA-9O5-B	Antenna, Omni, 900 MHz, 5 dBd/7.2 dBi, With ground plane, N Female
	BWA-2O8-A	Antenna, Omni, 2.4 GHz, 8.5 dBi, N Female, Fiberglass 24"
	BWA-2O6-A	Antenna, Omni, 2.4 GHz, 6 dBi, N Female, Fiberglass 16"
2	BWC-4MNFN3	LMR400 Cable, N-Male to N-Female, 3 Meters
	BWC-4MNFN6	LMR400 Cable, N-Male to N-Female, 6 Meters
	BWC-4MNFN15	LMR400 Cable, N-Male to N-Female, 15 Meters
	BWC-4MNFN30	LMR400 Cable, N-Male to N-Female, 30 Meters
3	BWC-LFNBMN-DC	Surge Suppressor, Bulkhead, N-Type, 900 MHz/2.4 GHz, dc-Blocking
4	BWC-1MRSMN05	LMR200 Cable, RP-SMA to N-Male, 0.5 Meters
	BWC-1MRSMN2	LMR200 Cable, RP-SMA to N-Male, 2 Meters
5	DIN-35-105	DIN Rail section, 105 mm long, 35 mm design
6	SMBDX80DIN	Bracket Assembly, DIN Rail, for DX80
7	BWA-EF14128	Fiberglass enclosure, 14"x 12" x 8"

	Model Number	Description
8	BWA-PA1412	Internal panel, 14" x 12"
9 *		

* This example image depicts a DX80 radio with a 10-30V dc power supply. The example installation may also work with the DX70 radios or MultiHop radios. However, the DX81 and DX81P6 FlexPower Battery Supply Modules can only power FlexPower devices. They battery supply modules cannot be used with any 10-30V dc-only powered devices and cannot be used with the DX70 radios.

Binding the DX70 Gateway and Node

DX70 Gateway and Node kits ship from the factory bound to each other. You should only need to bind devices if you are replacing one of the devices in your existing pair.

Binding Nodes to a Gateway ensures the Nodes only exchange data with the Gateway they are bound to. After a Gateway enters binding mode, the Gateway automatically generates and transmits a unique extended addressing (XADR), or binding, code to all Nodes within range that are also in binding mode. The extended addressing (binding) code defines the network, and all radios within a network must use the same code. After binding your Nodes to the Gateway, make note of the binding code displayed under the *DVCFG menu, XADR submenu on the LCD. Knowing the binding code prevents having to re-bind all Nodes if your Gateway is ever replaced.

If the power is applied and the Power LED is solid green and the Signal LED is solid red for more than thirty seconds (indicating an RF link error), the devices need to be bound. To bind your DX70 pair, follow these instructions.

1. Install the supplied antennas to both the Gateway and Node.
2. Apply power to both devices and position the Gateway and Node at least two meters apart.
   The Power LED is solid green and the Signal LED is solid red, indicating an RF link error.*
3. Remove the rotary dial access covers.
4. On the Gateway, set both the left and right rotary dials to 0, then set both the left and right rotary dials to F.
   The Gateway enters binding mode. Note that both rotary dials for each device must be changed to F after applying power, not before applying power. Both the POWER and SIGNAL LEDs flash red.
5. On the Node, set both the left and right rotary dials to 0, then set both rotary dials to F.
   The Node enters binding mode and waits for the Gateway to respond. Both the Gateway's and Node's LEDs alternately flash red during pairing. After the devices are successfully bound, the Node's LEDs are solid red for a few seconds and the Node automatically exits binding mode. The Node Power LED is solid green and Signal LED is solid red, indicating the Node is bound. Binding should take less than twenty seconds.
6. Change the Gateway's rotary dials to a valid Network ID.
   Valid Network IDs are 01 through 32, in decimal, established using both rotary dials. The left dial may be set to 0, 1, 2, or 3. The right dial may be set from 0 to 9 when the left dial is at 0, 1, or 2; or set to 0 through 2 when the left dial is at 3. (Positions A through F are invalid network ID numbers.)**
7. The Node automatically synchronizes to the Gateway and establishes a radio link in less than a minute.
   When a radio link is established, the Power LED is green and the Signal LED flashes yellow on both devices to indicate the signal strength.
8. On the Node, set both the left and right rotary dials back to 0, or any position other than F.
9. Replace both the rotary dial access covers.

Regardless of the position of the Node's rotary dials, the DX70 devices within this bound pair maintain a radio link. For successful binding, the Gateway and Node should be at least two meters apart and have the antennas installed.

* Unbound devices will have a solid green Power LED and solid red Signal LED thirty seconds after power up. Bound devices have a solid green Power LED and a flashing yellow Signal LED within thirty seconds of power up.

** When multiple networks operate in the same area, assign a unique Network ID (NID) to the Gateway device within each bound pair. For more information about collocated networks and Network IDs, refer to the Troubleshooting section.

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Maintenance

Follow these instructions to perform basic maintenance tasks.

Replacing the 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.

Replacing the Rotary Dial Access Cover

Check the rotary dial 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 dial access cover, manually twist the cover into position. Do not allow cross-threading between the cover and the devce's 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 dial access cover even with the cover surface.

Troubleshooting

The following troubleshooting tips include some basic instructions for common problems.

Troubleshooting Problems on Your DX70 Network

No LEDs. Recheck the power connections and power requirements. DX70 devices require 10 to 30V dc.

Signal LED is solid red or flashing red for more than 30 seconds. If the devices are less than two meters apart, they may not communicate properly (radios may saturate). The devices may be too far apart to achieve sync – consult factory for options.

Collocated Networks. To prevent interference between collocated networks, assign each wireless network a different Network ID.

RF Link Timeout and Recovery

The SureCross™ DX70 wireless devices employ a deterministic link timeout method to address RF link interruption or failure. As soon as a specific RF link fails, all pertinent wired outputs are brought to a predefined state until the link is recovered (default DIP switch setting). 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 device on the network. If after a specified number of sequential polling cycles a device does not acknowledge a message, the devices consider the link to be timed out. Once a link has timed out, the units must send and receive a specified number of good RF communications packets before the link is reinstated. Outputs are restored to current values when the link is recovered.

The lost link option is only available on the 4P4M2M2 models.
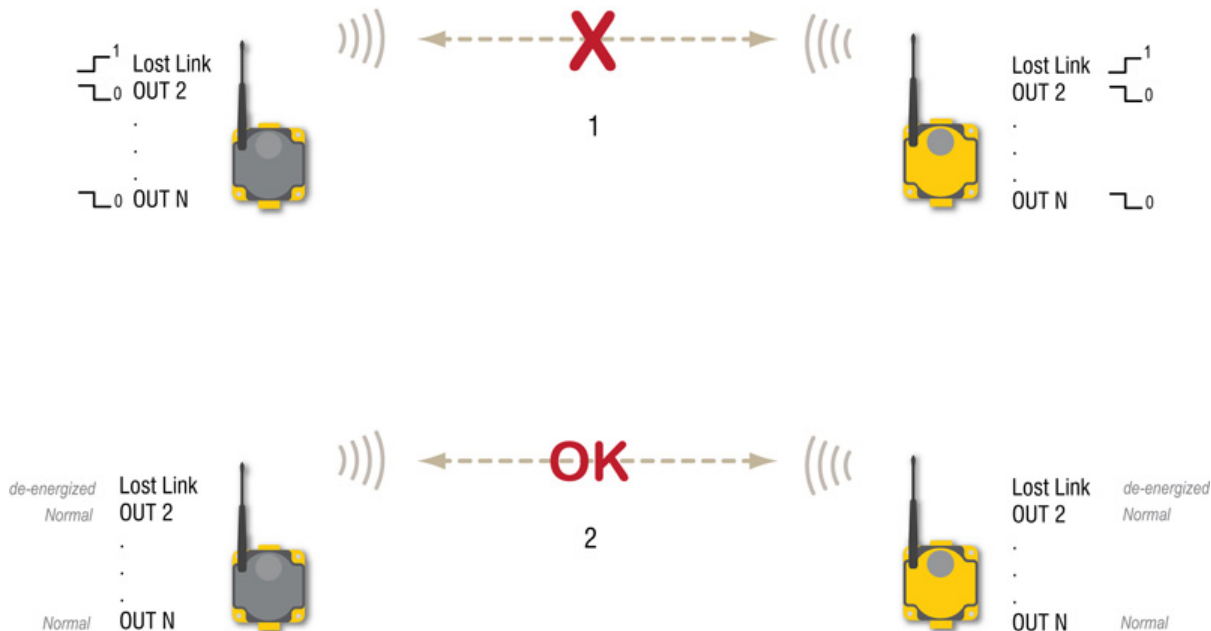
1. The RF link between the devices has timed out. In this example, the lost link is energized and the outputs have been programmed by the DIP switches to go to their de-energized states (default DIP switch position).

2. The RF link between the devices has recovered and the outputs return to their current states.

A wireless network can be hindered by radio interference and by obstructions in the path of the receiver and transmitter. To achieve the best radio performance possible, carefully consider the installation locations for all devices. The need for a clear path increases as the transmission distance increases.

Collocated Networks

To prevent interference between collocated wireless networks, assign each wireless network a different Network ID. The Network ID is a unique identifier assigned to each wireless network using the rotary dials on the Gateway.

Setting the Network ID on the DX70s

The Network ID is a unique identifier assigned to each wireless network that minimizes the chances of two collocated networks interfering with each other. Assigning different NIDs to different networks improves collocation performance in dense installations.

To assign the Network ID for the DX70 network, use the Gateway's rotary dials. Valid Network IDs are 01 through 32, in decimal, establish using both rotary dials on the Gateway.

1. Set the Gateway's left dial to either 0, 1, 2, or 3.

2. Set the Gateway's right dial to any number from 0 to 9 when the left dial is at 0, 1, or 2; or set to 0 through 2 when the left dial is at 3. (Positions A through F are invalid network ID numbers.)

Accessories

The accessories list includes FCC approved antennas, antenna cabling, surge suppressors, power supplies, replacement batteries, enclosures, cables, and other hardware.

Antennas

Not to scale
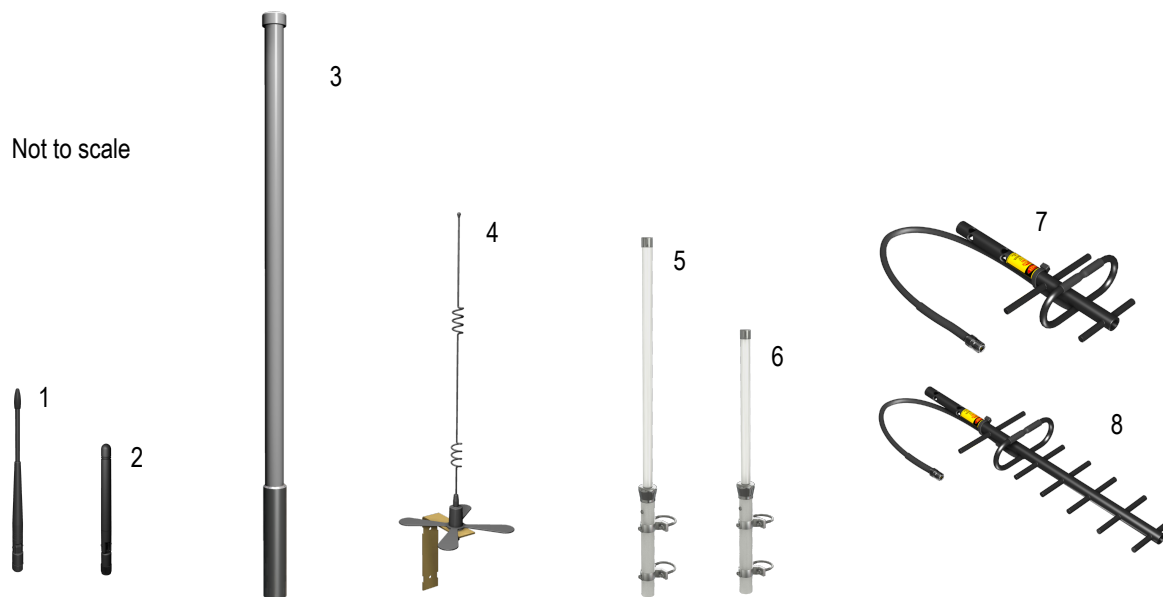
	Part No.	Model No.	Description
Omni-Directional Antennas			
1	76908	BWA-9O2-C	902-928 MHz, 2 dBi, RP-SMA Male, Rubber swivel (ships with 900 MHz DX80 devices)
	17721	BWA-9O5-C	902-928 MHz, 5 dBi, RP-SMA Male, Rubber swivel
2	77816	BWA-2O2-C	2.4 GHz, 2 dBi, RP-SMA Male, Rubber swivel, 3 1/4" (ships with 2.4 GHz DX80 devices)
	77817	BWA-2O5-C	2.4 GHz, 5 dBi, RP-SMA Male, Rubber swivel, 6 1/2"
	77818	BWA-2O7-C	2.4 GHz, 7 dBi, RP-SMA Male, Rubber swivel, 9 1/4"
3	77481	BWA-9O6-A	902-928 MHz, 6 dBd, N Female, Fiberglass, 71.5" Outdoor
4	77819	BWA-9O5-B	902-928 MHz, 5 dBd/7.2 dBi, N Female, with Ground Plane, 32" Indoor/Outdoor
5	81080	BWA-2O8-A	2.4 GHz, 8.5 dBi, N Female, 24" Indoor/Outdoor
6	81081	BWA-2O6-A	2.4 GHz, 6 dBi, N Female, 16" Indoor/Outdoor
Directional (Yagi) Antennas			
7	77479	BWA-9Y6-A	890-960 MHz, 6.5 dBd, N Female, 6.8" x 13" Outdoor
8	77480	BWA-9Y10-A	890-960 MHz, 10 dBd, N Female, 6.8" x 24" Outdoor

Other Power Supplies

Part No.	Model No.	Description
65837	SPS101Q	DC Power Supply, 120 mA, 12–30V dc, 5-pin Euro-style QD

	Part No.	Model No.	Description
	65848	SPS101QP	DC Power Supply, 120 mA, 12–30V dc, 5-pin Euro-style QD and pigtail
	77422	PS24W	DC Power Supply, 500 mA, 24V dc, Demo kit power supply
	74321	EZAC-E-QE5	DC Power Supply, 700 mA, 24V dc, 5-pin Euro-style QD, Hard-wired AC power connection
	73466	EZAC-E-QE5-QS5	DC Power Supply, 700 mA, 24V dc, 5-pin Euro-style QD, 5-pin Mini QD AC power connection
	76809	PSDINA-24-4	DC Power Supply, 4 Amps, 24V dc, Terminal block connection, Converts 85-264V ac 50/60 Hz
	26007	PSDINM-24-04	DC Power Supply, 0.4 Amps, 24V dc, with DIN Rail Mount
	26008	PSDINM-24-10	DC Power Supply, 1.0 Amps, 24V dc, with DIN Rail Mount
	26009	PSDINM-24-17	DC Power Supply, 1.7 Amps, 24V dc, with DIN Rail Mount
	26010	PSDINM-24-25	DC Power Supply, 2.5 Amps, 24V dc, with DIN Rail Mount

Surge Suppressors

	Part No.	Model No.	Description
	79296	BWC-LMRSFRPB	Surge Suppressor, bulkhead, RP-SMA Type
	12477	BWC-LFNBMN-DC	Surge Suppressor, bulkhead, N-Type, dc Blocking

Cordsets and SureCross Cables

Antenna Cables

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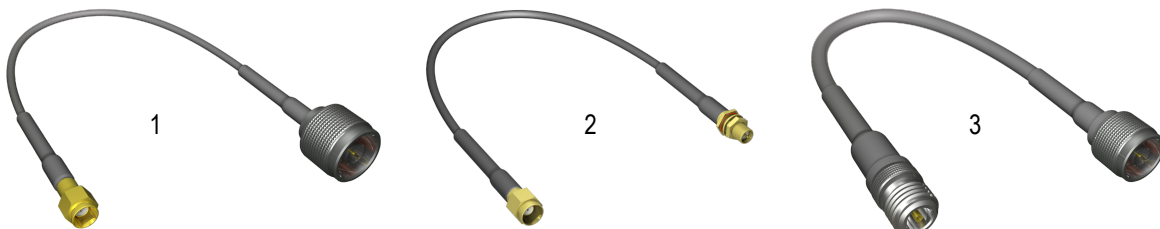
	Part No.	Model No.	Description
1	77486	BWC-1MRSMN05	LMR200 RP-SMA to N Male, 0.5M
	77820	BWC-1MRSMN2	LMR200 RP-SMA to N Male, 2M
2	78544	BWC-1MRSFRSB0.2	RG58, RP-SMA to RP-SMAF Bulkhead, 0.2M
	78337	BWC-1MRSFRSB1	RG58, RP-SMA to RP-SMAF Bulkhead, 1M
	78338	BWC-1MRSFRSB2	RG58, RP-SMA to RP-SMAF Bulkhead, 2M
	77488	BWC-1MRSFRSB4	RG58, RP-SMA to RP-SMAF Bulkhead, 4M
3	77489	BWC-4MNFN3	LMR400 N Male to N Female, 3M
	77490	BWC-4MNFN6	LMR400 N Male to N Female, 6M
	77821	BWC-4MNFN15	LMR400 N Male to N Female, 15M
	77822	BWC-4MNFN30	LMR400 N Male to N Female, 30M

Euro-Style Cordsets

	Part No.	Model No.	Description
	78382	BWA-QD5.5	Prewired 5-pin Euro connector, 1/2-14 NBSM
	78383	BWA-QD8.5	Prewired, 8-pin Euro connector, 1/2-14 NBSM
	78384	BWA-QD12.5	Prewired 12-pin Euro connector, 1/2-14 NBSM
	58912	FIC-M12F4	Euro-Style Field-Wireable Connector 4-pin Female Straight
	62837	DEUR-506.6C	Cordset, 5-pin Euro-style, double ended, male/female, 1.83m
	72333	DEE2R-51D	Cordset, 5-pin Euro-style, double ended, male/female, 0.3m
	72334	DEE2R-53D	Cordset, 5-pin Euro-style, double ended, male/female, 1m
	72636	DEE2R-58D	Cordset, 5-pin Euro-style, double ended, male/female, 2.4m
	71038	MQDC1-501.5	Cordset, 5-pin Euro-style, single ended, female, 0.5m
	12597	MQDMC-401	Cordset, 4-pin Euro-style, single ended, male, straight, 0.5m, longer pigtail ends for DX80…C models
	51127	MQDC1-506	Cordset, 5-pin Euro-style, single ended, female, 1.83m
	47812	MQDC1-515	Cordset, 5-pin Euro-style, single ended, female, 4.57m
	47814	MQDC1-530	Cordset, 5-pin Euro-style, single ended, female, 9.14m
	51128	MQDC1-506RA	Cordset, 5-pin Euro-style, single ended, female, right-angle, 1.83m
	47813	MQDC1-515RA	Cordset, 5-pin Euro-style, single ended, female, right-angle, 4.57m
	47815	MQDC1-530RA	Cordset, 5-pin Euro-style, single ended, female, right-angle, 9.14m

1. Brown
2. White
3. Blue
4. Black
5. Gray

Right-angle cordsets are not compatible with the DX70 devices. When facing the Node or Gateway toward you and the quick disconnect connection is facing down, the right-angle cables exit to the right.

If using the communication lines, the cable length cannot exceed 3 meters, or 10 feet.

When using the FlexPower Node with integrated battery, use the double ended cordsets. For a FlexPower Node with external power supply, use the single ended cordset.

Other Cables

Part No.	Model No.	Description
79985	BWA-RIBBON-001	Ribbon cable, 20-pin DBL socket
10200	BWA-HW-010	Cable, FlexPower Current Monitoring

Enclosures and Relay Boxes

Part No.	Model No.	Description
11320	BWA-EF14128	Enclosure Fiberglass Hinged 14"x12"x8"
11321	BWA-EF1086	Enclosure Fiberglass Hinged 10"x8"x6"
11322	BWA-EF866	Enclosure Fiberglass Hinged 8"x6"x6"
11326	BWA-PA1412	Panel, 14 x 12
11327	BWA-PA108	Panel, 10 x 8
11327	BWA-PA86	Panel, 8 x 6
11329	BWA-PM12	Pole Mount, 12 inch
11340	BWA-PM8	Pole Mount, 8 inch
11341	BWA-PM6	Pole Mount, 6 inch
11346	IB6RP	Interface Relay Box, 18-26V dc inputs, isolated relay outputs (not shown)

Replacement Parts for DX70 Models

Part No.	Model No.	Description	Items
76907	BWA-HW-001	Mounting Hardware Kit	Screw, M5-0.8 x 25 mm, SS (4)
			Screw, M5-0.8 x 16mm, SS (4)
			Hex nut, M5-0.8mm, SS (4)
			Bolt, #8-32 x 3/4", SS (4)
76910	BWA-HW-003	PTFE Tape	
16328	BWA-HW-004	Replacement Seals	O-ring, rotary access cover, PG21 (2)
			O-ring, body gasket (2)

Part No.	Model No.	Description	Items
			Access cover, rotary, clear plastic (2)
79438	BWA-CG.5-10	Cable Glands, 1/2-inch NPT	10 pieces, cordgrips for cable diameters 0.17'' to 0.45''
79984	BWA-HP.5-10	Dummy Hole Plugs, 1/2-inch NPT	10 pieces
77161	SMBDX80DIN	Bracket assembly, DIN rail, flat mount	

Radio Certifications

Banner's SureCross product line is certified by the FCC, European Union, and many other countries for operation within specific radio frequencies.

FCC Certification, 900MHz

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 collocated 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.

Model Number	Antenna Type	Maximum Gain
	Integral antenna	Unity gain

Model Number	Antenna Type	Maximum 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 antennas

FCC Certification, 2.4GHz

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 collocated 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.

Model Number	Antenna Type	Maximum Gain
	Integral antenna	Unity gain

Model Number	Antenna Type	Maximum 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

Certified For Use in the Following Countries

The SureCross radio devices are approved for use in the following countries.

	Radio Modules		
Country	900 MHz (150 mW)	900 MHz (1 Watt)	2.4 GHz (65 mW)
Australia			x
Austria			x
Bahamas, The	x		x
Bahrain (Kingdom of)			x
Belgium			x
Brazil			x
Bulgaria			x
Canada	x	x	x
Chile			x
China (People's Republic of)			x
Colombia	x		x
Cyprus			x
Czech Republic			x
Denmark			x
Ecuador			x
Estonia			x
Egypt			x
Finland			x
France			x
Germany			x
Greece			x
Hungary			x
Iceland			x
India			x
Ireland			x
Israel			x*
Italy			x

Country	Radio Modules		
	900 MHz (150 mW)	900 MHz (1 Watt)	2.4 GHz (65 mW)
Latvia			x
Liechtenstein			x
Lithuania			x
Luxembourg			x
Malta			x
Mexico	x	x	x
Netherlands			x
New Zealand			x
Norway			x
Panama	x		x
Poland			x
Portugal			x
Romania			x
Saudi Arabia (Kingdom of)			x
Singapore			x
Slovakia			x
Slovenia			x
South Africa			x
Spain			x
Sweden			x
Switzerland			x
Taiwan			x **
Thailand			x
United Arab Emirates			x
United Kingdom			x
United States of America	x	x	x

Bulgaria - Authorization required for outdoor and public service use.

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 prescrites dans le Reglement sur le brouillage radioélectrique édits par le ministere des Communications du Canada.

France - In Guyane (French Guiana) and La Réunion (Reunion Island), outdoor use not allowed.

* **Israel** - DX80 and DX99 models are certified for the external antenna models only.

Italy - If used outside of own premises, general authorization is required.

Luxembourg - General authorization is required for public service.

** **Taiwan** - Taiwan is certified to operate specific DX70, DX80, and DX99 models. For a list of specific models, refer to the certificate.

Additional Statements - 900 MHz

This device has been designed to operate with the antennas listed on Banner Engineering's website and having a maximum gain of 9 dBm. Antennas not included in this list or having a gain greater that 9 dBm are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen such that the equivalent isotropically radiated power (EIRP) is not more than that permitted for successful communication.

Transmit Power Levels

The SureCross wireless products were certified for use in these countries using the standard antenna that ships with the product. When using other antennas, verify you are not exceeding the transmit power levels allowed by local governing agencies.

Specifications

Radio

Range
900 MHz: Up to 4.8 kilometers (3 miles) *
2.4 GHz: Up to 3.2 kilometers (2 miles) *

Transmit Power
900 MHz: 21 dBm conducted
2.4 GHz: 18 dBm conducted, less than or equal to 20 dBm EIRP

900 MHz Compliance (150 mW Radios)
FCC ID TGUDX80 - This device complies with FCC Part 15, Subpart C, 15.247
IC: 7044A-DX8009

2.4 GHz Compliance
FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247
ETSI/EN: In accordance with EN 300 328: V1.7.1 (2006-05)
IC: 7044A-DX8024

Spread Spectrum Technology
FHSS (Frequency Hopping Spread Spectrum)

Antenna Connection
Ext. Reverse Polarity SMA, 50 Ohms
Max Tightening Torque: 0.45 N·m (4 in·lbf)

Link Timeout
1 or 4 seconds

* With the 2 dB antenna that ships with the product. High-gain antennas are available, but the range depends on the environment and line of sight. To determine the range of your wireless network, perform a Site Survey.

General

Power*
Requirements: +10 to 30V dc (For European applications: +10 to 24V dc, ± 10%). (See UL section below for any applicable UL specifications)
Consumption: Less than 1.4 W (60 mA) at 24V dc

Housing
Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers
Weight: 0.26 kg (0.57 lbs)
Mounting: #10 or M5 (SS M5 hardware included)
Max. Tightening Torque: 0.56 N·m (5 in·lbf)

Interface
Indicators: Red/Green Power LED, Red/Yellow Signal LED

Wiring Access
Two 1/2-inch NPT

* For European applications, power the DX80 from a Limited Power Source as defined in EN 60950-1.

Inputs

Discrete Inputs
Rating: 3 mA max current at 30V dc
Sample Rate: 62.5 milliseconds
Report Rate: On change of state
Discrete Input ON Condition
PNP: Greater than 8V
NPN: Less than 0.7V
Discrete Input OFF Condition
PNP: Less than 5V
NPN: Greater than 2V or open

Analog Inputs
Rating: 24 mA
Impedance: 100 Ohms
Sample Rate: 62.5 milliseconds
Report Rate: 1 second or On Change of State (1% change in value)
Accuracy: 0.1% of full scale +0.01% per °C
Resolution: 12-bit

To verify the analog input's impedance, use an Ohm meter to measure the resistance between the analog input terminal (AI*x*) and the ground (GND) terminal.

Outputs

Discrete Outputs
Update Rate: 125 milliseconds
ON Condition: Supply minus 2V
OFF Condition: Less than 2V
Discrete Output Rating (PNP)
100 mA max current at 30V dc
ON-State Saturation: Less than 3V at 100 mA
OFF-state Leakage: Less than 10 µA

Max. End-to-End Latency
300 milliseconds *
Analog Outputs
Update Rate: 125 milliseconds
Accuracy: 0.1% of full scale +0.01% per °C
Resolution: 12-bit

*From the sample point and with a good RF signal.

Environmental

Environmental Conditions
Rating: IEC IP67; NEMA 6; (See UL section below for any applicable UL specifications)
Operating Temperature: −40 to +85° C
Operating Humidity: 95% max. relative (non-condensing)
Radiated Immunity: 10 V/m, 80-2700 MHz (EN61000-6-2)

Shock and Vibration
IEC 68-2-6 and IEC 68-2-7
Shock: 30g, 11 millisecond half sine wave, 18 shocks
Vibration: 0.5 mm p-p, 10 to 60 Hz

Operating the devices at the maximum operation conditions for extended periods can shorten the life of the device.

Certifications

Warnings

The manufacturer does not take responsibility for the violation of any warning listed in this document.

Make no modifications to this product. Any modifications to this product not expressly approved by Banner Engineering could void the user's authority to operate the product. Contact the Factory for more information.

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Antenna Installation

Always install and properly ground a qualified surge suppressor when installing a remote antenna system. Remote antenna configurations installed without surge suppressors invalidate the manufacturer's warranty.

Always keep the ground wire as short as possible and make all ground connections to a single-point ground system to ensure no ground loops are created. No surge suppressor can absorb all lightning strikes. Do not touch the SureCross™ device or any equipment connected to the SureCross device during a thunderstorm.

Exporting SureCross Radios

It is our intent to fully comply with all national and regional regulations regarding radio frequency emissions. **Customers who want to re-export this product to a country other than that to which it was sold must ensure the device is approved in the destination country.** A list of approved countries appears in the *Agency Certifications* section of the product manual. The SureCross wireless products were certified for use in these countries using the antenna that ships with the product. When using other antennas, verify you are not exceeding the transmit power levels allowed by local governing agencies. Consult with Banner Engineering if the destination country is not on this list.

Banner Engineering Corp Limited Warranty

Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

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Banner Engineering Corp. reserves the right to change, modify or improve the design of the product without assuming any obligations or liabilities relating to any product previously manufactured by Banner Engineering Corp.

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