

Datasheet

The SureCross® wireless system is a radio frequency network with integrated I/O that can operate in most environments and eliminate the need for wiring runs. Wireless networks are formed around a Gateway, which acts as the wireless network master device, and one or more Nodes.



- Wireless industrial I/O device with two selectable discrete inputs, two NMOS discrete outputs, and two thermistor inputs when configured for discrete mode; two selectable discrete inputs, two NMOS discrete outputs, two analog inputs, and two thermistor inputs when configured for analog mode; switch power outputs in each mode
- Selectable transmit power levels of 250 mW or 1 Watt for 900 MHz models and 65 mW for 2.4 GHz models
- FlexPower® power options allow for 10 to 30 V dc, solar, and battery power sources for low power applications.
- DIP switches for user configuration
- Frequency Hopping Spread Spectrum (FHSS) technology and Time Division Multiple Access (TDMA) control architecture 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

Model	Freq.	Power	Housing	Inputs and Outputs	
DX80N9X2S-P1	900 MHz ISM Band	10 to 30 V dc or battery supply module	IP67, NEMA 6	Discrete Mode	Analog Mode
DX80N9X1S-P1E		10 to 30 V dc or integrated battery	IP54, NEMA 4	Inputs: Two selectable discrete and two thermistor	Inputs: Two selectable discrete, two analog (0–20 mA or 0–10 V), and two thermistor
DX80N2X2S-P1	2.4 GHz ISM Band	10 to 30 V dc or battery supply module	IP67, NEMA 6	Outputs: Two NMOS/sinking discrete	Outputs: Two NMOS/sinking discrete
DX80N2X1S-P1E		10 to 30 V dc or integrated battery	IP54, NEMA 4	Switch Power: Two	Switch Power: One *

* This model can be configured to supply continuous power. For more information and detailed instructions, refer to the technical note "[Configuring for Continuous Switch Power or Host Controlled Switch Power](#)," part number b_3099584.



DX80...C (IP20; NEMA 1) models are also available. To order this model with an IP20 housing, add a C to the end of the model number: DX80N9X2S-P1C.

Integrated battery models are also available without batteries. If you purchase a model without the battery, Banner Engineering recommends using the XENO XL-205F battery or equivalent. For DX99 models, only a XENO XL-205F battery is certified.



WARNING: Not To Be Used for Personnel Protection

Never use this device as a sensing device for personnel protection. Doing so could lead to serious injury or death. This device 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.





CAUTION: Never Operate 1 Watt Radios Without Antennas

To avoid damaging the radio circuitry, never power up SureCross Performance or SureCross MultiHop (1 Watt) radios without an antenna.

SureCross User Configuration Tool

The User Configuration Tool (UCT) software runs on any Windows machine and uses a converter cable to connect your Gateway to the computer.



The User Configuration Tool (UCT) offers an easy way to link I/O points in your wireless network, view I/O register values graphically, and set system communication parameters when a host system is not part of the wireless network. Download the most recent revisions of the UCT software from Banner Engineering's website: <http://www.bannerengineering.com/wireless>.

The UCT requires a special USB to RS-485 (model number BWA-UCT-900 for 1 Watt radios, BWA-HW-006 can be used for all other radios) converter cable to pass information between your computer and the Gateway.

Setting Up Your Wireless Network

To set up and install your wireless network, follow these steps.

Disconnect the power from your SureCross devices.

1. Configure the DIP switches of all devices.
2. Connect the sensors to the SureCross devices.
3. Apply power to all devices.
On the Gateway, LED 1 is solid green. On the Node, LED 2 flashes red to indicate there is no radio link to the Gateway.
4. Form the wireless network by binding the Nodes to the Gateway. If the binding instructions are not included in the datasheet, refer to the product manual for binding instructions.
5. Observe the LED behavior to verify the devices are communicating with each other.
On the Gateway, LED 1 is solid green. On the Node, LED 1 flashes green to indicate it is communicating with the Gateway.
6. Conduct a site survey between the Gateway and Nodes. If the site survey instructions are not included in this datasheet, refer to the product manual for detailed site survey instructions.
7. Install your wireless sensor network components. If installation instructions are not included in this datasheet, refer to the product manual for detailed installation instructions.

For additional information, including installation and setup, weatherproofing, device menu maps, troubleshooting, and a list of accessories, refer to one of the following product manuals.

- SureCross Quick Start Guide: [128185](#)
- SureCross Wireless I/O Network Instruction Manual: [132607](#)
- Web Configurator Instruction Manual (used with "Pro" and DX83 models): [134421](#)
- Host Controller Systems Instruction Manual: [132114](#)

Configure the DIP Switches

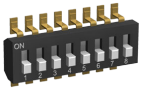
Before making any changes to the DIP switch positions, disconnect the power. DIP switch changes will not be recognized if power isn't cycled to the device.

For parameters not set via DIP switches, use the User Configuration Tool (UCT) to make configuration changes. For parameters set using the DIP switches, the DIP switch positions override any changes made using the User Configuration Tool.

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.
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

Device Settings	Switches	
	1	2
Transmit power level: 1 Watt (30 dBm)	OFF*	
Transmit power level: 250 mW (24 dBm), DX80 compatibility mode	ON	
Analog configuration		OFF*
Discrete configuration		ON

* Default configuration

Analog or Discrete Configuration

Select between an analog configuration or a discrete configuration using the DIP switch specified in the table. The default switch settings for this device are all in the OFF position.

Transmit Power Levels

The 900 MHz radios can be operated at 1 watt (30 dBm) or 250 mW (24 dBm). While the radios operate in 1 Watt mode, they cannot communicate with 150 mW DX80 radio devices. To communicate with the 150 mW radio models, operate this radio in 250 mW mode. For 2.4 GHz radios, this DIP switch is disabled. The transmit power for 2.4 GHz is fixed at about 100 mW EIRP (18 dBm), making the 2.4 GHz Performance models automatically compatible with the DX80 2.4 GHz models.

DIP Switch Settings for Analog Configuration (Switch 2 OFF)

Select between an analog configuration or a discrete configuration using DIP switch 2.

For analog configuration, DIP switch 2 is in the OFF position (factory default). Analog configuration has analog IN 1 linked to switch power 1 (SP1) and is programmable using switches four through eight. Sample and report rates for analog input 2 (not available in the integrated battery model) are listed in the specifications. Discrete inputs 1 and 2 are also active in this configuration and the input types are defined using switch 3. Two sinking discrete outputs are active for this configuration.

Analog Configuration, Switch 2 OFF	DIP Switches					
Descriptions	3	4	5	6	7	8
Discrete Sinking (NPN)	OFF*					
Discrete Sourcing (PNP)	ON					
Boost Voltage: 10V (to Analog IN 1)		OFF*				
Boost Voltage: 15V (to Analog IN 1)		ON				
Warm-up Time 10 milliseconds			OFF*			
Warm-up Time 500 milliseconds			ON			
Sample/Report Rate 1 second				OFF	OFF	OFF
Sample/Report Rate 2 seconds				OFF	OFF	ON
Sample/Report Rate 4 seconds				OFF	ON	OFF
Sample/Report Rate 16 seconds				OFF	ON	ON
Sample/Report Rate 64 seconds				ON	OFF	OFF
Sample/Report Rate 5 minutes				ON	OFF	ON

Analog Configuration, Switch 2 OFF	DIP Switches					
Descriptions	3	4	5	6	7	8
Modbus or UCT configured (overrides DIP switches)				ON	ON	OFF
Sample/Report Rate 15 minutes				ON	ON	ON

Analog IN 2 (not available in integrated battery model), Discrete 1, and Discrete 2 are not powered from switched power terminals. In this configuration, SP2 is disabled. If you need SP2, contact the factory.

DIP Switch Settings for Discrete Configuration (DIP Switch 2 ON)

The discrete configuration matches the switch power outputs (SP1, SP2) with the discrete inputs. The discrete configuration is selected when switch 2 is in the ON position. Two sinking discrete outputs are active for this configuration.

Discrete Configuration, Switch 2 ON	DIP Switches					
Descriptions	3	4	5	6	7	8
Discrete Sinking (NPN)	OFF*					
Discrete Sourcing (PNP)	ON					
Boost Voltage: 5V		OFF*				
Boost Voltage: 10V		ON				
Warm-up Time 4 milliseconds			OFF*			
Warm-up Time 10 milliseconds			ON			
Sample/Report Rate 62.5 milliseconds				OFF	OFF	OFF
Sample/Report Rate 125 milliseconds				OFF	OFF	ON
Sample/Report Rate 250 milliseconds				OFF	ON	OFF
Sample/Report Rate 500 milliseconds				OFF	ON	ON
Sample/Report Rate 1 second				ON	OFF	OFF
Sample/Report Rate 2 seconds				ON	OFF	ON
Modbus or UCT configured (overrides DIP switches)				ON	ON	OFF
Sample/Report Rate 16 seconds				ON	ON	ON

Discrete IN 1 uses switched power 1 (SP1). Discrete IN 2 uses switched power 2 (SP2).

Boost Voltage

The boost voltage is the power supplied to the sensor powered by this *FlexPower* Node.

Discrete Input Type

Select the type of discrete input sensors to use with this device: sourcing (PNP) sensors or sinking (NPN) sensors.

Modbus/User Configuration Tool (UCT) or DIP Switch Configured

In Modbus/UCT Configured mode, the device parameters are changed using the User Configuration Tool (UCT) or a Modbus command. All DIP switch positions are ignored. In DIP Switch Configured mode, use the DIP switches to configure the parameters listed in the table.

Sample and Report Rates

The sample interval, or rate, defines how often the SureCross device samples the input. For battery-powered applications, setting a slower rate extends the battery life.

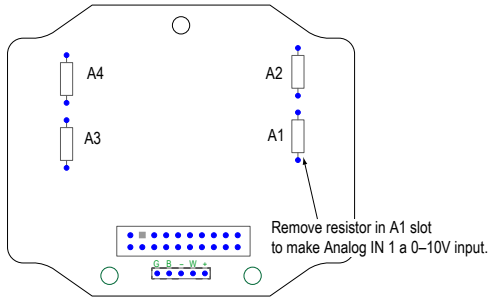
The report rate defines how often the Node communicates the I/O status to the Gateway. Change of state reporting sets the system to report only when the value crosses the threshold setting. For *FlexPower™* applications, setting the report rate to a slower rate extends the battery life.

Warm-Up Time

The warm-up time defines how long the device must power up the sensor before a stable sensor reading is taken.

Configuring Universal Analog Inputs for mA or V

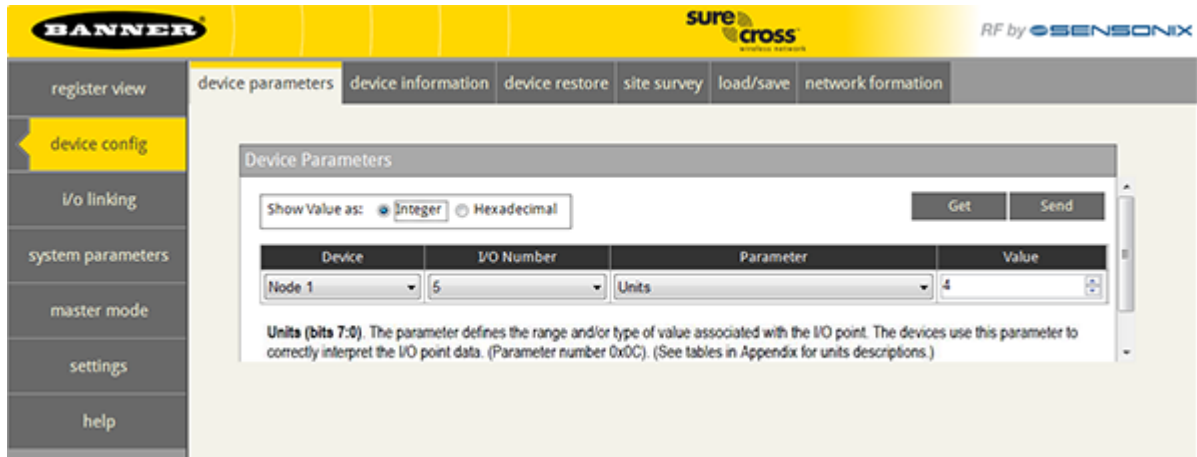
To configure inputs to use 0 to 10V instead of 0 to 20mA, remove the installed resistors from the marked locations on the wiring board. For example, to make analog input 1 a 0 to 10V input, follow these instructions.



Step 1. Cut out the resistor installed in the A1 (analog 1) slot. (Your wiring board may differ slightly from the board shown. Use the board's labels to confirm you have selected the correct resistor to cut.)

Step 2. Launch the User Configuration Tool software.

Step 3. Change the units parameter for this particular input on this device (Gateway or Node) to use voltage instead of milliamps. Refer to the Modbus Register table for the I/O number for each analog input. Writing a four (4) to the Units parameter defines the units as 0 to 10V. Writing a two (2) to the Units parameter defines the units as 0 to 20 mA.



Note that a 220 ohm 0.1% resistor must be installed for a 0 to 20mA input. The resistor must be removed for an input defined as a 0 to 10V input.

Mixing Performance and Non-Performance Radios in the Same Network

To comply with federal regulations, the 150 mW radios and 1 Watt radios communicate differently. To mix Performance radios with non-Performance radios:

- Performance radios must operate in 250 mW mode, not 1 Watt mode (DIP switch 1 ON)
- Non-Performance radios must be set to use Extended Address Mode (DIP switch 1 ON)

For more detailed instructions about setting up your wireless network, refer to the Quick Start Guide, Banner document number 128185. For more information about using Performance and non-Performance radios within the same network, refer the technical note titled *Mixing Performance Radios and 150 mW Radios in the Same Network* listed on the FAQ/ Knowledgebase section of Banner's Wireless Sensor Networks website.

Wiring Your SureCross® Device

Use the following wiring diagrams to first wire the sensors and then apply power to the SureCross devices.

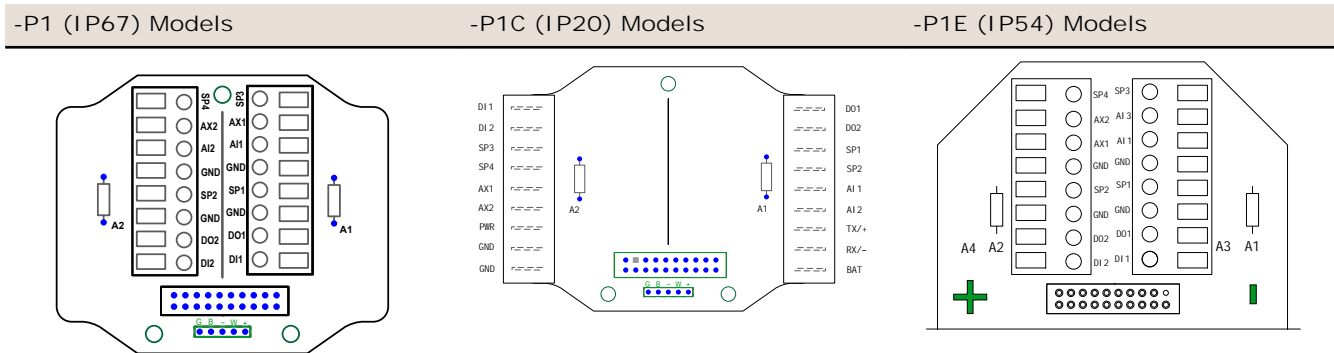
5-pin Euro-Style Wiring for Nodes

Wiring the 5-pin Euro-style connector depends on the model and power requirements of the device. Not all models can be powered by 10 to 30 V dc and not all models can be powered by 3.6 to 5.5 V dc. Refer to the Specifications to verify the power requirements of your device. For FlexPower devices, do not apply more than 5.5 V to the gray wire.

	Wire No.	Wire Color	10 to 30 V dc Powered	Battery Powered
	1	Brown	10 to 30 V dc	
	2	White		
	3	Blue	dc common (GND)	dc common (GND)
	4	Black		
	5	Gray		3.6 to 5.5 V dc

Wiring Boards

These are the wiring board for the DX80* *M6S-P1, -P1C, and -P1E models.



AIx or Ax. Analog IN x.

AX1. Thermistor

AX2. Thermistor

AOx. Analog OUT x.

B+. 3.6 to 5.5 V dc (for battery powered models only).

DIx. Discrete IN x.

DOx. Discrete OUT x.

GND. Ground/dc common connection.

SPx. Switch Power. Provides variable power sources for external devices.

PWR. Power, 10 to 30 V dc power connection.

RX/-. Serial comms line for Gateways and DX85s only. No connection for Nodes.

TX/+. Serial comms line for Gateways and DX85s only. No connection for Nodes

DX80...C Wiring

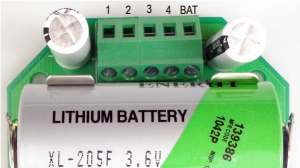
Wiring power to the DX80...C models varies depending the power requirements of the model. Connecting dc power to the communication pins (Tx/Rx) causes permanent damage. For FlexPower devices, do not apply more than 5.5 V to the B+ terminal.

Terminal Label	Gateway, DX85	10 to 30 V dc Powered Nodes	Battery Powered Nodes
V+	10 to 30 V dc	10 to 30 V dc	
Tx/+	RS485 / D1 / B / +		
V-	dc common (GND)	dc common (GND)	dc common (GND)
Rx/-	RS485 / D0 / A / -		
B+			3.6 to 5.5 V dc

Wiring for DX80...E Radios

Connecting dc power to the communication pins will cause permanent damage. The integrated battery DX80...E radios may also be powered by 10 to 30V dc. The power for the sensors can be supplied by the radio's SPx terminals or from the 10 to 30V dc used to power the radio.

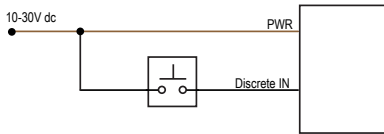
The BAT connection is a low voltage connection to the internal battery. Remove the internal battery if a low voltage source is connected to the BAT terminal. When powering the device from the integrated battery, the BAT connection must remain open.

	Integrated battery (RS-485) (P1E, M-H1E Models)	Integrated battery (RS-232) (P3E, P4E, M-H3E, M-H4E Models)
	<ol style="list-style-type: none"> 10 to 30V dc (optional) RS-485 / D1 / B / + dc common (GND) RS-485 / D0 / A / - 	<ol style="list-style-type: none"> 10 to 30V dc (optional) RS-232 Tx dc common (GND) RS-232 Rx

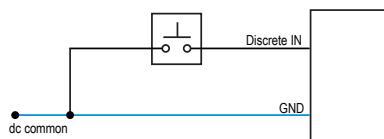
Wiring Diagrams

Connecting dc power to the communication pins will cause permanent damage. Do not exceed analog input ratings for analog inputs. Only connect sensor outputs to analog inputs.

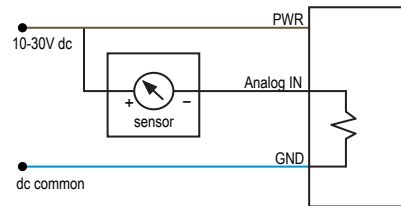
Discrete Input Wiring for PNP Sensors



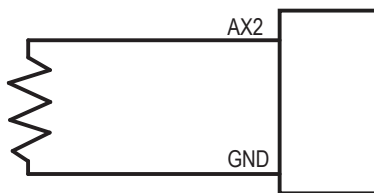
Discrete Input Wiring for NPN Sensors



Analog Input Wiring (10 to 30 V dc Power)

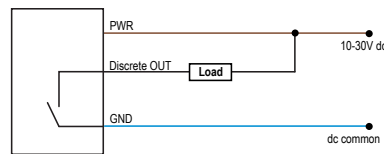


Thermistor Input Wiring



Use AX1 or AX2 for the thermistor input wiring.

Discrete Output Wiring (NPN or NMOS)



LED Behavior for the Gateways

After binding the Gateway and Nodes, verify all devices are communicating properly. The radios and antennas must be a minimum distance apart to function properly. Recommended minimum distances are:

- 2.4 GHz 65 mW radios: 1 foot
- 900 MHz 150 mW radios: 6 feet
- 900 MHz 1 Watt radios: 15 feet

LED 1	LED 2	Gateway Status
● (solid green)		Power ON
☼ (flashing red)	☼ (flashing red)	Device Error
	☼ (flashing amber)	Modbus Communication Active
	☼ (flashing red)	Modbus Communication Error

For Gateway and Ethernet Bridge systems, active Modbus communication refers to the communication between the Gateway and the Ethernet Bridge. For GatewayPro systems, the Modbus communication LEDs refer to the communication internal to the GatewayPro. For Gateway only systems, the Modbus communication LEDs refer to the communication between the Gateway and its host system (if applicable).

Modbus Register Table

I/O	Modbus Holding Register		I/O Type	Units	I/O Range		Holding Register Representation		Terminal Block Labels
	Gateway	Any Node			Min. Value	Max. Value	Min. (Dec.)	Max. (Dec.)	
1	1	1 + (Node# × 16)	Discrete IN 1	-	0	1	0	1	DI1
2	2	2 + (Node# × 16)	Discrete IN 2	-	0	1	0	1	DI2
3	3	3 + (Node# × 16)	Analog IN 1	mA / V	0.0	20.0 / 10.0	0	65535	AI1
4	4	4 + (Node# × 16)	Analog IN 2						AI2
5	5	5 + (Node# × 16)	Thermistor IN 1	°F/°C	-1638.3	+1638.4	-32768	32767	AX1
6	6	6 + (Node# × 16)	Thermistor IN 2						AX2
7	7	7 + (Node# × 16)	Reserved						
8	8	8 + (Node# × 16)	Device Message						
9	9	9 + (Node# × 16)	Discrete OUT 1	-	0	1	0	1	DO1
10	10	10 + (Node# × 16)	Discrete OUT 2	-	0	1	0	1	DO2
		...							
15	15	15 + (Node# × 16)	Control Message						
16	16	16 + (Node# × 16)	Reserved						

The temperature = (Modbus register value) ÷ 20.

Temperature values are stored as signed values in the Modbus register. A 0 in the register is interpreted as 0°; and -32767 (65535 unsigned) in the register (0xFFFF) is interpreted as $-1 \div 20 = -0.05^\circ$ in high resolution mode and $-1 \div 2 = -0.5^\circ$ in low resolution mode.

Storage Mode and Sleep Mode

While in storage mode, the radio does not operate. All SureCross® radios powered from an integrated battery ship from the factory in storage mode to conserve the battery. To wake the device, press and hold button 1 for 5 seconds. To put any FlexPower® or integrated battery SureCross radio into storage mode, press and hold button 1 for 5 seconds. The radio is in storage mode when the LEDs stop blinking, but in some models, the LCD remains on for an additional minute after the radio enters storage mode. After a device has entered storage mode, you must wait 1 minute before waking it.

During normal operation, the SureCross radio devices enter sleep mode after 15 minutes of operation. The radio continues to function, but the LCD goes blank. To wake the device, press any button.

Replacing the Integrated Battery (DX80...E Models)

To replace the lithium "D" cell battery in any integrated housing model, follow these steps.

1. Remove the four screws mounting the face plate to the housing and remove the face plate. Do not remove the radio cover from the face plate.
2. Remove the discharged battery and replace with a new battery.
Only use a 3.6V lithium battery from Xeno, model number XL-205F.
3. Verify the battery's positive and negative terminals align to the positive and negative terminals of the battery holder mounted within the case.
Caution: There is a risk of explosion if the battery is replaced incorrectly.
4. After replacing the battery, allow up to 60 seconds for the device to power up.

For outside or high humidity environments, conductive grease may be applied to the battery terminals to prevent moisture and corrosion buildup.

Properly dispose of your used battery according to local regulations by taking it to a hazardous waste collection site, an e-waste disposal center, or 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.

Replacement battery model number: BWA-BATT-001. For pricing and availability, contact Banner Engineering.



Specifications

Radio	General
Radio Range 900 MHz (1 Watt): Up to 9.6 km (6 miles) ¹ 2.4 GHz: Up to 3.2 km (2 miles)	Power DX80 and DX80...C Models 10 to 30 V dc or 3.6 to 5.5 V dc low power option (Outside the USA: 12 to 24 V dc, $\pm 10\%$ or 3.6 to 5.5 V dc low power option) ² DX80...E Models 3.6 V dc low power option from an internal battery or 10 to 30 V dc 900 MHz Consumption: Maximum current draw is < 40 mA and typical current draw is < 30 mA at 24 V dc. (2.4 GHz consumption is less.)
Minimum Separation Distance 900 MHz (1Watt): 4.57 m (15 ft) 2.4 GHz (65 mW): 0.3 m (1 ft)	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) DX80 and DX80...C Mounting: #10 or M5 (SS M5 hardware included) DX80...E Mounting: 1/4-inch or M7 (SS M7 hardware included) Max. Tightening Torque: 0.56 N·m (5 lbf·in)
Radio Transmit Power 900 MHz (1 Watt): 30 dBm (1 W) conducted (up to 36 dBm EIRP) 2.4 GHz: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP	Antenna Connection Ext. Reverse Polarity SMA, 50 Ohms Max Tightening Torque: 0.45 N·m (4 lbf·in)
900 MHz Compliance (1 Watt) FCC ID UE3RM1809: This device complies with FCC Part 15, Subpart C, 15.247 IC: 7044A-RM1809	Interface Indicators: Two bi-color LEDs Buttons: Two Display: Six character LCD
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	Wiring Access DX80 Models: Four PG-7, One 1/2-inch NPT, One 5-pin Euro-style male connector DX80...C Models: External terminals DX80...E Models: Two 1/2-inch NPT
Spread Spectrum Technology FHSS (Frequency Hopping Spread Spectrum)	
Link Timeout Gateway: Configurable via User Configuration Tool (UCT) software Node: Defined by Gateway	

Inputs and Outputs

Discrete Input Rating: 3 mA max current at 30 V dc Sample / Report Rates: DIP switch configurable	Discrete Output Rating (Performance NMOS) Less than 1 A max current at 30 V dc ON-State Saturation: Less than 0.7 V at 20 mA
Discrete Input ON Condition PNP: Greater than 8 V NPN: Less than 0.7 V	Discrete Output Update Rate: 1 second ON Condition: Less than 0.7 V OFF Condition: Open Output State Following Timeout: De-energized (OFF)
Discrete Input OFF Condition PNP: Less than 5 V NPN: Greater than 2 V or open	Switch Power Outputs Analog configuration: one Discrete configuration: two Host configuration: up to four
Analog Inputs Rating in 0–20 mA mode: 24 mA Rating in 0–10V mode: 10 V Impedance: Approx. 220 Ohms Analog Input 1 Sample/Report Rates: DIP switch configurable Analog Input 2 Sample/Report Rates: 1 second / 16 seconds Accuracy: 0.2% of full scale +0.01% per °C Resolution: 12-bit	Thermistor Input Model: Omega's 44006 or 44031 families of 10 kOhm Sample Rate: 1 second Report Rate: 16 seconds Accuracy: 0.4 °C (10 to 50 °C); Up to 0.8 °C (–40 to 85 °C)

¹ Radio range is 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.

² For European applications, power the DX80 from a Limited Power Source as defined in EN 60950-1.

Environmental ³

Ratings

DX80: IEC IP67; NEMA 6; (See UL section below for any applicable UL specifications)

DX80...C: IEC IP20; NEMA 1

DX80...E: IEC IP54; NEMA 4

Operating Conditions

Temperature (P1 and P1C models): -40 to 85 °C (Electronics); -20 to 80 °C (LCD)

Temperature (P1E model): -40 to 65 °C

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

Refer to the [SureCross DX80 Wireless I/O Network Product Manual](#) (p/n 132607) for installation and waterproofing instructions.

Included with Model

The following items ship with the DX80 radios.

- BWA-HW-002: DX80 Access Hardware Kit, containing four PG-7 plastic threaded plugs, four PG-7 nylon gland fittings, four PG-7 hex nuts, one 1/2-inch NPT plug, and one 1/2-inch nylon gland fitting. (Not included with IP20 DX80...C models)
- BWA-HW-001: Mounting Hardware Kit, containing four M5-0.8 x 25mm SS screws, four M5-0.8 x 16mm SS screws, four M5-0.8mm SS hex nuts, and four #8-32 x 3/4" SS bolts
- BWA-HW-003: PTFE tape
- BWA-902-C (900 MHz) or BWA-202-C (2.4 GHz): Antenna, 2 dBd Omni, Rubber Swivel RP-SMA Male. (Not included with Internal antenna models)
- Quick Start Guide (128185 for DX80 Gateways or 152653 for MultiHop models)
- MQDC1-506: 5-Euro (single ended) straight cable, 2m (Not included with FlexPower devices)
- BWA-HW-011: IP20 Screw Terminal Headers (2 pack) (Included only with the IP20 DX80...C models)

Included with Device (DX80...E Models)

The following items ship with the DX80...E (NEMA 4) models.

- Mounting hardware kit
- BWA-HW-003: PTFE tape
- BWA-902-C (900 MHz) or BWA-202-C (2.4 GHz): Antenna, 2 dBd Omni, Rubber Swivel RP-SMA Male. (Not included with Internal antenna models)
- Quick Start Guide (128185 for DX80 Gateways or 152653 for MultiHop models)

Warnings

Antenna Installations. 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. 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 *Radio 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 Corp. if the destination country is not on this list.

Violating 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. All specifications published in this document are subject to change; Banner reserves the right to modify product specifications or update documentation at any time. For the most recent version of any documentation, refer to: www.bannerengineering.com. © 2006-2013 Banner Engineering Corp. All rights reserved.

³ Operating the devices at the maximum operating conditions for extended periods can shorten the life of the device.

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.

THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND WHETHER ARISING UNDER COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.

This Warranty is exclusive and limited to repair or, at the discretion of Banner Engineering Corp., replacement. IN NO EVENT SHALL BANNER ENGINEERING CORP. BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR ANY EXTRA COSTS, EXPENSES, LOSSES, LOSS OF PROFITS, OR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM ANY PRODUCT DEFECT OR FROM THE USE OR INABILITY TO USE THE PRODUCT, WHETHER ARISING IN CONTRACT OR WARRANTY, STATUTE, TORT, STRICT LIABILITY, NEGLIGENCE, OR OTHERWISE.

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.