



SureCross™ DX80 Wireless Node

Configurable Node with 4 discrete inputs, 4 discrete outputs, 2 analog inputs, and 2 analog outputs

Features

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

- Wireless industrial I/O device with four discrete DIP switch selectable inputs, four discrete (sourcing) outputs, two analog (0–20 mA) inputs, and two analog (0–20 mA) outputs
- DIP switches for user configuration
- +10 to 30V dc power input
- 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) bands
- Transceivers provide two-way 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
- The DX80...C models are certified for use in Class I, Division 2, Group A, B, C, D Hazardous Locations when properly installed in accordance with the National Electrical Code, the Canadian Electrical Code, or applicable local codes/regulations (See *Specifications*)

For additional information and a complete list of accessories, including FCC approved antennas, refer to Banner Engineering's website, www.bannerengineering.com/surecross.



DX80N2X6S4P4M2M2



DX80N9X6S4P4M2M2C

Models

Model	Frequency	Antenna	Environmental Rating	I/O
DX80N9X6S4P4M2M2	900 MHz	External	IP67, NEMA 6	Discrete Inputs: Four Selectable Discrete Outputs: Four Sourcing Analog Inputs: Two 0–20 mA Analog Outputs: Two 0–20 mA
DX80N9X6W4P4M2M2	ISM Band	Internal		
DX80N2X6S4P4M2M2	2.4 GHz	External		
DX80N2X6W4P4M2M2	ISM Band	Internal		
DX80N9X6S4P4M2M2C	900 MHz	External	IP20, NEMA 1 Class I, Division 2, Group A, B, C, D Hazardous Locations (See <i>Specifications</i>)	
DX80N9X6W4P4M2M2C	ISM Band	Internal		
DX80N2X6S4P4M2M2C	2.4 GHz	External		
DX80N2X6W4P4M2M2C	ISM Band	Internal		

WARNING . . . Not To Be Used for Personnel Protection

Never use these products for personnel protection. Doing so could lead to serious injury or death.

These products do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A failure or malfunction can cause either an energized or de-energized output condition. Consult your current Banner Safety Products catalog for safety products that meet OSHA, ANSI, and IEC standards for personnel protection.



SureCross™ DX80 Wireless Node

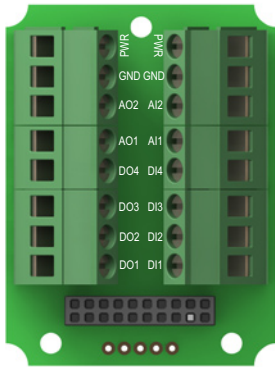
Hookup Diagrams

Modbus Register Block

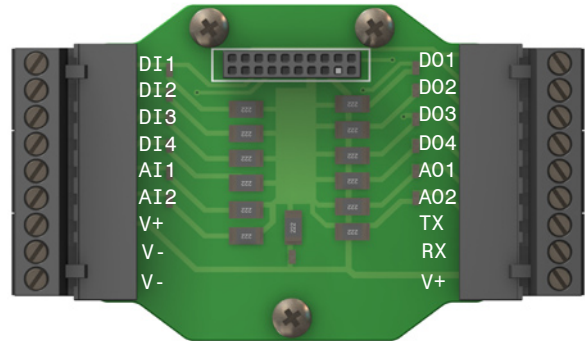
I/O Point*	Modbus Holding Register		I/O Type	Units	I/O Range		Holding Register Representation		Terminal Block Labels
	Gateway	Any Node			Min. Value	Max. Value	Min. (Decimal)	Max. (Decimal)	
1	1	1 + (node# × 16)	Discrete IN 1	-	0	1	0	1	DI1
2	2	2 + (node# × 16)	Discrete IN 2	-	0	1	0	1	DI2
3	3	3 + (node# × 16)	Discrete IN 3	-	0	1	0	1	DI3
4	4	4 + (node# × 16)	Discrete IN 4	-	0	1	0	1	DI4
5	5	5 + (node# × 16)	Analog IN 1	mA	0.0	20.0	0	65535	AI1
6	6	6 + (node# × 16)	Analog IN 2	mA	0.0	20.0	0	65535	AI2
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
11	11	11 + (node# × 16)	Discrete OUT 3	-	0	1	0	1	DO3
12	12	12 + (node# × 16)	Discrete OUT 4	-	0	1	0	1	DO4
13	13	13 + (node# × 16)	Analog OUT 1	mA	0.0	20.0	0	65535	AO1
14	14	14 + (node# × 16)	Analog OUT 2	mA	0.0	20.0	0	65535	AO2
15	15	15 + (node# × 16)	Control Message						
16	16	16 + (node# × 16)	Reserved						

* These are the I/O points as displayed on the device LCD.

IP67/NEMA 6 model terminal block



Class I, Division 2 model terminal block



5-pin Euro-style Hookup

Wire Color	10–30V dc Node
1 Brown	+10 to 30V dc Input
2 White	
3 Blue	dc common (GND)
4 Black	
5 Gray	

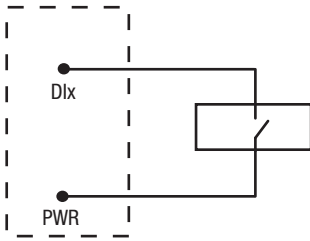
* Connecting dc power to the communication pins will cause permanent damage.

DX80...C Hookups

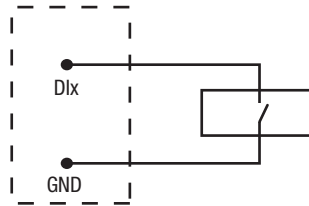
Terminal Block Labels	10–30V dc Node
V+	+10 to 30V dc Input
Tx	
V-	dc common (GND)
Rx	
B+	

* Connecting dc power to the communication pins will cause permanent damage.

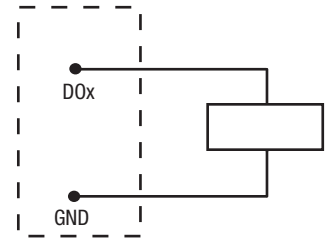
Sourcing Input Wiring



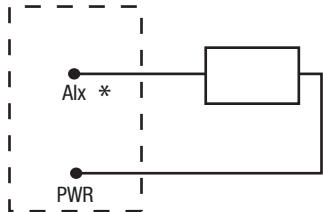
Sinking Input Wiring



Sourcing Output Wiring

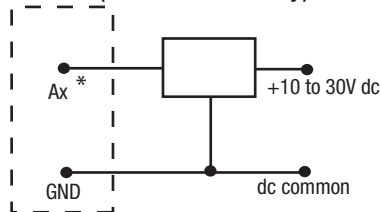


Analog (Sourcing) Input Wiring (10 to 30V dc Power)



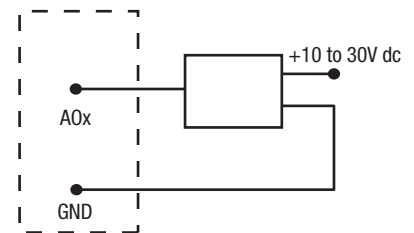
* Do not exceed analog input ratings for analog inputs. Only connect sensor outputs to analog inputs.

Analog (Sourcing) Input Wiring (Powered externally)

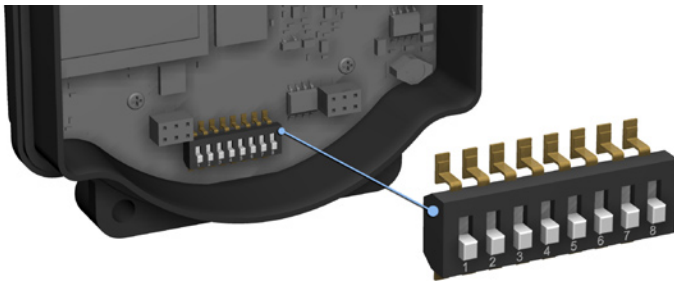


* Do not exceed analog input ratings for analog inputs. Only connect sensor outputs to analog inputs.

Analog (Sourcing) Output Wiring



Device Configuration



Turn the Power Off

Before making any changes to the DIP switch positions, disconnect the power. For devices with batteries integrated into the housing, remove the battery.

Accessing the DIP Switches

To access the 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.

For additional information, including installation and setup, weatherproofing, device menu maps, troubleshooting, and a list of accessories, refer to the SureCross™ Wireless I/O Network product manual, Banner p/n [132607](#).

SureCross™ DX80 Wireless Node

Device Settings	Switches							
	1	2	3	4	5	6	7	8
Rotary switch address mode	OFF*							
Extended address mode	ON							
Host configured (overrides switches 3-8)		OFF*						
Use switch settings		ON						
Inputs sourcing (PNP)			OFF*					
Inputs sinking (NPN)			ON					
Link loss output: zero				OFF*	OFF*			
Link loss output: one				OFF	ON			
Link loss output: hold last state				ON	OFF			
Link loss output: user configuration				ON	ON			
0–20 mA scale						OFF*		
4–20 mA scale						ON		

* Default configuration

Address Mode

The SureCross wireless devices may use one of two types of addressing modes: rotary switch addressing or extended addressing. In rotary switch address mode, the left rotary dial establishes the network ID and the right rotary dial sets the device ID. The wireless network is restricted to a maximum of 16 devices.

Extended address mode binds Nodes to a specific Gateway, allowing network expansion to more than 16 devices in a wireless network. For more information on extended address mode, refer to the SureCross™ Wireless I/O Network product manual.

The device ships in rotary switch address mode by default, with the DIP switch in the OFF position. To use extended address mode, change the DIP switch to the ON position.

Host Configured

Selecting “Host Configured (override switches)” uses the factory’s default configuration for this device or allows a host system to set parameters. If the host configured option is not selected, use the DIP switches to configure the device parameters.

Discrete Input Type

Select the discrete input type, sourcing (PNP) or sinking (NPN), using this DIP switch.

Analog Input and Output Scale

Use the DIP switch to select which current scale to use for all the device’s analog inputs and outputs: 0 to 20 mA or 4 to 20 mA. Note that this DIP switch is used only on the 0 to 20 mA models, not the 0 to 10V models.

Link Loss Outputs

The SureCross™ DX80 wireless devices use a deterministic link time-out method to address RF link interruption or failure. When a radio link fails, all pertinent wired outputs are de-energized until the link is recovered, ensuring that disruptions in the communications link result in predictable system behavior. Following a time-out, all outputs linked to the Node in question are set to zero, one, or hold the last stable state depending on the DIP switch position selected.

Specifications

Many of the parameters are configurable. The values in the tables represent factory defaults unless otherwise noted.

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, ≤ 20 dBm EIRP
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)
Antenna Connector	Ext. Reverse Polarity SMA, 50 Ohms
Antenna Max. Tightening Torque	0.45 N•m (4 in•lbf)
Link Timeout	Defined by Gateway

* With the standard 2 dB antenna. 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*	+10 to 30V dc For European applications: +10 to 24V dc, ± 10%
Power Consumption	Less than 1.4 W (60 mA) at 24V dc
Mounting	#10 or M5 (M5 hardware included)
M5 Fasteners Max. Tightening Torque	0.56 N•m (5 in•lbf)
Case Material	Polycarbonate
Weight	0.26 kg (0.57 lb.)
Indicators	Two LED, bi-color
Switches	Two Push Buttons
Display	Six Character LCD
External Cable Glands	Four PG-7 type, One 1/2 NPT type
Cable Glands Max. Tightening Torque	0.56 N•m (5 in•lbf)

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

Inputs

Discrete Inputs	Four Sourcing (default) or Sinking
Discrete Input Rating	3 mA max current at 30V dc
Discrete Input Sample Rate	62.5 milliseconds
Discrete Input Report Rate	On Change of State
Discrete Input ON Condition	Sourcing: Greater than 8V NPN Sinking: Less than 0.7V
Discrete Input OFF Condition	Sourcing: Less than 5V NPN Sinking: Greater than 2V or open
Analog Inputs	Two, 0 to 20 mA
Analog Input Sample Rate	125 milliseconds
Analog Input 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

SureCross™ DX80 Wireless Node

Outputs

Discrete Outputs	Four Sourcing
Discrete Output Rating	100 mA max current at 30V dc ON-State Saturation: Less than 3V at 100 mA OFF-state Leakage: Less than 10 µA
Discrete Output ON Condition	Supply minus 2V
Discrete Output OFF Condition	Less than 2V
Analog Outputs	Two, 0 to 20 mA
Discrete, Analog Output Update Rate	125 milliseconds
Output State Following RF Link Timeout	De-energized (OFF)
Accuracy	0.1% of full scale +0.01% per °C
Resolution	12-bit

Environmental

Environmental Rating*	IEC IP67; NEMA 6
Operating Temperature**	-40 to +85° C (Electronics); -20 to +80° C (LCD)
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

* Please refer to the SureCross™ Wireless I/O Network product manual, Banner p/n [132607](#), for installation and waterproofing instructions.

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



Environmental (DX80...C Models)

Environmental Rating* (device case)	IEC IP20; NEMA 1
Environmental Rating* (in suitable enclosure)	Class I, Division 2, Group A, B, C, D T4 -40 to 80° C
Operating Temperature**	-40 to +85° C (Electronics); -20 to +80° C (LCD)
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

* Please refer to the SureCross™ Wireless I/O Network product manual, Banner p/n [132607](#), for installation and waterproofing instructions.

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Certifications, Radio

900 MHz Models	FCC ID TGUDX80 - This device complies with FCC Part 15, Subpart C, 15.247 IC: 7044A-DX8009	
2.4 GHz Models	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	

It is Banner Engineering's 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 that the device is approved in the destination country. A list of approved countries appears in the SureCross Wireless I/O Network product manual, in the Agency Certifications section. Consult with Banner Engineering if the destination country is not on this list.

SureCross™ DX80 Wireless Node



Certification (DX8x..C External Wiring Terminals)

Class I, Division 2, Groups A, B, C, D. Certificate: 1921239
Ex/A Ex nA II T4

LCIE/ATEX Zone 2. Certificate: LCIE 09 ATEX 1035 U
II 3G
Ex nA IIC

Included with Device	Model	Qty	Item
DX80 Access Hardware Kit	BWA-HW-002	4	Plastic threaded plugs, PG-7
		4	Nylon gland fittings, PG-7
		4	Hex nuts, PG-7
		1	Plug, 1/2" NPT
		1	Nylon gland fitting, 1/2" NPT
Mounting Hardware Kit	BWA-HW-001	4	Screw, M5-0.8 x 25mm, SS
		4	Screw, M5-0.8 x 16mm, SS
		4	Hex nut, M5-0.8mm, SS
		4	Bolt, #8-32 x 3/4", SS
PTFE Tape	BWA-HW-003	1	PTFE tape
Antenna*	BWA-9O2-C, or BWA-2O2-C	1	Antenna, 902-928 MHz, 2 dBd Omni, Rubber Swivel RP-SMA Male, or Antenna, 2.4 GHz, 2 dBd Omni, Rubber Swivel RP-SMA Male
SureCross Literature CD	79685	1	SureCross Literature CD
SureCross Quick Start Guide**	128185	1	SureCross Quick Start Guide
Data sheet		1	
Cable	MQDC1-506	1	Cable, 5-pin Euro (single ended), Straight, 2 m

* Internal antenna devices do not ship with this antenna

** Gateways only

Included with Device (DX80...C Models)	Model	Qty	Item
Mounting Hardware Kit	BWA-HW-001	4	Screw, M5-0.8 x 25mm, SS
		4	Screw, M5-0.8 x 16mm, SS
		4	Hex nut, M5-0.8mm, SS
		4	Bolt, #8-32 x 3/4", SS
Antenna*	BWA-9O2-C, or BWA-2O2-C	1	Antenna, 902-928 MHz, 2 dBd Omni, Rubber Swivel RSMA Male, or Antenna, 2.4 GHz, 2 dBd Omni, Rubber Swivel RSMA Male
SureCross Literature CD	79685	1	SureCross Literature CD
SureCross Quick Start Guide**	128185	1	SureCross Quick Start Guide
Data sheet		1	
	BWA-HW-011	1	IP20 Screw Terminal Headers (2 pack)

* Internal antenna devices do not ship with this antenna

** Gateways only

SureCross™ DX80 Wireless Node

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



CAUTION . . .

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.

Always use lightning arrestors/surge protection with all remote antenna systems to avoid invalidating the Banner Engineering Corp. warranty. No surge protector can absorb all lightning strikes. Do not touch the SureCross device or any equipment connected to the SureCross device during a thunderstorm.

WARRANTY: Banner Engineering Corp. warrants its products to be free from defects for one year. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture found to be defective at the time it is returned to the factory during the warranty period. This warranty does not cover damage or liability for the improper application of Banner products. This warranty is in lieu of any other warranty either expressed or implied.

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