



# SureCross™ DX80 Node with Integrated Battery and Serial Interface

Configurable Node with an integrated battery and serial sensor interface for one serial sensing device

## Features



The SureCross™ DX80 is a radio frequency network system built around a Gateway and one or more Nodes.

- Wireless industrial I/O device with a serial interface to handle one serial sensing device
- Integrated lithium battery for up to five years of service
- 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 (internal antenna shown)

For additional information and a complete list of accessories, including FCC approved antennas, please refer to Banner Engineering's website, [www.bannerengineering.com/surecross](http://www.bannerengineering.com/surecross).

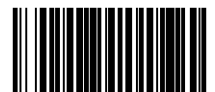
## Models

Model	FlexPower™	Frequency	Antenna	I/O
DX80N9X1S1S	3.6 to 5.5V dc low power option	900 MHz ISM Band	External	<b>Inputs:</b> Serial interface for one serial sensing device
DX80N9X1W1S			Internal	
DX80N2X1S1S		2.4 GHz ISM Band	External	
DX80N2X1W1S			Internal	

### **WARNING . . . Not To Be Used for Personnel Protection**

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

These devices do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A device 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 Integrated Battery Node with a Serial Interface

## Hookup Diagrams

### Modbus Register Block

I/O Point*	Node Modbus Register	DX80 Device I/O	
1	1 + (Node# • 16)	Serial device 1, primary input 1	0h00
2	2 + (Node# • 16)	Serial device 1, primary input 2	0h01
3	3 + (Node# • 16)	Serial device 1, primary input 3	0h02
4	4 + (Node# • 16)	Serial device 1, secondary input 1 OR Serial device 2, primary input 1	0h03** 0h00
5	5 + (Node# • 16)	Serial device 1, secondary input 2 OR Serial device 2, primary input 2	0h04** 0h01
6	6 + (Node# • 16)	Serial device 1, secondary input 3 OR Serial device 2, primary input 3	0h05** 0h02
7	7 + (Node# • 16)	Reserved	
8	8 + (Node# • 16)	Device Message	
9	9 + (Node# • 16)	Serial device 1, primary output 1	0h00
10	10 + (Node# • 16)	Serial device 1, primary output 2	0h01
11	11 + (Node# • 16)	Serial device 1, primary output 3	0h02
12	12 + (Node# • 16)	Serial device 1, secondary output 1 OR Serial device 2, primary output 1	0h03** 0h00
13	13 + (Node# • 16)	Serial device 1, secondary output 2 OR Serial device 2, primary output 2	0h04** 0h01
14	14 + (Node# • 16)	Serial device 1, secondary output 3 OR Serial device 2, primary output 3	0h05** 0h02
15	15 + (Node# • 16)	Control Message	
16	16 + (Node# • 16)	Reserved	

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

\*\* Based on DIP switch settings.

The DX80 Node connections are completed using the 5-pin M12 Euro hookup. The following table defines the wires and the appropriate connection points in the Node.

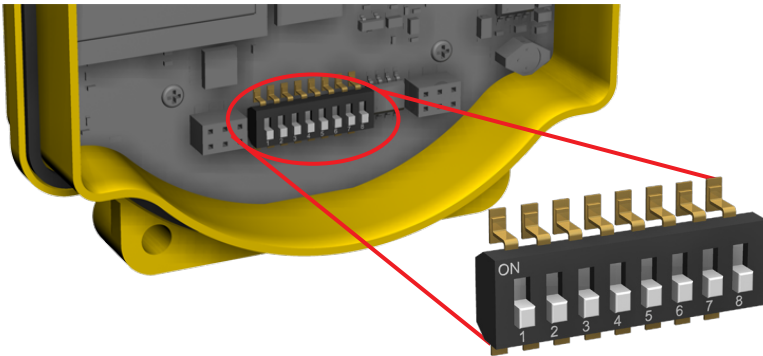


Pin	Connection	Serial Device Wire
1	Power +	Brown
2	Device Select	White
3	Ground -	Blue
4	Device Output	Black
5	Serial Comms	Gray

For additional information, including installation and setup, weatherproofing, device menu maps, troubleshooting, and a list of accessories, please refer to the DX80 Wireless Network product manual, Banner p/n 132607.

# SureCross™ DX80 Integrated Battery Node with a Serial Interface

## Device Configuration



### Address Mode

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 addressing mode binds Nodes to a specific Gateway, allowing network expansion to more than 16 devices in a wireless network. For most users, this DIP switch is OFF.

For more information on extended address mode, refer to the SureCross™ Wireless I/O Network product manual. After making any changes to the DIP switches, cycle power to the device to activate the change.

### Host Configuration vs Switch Settings

Selecting “Use Configuration” (DIP switch OFF) uses the factory’s default configuration for this device or allows a host system to set parameters. Using the switch settings (DIP switch ON) uses the DIP switches to configure the device parameters.

### Register Configuration

The Node’s Modbus registers can be configured using DIP switches 3 through 5, allowing for some custom configurations. Each *FlexPower* Serial Sensor has a defined set of template registers listed in the device’s data sheet. For example, the *FlexPower* Temperature/Humidity sensor has three defined primary registers a user can access: register 1 for relative humidity, register 2 for the temperature in degrees C, and register 3 for the temperature in degrees F. With the default switch settings (OFF, OFF, OFF), the Node reads all three registers and places the contents in the first three Modbus registers associated with the Node. With the switch settings set to “001” (OFF, OFF, ON), only the relative humidity information is read and placed into Modbus register 1.

Integrated battery devices support only one serial sensor device per Node. *FlexPower* Serial Nodes with internal wiring terminals support up to two serial sensor devices per Node. Use the DIP switches to define the Modbus register use for both serial sensor devices.

Some *FlexPower* Serial Sensor devices have more than three primary inputs; these inputs are referred to as secondary inputs or outputs. The DIP switch configurations allow for up to six inputs and six outputs for a single device.

### Sample and Report Rates

The sample rate defines how often the Node samples the sensor. The report rate defines how often the Node communicates the I/O status to the Gateway. For *FlexPower*™ applications, setting the sample and/or report rates to slower rates extends the battery life.

# SureCross™ DX80 Integrated Battery Node with a Serial Interface

## Device Configuration, continued

Device Settings	Switches							
	1	2	3	4	5	6	7	8
Rotary Switch Address Mode	OFF*							
DX80 Extended Address Mode	ON							
Host Configured (Override Switches)		OFF*						
Use Switch Settings		ON						
1 Sensor: 3 inputs, 0 outputs (Primary inputs 1-3)			OFF*	OFF*	OFF*			
1 Sensor: 1 input, 0 outputs (Primary input 1)			OFF	OFF	ON			
1 Sensor: 2 inputs, 0 outputs (Primary inputs 1-2)			OFF	ON	OFF			
1 Sensor: 6 inputs, 6 outputs (Primary and secondary I/O 1-3)			OFF	ON	ON			
2 Sensors: 3 inputs, 0 outputs (Primary inputs 1-3)			ON	OFF	OFF			
2 Sensors: 1 input, 0 outputs (Primary input 1)			ON	OFF	ON			
2 Sensors: 2 inputs, 0 outputs (Primary inputs 1-2)			ON	ON	OFF			
2 Sensors: 3 inputs, 3 outputs (Primary and secondary I/O 1-3)			ON	ON	ON			
Sample/Report Rates: 16 seconds						OFF*	OFF*	OFF*
Sample/Report Rates: 64 seconds						OFF	OFF	ON
Sample/Report Rates: Sample on Demand						OFF	ON	OFF
Sample/Report Rates: 125 milliseconds						OFF	ON	ON
Sample/Report Rates: 500 milliseconds						ON	OFF	OFF
Sample/Report Rates: 1 seconds						ON	OFF	ON
Sample/Report Rates: 4 seconds						ON	ON	OFF
Sample/Report Rates: 8 seconds						ON	ON	ON

\* Default configuration

# SureCross™ DX80 Integrated Battery Node with a Serial Interface

## Specifications

Many of the DX80 parameters are configurable. The values in the tables represent factory defaults unless otherwise noted.

Radio	900 MHz	2.4 GHz
<b>Range, with standard 2 dB antenna*</b>	Up to 4.8 kilometers (3 miles)	Up to 3.2 kilometers (2 miles)
<b>Frequency</b>	902 to 928 MHz ISM band	2.4 to 2.4835 GHz ISM Band
<b>Transmit Power</b>	21 dBm Conducted	18 dBm Conducted, ≤ 20 dBm EIRP
<b>Spread Spectrum Technology</b>	FHSS (Frequency Hopping Spread Spectrum)	FHSS (Frequency Hopping Spread Spectrum)
<b>Antenna Connector</b>	Ext. Reverse Polarity SMA, 50 Ohms	Ext. Reverse Polarity SMA, 50 Ohms
<b>Antenna Max. Tightening Torque</b>	0.45 N•m (4 in•lbf)	0.45 N•m (4 in•lbf)
<b>Link Timeout</b>	Defined by Gateway	Defined by Gateway

\* The range depends on the environment and line of sight. High-gain antennas are available to increase the range.

General	
<b>Power*</b>	3.6V dc from an internal battery
<b>Power Consumption</b>	As low as 1 mW (250 µA) at 3.6V dc (depending on configuration)
<b>Mounting</b>	#10 or M5 (M5 hardware included)
<b>M5 Fasteners Max. Tightening Torque</b>	0.56 N•m (5 in•lbf)
<b>Case Material</b>	Polycarbonate
<b>Weight</b>	0.30 kg (0.65 lbs)
<b>Indicators</b>	Two LED, bi-color
<b>Switches</b>	Two Push Buttons
<b>Display</b>	Six Character LCD
Inputs	
<b>Discrete Inputs</b>	One Sinking
<b>Discrete Input Rating</b>	3 mA max current at 30V dc
<b>Discrete Input ON Condition</b>	Less than 0.7V
<b>Discrete Input OFF Condition</b>	Greater than 2V or Open
Outputs	
<b>Discrete Outputs</b>	One NMOS Sinking
<b>Discrete Output Rating</b>	Less than 10 mA max current at 30V, ON-State Saturation: Less than 0.7V at 20 mA
<b>Discrete Output ON Condition</b>	Less than 0.7V
<b>Discrete Output OFF Condition</b>	Open



\* Replacement battery model number: BWA-BATT-001.

\*\* Please refer to the SureCross™ DX80 Wireless 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.

# SureCross™ DX80 Integrated Battery Node with a Serial Interface

## Specifications, continued

<b>Environmental</b>	
<b>Environmental Rating**</b>	IEC IP67; NEMA 6
<b>Operating Temperature***</b>	-40 to +85° C (Electronics); -20 to +80° C (LCD)
<b>Operating Humidity</b>	95% max. relative (non-condensing)
<b>Radiated Immunity</b>	10 V/m, 80-2700 MHz (EN61000-6-2)
<b>Shock and Vibration</b>	IEC 68-2-6 and IEC 68-2-7 <b>Shock:</b> 30g, 11 millisecond half sine wave, 18 shocks <b>Vibration:</b> 0.5 mm p-p, 10 to 60 Hz
<b>Compliance</b>	
<b>900 MHz Models</b>	FCC ID TGUDX80: This device complies with FCC Part 15, Subpart C, 15.247 IC: 7044A-DX8009 
<b>2.4 GHz Models</b>	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 

Included with Device	Model	Qty	Item
<b>Mounting Hardware Kit</b>	<b>BWA-HW-001</b>	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
<b>Antenna*</b>	<b>BWA-902-C, or BWA-202-C</b>	1	Antenna, 902-928 MHz, 2 dBd Omni, Rubber Swivel RSMA Male, or Antenna, 2.4 GHz, 2 dBd Omni, Rubber Swivel RSMA Male
<b>SureCross Literature CD</b>	<b>79685</b>	1	SureCross Literature CD

\* Internal antenna devices do not ship with this antenna

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 DX80 Wireless Product Manual, in the Agency Certifications section. Consult with Banner Engineering if the destination country is not on this list.

# SureCross™ DX80 Integrated Battery Node with a Serial Interface

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## Notes

# SureCross™ DX80 Integrated Battery Node with a Serial Interface

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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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