



SureCross™ DX80 FlexPower™ Node with Integrated Battery and Serial Interface

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



900 MHz Internal Antenna

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 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, refer to Banner Engineering's website, 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	Inputs: 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 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.



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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 OR Discrete IN 3	0h01
3	3 + (Node# • 16)	Serial device 1, primary input 3 OR Discrete IN 1	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 OR Discrete IN 4	0h04** 0h01
6	6 + (Node# • 16)	Serial device 1, secondary input 3 OR Serial device 2, primary input 3 OR Discrete IN 2	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.

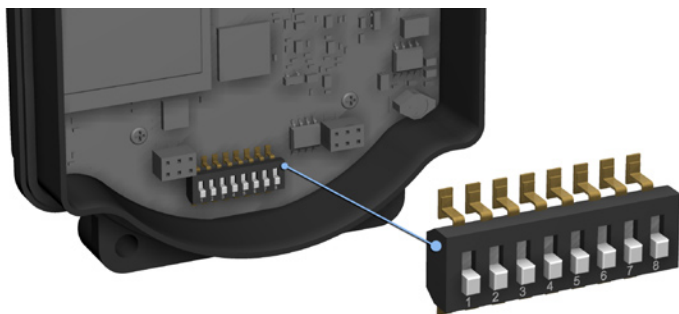


Pin	Connection	Serial Device Wire
1	Power +	Brown
2	Device Select	White
3	Ground -	Blue
4	Device Output	Black
5	Serial Comms	Gray

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.

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Device Configuration



Cycle Power

After making any changes to the DIP switch positions, cycle power to the device to activate the changes. For devices with batteries integrated into the housing, remove the battery for one minute to cycle power to the device.

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.

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.

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.

Change of state reporting sets the system to report only when the value crosses the threshold setting.

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 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.

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.

When using 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.

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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						
Sensor 1: 3 inputs, 0 outputs (Primary inputs 1-3)			OFF*	OFF*	OFF*			
Sensor 1: 1 input, 0 outputs (Primary input 1), Discrete IN 1, and Discrete IN 3**			OFF	OFF	ON			
Sensor 1: 2 inputs, 0 outputs (Primary inputs 1-2), and Discrete IN 1**			OFF	ON	OFF			
Sensor 1: 6 inputs, 6 outputs (Primary and secondary I/O 1-3)			OFF	ON	ON			
Sensors 1 & 2: 3 inputs, 0 outputs (Primary inputs 1-3)			ON	OFF	OFF			
Sensors 1 & 2: 1 input, 0 outputs (Primary input 1), and Discrete IN 1 through 4**			ON	OFF	ON			
Sensors 1 & 2: 2 inputs, 0 outputs (Primary inputs 1-2), Discrete IN 1, and Discrete IN 2**			ON	ON	OFF			
Sensors 1 & 2: 3 inputs, 3 outputs (Primary 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

** All discrete inputs are sinking inputs with sample rates of 62.5 milliseconds and change of state reporting.

Battery Replacement



DX80 Integrated Battery

To replace the lithium “D” cell battery in any integrated battery model:

1. Remove the four screws mounting the battery pack face plate to the body and remove 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. The negative end is toward the spring. Caution: There is a risk of explosion if the replacement battery is incorrect.
4. After replacing the battery, allow up to 60 seconds for the device to power up.

When removing the battery, press the battery towards the negative terminal to compress the spring. Pry up on the battery’s positive end to remove from the battery holder. Properly dispose of your used battery 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.

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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	Gateway: Configurable, up to 2 minutes Node: 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*	3.6V dc from an internal battery
Power Consumption	As low as 1 mW (250 µA) at 3.6V dc (depending on configuration)
Mounting	#10 or M5 (M5 hardware included)
M5 Fasteners Max. Tightening Torque	0.56 N•m (5 in•lbf)
Case Material	Polycarbonate
Weight	0.30 kg (0.65 lbs)
Indicators	Two LED, bi-color
Switches	Two Push Buttons
Display	Six Character LCD

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

Inputs

Discrete Inputs	One Sinking
Discrete Input Rating	3 mA max current at 30V dc
Discrete Input ON Condition	Less than 0.7V
Discrete Input OFF Condition	Greater than 2V or Open

Outputs

Discrete Outputs	One NMOS Sinking
Discrete Output Rating	Less than 10 mA max current at 30V ON-State Saturation: Less than 0.7V at 20 mA
Discrete Output ON Condition	Less than 0.7V
Discrete Output OFF Condition	Open

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.

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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™ 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.

Compliance

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	

Included with Device	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-902-C, or BWA-202-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

* Internal antenna devices do not ship with this antenna

Serial FlexSensor Models

Model #	Description	Specifications	Data Sheet
M12FTH1Q	Temperature and Relative Humidity Sensor	±2% Accuracy	137303
M12FTH2Q	Temperature and Relative Humidity Sensor	±3.5% Accuracy	
T30UFDNCQ	U-GAGE Ultrasonic, T30U	300 mm to 3 m Range	137254
QS30WEQ	WORLD-BEAM Photoelectric Emitter, QS30	Max Range: 100 feet 10x Excess Gain at 50 feet	140987
QS30WRQ	WORLD-BEAM Photoelectric Receiver, QS30		

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<p>For more information: Contact your local Banner representative or Banner Corporate Offices around the world.</p>	<p>Corporate Headquarters</p> <p>Banner Engineering Corp. 9714 Tenth Ave. North Mpls., MN 55441 Tel: 763-544-3164 www.bannerengineering.com sensors@bannerengineering.com</p>	<p>Europe</p> <p>Banner Engineering Europe Park Lane Culliganlaan 2F Diegem B-1831 BELGIUM Tel: 32-2 456 07 80 Fax: 32-2 456 07 89 www.bannereurope.com mail@bannereurope.com</p>	<p>Latin America</p> <p>Contact Banner Engineering Corp. (US) or e-mail Mexico: mexico@bannerengineering.com Brazil: brasil@bannerengineering.com</p>
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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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