



SureCross™ DX80 FlexPower™ Node with a Serial Interface

Configurable FlexPower Node with a serial interface

Features

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

- Wireless industrial device with a serial interface to handle up to two serial sensing devices
- FlexPower™ power input options allow for +10 to 30V dc or solar and battery power sources (3.6 to 5.5V dc)
- 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

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



Models

Model	FlexPower™	Frequency	Antenna	I/O
DX80N9X2S2S	+10 to 30V dc or 3.6 to 5.5V dc low power option	900 MHz ISM Band	External	Inputs: Serial interface for up to two serial sensing devices
DX80N9X2W2S			Internal	
DX80N2X2S2S		2.4 GHz ISM Band	External	
DX80N2X2W2S			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.

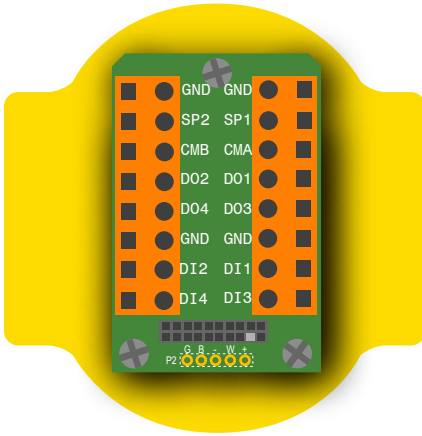
These devices do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A device failure or malfunction can cause either an energized or de-energized output condition. Consult your current Banner Safety Products catalog for safety products that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



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Hookup Diagrams

**Node
I/O Terminal Block**



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.

5-pin M12 Euro Hookup



1	Brown	+10 to 30V dc Input
3	Blue	dc common (GND)
5	Gray	3.6 to 5.5V dc

Do not apply more than 5.5V dc to the gray wire.

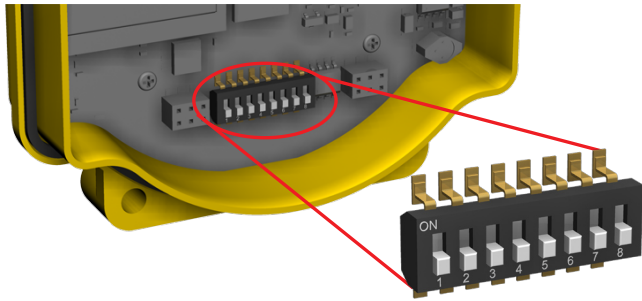
The DX80 Node connections are completed using the I/O terminal block. The following table defines the wires and the appropriate connection points in the Node.

Connection	Serial Device Wire	DX80 Node Wiring PCB
Power +	Brown	SP1 (device 1), SP2 (device 2)
Ground -	Blue	GND
Serial Comms	Gray	CMA (device 1), CMB (device2)
Device Select	White	DO1 (device 1), DO2 (device 2)

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



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 FlexPower™ Node with 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

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



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

** Please refer to the SureCross™ DX80 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.

SureCross™ DX80 FlexPower™ Node with Serial Interface

Specifications, continued

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
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
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	HWA-HW-003	1	PTFE tape
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

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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Notes

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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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