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SureCross™ DX80 Wireless *Flex*Power™ Serial Gateway

Flex*Power Gateway with serial RS-485 interface and Modbus RTU support*

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 Gateway with a serial RS-485 interface
- *Flex*Power™ power sources allow for +10 to 30V dc, solar, and battery power sources for low power applications
- 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
- Site Survey analyzes the network's signal strength and reliability
- Lost RF links are detected and relevant outputs set to user-defined conditions
- External antenna
- 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.

Models

Model	Power	Frequency	Antenna	Interface
DX80G9M2S	+10 to 30V dc or 3.6 to 5.5V dc low power option	900 MHz ISM Band	External	Serial RS-485 with Modbus RTU
DX80G2M2S		2.4 GHz ISM Band	External	

⚠ **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

5-pin Euro-style Hookup (RS-485)

	Wire Color	*Flex*Power Gateway and Data Radio**
1	Brown	+10 to 30V dc Input
2	White	RS485 / D1 / B / +
3	Blue	dc common (GND)
4	Black	RS485 / D0 / A / −
5	Gray	3.6 to 5.5V dc

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

** For *Flex*Power devices, do not apply more than 5.5V dc to the gray wire.

Modbus Holding Registers

There are sixteen Modbus holding registers for each SureCross™ device. Calculate the holding register number for each device using the equation:

Register number = I/O# + (Node# × 16).

Since the Gateway is always device 0, the Gateway's holding registers are registers 1 through 16. Registers for Node 1 are 17 through 32, as shown in the Modbus Holding Register table below. Though only ten Nodes are shown, the table can continue for as many Nodes as are used in a given network.

Using the equation or the Modbus Holding Registers table, the register number for I/O point 15 for Node 7 is 127.

Modbus Holding Registers									
I/O Point	Gateway	Node 1	Node 2	Node 3	Node 4	Node 5	Node 6	Node 7	Node 8
1	1	17	33	49	65	81	97	113	129
2	2	18	34	50	66	82	98	114	130
3	3	19	35	51	67	83	99	115	131
4	4	20	36	52	68	84	100	116	132
5	5	21	37	53	69	85	101	117	133
6	6	22	38	54	70	86	102	118	134
7	7	23	39	55	71	87	103	119	135
8	8	24	40	56	72	88	104	120	136
9	9	25	41	57	73	89	105	121	137
10	10	26	42	58	74	90	106	122	138
11	11	27	43	59	75	91	107	123	139
12	12	28	44	60	76	92	108	124	140
13	13	29	45	61	77	93	109	125	141
14	14	30	46	62	78	94	110	126	142
15	15	31	47	63	79	95	111	127	143
16	16	32	48	64	80	96	112	128	144

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.

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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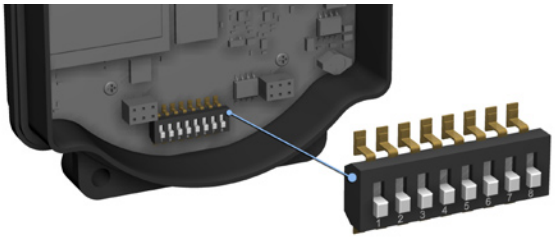
Device Configuration



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.

	Switches			
Device Settings	**1**	**2**	**3**	**4**
Rotary Switch Address Mode	OFF*			
Extended Address Mode	ON			

* Default configuration

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.

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 uses a security code to "bind" Nodes to a specific Gateway. Bound Nodes can only send and receive information from the Gateway they are bound to. In extended address mode, wireless networks may contain up to 56 radio devices. 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.

LED Status

Gateway Status	LED 1	LED 2
Power ON	Green ON	—
Modbus Communication Active	—	Yellow Flash
Modbus Communication Error	—	Red Flash
System Error	Red Flash	Red Flash

Node Status	LED 1	LED 2
RF Link Ok	Green Flash (1 per sec)	—
RF Link Error	—	Red Flash (1 every 3 sec)
System Error	Red Flash	Red Flash (1 per sec)

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	Configurable, up to 2 minutes

* 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 or 3.6 to 5.5V dc low power option For European applications: +10 to 24V dc, ± 10% or 3.6 to 5.5V dc low power option
Power Consumption	40 mA average at 3.6V and 8 Nodes 50 mA average at 3.6V and 16 Nodes
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
Wiring Access	One 1/2 NPT port with a 5-pin Euro-style connector
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.

Communications	
Interface	2-wire RS-485
Baud Rates	9.6k, 19.2k (default), or 38.4k
Data Format	8 data bits, no parity, 1 stop bit
Protocol	Modbus RTU

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 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 Wireless *Flex*Power™ Gateway

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
Certification	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
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 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

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Notes

SureCross™ DX80 Wireless *Flex*Power™ Gateway

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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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