



Wireless

SureCross™ Networks page 335

- Consists of a radio frequency network built around a Gateway system controller, one or more remotely located Nodes and integrated I/O
- Installs where conduit/wiring is not practical
- Integrates with existing process and control networks
- Communicates on secure Frequency Hopping Spread Spectrum (FHSS) protocol
- Delivers two-way Rx/Tx communications with full acknowledgement
- Ensures optimal device location and peak RF performance with embedded Site Survey
- Accommodates 900 MHz or 2.4 GHz ISM frequencies
- Rated IP67; NEMA 6P for challenging environments and outdoor applications
- Available in models with Class I, Division 2 certification for hazardous locations
- Features 1 watt data radios for extended range of Modbus networks

DX80

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- Includes a Gateway and one or more Nodes that operate on the same frequency
- Accommodates any combination of Nodes and FlexPower™ Nodes
- Offers discrete, analog/discrete, temperature and M-GAGE™ Nodes
- Directly connects to Modbus RTU, EtherNet/IP, Modbus TCP/IP and other industrial protocols



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- Bridges one Gateway and Node on the same frequency
- Provides plug-and-play installation with direct mapping between Gateway and Node
- Offers discrete and analog I/O in same unit
- Provides real-time feedback with built-in signal strength indicator



DX91

- 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 code regulations



1 Watt Data Radio

- Wireless industrial device for extending the range of a Modbus network
- Multi-drop capabilities for connecting multiple devices
- Transceivers for reliable bidirectional communication between radios



Accessories page 344

- A wide selection of power supplies for Gateways, Nodes and sensors
- Modbus RTU slave modules for expanding Gateway I/O capacity
- A complete selection of cables for easy hookup
- Antennas, cables and accessories for virtually every location challenge

SureCross™ DX80 Wireless Network

To satisfy the performance demands for reliable sensing and actuation, Banner has reinvented wireless. The SureCross™ Wireless Network is the first wireless platform built from the ground up for industry—featuring proprietary RF design, power management with battery and solar options, and a host of low-power sensors designed to deliver robust remote monitoring and control capabilities.

SureCross offers easy, reliable communication between disparate products and processes in a single scalable and unified platform.

- Access hard-to-reach locations; install where wiring and conduit are not practical
- Digital and analog I/O in a single unit
- Easy to retrofit, expand and relocate as needed
- Reliable and secure Frequency Hopping Spread Spectrum (FHSS) protocol
- FlexPower™ supply options including battery and solar
- Easy plug-and-play deployment

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SureCross™ Gateway and Node Possibilities

- I/O can be tailored to accommodate up to 12 functions per device
- Open design supports inputs from sensors and devices from Banner and other manufacturers
- Multiple hard-wired network and protocol options at the Gateway make it easy to link to industrial host systems
- FlexPower devices enable sensing solutions never before possible



Configured kits with everything needed to solve many common applications quickly and easily (see page 337).



What types of sensors can be used on a SureCross wireless network?

- Photoelectric
- Capacitive
- Pressure
- RTD
- Ultrasonic
- Inductive
- Thermistor
- Level
- Contact Closures
- Thermocouple
- Distance
- Flow



Which communication protocols are supported by SureCross Gateways?

- Modbus RTU
- Modbus TCP/IP
- EtherNet/IP



How much I/O is provided by each SureCross Node?

- Up to 4 Analog IN (current, voltage)
- Up to 4 Analog OUT (current, voltage)
- Up to 8 Discrete IN (sinking, sourcing)
- Up to 8 Discrete OUT (sinking, sourcing)



What types of power options are available?

- 10 to 30V dc
- AC options
- FlexPower supply options:
FlexPower Battery Modules
FlexPower Solar Modules

SureCross™ DX80 Wireless Networks

- Network identity and device address rotary switches
- Menu and configuration push buttons
- RF link status and communications LEDs
- External antenna that rotates for mounting and positioning versatility
- DIN rail mountable or integral mounting holes for versatile mounting
- ½ inch NPT conduit entrance
- 5-pin Euro-style quick-disconnect
- LCD display of device information



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SureCross™ DX80 Configured Kits—Discrete†

Model	Frequency**	Icon*	Gateway I/O	Node 1 I/O	Node 2 I/O	Node 3 I/O	Node 4 I/O	Data Sheet	
DX80K9M6EP1	900 MHz		Modbus Enabled 6 IN & 6 OUT	6 IN & 6 OUT	-	-	-	135535	
DX80K9M6ED1				4 IN & 8 OUT	8 IN & 4 OUT	-	-	134856	
DX80K9M6DP2				4 IN & 4 OUT	2 IN & 2 OUT	2 IN & 2 OUT	-	-	129307
DX80K9M6DP4				4 IN & 4 OUT	1 IN & 1 OUT	1 IN & 1 OUT	1 IN & 1 OUT	1 IN & 1 OUT	129308

SureCross™ DX80 Configured Kits—Analog & Discrete†

Model	Frequency**	Icon*	Gateway I/O	Node 1 I/O	Node 2 I/O	Data Sheet
DX80K9M6EM1	900 MHz		Modbus Enabled Discrete: 4 IN & 4 OUT Analog: 2 IN & 4 OUT	Discrete: 4 IN & 4 OUT Analog: 2 IN & 2 OUT	-	134862
DX80K9M6MP2				Discrete: 2 IN & 2 OUT Analog: 2 IN & 2 OUT	Discrete: 1 IN & 1 OUT Analog: 1 IN & 1 OUT	Discrete: 1 IN & 1 OUT Analog: 1 IN & 1 OUT

SureCross™ DX80 Configured Kits—FlexPower™

Model	Frequency**	Icon*	Gateway I/O	Node 1 I/O	Data Sheet
DX80K9M3PE1	900 MHz		Modbus Enabled Discrete: 2 OUT (sourcing)	Discrete: 1 IN configured for MINI-BEAM*** 1 IN (sinking) (DX81 FlexPower supply included; provides power for Node and MINI-BEAM)	129318
DX80K9M3GE1				Discrete: 2 OUT (sourcing) Analog: 2 OUT	Discrete: 2 IN (sinking) Analog: 2 IN (0-20 mA) dc Switched Power Outputs: Switch Configurable (DX81 FlexPower supply included; provides power for Node and one analog sensor)

* = Gateway = Node

** For 2.4 GHz frequency, replace 9 with 2 in the model number (example, DX80K2M6EM1).

*** Low power MINI-BEAM model SM312-75904 ordered separately (see page 343).

† Discrete outputs are sourcing unless otherwise noted. Analog outputs are 0-20 mA.



SureCross™ DX80 Gateways, 10 to 30V dc

Model	Frequency*	Gateway I/O	Antenna	Data Sheet
DX80G9M6W4P4M2M2	900 MHz	Modbus Enabled	Internal	131935
DX80G9M6S4P4M2M2			External	
DX80G9M6W4P4V2V2			Internal	134301
DX80G9M6S4P4V2V2			External	
DX80G9M6W8P4			Internal	132157
DX80G9M6S8P4			External	
DX80G9M6W4P8			Internal	132158
DX80G9M6S4P8			External	
DX80G9M6W6P6			Internal	132159
DX80G9M6S6P6			External	
DX80G9M6W0P0M4M4			Internal	134302
DX80G9M6S0P0M4M4			External	
DX80G9M6W6P6Z			Internal	134303
DX80G9M6S6P6Z			External	

SureCross™ DX80 Gateway Pro, 10 to 30V dc



Model	Frequency*	Protocol	Antenna	Data Sheet
DX80P9T6W	900 MHz	Modbus/TCP (default) or EtherNet/IP	Internal	131933
DX80P9T6S			External	

Expandable Remote I/O



Model	I/O Functionality	Description	Housing	Data Sheet
DX85M4P4M2M2	Discrete: 4 IN & 4 OUT(sourcing) Analog: 2 IN & 2 OUT(0-20 mA)	Modbus RTU Slave Expansion I/O Modules; used to expand Gateway I/O capacity	IP67	131629
DX85M6P6	Discrete: 6 IN & 6 OUT(sourcing)			131599



* For 2.4 GHz frequency, replace 9 with 2 in the model number (example, DX80G2M6S4P4M2M2).

** For 0-10V dc analog models, replace M with V in the model number (example, DX80G9M6W0P0V4V4).



SureCross™ DX80 Nodes, 10 to 30V dc

Model	Frequency*	I/O	Antenna	Data Sheet
DX80N9X6W4P4M2M2	900 MHz	Discrete: 4 IN & 4 OUT (sourcing) Analog: 2 IN & 2 OUT (0-20 mA)	Internal	131936
DX80N9X6S4P4M2M2			External	
DX80N9X6W4P4V2V2		Discrete: 4 IN & 4 OUT (sourcing) Analog: 2 IN & 2 OUT (0-10V dc)	Internal	134323
DX80N9X6S4P4V2V2			External	
DX80N9X6W8P4		Discrete: 8 IN & 4 OUT (sourcing)	Internal	132160
DX80N9X6S8P4			External	
DX80N9X6W4P8		Discrete: 4 IN & 8 OUT (sourcing)	Internal	132161
DX80N9X6S4P8			External	
DX80N9X6W6P6		Discrete: 6 IN & 6 OUT (sourcing)	Internal	132162
DX80N9X6S6P6			External	
DX80N9X6W0P0M4M4		Analog: 4 IN & 4 OUT (0-20 mA)**	Internal	134322
DX80N9X6S0P0M4M4			External	

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SureCross™ DX80 FlexPower™ Nodes with Switched Power Outputs



Model	Frequency*	I/O	Antenna	Data Sheet
DX80N9X2W2N2M2X	900 MHz	Discrete: 2 IN (sinking) & 2 OUT (NMOS) Analog: 2 IN (0-20 mA) dc Switched Power Outputs: Switch Configurable	Internal	131296
DX80N9X2S2N2M2X			External	

SureCross™ DX80 FlexPower™ Nodes



Model	Frequency*	I/O	Antenna	Data Sheet
DX80N9X2W2N2T	900 MHz	Temperature: 3 IN Thermocouple † & 1 Integrated Thermistor for cold junction compensation Discrete: 2 IN (sinking) & 2 OUT (NMOS)	Internal	131297
DX80N9X2S2N2T			External	
DX80N9X2W0P0R		Temperature: 4 IN (3-wire RTD ††)	Internal	131597
DX80N9X2S0P0R			External	

* For 2.4 GHz frequency, replace 9 with 2 in the model number (example, DX80N2X6W4P4M2M2).

** For 0-10V dc analog models, replace M with V in the model number (example, DX80N9X6W0P0V4V4).

† Thermocouple units default to J-type. Other types configurable.

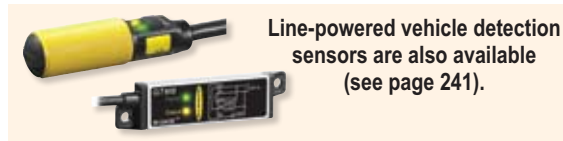
†† RTD units default to 3-wire 100 ohm platinum. Other types available.



SureCross™ DX80 FlexPower™ Nodes (cont'd)

Model	Frequency*	I/O	Antenna	Data Sheet
DX80N9X2W2N2M4	900 MHz	Discrete: 2 IN (sinking) & 2 OUT (NMOS) Analog: 4 IN (0-20 mA)	Internal	131762
DX80N9X2S2N2M4			External	
DX80N9X1W0P0Z		M-GAGE™ with internal battery	Internal	131598

* For 2.4 GHz frequency, replace 9 with 2 in the model number (example, DX80N2X2S2N2M4).



SureCross™ DX80 Specifications

General	<p>Power: +10 - 30V dc or 3.6 - 5.5V dc low power option 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-inch NPT type Cable Glands – Max. Tightening Torque: 0.56 N•m (5 in•lbf)</p>		
Radio		900 MHz	2.4 GHz
	<p>Range, with Standard 2dB Antenna: Up to 4.8 kilometers (3 miles)* Frequency: 902 - 928 MHz ISM band Transmit Power: 21 dBm conducted</p> <p>Spread Spectrum Technology: FHSS (Frequency Hopping Spread Spectrum)</p> <p>Antenna Connector: Ext. reverse polarity SMA - 50 Ω Antenna – Max. Tightening Torque: 0.45 N•m (4 in•lbf)</p>	<p>Up to 3.2 kilometers (2 miles)* 2.4 - 2.4835 GHz ISM band 18 dBm conducted, ≤ 20 dBm EIRP</p> <p>FHSS (Frequency Hopping Spread Spectrum)</p> <p>Ext. reverse polarity SMA - 50 Ω 0.45 N•m (4 in•lbf)</p>	<p>Up to 3.2 kilometers (2 miles)* 2.4 - 2.4835 GHz ISM band 18 dBm conducted, ≤ 20 dBm EIRP</p> <p>FHSS (Frequency Hopping Spread Spectrum)</p> <p>Ext. reverse polarity SMA - 50 Ω 0.45 N•m (4 in•lbf)</p>
	* Depending on the environment and line-of-sight, high gain antennas are available to increase the range.		
Environmental	<p>Rating: NEMA 6; IEC IP67** Operating Temperature: -40 to +85° C (electronics); -20 to +80° C (LCD) Operating Humidity: 95% max. relative (non-condensing) Shock and Vibration: IEC 68-2-6 and IEC 68-2-7 Shock: 30g, 11 milliseconds half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 - 60 Hz</p> <p>** Please refer to the SureCross™ DX80 Wireless I/O Network Product Manual, Banner part number 132607, for installation and waterproofing instructions.</p>		
Connection	5-pin Euro-style quick-disconnect fitting. QD cables included. See page 414.		
Compliance	<p>900 MHz Models: FCC ID TGUDX80 - This device complies with FCC Part 15, Subpart C, 15.247 IC:7044-A-DX8009 </p> <p>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:7044-A-DX8024 </p>		
Hookup Diagrams	See data sheet for hookup instructions		



SureCross™ DX70 Wireless Network

- A network includes a Gateway and one Node that operate in the same frequency band.
- 900 MHz or 2.4 GHz frequency models are available to accommodate worldwide communication standards.
- Models include discrete and analog I/O.
- Input-to-output mapping is controlled by a configured Gateway.
- Open design supports inputs from sensors and devices made by Banner and other manufacturers.
- Frequency Hopping Spread Spectrum (FHSS) and Time Division Multiple Access (TDMA) architecture combine to ensure reliable data delivery.
- Rotary switch for network identity is easy to set and change.
- Gateways and Nodes require 10 to 30V dc line power.
- Models with internal or external antennas are available, depending on range.
- Wiring terminals are accessible without removal from mounting.

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SureCross™ DX70 Wireless Networks

- External or internal antenna that rotates for mounting and positioning versatility
- 1/2 inch NPT conduit entrance
- Network identity rotary switch
- Power indicator
- DIN-rail mountable or integral mounting holes for versatile mounting
- RF link status LED

SureCross™ DX70, 10 to 30V dc

Gateway Model	Node Model	Frequency*	I/O	Antenna**	Data Sheet
DX70G9X6S4P4M2M2	DX70N9X6S4P4M2M2	900 MHz	Discrete: 4 IN & 4 OUT (sourcing) Analog: 2 IN & 2 OUT (0-20 mA)	External	133214
DX70G9X6S4P8	DX70N9X6S8P4		Node Discrete: 8 IN & 4 OUT (sourcing)		133214
			Gateway Discrete: 4 IN & 8 OUT (sourcing)		

* For 2.4 GHz frequency, replace 9 with 2 in the model number (example, DX70G2X6S4P4M2M2).

** For internal antennas, replace S with W in the model number (example, DX70G9X6W4P4M2M2).

SureCross™ DX70 Specifications

General	Power: +10 - 30V dc or 3.6 - 5.5V dc low power option 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: Power LED – Green/Red Signal LED – Yellow/Red Switches: Two push buttons Display: Six character LCD External Cable Glands: Two 1/2-inch NPT type Cable Glands – Max. Tightening Torque: 0.56 N•m (5 in•lbf)		
Radio		900 MHz	2.4 GHz
	Range, with Standard 2dB Antenna: Frequency: Transmit Power: Spread Spectrum Technology: Antenna Connector: Antenna – Max. Tightening Torque:	Up to 4.8 kilometers (3 miles)* 902 - 928 MHz ISM band 21 dBm conducted FHSS (Frequency Hopping Spread Spectrum) Ext. reverse polarity SMA - 50 Ω 0.45 N•m (4 in•lbf)	Up to 3.2 kilometers (2 miles)* 2.4 - 2.4835 GHz ISM band 18 dBm conducted, ≤ 20 dBm EIRP FHSS (Frequency Hopping Spread Spectrum) Ext. reverse polarity SMA - 50 Ω 0.45 N•m (4 in•lbf)
	* Depending on the environment and line-of-sight, high gain antennas are available to increase the range.		
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) Shock and Vibration: IEC 68-2-6 and IEC 68-2-7 Shock: 30g, 11 milliseconds half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 - 60 Hz ** Please refer to the SureCross™ DX70 data sheet, Banner part number 133214 for installation and waterproofing instructions.		
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		
Hookup Diagram	See data sheet for hookup instructions		



Sensors—Optimized for use with FlexPower™ Systems

Sensor Models	Supply Voltage	Description	Sensing Mode	Range	Output Type	Connection†	Data Sheet*
QT50ULBQ6-75390	FlexPower	U-GAGE Ultrasonic	-	200 mm to 8 m	0 to 10V dc or 4 to 20 mA	5-pin Euro QD	70137
SM312LPQD-76885		MINI-BEAM Photoelectric	Polar Retro	3 m	Bipolar NPN/PNP	4-pin Euro QD	134420
SM312DQD-75904		Diffuse	380 mm				



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* Data sheet is for standard products, contact factory at 1-888-373-6767 for supporting literature.

† Mating cable required (see pages 412 and 415).

Mounting Hardware

Model	Description
BWA-HW-001	Replacement mounting hardware packet
BWA-HW-002	Replacement access hardware pack (5 plugs & 4 glands)

Power Supplies



Model	Voltage Supplied	Description	Connection	Housing	Data Sheet
AC PS24W	24V dc @ 500 mA	Converts 100 - 240V ac to 24V dc North America (wall plug)	5-pin Euro QD	Non-industrial (not sealed)	N/A
FlexPower™ DX81	FlexPower Battery Module to supply FlexPower Node	Module driven by one lithium primary battery**	5-pin Euro Pigtail QD	IP67	131596
		Module driven by six lithium primary batteries			131628

**Replacement lithium primary battery model number is BWA-BATT-001

Antennas



Antennas	Description	Frequency	Reference Guide
BWA-9Y6-A	6.5 dBd, Yagi, N Female	890-960 MHz	132113
BWA-9Y10-A	10.0 dBd, Yagi, N Female	890-960 MHz	
BWA-9O6-A	6.0 dBd, Fiberglass, Omni, N Female	902-928 MHz	
BWA-9O5-B	5.0 dBd/7.2 dBd Omni, with ground plate, N Female	902-928 MHz	
Cables	Description	Length	
BWC-1MRSMN2	LMR200, RSMA to N Male	2 m	
BWC-1MRSFRSB4	RG58, RSMA to RSMF Bulkhead	4 m	
BWC-4MNFN6	LMR400, N Male to N Female	6 m	
BWC-4MNFN15	LMR400, N Male to N Female	15 m	
Lightning Protectors	Description	Frequency	
BWC-LFNBMN	Bulkhead Lightning Suppressor, N type	900 MHz & 2.4 GHz	

Wireless Accessories

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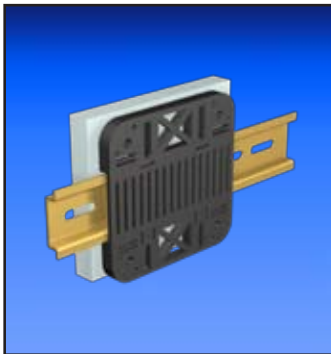
Cables page 412

- Quick-disconnect cordsets for Gateways, Nodes, Expandable Remote I/O, *FlexPower*™ devices, sensors and indicators
- Single-ended and double-ended cordsets
- A variety of lengths with right-angle or straight connectors
- Cordsets available for interfacing antennas



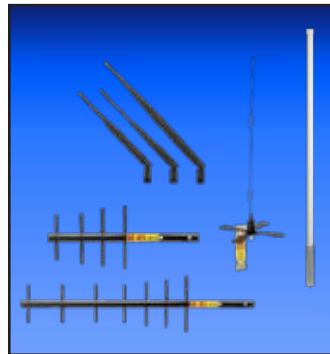
Power Supplies page 343

- Power supplies for Gateways, Nodes and sensors
- Models for converting ac voltage to dc
- *FlexPower* supplies with solar and battery options for *FlexPower* Nodes



Brackets page 374

- DIN-mount bracket for *SureCross*™ models
- Hardware for mounting to housing
- Black ABS thermoplastic



Antennas page 343

- Omni and Yagi antenna models for increasing the range of *SureCross* wireless networks
- Antenna extension and adapter cables for remote mounting options