



# 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

DX70

ACCESSORIES



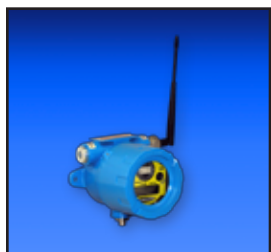
### DX80 page 336

- 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



### DX70 page 341

- 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

More information online at [bannerengineering.com](http://bannerengineering.com)

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# 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

### 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



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

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



*Which communication protocols are supported by SureCross Gateways?*

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



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



*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



## 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	—	—	129307
DX80K9M6DP4				4 IN & 4 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	129313

## 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 dc Switched Power Outputs: Switch Configurable (DX81 FlexPower supply included; provides power for Node and one analog sensor)	129320

\* = 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.

More information online at [bannerengineering.com](http://bannerengineering.com)

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## SureCross™ DX80 Gateways, 10 to 30V dc

Model	Frequency*	Gateway I/O		Antenna	Data Sheet
DX80G9M6W4P4M2M2	900 MHz	Modbus Enabled	Discrete: 4 IN & 4 OUT (sourcing) Analog: 2 IN & 2 OUT (0-20 mA)	Internal	131935
DX80G9M6S4P4M2M2				External	
DX80G9M6W4P4V2V2			Discrete: 4 IN & 4 OUT (sourcing) Analog: 2 IN & 2 OUT (0-10V dc)	Internal	134301
DX80G9M6S4P4V2V2				External	
DX80G9M6W8P4			Discrete: 8 IN & 4 OUT (sourcing)	Internal	132157
DX80G9M6S8P4				External	
DX80G9M6W4P8			Discrete: 4 IN & 8 OUT (sourcing)	Internal	132158
DX80G9M6S4P8				External	
DX80G9M6W6P6			Discrete: 6 IN & 6 OUT (sourcing)	Internal	132159
DX80G9M6S6P6				External	
DX80G9M6W0P0M4M4			Analog: 4 IN & 4 OUT (0-20 mA)**	Internal	134302
DX80G9M6S0P0M4M4				External	
DX80G9M6W6P6Z			M-GAGE™ Baseline Function for up to 6 M-GAGE Nodes	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	

## 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).

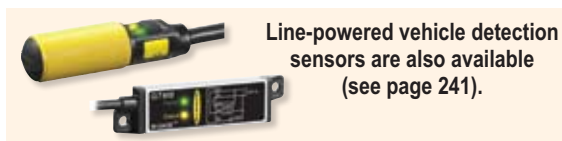
† Thermocouple units default to J-type. Other types configurable.

†† 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

<b>General</b>	<b>Power:</b> +10 - 30V dc or 3.6 - 5.5V dc low power option <b>Power Consumption:</b> Less than 1.4 W (60 mA) at 24V dc <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> 0.26 kg (0.57 lb.) <b>Indicators:</b> Two LED, bi-color <b>Switches:</b> Two push buttons <b>Display:</b> Six character LCD <b>External Cable Glands:</b> Four PG-7 type, one 1/2-inch NPT type <b>Cable Glands – Max. Tightening Torque:</b> 0.56 N•m (5 in•lbf)		
<b>Radio</b>	<b>Range, with Standard 2dB Antenna:</b> <b>Frequency:</b> <b>Transmit Power:</b>  <b>Spread Spectrum Technology:</b>  <b>Antenna Connector:</b> <b>Antenna – Max. Tightening Torque:</b>	<b>900 MHz</b> 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)	<b>2.4 GHz</b> 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.			
<b>Environmental</b>	<b>Rating:</b> NEMA 6; IEC IP67** <b>Operating Temperature:</b> -40 to +85° C (electronics); -20 to +80° C (LCD) <b>Operating Humidity:</b> 95% max. relative (non-condensing) <b>Shock and Vibration:</b> IEC 68-2-6 and IEC 68-2-7 <b>Shock:</b> 30g, 11 milliseconds half sine wave, 18 shocks <b>Vibration:</b> 0.5 mm p-p, 10 - 60 Hz ** Please refer to the SureCross™ DX80 Wireless I/O Network Product Manual, Banner part number 132607, for installation and waterproofing instructions.		
<b>Connection</b>	5-pin Euro-style quick-disconnect fitting. QD cables included. See page 414.		
<b>Compliance</b>	<b>900 MHz Models:</b> FCC ID TGUDX80 - This device complies with FCC Part 15, Subpart C, 15.247 IC:7044-A-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:7044-A-DX8024		
<b>Hookup Diagrams</b>	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.

DX80

DX70

ACCESSORIES



## 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

<b>General</b>	<b>Power:</b> +10 - 30V dc or 3.6 - 5.5V dc low power option <b>Power Consumption:</b> Less than 1.4 W (60 mA) at 24V dc <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> 0.26 kg (0.57 lb.) <b>Indicators:</b> Power LED – Green/Red Signal LED – Yellow/Red <b>Switches:</b> Two push buttons <b>Display:</b> Six character LCD <b>External Cable Glands:</b> Two 1/2-inch NPT type <b>Cable Glands – Max. Tightening Torque:</b> 0.56 N•m (5 in•lbf)		
<b>Radio</b>	<b>Range, with Standard 2dB Antenna:</b> <b>Frequency:</b> <b>Transmit Power:</b>  <b>Spread Spectrum Technology:</b>  <b>Antenna Connector:</b> <b>Antenna – Max. Tightening Torque:</b>	<b>900 MHz</b> 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)	<b>2.4 GHz</b> 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.			
<b>Environmental</b>	<b>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>Shock and Vibration:</b> IEC 68-2-6 and IEC 68-2-7 <b>Shock:</b> 30g, 11 milliseconds half sine wave, 18 shocks <b>Vibration:</b> 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.		
<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		
<b>Hookup Diagram</b>	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			



\* 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 RSMAF 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-LFNBMM	Bulkhead Lightning Suppressor, N type	900 MHz & 2.4 GHz	

# Wireless Accessories

DX80

DX70

ACCESSORIES



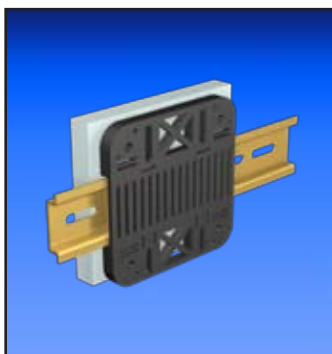
## Cables page 412

- 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