

SureCross™ DX80 Point-to-Multipoint Wireless I/O Network

- An industrial wireless I/O network that can operate in extreme environments while eliminating the need for costly wiring runs
- A basic network consists of a Gateway system controller and one or more Nodes that monitor and/or control I/O in remote locations
- Nodes are easily deployed throughout a facility for gathering data to be concentrated at the Gateway
- Bi-directional communication between the Gateway and Node(s), including fully acknowledged data transmission
- 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
- *FlexPower™* options allow for +10-30V dc, solar and battery power sources
- 900 MHz and 2.4 GHz models accommodate worldwide communication standards
- Rugged IP67/NEMA 6 design enabling simple plug-and-play installation
- Installation is fast and easy with flexible mounting and power options



DX85 Modbus RTU Remote I/O
Used to expand I/O capacity when connected to a Data Radio or Gateway (see page 394)

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DX80 Gateways

- Gateways are the master of Banner's SureCross Wireless Network
- Modbus RTU over RS-485 communication capability is integrated into every Gateway
- Gateway models are available with discrete, analog and a mix of both I/O types
- IP20 housing option is certified for Class I Div 2 areas

DX80 Nodes

- The Node collects the data and wirelessly transmits it to the Gateway
- Nodes may be powered by either 10 to 30V dc battery or solar power options
- Models are available in a variety of input/output options
- IP20 housing option is certified for Class I Div 2 areas

User Configuration Tool RS-485 to USB Adapter Cable

BWA-HW-006 RS-485 to USB adapter cable is used to connect the DX80 Gateway to a computer. Download your free configuration software at bannerengineering.com/wireless



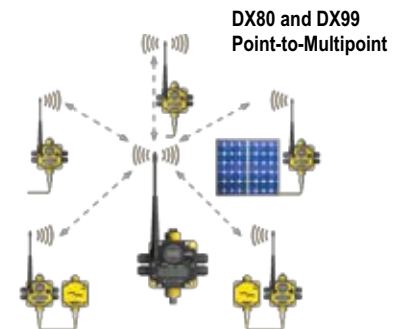
DX80 Gateways and Node



DX80 Gateway



DX80 Node



DX80 EtherNet/IP and Modbus TCP Gateways

	Frequency	I/O	Models	
 	900 MHz	DX80 GatewayPro Modbus/TCP to EtherNet/IP protocol converter	DX80P9T6S	
	2.4 GHz		DX80P2T6S	
	900 MHz	DX80 GatewayPro (Modbus/TCP) with advanced web-based configuration capabilities	DX80P9A6S	
	2.4 GHz		DX80P2A6S	
	No Radio	Protocol Conversion: Modbus RTU to Modbus TCP/IP or EtherNet/IP		DX83T
		Advanced user configuration model		DX83A

DX80 Modbus RTU Gateways, 10–30V dc

	Frequency	Base	I/O	Models*	
 	900 MHz	IP67	Discrete: Six selectable inputs, six PNP outputs	DX80G9M6S6P6	
		IP20		DX80G9M6S6P6C	
	2.4 GHz	IP67		DX80G2M6S6P6	
		IP20		DX80G2M6S6P6C	
	900 MHz	IP67	Discrete: Six selectable inputs, six NPN outputs	DX80G9M6S6N6	
		IP20		DX80G9M6S6N6C	
	2.4 GHz	IP67		DX80G2M6S6N6	
		IP20		DX80G2M6S6N6C	
	900 MHz	IP67	Analog: Four inputs, four outputs (0-20 mA)	DX80G9M6S0P0M4M4	
				IP20	DX80G9M6S0P0M4M4C
		2.4 GHz		IP67	DX80G2M6S0P0M4M4
				IP20	DX80G2M6S0P0M4M4C
900 MHz	IP67	Analog: Four inputs, four outputs (0-10V)		DX80G9M6S0P0V4V4	
				IP20	DX80G9M6S0P0V4V4C
	2.4 GHz			IP67	DX80G2M6S0P0V4V4
				IP20	DX80G2M6S0P0V4V4C
900 MHz	IP67		Discrete: Four selectable inputs, four PNP outputs Analog: Two inputs, two outputs (0-20 mA)	DX80G9M6S4P4M2M2	
				IP20	DX80G9M6S4P4M2M2C
	2.4 GHz			IP67	DX80G2M6S4P4M2M2
				IP20	DX80G2M6S4P4M2M2C
900 MHz	IP67	Discrete: Four selectable inputs, four PNP outputs Analog: Two inputs, two outputs (0-10V)		DX80G9M6S4P4V2V2	
				IP20	DX80G9M6S4P4V2V2C
	2.4 GHz			IP67	DX80G2M6S4P4V2V2
				IP20	DX80G2M6S4P4V2V2C
900 MHz	IP67		Discrete: Eight selectable inputs, four PNP outputs (When your wireless network does not include a host system, the eight input/four output Gateway must be mapped to the four input/eight output Node.)	DX80G9M6S8P4	
				IP20	DX80G9M6S8P4C
	2.4 GHz			IP67	DX80G2M6S8P4
				IP20	DX80G2M6S8P4C
900 MHz	IP67	Discrete: Four selectable inputs, eight PNP outputs (When your wireless network does not include a host system, the four input/eight output Gateway must be mapped to the eight input/four output Node.)		DX80G9M6S4P8	
				IP20	DX80G9M6S4P8C
	2.4 GHz			IP67	DX80G2M6S4P8
				IP20	DX80G2M6S4P8C



* To order the internal antenna models, replace the **S** as the 9th digit with a **W**. Internal antennas require an additional week for manufacture and shipping. For example, **DX80G9M6S0P0V4V4** is the external antenna model and **DX80G9M6W0P0V4V4** is the internal antenna model.

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DX80 Nodes, 10-30V dc—Analog and Discrete

	Frequency	Base	I/O	Models*
 <p>DX80 Node IP67</p>	900 MHz	IP67	Discrete: Four selectable inputs, four PNP outputs Analog: Two inputs, two outputs (0-20 mA)	DX80N9X6S4P4M2M2
		IP20		DX80N9X6S4P4M2M2C
	2.4 GHz	IP67		DX80N2X6S4P4M2M2
		IP20		DX80N2X6S4P4M2M2C
 <p>DX80..C IP20 External Terminal Strips CID2 certified</p>	900 MHz	IP67	Discrete: Four selectable inputs, four PNP outputs Analog: Two inputs, two outputs (0-10V)	DX80N9X6S4P4V2V2
		IP20		DX80N9X6S4P4V2V2C
	2.4 GHz	IP67		DX80N2X6S4P4V2V2
		IP20		DX80N2X6S4P4V2V2C


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DX80 Nodes, FlexPower—Analog and Discrete



	Frequency	Base	I/O	Models*
 <p>DX81</p> <p>QT50ULBQ6-75390</p> <p>DX80 Node</p>	900 MHz	IP67	Discrete: Two selectable inputs, two NMOS sinking outputs Analog: Two inputs (0-20 mA, depending on configuration) Switched Power Outputs	DX80N9X2S2N2M2
		IP20		DX80N9X2S2N2M2C
	2.4 GHz	IP67		DX80N2X2S2N2M2
		IP20		DX80N2X2S2N2M2C
	900 MHz	IP67	Discrete: Two selectable inputs, two NMOS sinking outputs Analog: Two inputs (0-10V, depending on configuration) Switched Power Outputs	DX80N9X2S2N2V2
		IP20		DX80N9X2S2N2V2C
	2.4 GHz	IP67		DX80N2X2S2N2V2
		IP20		DX80N2X2S2N2V2C

FlexPower™ Node with Switched Power Outputs

	Frequency	Base	I/O	Models*	
	900 MHz	IP67	Discrete: Two selectable inputs, one NMOS sinking output Analog: One input (0-20 mA) Switched Power Outputs	DX80N9X1S2N1M1	
	2.4 GHz			Battery integrated into the housing	DX80N2X1S2N1M1
	900 MHz		Discrete: Two selectable inputs, one NMOS sinking output Analog: One input (0-10V) Switched Power Outputs	Battery integrated into the housing	DX80N9X1S2N1V1
	2.4 GHz				DX80N2X1S2N1V1

* All Nodes on this page are available with internal antennas. To order the internal antenna models, replace the **S** as the 9th digit with a **W**. Internal antennas require an additional week for manufacture and shipping. For example, **DX80N9X2S2N2M2** is the model number for the external antenna device and **DX80N9X2W2N2M2** is the internal antenna device. Models with batteries integrated into the housing are so noted. All other FlexPower Nodes can be powered using 10-30V dc, battery or solar power options. Power supplies are sold separately (see page 400).

DX80 Nodes, 10-30V dc—Discrete

	Frequency	Base	I/O	Models*	
 <p>DX80 Node IP67</p>	900 MHz	IP67	Discrete: Six selectable inputs, six PNP outputs	DX80N9X6S6P6	
		IP20		DX80N9X6S6P6C	
	2.4 GHz	IP67		DX80N2X6S6P6	
		IP20		DX80N2X6S6P6C	
	 <p>DX80..C IP20 External Terminal Strips CID2 certified</p>	900 MHz	IP67	Discrete: Six selectable inputs, six NPN outputs	DX80N9X6S6N6
			IP20		DX80N9X6S6N6C
		2.4 GHz	IP67		DX80N2X6S6N6
			IP20		DX80N2X6S6N6C
900 MHz		IP67	Discrete: Eight selectable inputs, four PNP outputs (When your wireless network does not include a host system, the eight input/four output Node must be mapped to the four input/eight output Gateway.)	DX80N9X6S8P4	
		IP20		DX80N9X6S8P4C	
		2.4 GHz		IP67	DX80N2X6S8P4
				IP20	DX80N2X6S8P4C
900 MHz	IP67	Discrete: Four selectable inputs, eight PNP outputs (When your wireless network does not include a host system, the four input/eight output Node must be mapped to the eight input/four output Gateway.)	DX80N9X6S4P8		
	IP20		DX80N9X6S4P8C		
	2.4 GHz		IP67	DX80N2X6S4P8	
			IP20	DX80N2X6S4P8C	

* All Nodes on this page are available with internal antennas. To order the internal antenna models, replace the **S** as the 9th digit with a **W**. Internal antennas require an additional week for manufacture and shipping. For example, **DX80N9X6S6P6** is the model number for the external antenna device and **DX80N9X6W6P6** is the internal antenna device.

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DX80 Nodes, 10-30V dc—Analog


	Frequency	Base	I/O	Models*
 <p>DX80 Node IP67</p>	900 MHz	IP67	Analog: Four inputs, four outputs (0-20 mA)	DX80N9X6S0P0M4M4
		IP20		DX80N9X6S0P0M4M4C
	2.4 GHz	IP67		DX80N2X6S0P0M4M4
		IP20		DX80N2X6S0P0M4M4C
 <p>DX80 Node IP20 (C1D2 certified)</p>	900 MHz	IP67	Analog: Four inputs, four outputs (0-10V)	DX80N9X6S0P0V4V4
		IP20		DX80N9X6S0P0V4V4C
	2.4 GHz	IP67		DX80N2X6S0P0V4V4
		IP20		DX80N2X6S0P0V4V4C

Counter DX80 Nodes, *FlexPower*

	Frequency	Base	I/O	Counter Input	Models*
 <p>DX80N9X1S2A1</p>	900 MHz	IP67	Discrete: Two selectable inputs, two NMOS sinking outputs Counter: Two selectable inputs	User selectable 10 kHz event counter(s) 25 kHz frequency counter(s)	DX80N9X2S4A2
		IP20			DX80N9X2S4A2C
	2.4 GHz	IP67			DX80N2X2S4A2
		IP20			DX80N2X2S4A2C
	900 MHz	IP67	Discrete: One selectable inputs, one NMOS sinking output Counter: One selectable input Battery integrated into the housing		DX80N9X1S2A1
	2.4 GHz				DX80N2X1S2A1


* To order the internal antenna models, replace the **S** as the 9th digit with a **W**. Internal antennas require an additional week for manufacture and shipping. For example, **DX80N9X2S4A2** is the model number for the external antenna device and **DX80N9X2W4A2** is the internal antenna device. Models with batteries integrated into the housing are so noted. All other *FlexPower* models may be powered using 10-30V dc, battery or solar power options. Power supplies are sold separately. (see page 400).

Solar DX80 Nodes

	Frequency	I/O	Models†
 DX80N9X2S-CS1 and BWA-SOLAR-001	900 MHz	Discrete Inputs: Two selectable Switch Power: One continuous Analog Inputs: Two (0–20 mA) Thermistor: One Battery Status: One Discrete Output: One NMOS sinking	DX80N9X2S-CS1
	2.4 GHz		DX80N2X2S-CS1

† Required FlexPower solar supply is sold separately (see page 400).

Temperature DX80 Nodes, FlexPower

	Frequency	Base	I/O	Models*
 DX80N2X2S2N2TC	900 MHz	IP67	Thermocouple: Three inputs, one thermistor CJC input Discrete: Two selectable inputs, two NMOS sinking outputs	DX80N9X2S2N2T
		IP20		DX80N9X2S2N2TC
	2.4 GHz	IP67		DX80N2X2S2N2T
		IP20		DX80N2X2S2N2TC
	900 MHz	IP67	RTD: Four three-wire inputs	DX80N9X2S0P0R
		IP20		DX80N9X2S0P0RC
	2.4 GHz	IP67		DX80N2X2S0P0R
		IP20		DX80N2X2S0P0RC

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Temperature and Relative Humidity DX80 Nodes

	Frequency	Base	I/O	Models*
	900 MHz	IP67	Two temp/RH FlexSensor inputs	DX80N9X2S2S
	2.4 GHz			DX80N2X2S2S
	900 MHz		One temp/RH FlexSensor input Battery integrated into the housing	DX80N9X1S1S
	2.4 GHz			DX80N2X1S1S

Temperature & Relative Humidity FlexSensors


M12FTH1Q
Temperature and
relative humidity
sensor ±2%

M12FTH2Q
Temperature and
relative humidity
sensor ±3.5%
(Both offer NIST
traceability)



* To order the internal antenna models, replace the **S** in the 9th digit with a **W**. Internal antennas require an additional week for manufacture and shipping. For example, **DX80N9X2S2S** is the model number for the external antenna device and **DX80N9X2W2S** is the internal antenna device. Models with batteries integrated into the housing are so noted. All other FlexPower Nodes may be powered using 10-30V dc, battery or solar power options. Power supplies are sold separately. (see page 400).






M-GAGE™ DX80 Nodes

	Frequency	Base	Description	Models†
	900 MHz	IP67	M-GAGE sensor with an internal antenna and a battery integrated into an easy-to-embed Node housing	DX80N9X1W0P0ZR
	2.4 GHz			DX80N2X1W0P0ZR

† The M-GAGE Nodes are powered by a 3.6V lithium D cell integrated into the housing.

DX85 Modbus RTU Remote I/O

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	Base	I/O	Models
	IP67	Discrete: Six PNP inputs, six PNP outputs	DX85M6P6
	IP20		DX85M6P6C
	IP67	Analog: Four inputs, four outputs (0-20 mA)	DX85M0P0M4M4
	IP20		DX85M0P0M4M4C
	IP67	Discrete: Four PNP inputs, four PNP outputs Analog: Two inputs, two outputs(0-20 mA)	DX85M4P4M2M2
	IP20		DX85M4P4M2M2C
	IP67	Discrete: Eight PNP inputs, four PNP outputs (When your wireless network does not include a host system, the eight input/four output devices must be mapped to the four input/eight output devices.)	DX85M8P4
	IP20		DX85M8P4C
	IP67	Discrete: Four sourcing inputs, eight sourcing outputs (When your wireless network does not include a host system, the four input/eight output devices must be mapped to the eight input/four output devices.)	DX85M4P8
	IP20		DX85M4P8C





SureCross™ DX80 Specifications

Radio	
Range*	900 MHz: Up to 4.8 kilometers (3 miles); 2.4 GHz: Up to 3.2 kilometers (2 miles)
Transmit Power (150 mW radios)	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.

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SureCross™ DX80 Specifications (cont'd)

General	
Power*	+10 to 30V dc (For European applications: +10 to 24V dc, ± 10%) FlexPower: +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) Integrated Battery models: 3.6V dc low power option from an internal battery
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.) Integrated battery models: 0.30 kg (0.65 lbs) IP20 models: 0.23 kg (0.50 lbs)
Indicators	Two LED, bi-color
Switches	Two Push Buttons
Display	Six Character LCD
Connection**	5-pin M12 Euro-style quick disconnect (QD cable is included with DX80 product)
External Cable Glands**	Four PG-7 type, One 1/2 NPT type
Cable Glands Max. Tightening Torque**	0.56 N·m (5 in·lbf)
Gateway 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	Internal wiring terminals: IEC IP67; NEMA 6 External wiring terminals: IEC IP20; NEMA 1
Environmental Rating (external wiring terminals, in suitable enclosure)	External wiring block models: Class I, Division 2, Group A, B, C, D; T4 -40 to +80° C
Operating Temperature	Electronics: -40 to +85° C LCD: -20 to +80° C
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, 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 (DX8x..C External Wiring Terminals and IP20 Housings)	Class I, Division 2, Groups A, B, C, D. Certificate: 1921239 Ex/AEx nA II  LCIE/ATEX Zone 2 (Group IIC). Certificate: LCIE 10 ATEX 1012 X II 3G Ex nA IIC T4 

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

** IP67 models only

*** Operating the devices at the maximum operating conditions for extended periods can shorten the life of the device.

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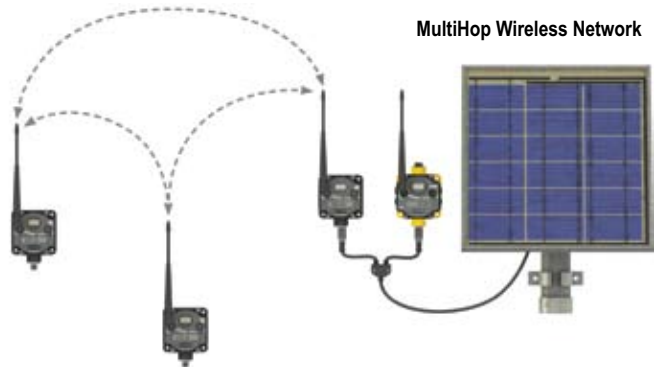
- Selectable power levels up to 1 watt transmit power; license-free operation up to 4 watt EIRP, with a high-gain antenna, in the U.S. and Canada for 900 MHz
- FlexPower power input options allow for +10 to 30V dc, solar or battery power
- Serial communication style (RS-232 or RS-485) is user selectable
- Multiple hops allow for an extended range
- Message routing improves link performance
- SureCross architecture creates self-forming and self-healing wireless networks
- DIP switches select operational modes: master, repeater or slave
- Built-in site survey mode enables rapid assessment of a location's RF transmission properties
- FHSS radios operate and synchronize automatically; selectable network IDs reduce interference from collocated networks
- Banner is constantly working on new models with I/O variations, contact factory for the latest model information



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DX85 Modbus RTU Remote I/O
Used to expand I/O capacity when connected to a Data Radio or Gateway (see page 394)



DX80 MultiHop Data Radios, FlexPower

Description	Frequency	Transmit Power	Models*
MultiHop Radio	900 MHz	DIP switch selectable up to 1 Watt	DX80DR9M-H
	2.4 GHz	100 mW EIRP	DX80DR2M-H

* Banner is constantly working on new models with I/O variations. Contact factory for the latest model information.

DX80 MultiHop Data Radio Specifications

Visit bannerengineering.com for more information.

SureCross™ DX80 Ethernet Wireless Network

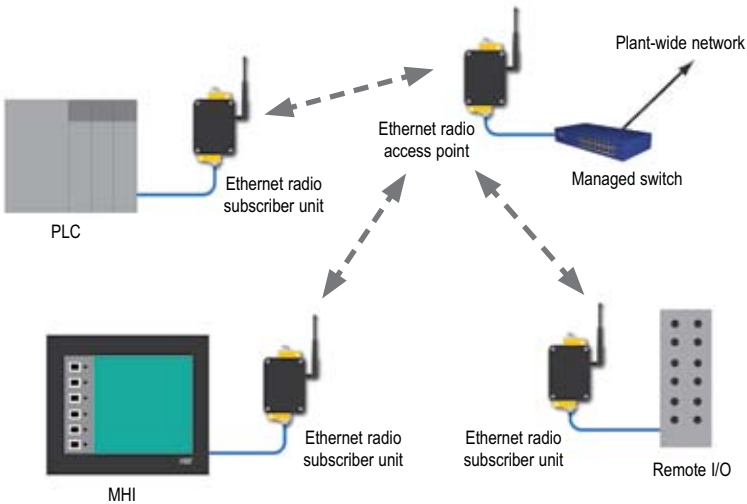
- Industrial grade, long-range, 900 MHz radio used to create point-to-multipoint configurations of wireless Ethernet networks
- RF transmission rate of 1.536 Mb/s and a throughput of 935 Kb/s
- 128 bit AES encryption for Ethernet data packets
- Sub-block error detection and retransmission
- Automatic scan or manual override for the best of the 12 communication channels
- Indicator LEDs for channel selection and signal strength
- Point-to-multipoint configurations with up to 16 subscriber units
- User configuration via internal web page
- Built-in spectrum analyzer and firmware upgrading



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Ethernet Data Radio Network



WIRELESS

- DX70
- DX80
- DX99
- MultiHop
- Ethernet Radio

SureCross™ DX80 Ethernet Radio, 10-30V dc

Description	Frequency	Transmit Power	Models*
Ethernet Radio	900 MHz	150 mW	DXER9

DX80 Ethernet Data Radio Specifications

Visit bannerengineering.com for more information.