SureCross Performance Gateway Module with I/O

Configurable Gateway with discrete and analog I/O and DIP switches that automatically map I/O from a Node to the Gateway

SureCross® Performance embeddable board modules were specifically designed for the needs of industrial users to provide connectivity where traditional wired connections are not possible or cost prohibitive. Wireless networks are formed around a Gateway, which acts as the wireless network master device, and one or more Nodes. SureCross Performance embeddable board modules communicate with all SureCross Performance radios.

- Wireless industrial I/O device with two sourcing discrete inputs, two sourcing discrete outputs, two 0 to 20 mA analog inputs, and two 0 to 20 mA analog outputs
- Selectable transmit power levels of 250 mW or 1 Watt and license-free operation up to 4 watt EIRP, with a high-gain antenna, in the U.S. and Canada for 900 MHz
- 10 to 30V dc power input
- DIP switches for user configuration
- Modbus serial interface
- Frequency Hopping Spread Spectrum (FHSS) technology and Time Division Multiple Access (TDMA) control architecture ensure reliable data delivery within the unlicensed Industrial, Scientific, and Medical (ISM) band
- Transceivers provide bidirectional communication between the Gateway and Node, including fully acknowledged data transmission
- Lost RF links are detected and relevant outputs set to user-defined conditions

For additional information, the most recent version of all documentation, and a complete list of accessories, refer to Banner Engineering's website, *www.bannerengineering.com/surecross*.

Models	Frequency	Inputs and Outputs
DX80G2M6S-PB2	2.4 GHz ISM Band	**Inputs**: Two sourcing discrete. two 0-20 mA analog
DX80G9M6S-PB2	900 MHz ISM Band	**Outputs**: Two sourcing discrete, two 0-20 mA analog

⚠️ **WARNING: Not To Be Used for Personnel Protection**
Never use this device as a sensing device for personnel protection. Doing so could lead to serious injury or death. This device does NOT include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

⚠️ **CAUTION: Electrostatic Discharge (ESD)**
ESD Sensitive Device. Use proper handing procedures to prevent ESD damage to these devices. The module does not contain any specific ESD protection beyond the structures contained in its integrated circuits. Proper handling procedures should include leaving devices in their anti-static packaging until ready for use; wearing anit-static wrist straps; and assembling units on a grounded, static-dissipative surface.

☞ **Important: Never Operate 1 Watt Radios Without Antennas.**
To avoid damaging the radio circuitry, never power up SureCross Performance or SureCross MultiHop (1 Watt) radios without an antenna.

The SureCross® Performance Wireless Network

The SureCross® Performance wireless I/O network provides reliable monitoring without the burden of wiring or conduit installation. The SureCross wireless network can operate independently or in conjunction with a host system, PLC, and/or PC software.

Each wireless network system consists of one Gateway and one or more Nodes. Devices ship with factory defined inputs and outputs that may be all discrete, all analog, or a mix of discrete and analog I/O.

FlexPower Node with
integrated battery

Gateway

Node

Node
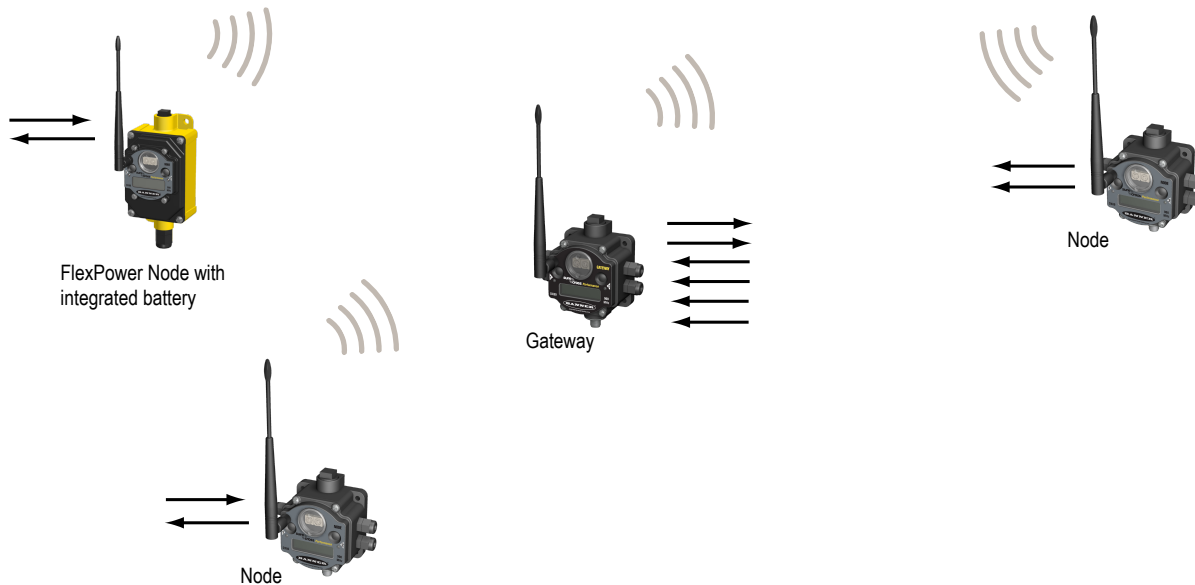
The SureCross® Performance network is a deterministic system—the network identifies when the radio signal is lost and drives relevant outputs to user-defined conditions. Once the radio signal is reacquired, the network returns to normal operation.

SureCross® Performance Gateways and Nodes

A **Gateway** is the master device within each radio network. Every wireless network must have one Gateway that schedules communication traffic and controls the I/O configuration for the network. A radio network contains only one Gateway, but can contain many Nodes. Similar to how a gateway device on a wired network acts as a "portal" between networks, the SureCross Gateway acts as the portal between the wireless network and the host controller. When the Gateway, using its Modbus RTU RS-485 connection, is a Modbus slave to a Modbus RTU host controller, the wireless network may contain up to 47 Nodes in a single wireless network and the Gateway holds the Modbus registers of all wireless devices within the network.

A **Node** is a wireless network end-point device used to provide sensing capability in a remote area or factory. The Node collects data from sensors and communicates the data back to the Gateway. Nodes are available in a wide variety of power or input/output options. Each Node device can be connected to sensors or output devices and reports I/O status to the Gateway.

SureCross User Configuration Tool
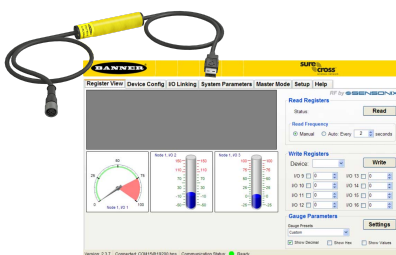
The User Configuration Tool (UCT) offers an easy way to link I/O points in your wireless network, view I/O register values graphically, and set system communication parameters when a host system is not part of the wireless network.

The UCT requires a special USB to RS-485 (model number BWA-UCT-900 for 1 Watt radios, BWA-HW-006 can be used for all other radios) converter cable to pass information between your computer and the Gateway. Download the most recent revisions of the UCT software from Banner Engineering's website: *http://www.bannerengineering.com/wireless*.

Mixing Performance and Non-Performance Radios in the Same Network

To comply with federal regulations, the 150 mW radios and 1 Watt radios communicate differently. To mix Performance radios with non-Performance radios:

- Performance radios must operate in 250 mW mode, **not** 1 Watt mode (DIP switch 1 ON)
- Non-Performance radios must be set to use Extended Address Mode (DIP switch 1 ON)

For more detailed instructions about setting up your wireless network, refer to the Quick Start Guide, Banner document number 128185. For more information about using Performance and non-Performance radios within the same network, refer the technical note titled *Mixing Performance Radios and 150 mW Radios in the Same Network* listed on the FAQ/Knowledgebase section of Banner's Wireless Sensor Networks website.

Setting Up Your Wireless Network

To set up and install your wireless network, follow these steps:

1. Configure the DIP switches of all devices.
2. Connect the sensors to the SureCross devices.
3. Apply power to all devices.
4. Form the wireless network by binding the Nodes to the Gateway. If the binding instructions are not included in the datasheet, refer to the product manual for binding instructions.
5. Observe the LED behavior to verify the devices are communicating with each other.
6. Conduct a site survey between the Gateway and Nodes. If the site survey instructions are not included in this datasheet, refer to the product manual for detailed site survey instructions.
7. Install your wireless sensor network components. If installation instructions are not included in this datasheet, refer to the product manual for detailed installation instructions.

For additional information, including installation and setup, weatherproofing, device menu maps, troubleshooting, and a list of accessories, refer to one of the following product manuals.

- SureCross Quick Start Guide: Banner part number *128185*
- SureCross Wireless I/O Network Manual: *132607*
- Web Configurator Manual (used with "Pro" and DX83 models): *134421*
- Host Configuration Manual *132114*

Configuring the DIP Switches

Before making any changes to the DIP switch positions, disconnect the power. For devices with batteries integrated into the housing, remove the battery for at least one minute. DIP switch changes will not be recognized if power isn't cycled to the device.

DIP Switch Settings

Transmit Power
The 900 MHz radios can be operated at 1 watt (30 dBm) or 250 mW (24 dBm). While the radios operate in 1 Watt mode, they cannot communicate with 150 mW DX80 radio devices. To communicate with the 150 mW radio models, operate this radio in 250 mW mode. For 2.4 GHz radios, this DIP switch is disabled. The transmit power for 2.4 GHz is fixed at about 100 mW EIRP (18 dBm), making the 2.4 GHz Performance models automatically compatible with the DX80 2.4 GHz models.

DIP Switch 1	
OFF *	1 Watt (30 dBm, 900 MHz models only)
ON	250 mW (24 dBm, 900 MHz models only), DX80 compatibility mode

Host Configured or Use DIP Switches
Selecting "Host configured" allows a host system to set parameters. By default, this Gateway uses the DIP switches to configure the device.

DIP Switch 2	
OFF *	Use DIP Switches
ON	Host configured (DIP switches 3-8 are ignored)

DIP Switch 3
DIP switch 3 must remain in the OFF position.

DIP Switch 3	
OFF *	

Link Loss Output State

The SureCross DX80 wireless devices use a deterministic radio link time-out method to address RF link interruption or failure. When a radio link fails, all pertinent wired outputs are sent to defined states until the link is recovered, ensuring that disruptions in the communications link result in predictable system behavior.

Select the state the outputs are changed to during a link loss.

DIP Switches		
4	**5**	
OFF *	OFF *	Off (discrete) or 0 mA (analog)
OFF	ON	On (discrete) or 20 mA (analog)
ON	OFF	Hold last stable state
ON	ON	Reserved

* Default configuration

Analog Scale

Use the DIP switch to select which current scale to use for all the device's analog inputs and outputs: 0 to 20 mA or 4 to 20 mA. When using a 4-20 mA sensor with a 0-20 mA input, the sensor uses the 4-20 mA section of the total range. Using a 4-20 mA with a 0-20 mA input allows you to determine when you have an error condition with the sensor. A normal input reading between 4 and 20 mA indicates a functioning sensor whereas a value below 4 mA indicates an error condition, such as a broken wire or loose connection. This DIP switch is used only on the 0 to 20 mA models, not the 0 to 10V models.

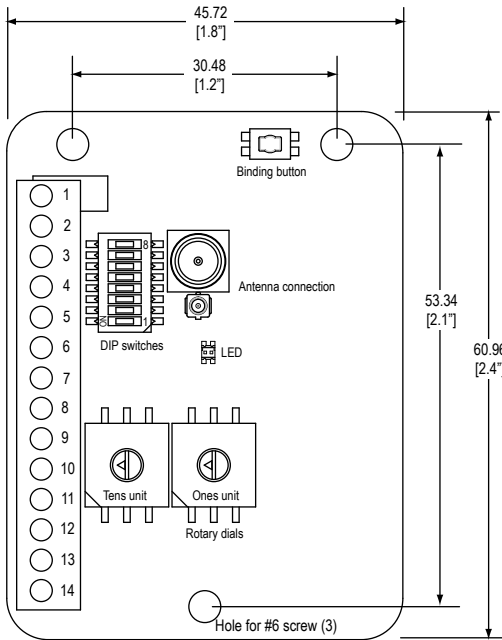| DIP Switch 6	
OFF *	0–20 mA scale
ON	4–20 mA scale

* Default configuration

I/O Mapping

	DIP Switches	
	7 = OFF	**8 = OFF**
	No I/O mapping via the DIP switches. Use the User Configuration Tool (UCT) to configure the I/O.	

|	DIP Switches	
One DX80N2X6S-PB2 Node to a DX80G2M6S-PB2 Gateway	**7 = OFF**	**8 = ON**
	Node 01 Discrete IN 1 → Gateway Discrete OUT 1 Node 01 Discrete IN 2 → Gateway Discrete OUT 2 Node 01 Analog IN 1 → Gateway Analog OUT 1 Node 01 Analog IN 2 → Gateway Analog OUT 2 Gateway Discrete IN 1 → Node 01 Discrete OUT 1 Gateway Discrete IN 2 → Node 01 Discrete OUT 2 Gateway Analog IN 1 → Node 01 Analog OUT 1 Gateway Analog IN 2 → Node 01 Analog OUT 2	

	DIP Switches	
Two DX80N2X6S-PB2 Nodes to a DX80G2M6S-PB2 Gateway	**7 = ON**	**8 = OFF**
Node 1 Gateway Node 2	Node 01 Discrete IN 1 → Gateway Discrete OUT 1 Node 02 Discrete IN 1 → Gateway Discrete OUT 2 Node 01 Analog IN 1 → Gateway Analog OUT 1 Node 02 Analog IN 1 → Gateway Analog OUT 2 Gateway Discrete IN 1 → Node 01 Discrete OUT 1 Gateway Discrete IN 2 → Node 02 Discrete OUT 1 Gateway Analog IN 1 → Node 01 Analog OUT 1 Gateway Analog IN 2 → Node 02 Analog OUT 1	

Wire the Gateway's I/O and Apply Power

	Pin	Description	Diagram Label
	1	Analog IN 1 (0 to 20 mA)	AI1
	2	Analog IN 2 (0 to 20 mA)	AI2
	3	Discrete IN 1 (PNP)	DI1
	4	Discrete IN 2 (PNP)	DI2
	5	Ground	GND
	6	Discrete OUT 1 (PNP)	DO1
	7	Discrete OUT 2 (PNP)	DO2
	8	Analog OUT 1 (0 to 20 mA)	AO1
	9	Analog OUT 2 (0 to 20 mA)	AO2
	10	RS-485 + Host communication connection	
	11	RS-485 – Host communication connection	
	12	Ground	GND
	13	10 to 30V dc	PWR
	14	Ground	GND

The three ground connections are tied together internally.

Input and Output Wiring
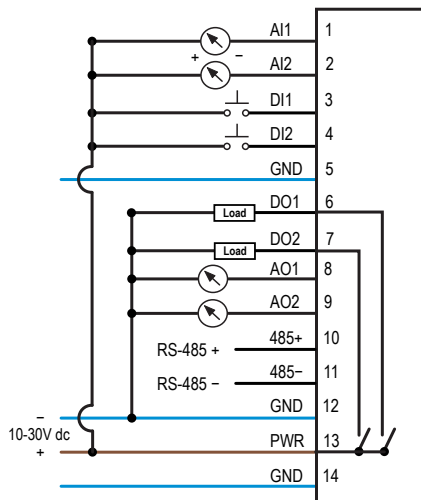
Binding Radios to Form Networks

Binding Nodes to a Gateway ensures the Nodes only exchange data with the Gateway they are bound to.

Apply power to the Gateway and the Node you are binding.

Binding Nodes to a Gateway ensures the Nodes only exchange data with the Gateway they are bound to. After a Gateway enters binding mode, the Gateway automatically generates and transmits a unique extended addressing (XADR), or binding, code to all Nodes within range that are also in binding mode. The extended addressing (binding) code defines the network, and all radios within a network must use the same code. After binding your Nodes to the Gateway, make note of the binding code displayed under the *DVCFG menu, XADR submenu on the LCD. Knowing the binding code prevents having to re-bind all Nodes if your Gateway is ever replaced.

1. Put the Gateway in binding mode.

Option	Description
Two-button Gateways	Triple-click button 2
One-button Gateways	Triple-click the button
Gateways without buttons	Remove the rotary dial access cover and set both the right and left rotary dials to 0, then set both the right and left rotary dials to F. Note that both rotary dials must be changed to F after applying power, not before applying power.

   The red LEDs flash alternately when the Gateway is in binding mode. Any Node entering binding mode will bind to this Gateway.

2. Put the Node in binding mode.

Option	Description
Two-button Nodes	Triple-click button 2
One-button Nodes	Triple-click the button
Nodes without buttons	Remove the top cover and set both the left and right rotary dials to F to enter binding mode.

   The Node enters binding mode and locates the Gateway in binding mode. With two LED models, the red LEDs flash alternately. With one LED models, the red and green LED flashes alternately while the Node searches for the Gateway; after binding is complete, the LED is red and green for four seconds (looks orange), then the red and green flash simultaneously (looks orange) four times. The Node automatically exits binding mode. After the Node is bound, the LEDs are both solid red for a few seconds. The Node cycles its power, then enters RUN mode.

3. Use both of the Node's rotary dials to assign a valid decimal Node Address (between 01 and 47). The left rotary dial represents the tens digit (0 through 4) and the right dial represents the ones digit (0 through 9) of the Node Address.

4. Repeat steps 2 and 3 for all Nodes that need to communicate to this Gateway.

5. Exit binding mode on the Gateway.

Option	Description
Two-button Gateways	Single click either button 1 or button 2
One-button Gateways	Single-click the button
Gateways with no buttons	Change the Gateway's rotary dials to a valid Network ID.

Notes on Network IDs: Valid Network IDs are 01 through 32, in decimal, established using both rotary dials. The left dial may be set to 0, 1, 2, or 3. The right dial may be set from 0 to 9 when the left dial is at 0, 1, or 2; or set to 0 through 2 when the left dial is at 3. (Positions A through F are invalid network ID numbers.)

When installing special kits with pre-mapped I/O, indicated by device model numbers beginning in DX80K, return the rotary dials to their original positions after binding. If the rotary dials are not returned to their original positions, the I/O mapping will not work.

LED Behavior for the Gateways

After powering up and binding the Gateway and its Nodes, verify all devices are communicating properly. When testing communication between the Gateway and Node, verify all radios and antennas are at least two meters apart or the communications may fail. This table lists the LED behavior for the board-model Gateways with one LED.

LED (Bi-color)	Gateway Status
🟢 (green on)	Power ON
(green and red flashing alternately)	Binding mode
(red flashing)	Device Error
(green and red flashing together, looks yellow-orange)	Modbus Communication Active
(red flashing)	Modbus Communication Error

For Gateway and Ethernet Bridge systems, active Modbus communication refers to the communication between the Gateway and the Ethernet Bridge. For Gateway-only systems, the Modbus communication LEDs refer to the communication between the Gateway and its host system (if applicable).

Conduct a Site Survey from a Gateway Board Model

Conducting a Site Survey, also known as an RSSI (Radio Signal Strength Indication), analyzes the radio communications link between the Gateway and any Node within the network by analyzing the radio signal strength of received data packets and reporting the number of missed packets that required a retry.

Perform a Site Survey before permanently installing the radio network to ensure reliable communication. Only the Gateway can initiate a Site Survey, and the Site Survey analyzes the radio communications link with one Node at a time. Follow these steps to conduct a Site Survey from the board module Gateway.

1. To start the Site Survey, set the Gateway's rotary dials to the Node address you'd like to conduct a Site Survey with. For example, to analyze the signal strength between this Gateway and Node 02, rotate the left rotary dial to 0 and the right rotary dial to 2.
   The Site Survey automatically begins running. If there is a device at address 02, the LED flashes amber. If there is no device at address 02, the LED is solid red. The amber LED flashes at varying rates to indicate the signal strength.
2. To exit the Site Survey, set the Gateway's rotary dials to 00. Otherwise, after 15 minutes the Gateway automatically exits Site Survey mode.
   The LED flashes green to indicate the Gateway is in standard operating mode.

The amber LED flashes at specific rates to indicate the Site Survey results. Each signal strength represents the majority of the data packets being received at that signal strength. For example, a strong signal strength indicates the majority of the data packets were received at a strong signal, but a few many have been received at a good or weak signal strength.

- Eight flashes per second: Very strong signal strength
- Four flashes per second: Strong signal strength

- Two flashes per second: Good signal strength
- One flash per second: Weak signal strength
- Solid amber LED: No radio communication detected

Installing the Board Modules

SureCross board modules must be mounted inside a panel or OEM enclosure.

Modbus Register Table

I/O #	Modbus Holding Register		I/O Type	Units	I/O Range		Holding Register Representation	
	Gateway	Any Node			Min. Value	Max. Value	Min. (Dec.)	Max. (Dec.)
1	1	1 + (Node# × 16)	Discrete IN 1	-	0	1	0	1
2	2	2 + (Node# × 16)	Discrete IN 2	-	0	1	0	1
3	3	3 + (Node# × 16)	Analog IN 1	mA	0.0	20.0	0	65535
4	4	4 + (Node# × 16)	Analog IN 2	mA	0.0	20.0	0	65535
5	5	...						
7	7	7 + (Node# × 16)	Reserved					
8	8	8 + (Node# × 16)	Device Message					
9	9	9 + (Node# × 16)	Discrete OUT 1	-	0	1	0	1
10	10	10 + (Node# × 16)	Discrete OUT 2	-	0	1	0	1
11	11	11 + (Node# × 16)	Analog OUT 1	mA	0.0	20.0	0	65535
12	12	12 + (Node# × 16)	Analog OUT 2	mA	0.0	20.0	0	65535
13	13	...						
15	15	15 + (Node# × 16)	Control Message					
16	16	16 + (Node# × 16)	Reserved					

Discrete Bit-Packed Registers

Discrete bit-packed registers include the discrete status registers, discrete inputs, and discrete outputs.

Bit packing involves using a single register, or range of contiguous registers, to represent I/O values.

When networks use similar Nodes to gather data using the same I/O registers for each Node, discrete data from multiple Nodes can be bit packed into a single register on the Gateway. The bit-packed data is arranged by I/O point starting at Modbus register 6601. For example, Discrete IN 1 for all the Nodes in the network is stored in three contiguous 16-bit registers.

The most efficient way to read (or write) discrete data from a SureCross® DX80 Gateway is by using these bit-packed registers because users can read or write registers for all devices using one Modbus message. The following registers contain discrete bit-packed I/O values for the Gateway and all Nodes. Values are stored first for the Gateway, then for each Node in order of Node address.

Bit-Packed Device Status Registers

Register Address	Bit Position															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6601	Node 15	Node 14	Node 13	Node 12	Node 11	Node 10	Node 9	Node 8	Node 7	Node 6	Node 5	Node 4	Node 3	Node 2	Node 1	Gateway
6602	Node 31	Node 30	Node 29	Node 28	Node 27	Node 26	Node 25	Node 24	Node 23	Node 22	Node 21	Node 20	Node 19	Node 18	Node 17	Node 16
6603	Node 47	Node 46	Node 45	Node 44	Node 43	Node 42	Node 41	Node 40	Node 39	Node 38	Node 37	Node 36	Node 35	Node 34	Node 33	Node 32

Bit-Packed Discrete Input 1

Register Address	Bit Position															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6611	Node 15	Node 14	Node 13	Node 12	Node 11	Node 10	Node 9	Node 8	Node 7	Node 6	Node 5	Node 4	Node 3	Node 2	Node 1	Gateway
6612	Node 31	Node 30	Node 29	Node 28	Node 27	Node 26	Node 25	Node 24	Node 23	Node 22	Node 21	Node 20	Node 19	Node 18	Node 17	Node 16
6613	Node 47	Node 46	Node 45	Node 44	Node 43	Node 42	Node 41	Node 40	Node 39	Node 38	Node 37	Node 36	Node 35	Node 34	Node 33	Node 32

Bit-Packed Discrete Output 1

Register Address	Bit Position															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6691	Node 15	Node 14	Node 13	Node 12	Node 11	Node 10	Node 9	Node 8	Node 7	Node 6	Node 5	Node 4	Node 3	Node 2	Node 1	Gateway
6692	Node 31	Node 30	Node 29	Node 28	Node 27	Node 26	Node 25	Node 24	Node 23	Node 22	Node 21	Node 20	Node 19	Node 18	Node 17	Node 16
6693	Node 47	Node 46	Node 45	Node 44	Node 43	Node 42	Node 41	Node 40	Node 39	Node 38	Node 37	Node 36	Node 35	Node 34	Node 33	Node 32

Inputs		Outputs	
Modbus Register Address (Decimal)	Description (Inputs)	Modbus Register Address (Decimal)	Description (Outputs)
6601-6603	Status for all devices		
6611-6613	Input 1 from all devices	6691–6693	Output 1 from all devices
6621-6623	Input 2 from all devices	6701–6703	Output 2 from all devices
6631-6633	Input 3 from all devices	6711–6713	Output 3 from all devices
6641-6643	Input 4 from all devices	6721–6723	Output 4 from all devices
6651-6653	Input 5 from all devices	6731–6733	Output 5 from all devices
6661-6663	Input 6 from all devices	6741–6743	Output 6 from all devices
6671-6673	Input 7 from all devices	6751–6753	Output 7 from all devices
6681-6683	Input 8 from all devices		

Status registers (6601-6603) contain a bit-packed representation defining the devices that are operational in the wireless system.

A one (1) written to the Discrete Status Register area indicates the device is active within the wireless system. A zero (0) indicates the device is not active within the wireless network.

Input registers from all devices use Modbus registers 6611 through 6683 to organize the least significant bit into a sequential array of registers. The first register contains the least significant bit from the input values for the Gateway through Node 15. The second register contains the input values for Node 16 through Node 31, and the third register contains the input values for Nodes 32 through 47.

For discrete inputs, only the least significant bit is used. For analog inputs, the least significant bit indicates if the analog value is above or below the selected threshold value (when using the threshold parameter). For example, a least significant bit of one (1) indicates the analog value is above the selected threshold value. A least significant bit of zero (0) indicates the analog value is below the threshold value.

Output registers from all devices use Modbus registers 6691 through 6753 to organize the least significant bit into a sequential array of registers. Output 8 (I/O point 16) cannot be written using the discrete format.

Analog 16-Bit Registers (Registers 6801 through 9098)

The most efficient way to read (or write) analog data from a SureCross® DX80 Gateway is by using these 16-bit analog registers. Most networks consist of similar DX80 Nodes reporting data using the same I/O registers for each Node. For this reason, the analog data is arranged by I/O point using Modbus registers 6801 through 9098. For example, Input 1 for Gateway and all Nodes is stored in the first 48 contiguous blocks of 16-bit analog registers, beginning with register 6801.

In this format, users can read a 16-bit holding register for all devices or write to a register for all devices using one Modbus message. Using these registers is the most efficient way to read all status registers, read all analog inputs, or write all analog outputs.

The following registers contain analog I/O values for the Gateway and all Nodes. Values are stored first for the Gateway, then for each Node in order of Node address.

Inputs		Outputs	
Modbus Register Address (Decimal)	**Description (Inputs)**	**Modbus Register Address (Decimal)**	**Description (Outputs)**
6801	Input 1 for Gateway	8001	Output 1 for Gateway
6802	Input 1 for Node 1	8002	Output 1 for Node 1
6803	Input 1 for Node 2	8003	Output 1 for Node 2
...	...	...	...
6951	Input 2 for Gateway	8151	Output 2 for Gateway
6952	Input 2 for Node 1	8152	Output 2 for Node 1
6953	Input 2 for Node 2	8153	Output 2 for Node 2
...	...	...	...
7101	Input 3 for Gateway	8301	Output 3 for Gateway
7102	Input 3 for Node 1	8302	Output 3 for Node 1
7103	Input 3 for Node 2	8303	Output 3 for Node 2
...	...	...	...
7851	Input 8 (Status Register) for Gateway	9051	Output 8 for Gateway
7852	Input 8 (Status Register) for Node 1	9052	Output 8 for Node 1
7853	Input 8 (Status Register) for Node 2	9053	Output 8 for Node 2
...	...	...	...

For example, 6801 contains the input 1 value for the Gateway, 6802 contains the input 1 value for Node 1, and 6848 contains the input 1 value for Node 47.
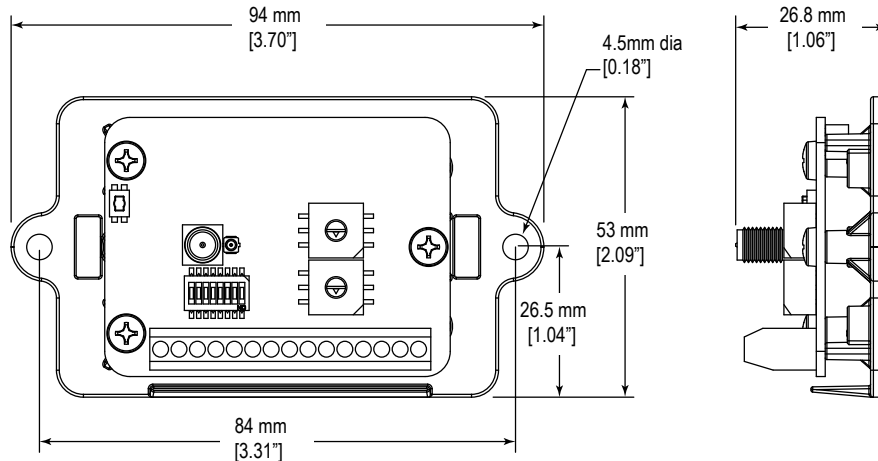
Specifications

Radio	General

Radio Range
900 MHz (1 Watt): Up to 9.6 kilometers (6 miles) *
2.4 GHz: Up to 3.2 kilometers (2 miles) *

Radio Transmit Power
900 MHz (1 Watt): 30 dBm conducted (up to 36 dBm EIRP)
2.4 GHz: 18 dBm conducted, less than or equal to 20 dBm EIRP

900 MHz Compliance (1 Watt Radios)
FCC ID UE3RM1809: This device complies with FCC Part 15, Subpart C, 15.247
IC: 7044A-RM1809

2.4 GHz Compliance

Power*
Requirements: +10 to 30V dc (For European applications: +10 to 24V dc, ± 10%). (See UL section below for any applicable UL specifications)

Interface
Indicators: One bi-color LED
Buttons: One

Wiring Access
Terminal block

Antenna Connection
Ext. Reverse Polarity SMA, 50 Ohms
Max Tightening Torque: 0.45 N·m (4 lbf·in)

Link Timeout
Gateway: Configurable

Radio	General

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

Spread Spectrum Technology

FHSS (Frequency Hopping Spread Spectrum)

* With the 2 dB antenna that ships with the product. 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.

Node: Defined by Gateway

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

Inputs	Outputs

Discrete Input

Two, sourcing

Rating: 3 mA max current at 30V dc

Sample Rate: 62.5 milliseconds

Report Rate: On change of state

ON Condition (PNP): Greater than 8V

OFF Condition (PNP): Less than 5V

Analog Inputs

Two, 0 to 20 mA

Rating: 24 mA

Impedance: 100 Ohms

Sample Rate: 62.5 milliseconds

Report Rate: 1 second or On Change of State (1% change in value)

Accuracy: 0.1% of full scale +0.01% per °C

Resolution: 12-bit

To verify the analog input's impedance, use an Ohm meter to measure the resistance between the analog input terminal (AI*x*) and the ground (GND) terminal.

Discrete Output

Two, sourcing

Update Rate: 1 second

ON Condition (PNP): Supply minus 2V

OFF Condition (PNP): Less than 2V

Output State Following Timeout: De-energized (OFF)

Discrete Output Rating (PNP)

100 mA max current at 30V dc

ON-State Saturation: Less than 3V at 100 mA

OFF-state Leakage: Less than 10 μA

Analog Outputs

Two, 0 to 20 mA

Update Rate: 125 milliseconds

Accuracy: 0.1% of full scale +0.01% per °C

Resolution: 12-bit

Communication	Environmental

Hardware (RS-485)

Interface: 2-wire half-duplex 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

Ratings

Operating Temperature: −40 to +85° C

Operating Humidity: 95% max. relative (non-condensing)

Radiated Immunity

10 V/m, 80-2700 MHz (EN61000-6-2)

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.

MultiHop M-HBx and Performance PBx Models Mounted on the Base

Most MultiHop M-HBx and Performance PBx models ship from the factory mounted on a plastic base.

94 mm [3.70"]

4.5mm dia [0.18"]

26.8 mm [1.06"]

53 mm [2.09"]

26.5 mm [1.04"]

84 mm [3.31"]

Warnings

The manufacturer does not take responsibility for the violation of any warning listed in this document.

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.

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