

SureCross DX80 GatewayPro



GatewayPro models for protocol conversion or web-based configuration

Features



The SureCross® wireless system is a radio frequency network with integrated I/O that can operate in most environments and eliminate the need for wiring runs. Wireless networks are formed around a Gateway, which acts as the wireless network master device, and one or more Nodes.

- 10 to 30V dc power input
- Modbus serial interface and Ethernet interface
- Site Survey analyzes the network's signal strength and reliability and displays the results on the Gateway's LCD
- 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) band
- Transceivers provide bidirectional communication between the Gateway and Node, including fully acknowledged data transmission

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

Model	Power	Feature	Frequency	Antenna
DX80P9T6S	+10 to 30V dc	Modbus/TCP or EtherNet/IP communication protocol	900 MHz ISM Band	External
DX80P9T6W				Internal
DX80P2T6S			2.4 GHz ISM Band	External
DX80P2T6W				Internal
DX80P9A6S		Modbus/TCP protocol, Configuration capability using the Web Configurator	900 MHz ISM Band	External
DX80P9A6W				Internal
DX80P2A6S			2.4 GHz ISM Band	External
DX80P2A6W				Internal



WARNING: Not To Be Used for Personnel Protection

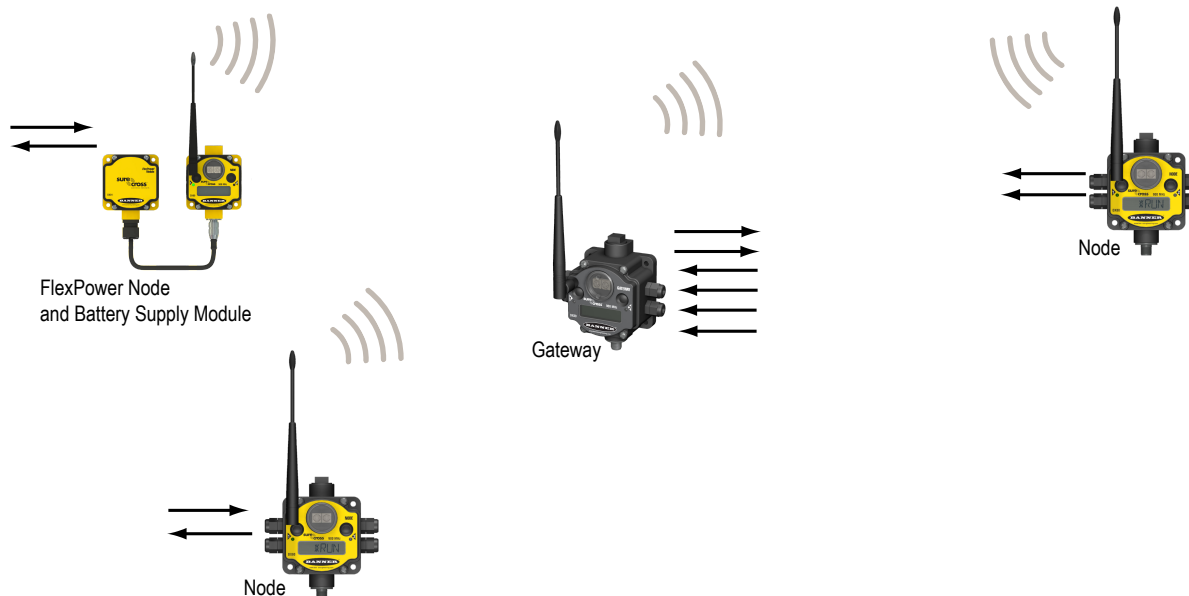
Never use this product as a sensing device for personnel protection. Doing so could lead to serious injury or death. This product does NOT include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized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



The SureCross® DX80 Wireless Network

The SureCross® DX80 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.



The SureCross® DX80 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® DX80 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® DX80 GatewayPro

The SureCross® DX80 GatewayPro combines, in one unit, the function of a SureCross® DX80 Gateway with the ability to interface to Ethernet using Modbus/TCP or EtherNet/IP™ protocols. The GatewayPro has a serial port as well as an industrial Ethernet port. There are two basic models of the GatewayPro: DX80P*T6* and DX80P*A6*.

- **DX80P*T6***. The 'T6 model acts as a protocol converter only, offering the Modbus/TCP or EtherNet/IP communication protocols.
- **DX80P*A6***. The 'A6 model includes DX80 wireless network configuration, Modbus RTU master, Modbus/TCP client/server, Script Basic, e-mail, data logging, and trending.

Connect a GatewayPro to a host system using the industrial Ethernet connection on the DX80 GatewayPro. To connect the GatewayPro directly to the host system without using an Ethernet switchbox/hub, some host systems may require a crossover cable.

By default, the GatewayPro is configured to use Modbus/TCP server. To use EtherNet/IP, connect the GatewayPro to a managed switch. For more information, see [SureCross Wireless I/O Product Manual](#) or [Host Configuration Manual](#).

Logging into the Web Configurator

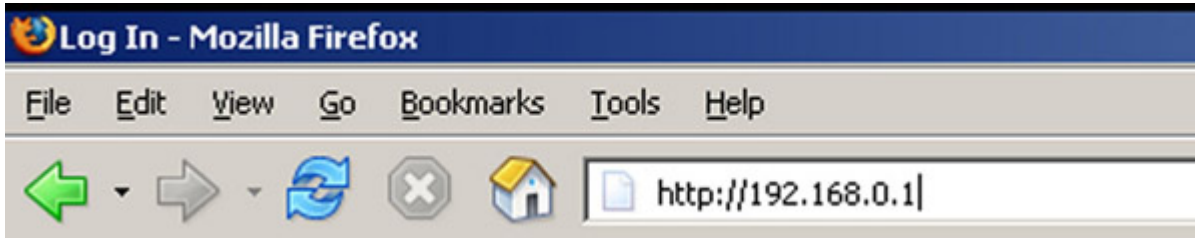
The SureCross™ Pro and DX83 Ethernet Bridge devices use an XML file to configure the network. To access the XML file, use any web browser set up for a direct connection to the Internet. If problems occur while connecting, verify the browser is not set to use a proxy server.

When connecting to the Ethernet Bridge, GatewayPro, or MultiHop Pro directly from a host computer, a crossover Ethernet cable is required; when connecting through a switch or Ethernet hub, use a standard Ethernet cable.

The factory default IP address for the devices is: **192.168.0.1**.

To change the device's default IP address, first set up the host PC with an IP address different from the Ethernet Bridge, GatewayPro, or MultiHop Pro IP addresses. (Please refer to Banner document 133116 for detailed instructions on setting up the host computer's network IP address.) For example, change the PC host IP address to: **192.168.0.2**.

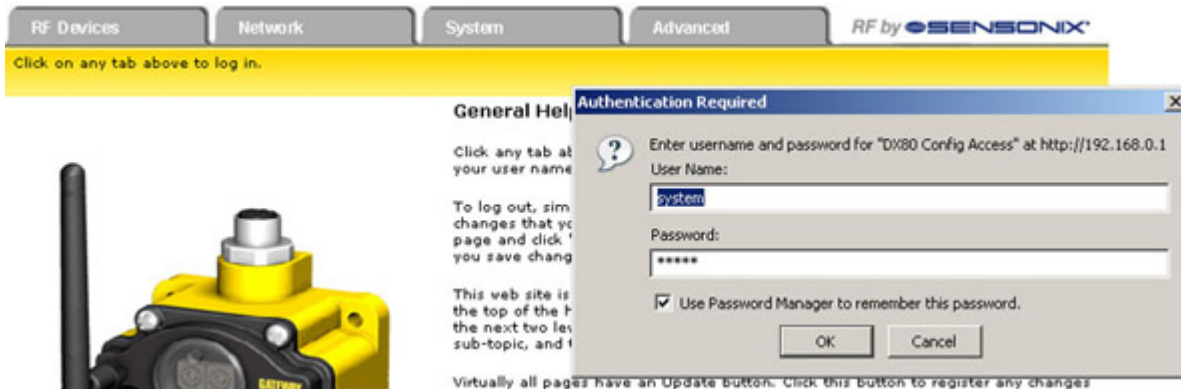
After changing the host's IP address, open a web browser and log into the Ethernet Bridge, GatewayPro, or MultiHop Pro by typing the IP address in the browser location window: **http://192.168.0.1**.



After entering the IP address, the home web page for the SureCross device displays. To log in, click on any tab at the top of the page. To log out, close the browser.

For user-level access, enter the following as the user name and password.

- **User name: system**
- **Password: admin**



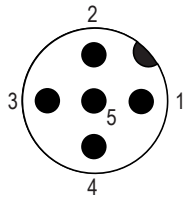
For Admin-level access, enter the following as the user name and password:

- **User name: root**
- **Password: sxi**

Admin-level access allows administrators to set up system users and their passwords. Admin-level access is also required to change the IP address of the system.

5-pin Euro-Style Hookup

Wiring the 5-pin Euro-style connector depends on the model and power requirements of the device. Connecting dc power to the communication pins will cause permanent damage.



Wire No.	Wire Color	Description
1	Brown	10 to 30V dc
2	White	RS485 / D1 / B / +
3	Blue	dc common (GND)
4	Black	RS485 / D0 / A / -
5	Gray	Comms Gnd

Industrial Ethernet Wiring

Use the 4-pin industrial Ethernet connection to connect the radio network to an Ethernet-based host system.



Wire No.	Wire Color	Description
1	White/Orange	+Tx
2	White/Blue	+Rx
3	Orange	-Tx
4	Blue	-Rx

Additional Information

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

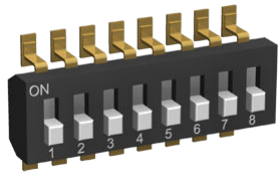
- SureCross Quick Start Guide: Banner part number [128185](#)
- SureCross Wireless I/O Network Manual: [132607](#)
- Web Configurator Manual (used with "Pro" and DX83 models): [134421](#)
- Host Configuration Manual [132114](#)

Modbus Register Table

I/O Point	Modbus Holding Register	
	Gateway	Any Node
1	1	1 + (Node# × 16)
2	2	2 + (Node# × 16)
3	3	3 + (Node# × 16)
4	4	4 + (Node# × 16)
5	5	5 + (Node# × 16)
6	6	6 + (Node# × 16)
7	7	7 + (Node# × 16)
8	8	8 + (Node# × 16)
9	9	9 + (Node# × 16)
10	10	10 + (Node# × 16)

I/O Point	Modbus Holding Register	
	Gateway	Any Node
11	11	11 + (Node# × 16)
12	12	12 + (Node# × 16)
13	13	13 + (Node# × 16)
14	14	14 + (Node# × 16)
15	15	15 + (Node# × 16)
16	16	16 + (Node# × 16)

DIP Switch Changes



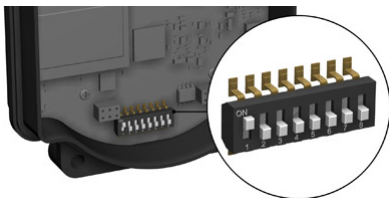
Before making any changes to the DIP switch positions, disconnect the power. For devices with batteries integrated into the housing, remove the battery for at least one minute.

DIP switch changes will not be recognized if power isn't cycled to the device.

Accessing the Internal DIP Switches

To access the internal 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. For integrated battery models (no ribbon cable) and Class I, Division 2 certified devices (ribbon cable is glued down), skip this step.
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.

DIP Switch Settings

Device Settings	Switches			
	1	2	3	4
Rotary dial address mode	OFF*			
Extended address mode	ON			

* Default configuration

Address Mode

The SureCross wireless devices may use one of two types of addressing modes: rotary dial addressing or extended addressing. In **rotary dial** 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 to which they are bound. In extended address mode, wireless networks may contain up to 48 radio devices. For more information on extended address mode, refer to the SureCross™ Wireless I/O Network product manual.

The device ships in rotary dial 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.

Specifications

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, less than or equal to 20 dBm EIRP

900 MHz Compliance (150 mW Radios)

FCC ID TGUDX80 - This device complies with FCC Part 15, Subpart C, 15.247

IC: 7044A-DX8009

2.4 GHz Compliance

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)

Antenna Connection

Ext. Reverse Polarity SMA, 50 Ohms

Max Tightening Torque: 0.45 N·m (4 in·lbf)

Link Timeout

Gateway: Configurable

Node: Defined by Gateway

* 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.



General

Power*

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

Consumption: Less than 2.9 W (120 mA) at 24V dc

Housing

Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers

Weight: 0.26 kg (0.57 lbs)

Mounting: #10 or M5 (SS M5 hardware included)

Max. Tightening Torque: 0.56 N·m (5 in·lbf)

Interface

Indicators: Two bi-color LEDs

Buttons: Two

Display: Six character LCD

Wiring Access

One 5-pin Euro-style male connector and One 4-pin female industrial Ethernet connection

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

Communication

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

Modbus/TCP and EtherNet/IP

4-wire Industrial Ethernet

10/100 Mbps, full or half duplex, auto sensing

Environmental

Rating

IEC IP67; NEMA 6; (See UL section below for any applicable UL specifications)

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

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.

Included with Device (*Pro Models)

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
5-pin Euro-style Cable	MQDC1-506	1	Cable, 5-pin Euro (female, single ended), Straight, 1.83m, black
Ethernet Crossover Cable	BWA-EX2M	1	Ethernet Cable, M12 Industrial/RJ45, Crossover, 2 meter
Antenna*	BWA-902-C or BWA-202-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
Quick Start Guide		1	128185 for DX80 Gateways or 152653 for MultiHop models

* Internal antenna devices do not ship with this antenna

Ethernet Cables

Part No.	Model No.	Description
77669	BWA-E2M	Ethernet cable, RSCD RJ45 440, 2M
78469	BWA-E8M	Ethernet cable, RSCD RJ45 440, 8M
78467	BWA-EX2M	Ethernet cable, crossover, RSCD RJ45CR 440, 2M

Use a crossover cable to connect the DX80 GatewayPro or DX83 Ethernet Bridge to a host system without using an Ethernet switchbox or hub. When using a switchbox or hub, use a straight cable.

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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Antenna Installation

Always install and properly ground a qualified surge suppressor when installing a remote antenna system. Remote antenna configurations installed without surge suppressors invalidate the manufacturer's warranty.

Always keep the ground wire as short as possible and make all ground connections to a single-point ground system to ensure no ground loops are created. No surge suppressor can absorb all lightning strikes. Do not touch the SureCross™ device or any equipment connected to the SureCross device during a thunderstorm.

Exporting SureCross Radios

It is our 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 the device is approved in the destination country.** A list of approved countries appears in the *Agency Certifications* section of the product manual. The SureCross wireless products were certified for use in these countries using the antenna that ships with the product. When using other antennas, verify you are not exceeding the transmit power levels allowed by local governing agencies. Consult with Banner Engineering if the destination country is not on this list.

Banner Engineering Corp Limited Warranty

Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

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