

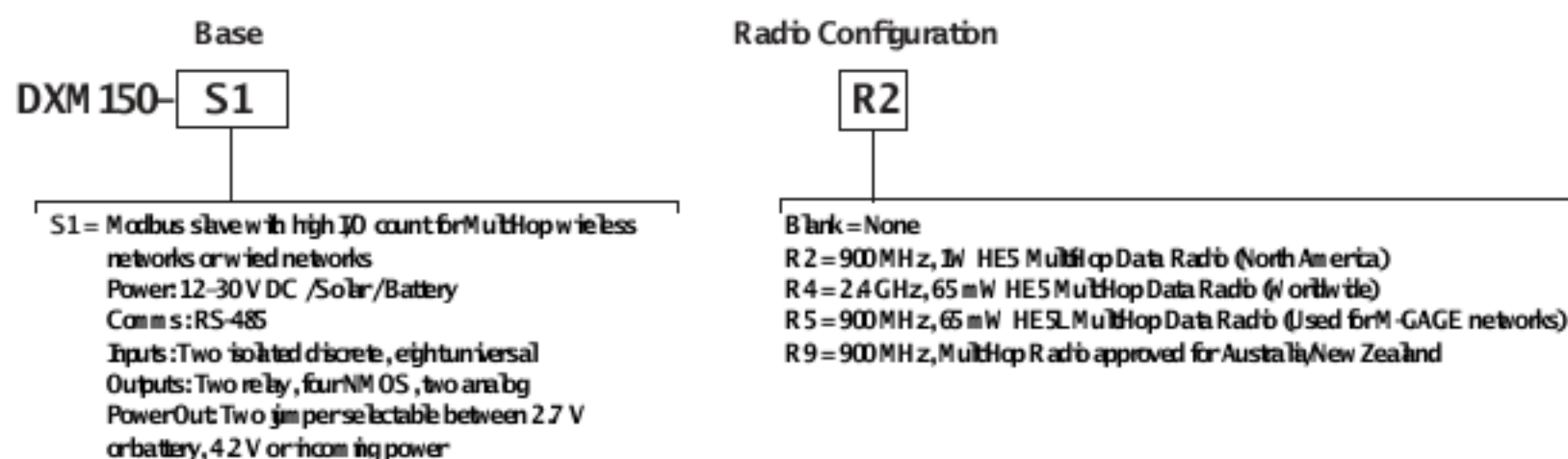
## Datasheet

The DXM150-S1 Wireless Modbus Slave can connect directly to an RS-485 serial bus or to a wireless ISM network as a remote Modbus Slave device.



- Power options include 12 to 30 V DC with or without a battery backup, or 12 V DC solar panel with a sealed lead acid battery
- Local I/O options: isolated discrete inputs, universal inputs, SPDT (Form C) relay outputs, NMOS outputs, and Analog outputs (0 to 10 V)
- ISM radios available in either a 900 MHz band or 2.4 GHz band for local wireless networks

## Model Key for the DXM150-S1 Models



Some example models include, but are not limited to, the following:

| Models      | Description                                                          |
|-------------|----------------------------------------------------------------------|
| DXM150-S1   | DXM150-S1 Wireless Modbus Slave                                      |
| DXM150-S1R2 | DXM150-S1 Wireless Modbus Slave base with MultiHop ISM 900 MHz radio |

## DXM150 Documentation

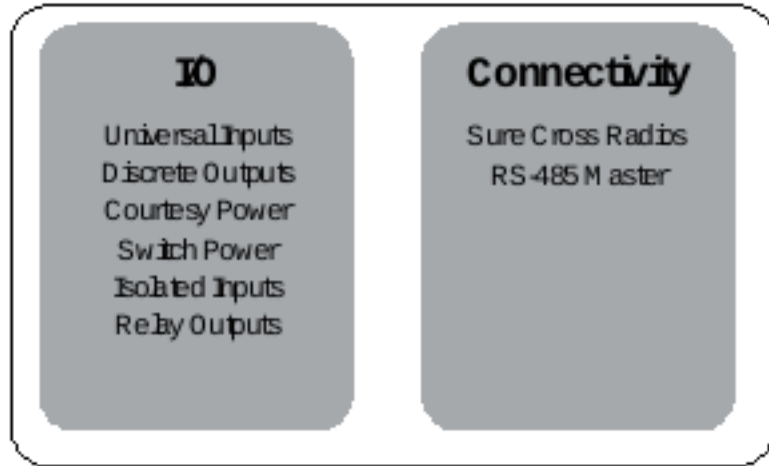
- DXM Wireless Controller Sell Sheet, p/n [194063](#)
- DXM150-B1 Wireless Controller Datasheet, p/n [178136](#)
- DXM150-B2 Wireless Controller Datasheet, p/n [195952](#)
- DXM150-Bx Wireless Controller Instruction Manual, p/n [190038](#)
- DXM150-S1 Modbus Slave Datasheet, p/n [160171](#)
- DXM150-S2 Modbus Slave Datasheet, p/n [200634](#)
- DXM150-Sx Modbus Slave Instruction Manual, p/n [195455](#)
- DXM ScriptBasic Instruction Manual, p/n [191745](#)
- DXM Controller API Protocol, p/n [186221](#)
- DXM Controller onuraton Quick Start, p/n [191247](#)
- DXM onuraton Software v4 (p/n [b\\_4496867](#))
- DXM onuraton Software v4 Instruction Manual, p/n [209933](#)
- DXM EDS onuraton File for Allen-Bradley PLCs (p/n [b\\_4205242](#))
- EIP onuraton File for DXM 1xx-BxR1 and R3 models (p/n [194730](#))
- Activating a Cellular Modem (p/n [b\\_4419353](#))
- Additional technical notes and videos

For more information about the DXM150 family of products, including technical notes, onuraton examples, and ScriptBasic programs, please visit [www.bannerengineering.com/wireless](http://www.bannerengineering.com/wireless).



## DXM150-S1 System Overview

Banner's DXM Logic Controller integrates Banner's wireless radio and local I/O for a remote I/O device.



Inputs/Outputs—On-board universal and programmable I/O ports connect to local sensors, indicators, and control equipment.

- Universal Inputs
- Discrete outputs
- Courtesy power
- Switch power
- Isolated inputs
- Relay outputs
- Battery backup
- Solar controller

Connectivity—The integrated Sure Cross® wireless radio enables Modbus connectivity to remote sensors, indicators, and control equipment.

Wired Connectivity  
Field Bus: Modbus RS-485 Master

Wireless Connectivity  
Sure Cross MultiHop 900 MHz, or MultiHop 2.4 GHz

## ptions

### MultiHop Radio options

**Radio Range**<sup>1</sup>  
900 MHz, 1 Watt: Up to 9.6 km (6 miles)  
2.4 GHz, 65 mW: Up to 3.2 km (2 miles)

**Antenna Minimum Separation Distance**  
900 MHz, 150 mW and 250 mW: 2 m (6 ft)  
900 MHz, 1 Watt: 4.57 m (15 ft)  
2.4 GHz, 65 mW: 0.3 m (1 ft)

**Radio Transmit Power**  
900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)  
2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP

**Spread Spectrum Technology**  
FHSS (Frequency Hopping Spread Spectrum)

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

**Radio Packet Size (MultiHop)**  
900 MHz: 175 bytes (85 Modbus registers)  
2.4 GHz: 75 bytes (37 Modbus registers)

900 MHz Compliance (1 Watt)  
FCC ID UE3RM1809: FCC Part 15, Subpart C, 15.247  
IC: 7044A-RM1809  
IFT: RCPBARM13-2283



(NOM approval only applies to 900 MHz models)

2.4 GHz Compliance (MultiHop)  
FCC ID UE300DX80-2400: FCC Part 15, Subpart C, 15.247  
Radio Equipment Directive (RED) 2014/53/EU  
IC: 7044A-DX8024  
ANATEL: 15966-21-04042 Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados. Para maiores informações, consulte o site da ANATEL [www.gov.br/anatel/pt-br/](http://www.gov.br/anatel/pt-br/)

### Power and I/O options

**Supply Voltage**  
12 to 30 V DC (use only with a suitable Class 2 power supply (UL) or a SELV (CE) power supply) or  
12 V DC solar panel and 12 V sealed lead acid battery

**Power Consumption**  
20 mA average at 12 Volts (exclusive of load)

**Solar Power**  
12 V sealed lead acid battery  
2 A maximum charge current  
12 V, 20 W maximum solar panel

**Solar Power Battery Charging**  
1 A maximum with 20 Watt solar panel

**Discrete Inputs**  
Optically isolated AC input type  
Input to output isolation: 2.5 kV

**Universal Inputs**  
Sinking/Sourcing discrete, 4–20 mA analog, 0–10 V analog, counter, and temperature  
10 kOhm thermistor

**Counters, Synchronous**  
32-bits unsigned  
10 ms clock rate minimum

**Selectable (Jumper) Power Out**  
Output on pin 45, jumper selects 2.7 V or battery  
Output on pin 35, jumper selects 4.2 V or incoming power  
100 mA maximum

**Indicators**  
Four LEDs, four control buttons, one LCD

**Construction**  
Polycarbonate; DIN rail mount option

**Communication Protocol**  
Modbus RTU Slave

**Analog Outputs (DAC)**  
0 to 10 V DC output  
Accuracy: 0.1 % of full scale +0.01 % per °C  
Resolution: 12-bit

**Discrete Output Rating (NMOS)**  
Less than 1 A max current at 30 V DC  
ON-State Saturation: Less than 0.7 V at 20 mA  
ON Condition: Less than 0.7 V  
OFF Condition: Open

**Relay Outputs**  
SPDT (Form C) relay  
250 V ac, 16 A

### RS-485 Communication options

**Communication Hardware (MultiHop RS-485)**  
Interface: 2-wire half-duplex RS-485  
Baud rates: 9.6k, 19.2k (default), or 38.4k via DIP switches; 1200 and 2400 via the MultiHop **Software**  
Data format: 8 data bits, no parity, 1 stop bit

<sup>1</sup> Radio range is 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. Always verify your wireless network's range by performing a Site Survey.

## Environmental p tions

### Operating Conditions<sup>2</sup>

-20 °C to +60 °C (-4 °F to +140 °F)  
95% maximum relative humidity (non-condensing)  
Radiated Immunity: 10 V/m (EN 61000-4-3)

### Shock and Vibration

All models meet IEC 60068-2-6 and IEC 60068-2-27 testing criteria  
Shock: 15G 11 ms duration, half sine wave per IEC 60068-2-27  
Vibration: 10 Hz to 55 Hz, 0.5 mm peak-to-peak amplitude per IEC 60068-2-6

Environmental Rating  
IP20

CE



(CE approval only applies to 2.4 GHz models)

## Accessories

For a complete list of all the accessories for the Sure Cross wireless product line, please download the Accessories List (p/n [b\\_3147091](#)).

### Cordsets

MQDC1-506—5-pin M12/Euro-style, straight, single ended, 6 ft  
MQDC1-530—5-pin M12/Euro-style, straight, single ended, 30 ft  
MQDC1-506RA—5-pin M12/Euro-style, right-angle, single ended, 6 ft  
MQDC1-530RA—5-pin M12/Euro-style, right-angle, single ended, 30 ft

### Static and Surge Suppressor

BWC-LFNBMN-DC—Surge Suppressor, bulkhead, N-Type, dc Blocking, N-Type Female, N-Type Male

### Short-Range Omni Antennas

BWA-2O2-D—Antenna, Dome, 2.4 GHz, 2 dBi, RP-SMA Box Mount  
BWA-9O2-D—Antenna, Dome, 900 MHz, 2 dBi, RP-SMA Box Mount  
BWA-9O2-RA—Antenna, Rubber Fixed Right Angle, 900 MHz, 2 dBi, RP-SMA Male Connector

### Medium-Range Omni Antennas

BWA-9O5-C—Antenna, Rubber Swivel, 900 MHz 5 dBi, RP-SMA Male Connector  
BWA-2O5-C—Antenna, Rubber Swivel, 2.4 GHz 5 dBi, RP-SMA Male Connector

### Enclosures and DIN Rail Kits

BWA-AH864—Enclosure, Polycarbonate, with Opaque Cover, 8 x 6 x 4  
BWA-AH1084—Enclosure, Polycarbonate, with Opaque Cover, 10 x 8 x 4  
BWA-AH12106—Enclosure, Polycarbonate, with Opaque Cover, 12 x 10 x 6  
BWA-AH8DR—DIN Rail Kit, 8", 2 trilobular/self-threading screws  
BWA-AH10DR—DIN Rail Kit, 10", 2 trilobular/self-threading screws  
BWA-AH12DR—DIN Rail Kit, 12", 2 trilobular/self-threading screws

### Misc Accessories

BWA-CG5-3X5.6-10—Cable Gland Pack: 1/2-inch NPT, Cordgrip for 3 holes of 2.8 to 5.6 mm diam, 10 pack  
BWA-HW-052—Cable Gland and Vent Plug Pack: includes 1/2-inch NPT gland, 1/2-inch NPT multi-cable gland, and 1/2-inch NPT vent plug, one each

### Antenna Cables

BWC-1MRSMN05—LMR200 RP-SMA to N-Type Male, 0.5 m  
BWC-2MRSFRS6—LMR200, RP-SMA Male to RP-SMA Female Bulkhead, 6 m  
BWC-4MNFN6—LMR400 N-Type Male to N-Type Female, 6 m

### Long-Range Omni Antennas

BWA-9O8-AS—Antenna, Fiberglass, 3/4 Wave, 900 MHz, 8 dBi, N-Type Female Connector  
BWA-2O8-A—Antenna, Fiberglass, 2.4 GHz, 8 dBi, N-Type Female Connector

### Long-Range Yagi Antennas

BWA-9Y10-A—Antenna, 900 MHz, 10 dBd, N-Type Female Connector

### Cellular Antenna

BWA-CELLA-002—Cellular multiband, 2 dBi, RP-SMA male connection, 6.3 inch blade style. Datasheet: [b\\_4475176](#)

### Power Supplies

PSD-24-4—DC Power Supply, Desktop style, 3.9 A, 24 V dc, Class 2, 4-pin M12/Euro-style quick disconnect (QD)  
PSDINP-24-13—DC power supply, 1.3 Amps, 24 V DC, with DIN Rail Mount, Class I Division 2 (Groups A, B, C, D) Rated  
PSDINP-24-25—DC power supply, 2.5 Amps, 24 V DC, with DIN Rail Mount, Class I Division 2 (Groups A, B, C, D) Rated  
BWA-SOLAR PANEL 20W—Solar Panel, 12 V, 20 W, Multicrystalline, 573 x 357 x .30, "L" style mounting bracket included (does not include controller)

## Warnings

Install and properly ground a qualified surge suppressor when installing a remote antenna system. Remote antenna connectors installed without surge suppressors invalidate the manufacturer's warranty. 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 Sure Cross® device or any equipment connected to the Sure Cross device during a thunderstorm.

Exporting Sure Cross® 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. The Sure Cross 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. This device has been designed to operate with the antennas listed on Banner Engineering's website and having a maximum gain of 9 dBm. Antennas not included in this list or having a gain greater than 9 dBm are strictly prohibited for use with this device. The required antenna impedance is 50 ohms. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen such that the equivalent isotropically radiated power (EIRP) is not more than that permitted for successful communication. Consult with Banner Engineering Corp. if the destination country is not on this list.



Important: Please download the complete DXM150-S1 Wireless Modbus Slave technical documentation, available in multiple languages, from [www.bannerengineering.com](#) for details on the proper use, applications, Warnings, and installation instructions of this device.



Important: Por favor descargue desde [www.bannerengineering.com](#) toda la documentación técnica de los DXM150-S1 Wireless Modbus Slave, disponibles en múltiples idiomas, para detalles del uso adecuado, aplicaciones, advertencias, y las instrucciones de instalación de estos dispositivos.



Important: Veuillez télécharger la documentation technique complète des DXM150-S1 Wireless Modbus Slave sur notre site [www.bannerengineering.com](#) pour les détails sur leur utilisation correcte, les applications, les notes de sécurité et les instructions de montage.



### WARNING:

- Do not use this device for personnel protection
- Using this device for personnel protection could result in serious injury or death.
- This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A device failure or malfunction can cause either an energized (on) or de-energized (off) output condition.

<sup>2</sup> Operating the devices at the maximum operating conditions for extended periods can shorten the life of the device.

**Important:**

- Never operate a 1 Watt radio without connecting an antenna
- Operating 1 Watt radios without an antenna connected will damage the radio circuitry.
- To avoid damaging the radio circuitry, never apply power to a Sure Cross® Performance or Sure Cross MultiHop (1 Watt) radio without an antenna connected.

**Important:**

- Electrostatic discharge (ESD) sensitive device
- ESD can damage the device. Damage from inappropriate handling is not covered by warranty.
- Use proper handling procedures to prevent ESD damage. Proper handling procedures include leaving devices in their anti-static packaging until ready for use; wearing anti-static wrist straps; and assembling units on a grounded, static-dissipative surface.

## 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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For patent information, see [www.bannerengineering.com/patents](http://www.bannerengineering.com/patents).

## Notas Adicionales

Información México: La operación de este equipo está sujeta a las siguientes dos condiciones: 1) es posible que este equipo o dispositivo no cause interferencia perjudicial y 2) este equipo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

Banner es una marca registrada de Banner Engineering Corp. y podrán ser utilizadas de manera indistinta para referirse al fabricante. "Este equipo ha sido diseñado para operar con las antenas tipo Omnidireccional para una ganancia máxima de antena de 6 dBd y Yagi para una ganancia máxima de antena 10 dBd que en seguida se enlistan. También se incluyen aquellas con aprobación ATEX tipo Omnidireccional siempre que no excedan una ganancia máxima de antena de 6dBd. El uso con este equipo de antenas no incluidas en esta lista o que tengan una ganancia mayor que 6 dBd en tipo omnidireccional y 10 dBd en tipo Yagi, quedan prohibidas. La impedancia requerida de la antena es de 50 ohms."

| Antenas SMA                                                    | Modelo    | Antenas Tipo-N                                                   | Modelo     |
|----------------------------------------------------------------|-----------|------------------------------------------------------------------|------------|
| Antena, Omni 902-928 MHz, 2 dBd, junta de caucho, RP-SMA Macho | BWA-902-C | Antena, Omni 902-928 MHz, 6 dBd, bra de vidrio, 1800mm, N Hembra | BWA-906-A  |
| Antena, Omni 902-928 MHz, 5 dBd, junta de caucho, RP-SMA Macho | BWA-905-C | Antena, Yagi, 900 MHz, 10 dBd, N Hembra                          | BWA-9Y10-A |

## Mexican Importer

Banner Engineering de México, S. de R.L. de C.V.  
David Afaro Siqueiros 103 Piso 2 Valle oriente  
San Pedro Garza García Nuevo León, C. P. 66269

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## ANATEL

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