

Datasheet



The DXM100-S1 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: universal inputs, NMOS outputs, and analog outputs (0 to 10 V or 4 to 20 mA)
- ISM radios available in either a 900 MHz band or 2.4 GHz band for local wireless networks



WARNING: Not To Be Used for Personnel Protection

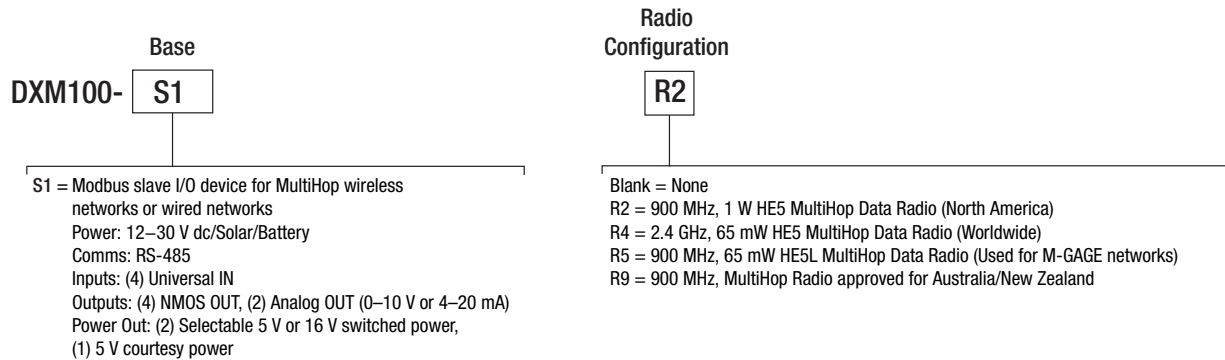
Never use this device as a sensing device for personnel protection. Doing so could lead to serious injury or death. This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized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



CAUTION: Electrostatic Discharge (ESD)

ESD Sensitive Device. Use proper handling 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 anti-static wrist straps; and assembling units on a grounded, static-dissipative surface.

Models



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

Models	Description
DXM100-S1	DXM100-S1 Modbus Slave
DXM100-S1R2	DXM100-S1 Modbus Slave base with MultiHop ISM 900 MHz radio

DXM100 Documentation

For more information or about the DXM100 Slave family of products, please see additional documentation and videos on the Banner website: www.bannerengineering.com.

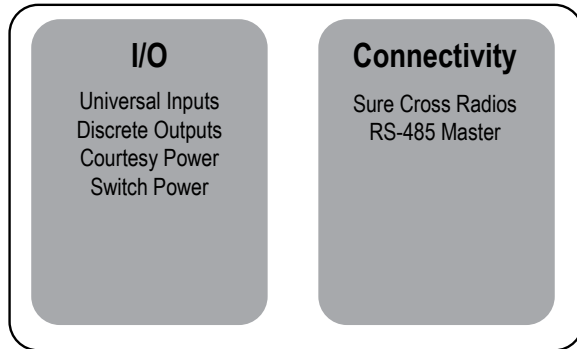


- DXM Wireless Controller Sell Sheet, p/n [194063](#)
- DXM100-B1 Wireless Controller Datasheet, p/n [186724](#)
- DXM100-B2 Wireless Controller Datasheet, p/n [195232](#)
- DXM100-Bx Wireless Controller Instruction Manual, p/n [190037](#)
- DXM100-S1 Wireless Modbus Slave Datasheet, p/n [195454](#)
- DXM100-S2 Wireless Modbus Slave Datasheet, p/n [195231](#)
- DXM100-Sx Wireless Modbus Slave Instruction Manual, p/n [188231](#)
- DXM ScriptBasic Instruction Manual, p/n [191745](#)
- DXM Controller Configuration Quick Start, p/n [191247](#)
- DXM Configuration Tool [software](#)
- DXM Configuration Tool Instruction Manual, p/n [158447](#)
- DXM EDS [Configuration file](#)
- Tech Note: [Activating and Provisioning Cellular Service](#)
- Additional technical notes and videos

Technical notes, configuration examples, and ScriptBasic program examples are available at www.bannerengineering.com.

DXM100-S1 Modbus Slave 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
- 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

Specifications

MultiHop Radio Specifications

Radio Range¹

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)

900 MHz Compliance (1 Watt)

FCC ID UE3RM1809: This device complies with FCC Part 15, Subpart C, 15.247
IC: 7044A-RM1809

2.4 GHz Compliance (MultiHop)

FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247
ETSI EN 300 328: V1.8.1 (2012-04)
IC: 7044A-DX8024

Antenna Connection

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

Packet Size (MultiHop)

900 MHz: 175 bytes (85 Modbus registers)
2.4 GHz: 75 bytes (37 Modbus registers)

¹ 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.

RS-485 Communication Specifications

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 Configuration Tool
Data format: 8 data bits, no parity, 1 stop bit

Power and I/O Specifications

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

Courtesy Power Out

One output at 5 Volts, 500 mA maximum
No short circuit protection

Counters, Synchronous

32-bits unsigned
10 ms clock rate minimum

Universal Inputs

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

Switched Power Out

Two selectable 5 V or 16 V outputs
5 V: 400 mA maximum
16 V: 125 mA maximum

Solar Power Battery Charging

1 Amp maximum with 20 Watt solar panel

Construction

Polycarbonate; DIN rail mount option

Analog Outputs (DAC)

0 to 20 mA or 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

Environmental Specifications

Operating Conditions²

–40 °C to +85 °C (–40 °F to +185 °F) (Electronics); –20 °C to +80 °C (–4 °F to +176 °F) (LCD)
95% maximum relative humidity (non-condensing)
Radiated Immunity: 10 V/m (EN 61000-4-3)

Shock and Vibration

IEC 68-2-6 and IEC 68-2-27
Shock: 30g, 11 millisecond half sine wave, 18 shocks
Vibration: 0.5 mm p-p, 10 to 60 Hz

Environmental Rating

IEC IP20

Certifications



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

Misc Accessories

BWA-CG.5-3X5.6-10—Cable Gland Pack: 1/2-inch NPT, Cordgrip for 3 holes of 2.8 to 5.6 mm diam, qty 10
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, qty 1 each

Antenna Cables

BWC-1MRSMN05—LMR100 RP-SMA to N-Type Male, 0.5 m
BWC-2MRSFRS6—LMR200, RP-SMA Male to RP-SMA Female, 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

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

Enclosures and DIN Rail Kits

BWA-AH864—Enclosure, Polycarbonate, with Opaque Cover, 8 × 6 × 4
BWA-AH1084—Enclosure, Polycarbonate, with Opaque Cover, 10 × 8 × 4
BWA-AH12106—Enclosure, Polycarbonate, with Opaque Cover, 12 × 10 × 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

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 × 357 × 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 configurations 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.** A list of approved countries appears in the *Radio Certifications* section of the product manual. 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. Consult with Banner Engineering Corp. if the destination country is not on this list.

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