Sure Cross® DXM100-S1 Wireless Modbus Slave

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
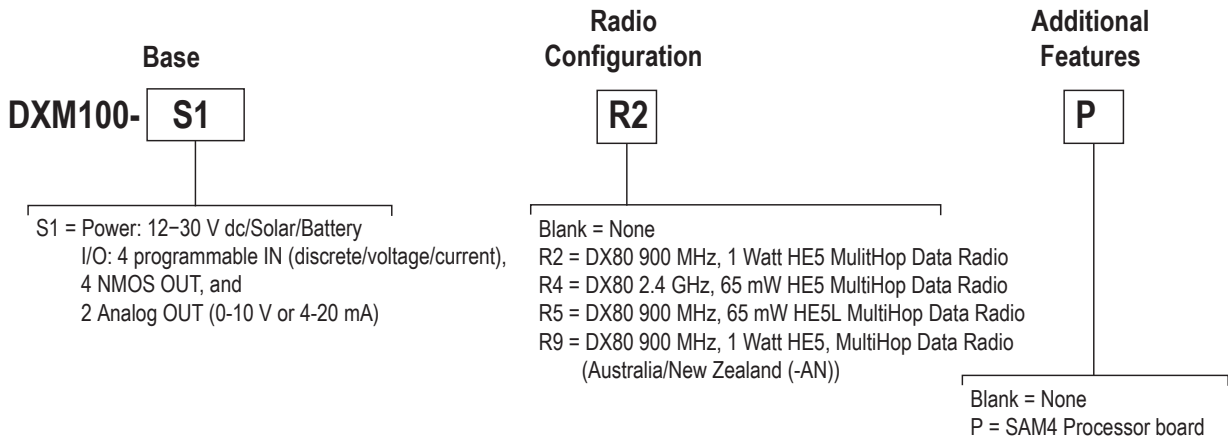
⚠️ **WARNING: Not To Be Used for Personnel Protection**

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 anit-static wrist straps; and assembling units on a grounded, static-dissipative surface.

Models

Base	Radio Configuration	Additional Features
DXM100- S1	R2	P

S1 = Power: 12–30 V dc/Solar/Battery
I/O: 4 programmable IN (discrete/voltage/current),
4 NMOS OUT, and
2 Analog OUT (0-10 V or 4-20 mA)

Blank = None
R2 = DX80 900 MHz, 1 Watt HE5 MulitHop Data Radio
R4 = DX80 2.4 GHz, 65 mW HE5 MultiHop Data Radio
R5 = DX80 900 MHz, 65 mW HE5L MultiHop Data Radio
R9 = DX80 900 MHz, 1 Watt HE5, MultiHop Data Radio
   (Australia/New Zealand (-AN))

Blank = None
P = SAM4 Processor board

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

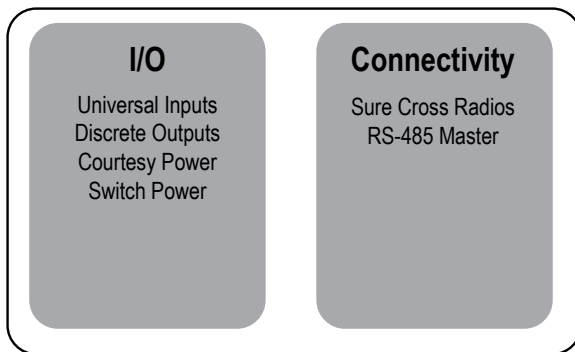| Models	Description
DXM100-S1	DXM100-S1 Modbus Slave
DXM100-S1R2	DXM100-S1 Modbus Slave base with MultiHop ISM 900 MHz radio
DXM100-S1R2P	DXM100-S1 Modbus Slave base with MultiHop ISM 900 MHz radio and SAM4 processor board for logging, special configuration, and ScriptBasic programming

DXM100 **Documentation**

For more information 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.

I/O
Universal Inputs
Discrete Outputs
Courtesy Power
Switch Power

Connectivity
Sure Cross Radios
RS-485 Master

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

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

Switched Power Outputs
Two outputs at 5 or 16 Volts
5 V: 400 mA maximum
16 V: 125 mA maximum

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

Radio (ISM Band) Transmit Power
900 MHz at 1 Watt
2.4 GHz at 65 mW

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

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

Radio Range[1]
 900 MHz, 1 Watt: Up to 9.6 km (6 miles)
 2.4 GHz, 65 mW: Up to 3.2 km (2 miles)
Minimum Radio **Separation** Distance
 900 MHz, 1 Watt: 4.57 m (15 ft)
 2.4 GHz, 65 mW: 0.3 m (1 ft)
Construction
 Polycarbonate; DIN rail mount option

Communication Hardware (RS-232)
 Baud rate: 9.6k or 19.2k (default)
 Data format: 8 bits; odd, even, or no parity; 1 stop bit

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

Operating Conditions[2]
 –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

2.4 GHz Compliance
 FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247
 ETSI EN 300 328 V1.8.1 (2012-06)
 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 lbf·in)
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
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 **Rating**
 IEC IP20
Certifications

CE

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 × 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", Includes 2 Trilobular/Self-Threading Screws, and DIN Rail
 BWA-AH10DR—DIN Rail Kit, 10", Includes 2 Trilobular/Self-Threading Screws, and DIN Rail
 BWA-AH12DR—DIN Rail Kit, 12", Includes 2 Trilobular/Self-Threading Screws, and DIN Rail

Misc Accessories
 BWA-CG.5-3X5.6-10—Cable Glands: 1/2-inch NPT, Cordgrip for 3 holes of 2.8 to 5.6 mm diam, 10 Pack
 BWA-HW-052— Cable Gland Pack: 1/2-inch NPT gland, 1/2-inch NPT multi-cable gland, and 1/2-inch NPT vent plug
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
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
 BWA-SOLAR PANEL 20W—

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

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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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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