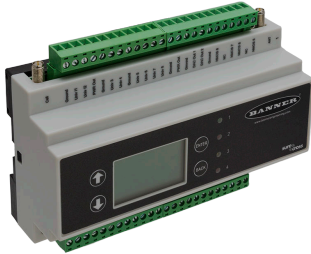


Datasheet

The DXM150-B1 Wireless Controller is a communications gateway that interfaces local serial ports, local I/O ports, and local ISM radio devices to the Internet using either a cellular connection or a wired network connection.



- Powered by 12 to 30 V dc, 12 V dc solar panel, or battery backup
- RS-232, RS-485, Ethernet, and USB communication ports
- Local I/O options: isolated discrete inputs, universal inputs, SPDT (Form C) relay outputs, NMOS outputs, and Analog outputs (0 to 10 V)
- Display options include an interactive LCD display for I/O information and user programmable LED functions
- ISM radios available in either a 900 MHz band or 2.4 GHz band for local wireless networks
- Internal cellular radio



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.



Important:

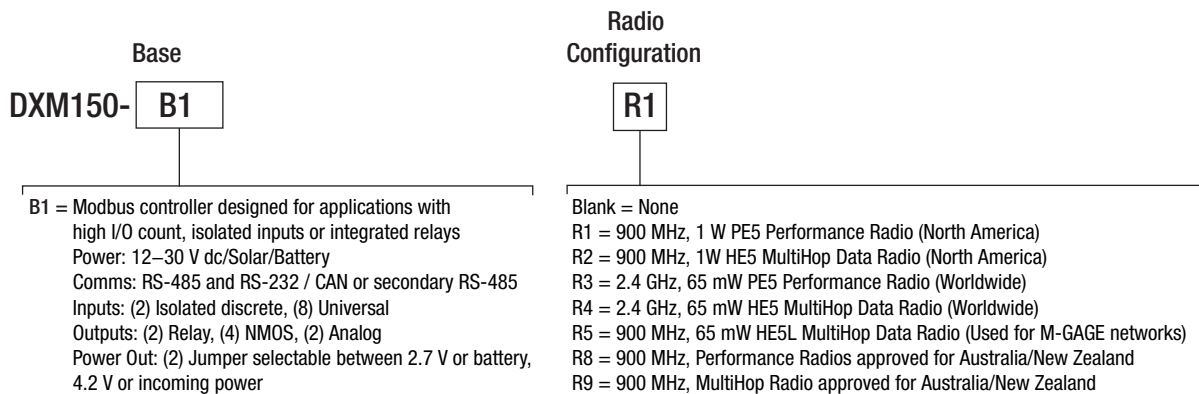
- **Never operate a 1 Watt radio without connecting an antenna**
- Operating 1 Watt radios without an antenna connected will damage the radio circuitry.
- To avoid damaging the radio circuitry, never apply power to a Sure Cross® Performance or Sure Cross MultiHop (1 Watt) radio without an antenna connected.



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.

Model Key for the DXM150-B1 Models



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



Models	Description
DXM150-B1C1	DXM150-B1 Wireless Controller with CDMA cellular radio
DXM150-B1R1	DXM150-B1 Wireless Controller with DX80 ISM 900 MHz radio
DXM150-B1R2	DXM150-B1 Wireless Controller with Data Radio ISM 900 MHz radio

Cellular Communication—Controllers accept Banner GSM and LTE modems only. Cellular modems are ordered separately as accessories under the following part numbers:

- GSM/3G (HSPA): **SXI-GSM-001**
- LTE-Verizon: **SXI-LTE-001**

DXM150 Documentation List

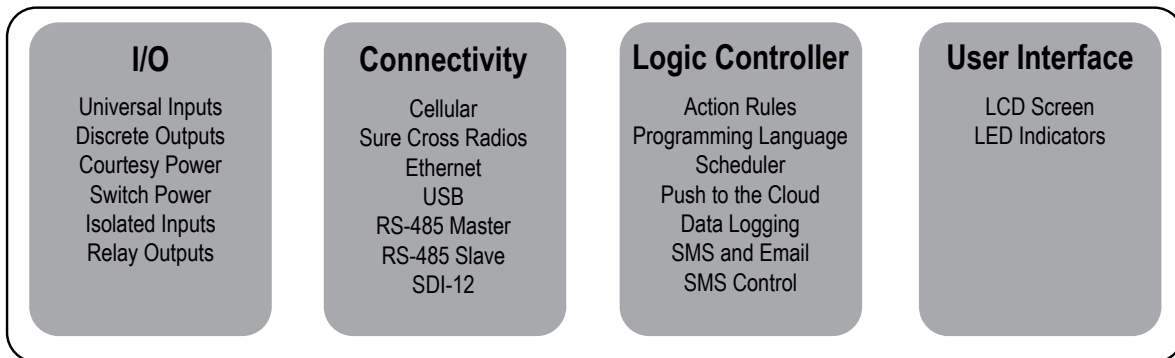
For more information about the DXM Wireless Controller family of products, please see additional documentation and videos on the Banner website: www.bannerengineering.com/wireless.

- 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 Configuration Quick Start, p/n [191247](#)
- DXM Configuration Tool software (p/n [b_4447978](#))
- DXM Configuration Tool Instruction Manual, p/n [158447](#)
- DXM EDS [Configuration file](#) for Allen-Bradley PLCs
- EIP Configuration File for DXM 1xx-BxR1 and R3 models (p/n [194730](#))
- Activating a Cellular Modem (p/n [b_4419353](#))
- Additional technical notes and videos

Technical notes, configuration examples, and ScriptBasic program examples are available at <http://www.bannerengineering.com>.

DXM150-B1 System Overview

Banner's DXM Logic Controller integrates Banner's wireless radio, cellular connectivity, and local I/O to provide a platform for the Industrial Internet of Things (IIoT). Various combinations of I/O and connectivity are available based on the different models.



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 DXM Wireless Controller's wired and wireless connectivity options make it easy to share data between local and remote equipment. The cellular modem option eliminates the need for IT infrastructures to connect remote equipment for sensing and control. The integrated Sure Cross® wireless radio enables Modbus connectivity to remote sensors, indicators, and control equipment.

Wired Connectivity

Ethernet: Modbus TCP or Ethernet/IP
Field Bus: Modbus RS-485 Master/Slave or CAN

Wireless Connectivity

Sure Cross Wireless Radio: DX80 900 MHz, DX80 2.4 GHz, MultiHop 900 MHz, or MultiHop 2.4 GHz
Cellular modem: CDMA (Verizon), GSM 3G, LTE (Verizon)

Logic Controller—Program the DXM Wireless Controller's logic controller using action rules and/or ScriptBasic language, which can execute concurrently. The control functions allow freedom when creating custom sensing and control sequences. The logic controller supports the Modbus protocol standards for data management, ensuring seamless integration with existing automation systems.

Action Rules

Supports simple logic, arithmetic and thresholding
Low complexity solutions
SMS text message Notifications
E-mail Notifications
Push data on conditions

Text Programming Language

ScriptBasic
Medium complexity solutions

Scheduler

Time/calendar-based events
Astronomical clock

Data Logging

Cyclic Data/Event logging
E-mail log files

SMS Commanding

Read/Write Local Registers
Force a push to the cloud
Reboot controller

User Interface—A simple user interface consists of an LCD screen and four LED indicators. Use the LCD to access system status and setup, view user selectable events or data, and to bind and perform site surveys for Sure Cross radios. Configure the user programmable LEDs to indicate the status of the DXM Wireless Controller, processes, or equipment.

User programmable LCD

Bind Sure Cross Radios
Site Survey
View Sensor Information
System Status

User Defined LED indicators

Applications Overview

The DXM150-B1 Wireless Controller is ideal for smart factory and facilities applications, including:

- Productivity solutions, such as
 - Call for parts, service, or maintenance
 - Pick-to-light
 - Tank level monitoring
- Predictive maintenance and continuous monitoring using
 - Vibration and temperature monitoring
 - Non-contact temperature monitoring
- Environmental monitoring and control, such as
 - Temperature and humidity monitoring

The DXM150-B1 Wireless Controller can provide visual indication using indicator lights, send text or email alerts, collect data, and interface with automation systems.

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: FCC Part 15, Subpart C, 15.247
IC: 7044A-RM1809

2.4 GHz Compliance (MultiHop)

FCC ID UE300DX80-2400: FCC Part 15, Subpart C, 15.247
RED Directive 2014/53/EU
IC: 7044A-DX8024

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)

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

RS-232 Communication Specifications

Communication Hardware (MultiHop RS-232)

Interface: 2-wire RS-232
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

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

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

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

Power Consumption

35 mA average at 12 Volts

Indicators

Four LEDs, four control buttons, one LCD

Security Protocols

VPN, SSL, and HTTPS

Communication Protocols

Modbus RTU Master/Slave, Modbus/TCP, and Ethernet/IP

Logging

8 GB maximum; removable Micro SD card format

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

Relay Outputs

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

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.

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)
 Micro CD Card (if applicable): -25 °C to +85 °C (-13 °F to +185 °F)
 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



(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-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 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

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 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.

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

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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