Wireless I/O, Data and Network Connectivity

Banner's network radios provide the backbone of a very flexible and highly expandable wireless network for industrial environments. The Performance Series centers around a Gateway and up to 47 remotely located Nodes with multiple I/O options. The MultiHop Series uses repeaters to extend the range of the network using multiple "hops" to cover larger distances or to circumvent obstacles (trees, buildings, topology, etc.).
Performance Series—Gateways

Create point-to-multipoint networks that distribute I/O over large areas. Input and output types include discrete (dry contact, PNP/NPN), analog (0 to 10 V dc, 0 to 20 mA), temperature (thermocouple and RTD), and pulse counter.

Key Features:
- Enhanced Gateways offer increased range in the 900 MHz frequency band
- High density I/O capacity provides up to 12 discrete inputs or outputs or a mix of discrete and analog I/O
- Universal analog inputs allow current or voltage to be selected in the field

**DX80 Performance Gateways, 10-30 V DC**

<table>
<thead>
<tr>
<th>Models</th>
<th>I/O</th>
<th>Frequency</th>
<th>Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80G9M2S-P</td>
<td>N/A</td>
<td>900 MHz</td>
<td>Low Profile</td>
</tr>
<tr>
<td>DX80G2M2S-P</td>
<td></td>
<td>2.4 GHz</td>
<td></td>
</tr>
<tr>
<td>DX80G9M6S-P2</td>
<td>Inputs: Four selectable discrete, two 0-20 mA or 0-10 V analog</td>
<td>900 MHz</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80G2M6S-P2</td>
<td>Outputs: Four sourcing discrete, two 0-20mA analog</td>
<td>2.4 GHz</td>
<td></td>
</tr>
<tr>
<td>DX80G9M2S-P7</td>
<td>Inputs/Outputs: Up to 12 NPN inputs or up to 12 NMOS outputs, or a mix of inputs and outputs not exceeding 12 I/O points</td>
<td>900 MHz</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80G2M2S-P7</td>
<td></td>
<td>2.4 GHz</td>
<td></td>
</tr>
<tr>
<td>DX80G9M6S-P8</td>
<td>Inputs/Outputs: Up to 12 PNP inputs or up to 12 PNP outputs, or a mix of inputs and outputs not exceeding 12 I/O points</td>
<td>900 MHz</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80G2M6S-P8</td>
<td></td>
<td>2.4 GHz</td>
<td></td>
</tr>
</tbody>
</table>

**DX80 Performance Gateways, Board Models Only 10-30 V DC**

<table>
<thead>
<tr>
<th>Models</th>
<th>I/O</th>
<th>Frequency</th>
<th>Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80G9M6S-PB2</td>
<td>Inputs: Two sourcing discrete, two 0-20 mA analog</td>
<td>900 MHz</td>
<td>Low Profile</td>
</tr>
<tr>
<td>DX80G2M6S-PB2</td>
<td>Outputs: Two sourcing discrete, two 0-20 mA analog</td>
<td>2.4 GHz</td>
<td></td>
</tr>
</tbody>
</table>

Courtesy of Steven Engineering, Inc - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com
**DX80 Performance Gateway Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Specification Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Radio Range</strong></td>
<td>900 MHz, 1 Watt: Up to 9.6 km (6 miles) 2.4 GHz, 65 mW: Up to 3.2 km (2 miles)</td>
</tr>
<tr>
<td><strong>Minimum Separation Distance</strong></td>
<td>900 MHz, 1 Watt: 4.57 m (15 ft) 2.4 GHz, 65 mW: 0.3 m (1 ft)</td>
</tr>
<tr>
<td><strong>Radio Transmit Power</strong></td>
<td>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</td>
</tr>
<tr>
<td><strong>Compliance</strong></td>
<td>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 FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247 ETSI/EN: In accordance with EN 300 328: V1..1 (2012-06) IC: 7044A-DX8024</td>
</tr>
<tr>
<td><strong>Spread Spectrum Technology</strong></td>
<td>FHSS (Frequency Hopping Spread Spectrum)</td>
</tr>
<tr>
<td><strong>Communication Hardware</strong></td>
<td>Interface: 2-wire half-duplex RS-485 Baud rates: 9.6k, 19.2k (default), or 38.4k via DIP switches Data format: 8 data bits, no parity, 1 stop bit</td>
</tr>
<tr>
<td><strong>Communication Protocol</strong></td>
<td>Modbus RTU</td>
</tr>
<tr>
<td><strong>Link Timeout</strong></td>
<td>Gateway: Configurable via User Configuration Tool (UCT) software Node: Defined by Gateway</td>
</tr>
<tr>
<td><strong>RTD Inputs</strong></td>
<td>Sample Rate: 1 second Report Rate: 16 seconds Accuracy: 0.1% of full scale Resolution: 0.1 °C, 15-bit</td>
</tr>
<tr>
<td><strong>Operating Conditions</strong></td>
<td>~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)</td>
</tr>
<tr>
<td><strong>Shock and Vibration</strong></td>
<td>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</td>
</tr>
<tr>
<td><strong>Supply Voltage</strong></td>
<td>DX80 and “C” Housing Models:10 to 30 V dc or 3.6 to 5.5 V dc low power option (Outside the USA: 12 to 24 V dc, ±10% or 3.6 to 5.5 V dc low power option) 900 MHz Consumption: Maximum current draw is &lt; 40 mA and typical current draw is &lt; 30 mA at 24 V dc. (2.4 GHz consumption is less)</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td>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) DX80 and “C” Housing Models: Mounting: #10 or M5 (SS M5 hardware included) Max. Tightening Torque: 0.56 N·m (5 lbf·in)</td>
</tr>
<tr>
<td><strong>Antenna Connection</strong></td>
<td>Ext. Reverse Polarity SMA, 50 Ohms Max Tightening Torque: 0.45 N·m (4 lbf·in)</td>
</tr>
<tr>
<td><strong>Interface</strong></td>
<td>Indicators: Two bi-color LEDs Buttons: Two Display: Six character LCD</td>
</tr>
<tr>
<td><strong>Wiring Access</strong></td>
<td>DX80 Housing Models: Four PG-3, One 1/2-in NPT, One 5-pin threaded M12/Euro-style male quick-disconnect “C” Housing Models: External terminals</td>
</tr>
<tr>
<td><strong>Environmental Rating</strong></td>
<td>DX80 models: IEC IP67; NEMA 6 “C” Housing Models: IEC IP20; NEMA 1</td>
</tr>
</tbody>
</table>

*See datasheet for model specific details*
Performance Series—Nodes

Create point-to-multipoint networks that distribute I/O over large areas. Input and output types include discrete (dry contact, PNP/NPN), analog (0 to 10 V dc, 0 to 20 mA), temperature (thermocouple and RTD), and pulse counter.

Key Features:

- Enhanced Nodes offer increased range in the 900 MHz frequency band
- High density I/O capacity provides up to 12 discrete inputs or outputs or a mix of discrete and analog I/O
- Universal analog inputs allow current or voltage to be selected in the field

<table>
<thead>
<tr>
<th>Models</th>
<th>I/O</th>
<th>Voltage</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80N9X2S-P1</td>
<td>Discrete Mode</td>
<td>10-30 V dc</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2X2S-P1</td>
<td>Inputs: Two selectable discrete and two thermistor Outputs: Two NMOS discrete Switch Power: Two</td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N8X1S-P1E</td>
<td>Analog Mode</td>
<td>Battery</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2X1S-P1E</td>
<td>Inputs: Two selectable discrete, two analog (0-20 mA or 0-10 V), and two thermistor Outputs: Two NMOS discrete Switch Power: One</td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X6S-P2</td>
<td>Inputs: Four selectable discrete, two 0-20 mA or 0-10 V (universal) analog Outputs: Four PNP discrete, two 0-20mA analog</td>
<td>10-30 V dc</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2X6S-P2</td>
<td></td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X2S-P3</td>
<td>Inputs: Two selectable discrete, four thermocouple, one thermistor for CJC Outputs: One NMOS discrete</td>
<td>10-30 V dc</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2X2S-P3</td>
<td></td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X1S-P3E</td>
<td></td>
<td>Battery</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2X1S-P3E</td>
<td></td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X2S-P4</td>
<td>Inputs: Four 3-wire RTDs</td>
<td>10-30 V dc</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N9X1S-P4E</td>
<td></td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X2S-P5</td>
<td>Inputs: Two NPN discrete, four selectable analog (0-20 mA or 0-10 V) Outputs: Two NMOS discrete Switch Power: Two</td>
<td>10-30 V dc</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2X2S-P5</td>
<td></td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X1S-P6</td>
<td>Inputs: 1-wire serial interface for one serial sensing device</td>
<td>Battery</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2X1S-P6</td>
<td></td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X6S-P6</td>
<td></td>
<td>10-30 V dc</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2X6S-P6</td>
<td></td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X2S-P7</td>
<td>Inputs/Outputs: Up to 12 NPN inputs or up to 12 NMOS outputs, or a mix of inputs and outputs not exceeding 12 I/O points</td>
<td>10-30 V dc</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2X2S-P7</td>
<td></td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X6S-P8</td>
<td>Inputs/Outputs: Up to 12 PNP inputs or up to 12 PNP outputs, or a mix of inputs and outputs not exceeding 12 I/O points</td>
<td>10-30 V dc</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2X6S-P8</td>
<td></td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X2S-DCLATCHE</td>
<td>Inputs: Two selectable discrete Outputs for DC Latch: DC Latch</td>
<td>Battery</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2X2S-DCLATCHE</td>
<td></td>
<td></td>
<td>2.4 GHz</td>
</tr>
</tbody>
</table>

Create point-to-multipoint networks that distribute I/O over large areas. Input and output types include discrete (dry contact, PNP/NPN), analog (0 to 10 V dc, 0 to 20 mA), temperature (thermocouple and RTD), and pulse counter.

Key Features:

- Enhanced Nodes offer increased range in the 900 MHz frequency band
- High density I/O capacity provides up to 12 discrete inputs or outputs or a mix of discrete and analog I/O
- Universal analog inputs allow current or voltage to be selected in the field
**DX80 Performance Nodes Specifications**

<table>
<thead>
<tr>
<th>Models</th>
<th>I/O</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80N9X2S-PB1</td>
<td>Inputs: Two NPN discrete, two 0-20 mA analog</td>
<td>900 MHz</td>
</tr>
<tr>
<td></td>
<td>Outputs: Two NMOS discrete</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td></td>
<td>Switch Power: Two</td>
<td></td>
</tr>
<tr>
<td>DX80N9X6S-PB2</td>
<td>Inputs: Two PNP discrete, two 0-20 mA analog</td>
<td>900 MHz</td>
</tr>
<tr>
<td></td>
<td>Outputs: Two PNP discrete, two 0-20 mA analog</td>
<td>2.4 GHz</td>
</tr>
</tbody>
</table>

**Radio Range**

900 MHz, 1 Watt: Up to 9.6 km (6 miles)  
2.4 GHz, 65 mW: Up to 3.2 km (2 miles)

**Minimum Separation Distance**

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

**Compliance**

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  
FCC ID UE300DX80-2400: This device complies with FCC Part 15, Subpart C, 15.247  
ETSI/EN: In accordance with EN 300 328: V1.8.1 (2012-08)  
IC: 7044A-DX8024

**Spread Spectrum Technology**

FHSS (Frequency Hopping Spread Spectrum)

**Link Timeout**

Gateway: Configurable via User Configuration Tool (UCT) software  
Node: Defined by Gateway

**Operating Conditions**

~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

**Supply Voltage**

DX80 and “C” Housing Models: 10 to 30 V dc or 3.6 to 5.5 V dc low power option (Outside the USA: 12 to 24 V dc, ±10% or 3.6 to 5.5 V dc low power option)  
*E* Housing Models: 3.6 V dc low power option from an internal battery or 10 to 30 V dc  
900 MHz Consumption: Maximum current draw is < 40 mA and typical current draw is < 30 mA at 24 V dc. (2.4 GHz consumption is less)

**Construction**

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)  
DX80 and “C” Housing Models: Mounting: #10 or M5 (SS M5 hardware included)  
*E* Housing Models: Mounting: 1/4-in or M7 (SS M7 hardware included)  
Max. Tightening Torque: 0.56 N·m (5 lbf·in)

**Antenna Connection**

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

**Interface**

Indicators: Two bi-color LEDs  
Buttons: Two  
Display: Six character LCD

**Wiring Access**

DX80 Housing Models: Four PG-7, One 1/2-in NPT, One 5-pin threaded M12/Euro-style male quick-disconnect  
*G* Housing Models: External terminals  
*E* Housing Models: Two 1/2-in NPT

**Environmental Rating**

DX80 models: IEC IP67; NEMA 6  
“C” Housing Models: IEC IP20; NEMA 1  
*E* Housing Models: IEC IP65; NEMA 4X

**Certifications**

* See datasheet for model specific details
Performance Series—P6 Nodes

The -P6 Performance Node is an industrial radio device with a 1-wire serial interface that is designed to transmit data from 1-wire serial sensors, such as the Banner Temperature and Humidity (M12FTH4Q) or Vibration and Temperature (QM42VT1) sensors.

Key Features:
• 1-wire serial interface
• Battery-powered models for a completely wireless solution
• Line-powered models for continuous sampling

Performance Series—Nodes

<table>
<thead>
<tr>
<th>Models</th>
<th>Power</th>
<th>I/O</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80N9X1S-P6</td>
<td>D-cell Lithium battery</td>
<td>Inputs: 1-wire serial interface for one 1-wire serial sensing device</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2X1S-P6</td>
<td></td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X65-P6</td>
<td>10-30 V dc</td>
<td></td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N9X65-P6</td>
<td></td>
<td></td>
<td>2.4 GHz</td>
</tr>
</tbody>
</table>

Used With

<table>
<thead>
<tr>
<th></th>
<th>see page</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12FTH4Q</td>
<td>10</td>
<td>Temperature and relative humidity via a 1-wire serial interface</td>
</tr>
<tr>
<td>M12FT4Q</td>
<td>10</td>
<td>Temperature via a 1-wire serial interface</td>
</tr>
<tr>
<td>QM42VT1</td>
<td>8</td>
<td>Vibration and temperature via a 1-wire serial interface</td>
</tr>
</tbody>
</table>
## DX80 Performance P6 Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>900 MHz, 1 Watt: Up to 9.6 km (6 miles)</th>
<th>2.4 GHz, 65 mW: Up to 3.2 km (2 miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Radio Range</strong></td>
<td>900 MHz, 1 Watt: 4.57 m (15 ft)</td>
<td>2.4 GHz, 65 mW: 0.3 m (1 ft)</td>
</tr>
<tr>
<td><strong>Minimum Separation Distance</strong></td>
<td>900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)</td>
<td>2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP</td>
</tr>
<tr>
<td><strong>Radio Transmit Power</strong></td>
<td>900 MHz Compliance (1 Watt)</td>
<td>2.4 GHz Compliance</td>
</tr>
<tr>
<td></td>
<td>FCC ID UE3RM1809: This device complies with FCC Part 15, Subpart C, 15.247</td>
<td>FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247</td>
</tr>
<tr>
<td></td>
<td>IC: 7044A-RM1809</td>
<td>ETSI/EN: In accordance with EN 300 328: V1.8.1 (2012-06)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IC: 7044A-DX8024</td>
</tr>
<tr>
<td><strong>Spread Spectrum Technology</strong></td>
<td>FHSS (Frequency Hopping Spread Spectrum)</td>
<td></td>
</tr>
<tr>
<td><strong>Link Timeout</strong></td>
<td>Gateway: Configurable via User Configuration Tool (UCT) software</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Node: Defined by Gateway</td>
<td></td>
</tr>
<tr>
<td><strong>Operating Conditions</strong></td>
<td>-40 °C to +85 °C (-40 °F to +185 °F) (Electronics); -20 °C to +80 °C (-4 °F to +176 °F) (LCD)</td>
<td>95% maximum relative humidity (non-condensing)</td>
</tr>
<tr>
<td></td>
<td>Radiated Immunity: 10 V/m (EN 61000-4-3)</td>
<td></td>
</tr>
<tr>
<td><strong>Shock and Vibration</strong></td>
<td>IEC 68-2-6 and IEC 68-2-27</td>
<td>Shock: 30g, 11 millisecond half sine wave, 18 shocks</td>
</tr>
<tr>
<td></td>
<td>Vibration: 0.5 mm p-p, 10 to 60 Hz</td>
<td></td>
</tr>
<tr>
<td><strong>Supply Voltage</strong></td>
<td>Integrated battery models: 3.6 V dc low power option from an internal battery</td>
<td>Non-battery models: 10 to 30 V dc (Outside the USA: 12 to 24 V dc, ±10%)</td>
</tr>
<tr>
<td></td>
<td>Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers</td>
<td>Integrated battery models: Weight: 0.30 kg (0.65 lbs) Non-battery models: Weight: 0.26 kg (0.57 lbs) Mounting: #10 or M5 (SS M5 hardware included) Max. Tightening Torque: 0.56 N·m (5 lbf·in)</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td>Integrated battery models: One 5-pin threaded M12 Euro-style female quick-disconnect</td>
<td>Non-battery models: One 5-pin threaded M12 Euro-style female quick-disconnect and one 5-pin threaded M12 Euro-style male quick-disconnect</td>
</tr>
<tr>
<td><strong>Antenna Connection</strong></td>
<td>Ext. Reverse Polarity SMA, 50 Ohms</td>
<td>Max Tightening Torque: 0.45 N·m (4 lbf·in)</td>
</tr>
<tr>
<td><strong>Interface</strong></td>
<td>Indicators: Two bi-color LEDs</td>
<td>Buttons: Two</td>
</tr>
<tr>
<td></td>
<td>Display: Six character LCD</td>
<td></td>
</tr>
<tr>
<td><strong>Wiring Access</strong></td>
<td>Integrated battery models:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-battery models: One 5-pin threaded</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M12 Euro-style female quick-disconnect</td>
<td></td>
</tr>
<tr>
<td></td>
<td>One 5-pin threaded M12 Euro-style male</td>
<td></td>
</tr>
<tr>
<td></td>
<td>quick-disconnect</td>
<td></td>
</tr>
<tr>
<td><strong>Environmental Rating</strong></td>
<td>IEC IP67; NEMA 6</td>
<td></td>
</tr>
<tr>
<td><strong>Certifications</strong></td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>
MultiHop Modbus Radios

MultiHop Modbus Data Radios extend the range of Modbus or other serial communication networks. Each radio may be set to act as either a master, repeater or slave. Models are available with built in discrete and analog I/O, which can be accessed using the Modbus protocol.

Key Features:
- Self-healing, auto routing RF network with multiple hops extends the network’s range
- Flexible: DIP switch selectable to be a master, repeater or slave
- User-selectable communication between RS-485 and RS-232

## MultiHop Modbus Radios

<table>
<thead>
<tr>
<th>Models</th>
<th>Transmit Power</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80DR9M-H</td>
<td>250 mW or 1 Watt (DIP switch selectable)</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80DR2M-H</td>
<td>65 mW (100 mW EIRP)</td>
<td>2.4 GHz</td>
</tr>
</tbody>
</table>

## MultiHop Modbus Radios with I/O

<table>
<thead>
<tr>
<th>Models</th>
<th>I/O</th>
<th>Voltage</th>
<th>Frequency</th>
<th>Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80DR9M-H1</td>
<td>Inputs: Four discrete, two 0-20 mA analog, one thermistor, one counter Outputs: Two NMOS discrete Switch Power: Two Serial Interface: RS-485</td>
<td>10-30 V dc</td>
<td>900 MHz</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80DR9M-H1E</td>
<td>Battery</td>
<td></td>
<td>900 MHz</td>
<td>IP54</td>
</tr>
<tr>
<td>DX80DR2M-H1</td>
<td>10-30 V dc</td>
<td></td>
<td>2.4 GHz</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80DR2M-H1E</td>
<td>Battery</td>
<td></td>
<td>2.4 GHz</td>
<td>IP54</td>
</tr>
<tr>
<td>DX80DR9M-H2</td>
<td>Inputs: Four discrete, two 0-20 mA analog Outputs: Four sourcing discrete, two 0-20 mA analog Serial Interface: RS-485</td>
<td>10-30 V dc</td>
<td>900 MHz</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80DR2M-H2</td>
<td>2.4 GHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DX80DR9M-H3</td>
<td>Inputs: Two discrete, four thermocouple, one thermistor (internal) Outputs: Two NMOS discrete Serial Interface: RS-232</td>
<td>10-30 V dc</td>
<td>900 MHz</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80DR9M-H3E</td>
<td>Battery</td>
<td></td>
<td>2.4 GHz</td>
<td>IP54</td>
</tr>
<tr>
<td>DX80DR2M-H3</td>
<td>10-30 V dc</td>
<td></td>
<td>900 MHz</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80DR2M-H3E</td>
<td>Battery</td>
<td></td>
<td>2.4 GHz</td>
<td>IP54</td>
</tr>
<tr>
<td>DX80DR9M-H4</td>
<td>Inputs: Four 3-wire Pt100 RTD Serial Interface: RS-232</td>
<td>Battery</td>
<td>2.4 GHz</td>
<td>IP54</td>
</tr>
<tr>
<td>DX80DR2M-H4E</td>
<td>10-30 V dc</td>
<td></td>
<td>900 MHz</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80DR2M-H4E</td>
<td>Battery</td>
<td></td>
<td>2.4 GHz</td>
<td>IP54</td>
</tr>
<tr>
<td>DX80DR2M-H5</td>
<td>2.4 GHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DX80DR9M-H6</td>
<td>Inputs: 1-wire serial interface for one 1-wire serial sensing device</td>
<td>Battery</td>
<td>900 MHz</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80DR2M-H6</td>
<td>2.4 GHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DX80DR9M-H12</td>
<td>Inputs: Two discrete, two 0-20 mA analog, one thermistor, one SDI-12 or counter Outputs: Two NMOS discrete Switch Power: Two Serial Interface: RS-485</td>
<td>10-30 V dc</td>
<td>900 MHz</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80DR2M-H12</td>
<td>2.4 GHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DX80DR9M-DCLATCH</td>
<td>Inputs: Two sinking discrete Outputs for DC Latch: DC Latch</td>
<td>Battery</td>
<td>900 MHz</td>
<td>IP54</td>
</tr>
<tr>
<td>DX80DR2M-DCLATCH</td>
<td>2.4 GHz</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### MultiHop Modbus Radios with I/O Specifications

#### Models and I/O

<table>
<thead>
<tr>
<th>Model</th>
<th>I/O</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80DR9M-HB1</td>
<td>Inputs: Two sinking discrete, 20 mA analog</td>
<td>900 MHz</td>
</tr>
<tr>
<td></td>
<td>Outputs: Two NMOS discrete</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80DR2M-HB1</td>
<td>Switch Power Outputs: Two</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80DR9M-HB2</td>
<td>Inputs: Two sourcing discrete, 20 mA analog</td>
<td>900 MHz</td>
</tr>
<tr>
<td></td>
<td>Outputs: Two sourcing discrete, 20 mA analog</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80DR2M-HB2</td>
<td></td>
<td>2.4 GHz</td>
</tr>
</tbody>
</table>

#### Radio Range

<table>
<thead>
<tr>
<th>Type</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>900 MHz, 1 Watt</td>
<td>Up to 9.6 km (6 miles)</td>
</tr>
<tr>
<td>2.4 GHz, 65 mW</td>
<td>Up to 3.2 km (2 miles)</td>
</tr>
</tbody>
</table>

#### Minimum Separation Distance

<table>
<thead>
<tr>
<th>Type</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>900 MHz, 1 Watt</td>
<td>4.57 m (15 ft)</td>
</tr>
<tr>
<td>2.4 GHz, 65 mW</td>
<td>0.3 m (1 ft)</td>
</tr>
</tbody>
</table>

#### Radio Transmit Power

<table>
<thead>
<tr>
<th>Type</th>
<th>Power Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>900 MHz, 1 Watt</td>
<td>30 dBm (1 W) conducted, less than or equal to 20 dBm (100 mW) EIRP</td>
</tr>
<tr>
<td>2.4 GHz, 65 mW</td>
<td>18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP</td>
</tr>
</tbody>
</table>

#### Power

<table>
<thead>
<tr>
<th>Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>FlexPower models</td>
<td>10 to 30 V dc (Outside the USA: 12 to 24 V dc, ±10%) on the brown wire, or 3.6 to 5.5 V dc low power option on the gray wire</td>
</tr>
<tr>
<td>Integrated battery models</td>
<td>3.6 V dc low power option from an internal battery or 10 to 30 V dc</td>
</tr>
<tr>
<td>Master radio consumption (900 MHz):</td>
<td>Maximum current draw is &lt; 100 mA and typical current draw is &lt; 30 mA at 24 V dc</td>
</tr>
<tr>
<td>Repeater/slave radio consumption (900 MHz):</td>
<td>Maximum current draw is &lt; 40 mA and typical current draw is &lt; 20 mA at 24 V dc</td>
</tr>
</tbody>
</table>

#### Compliance

<table>
<thead>
<tr>
<th>Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>900 MHz Compliance (1 Watt)</td>
<td>FCC ID UE3RM1809: This device complies with FCC Part 15, Subpart C, 15.247; IC: 7044A-RM1809</td>
</tr>
<tr>
<td>2.4 GHz Compliance</td>
<td>FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247 ETSI/EN: In accordance with EN 300 328: V1.8.1 (2012-04) IC: 7044A-DX8024</td>
</tr>
</tbody>
</table>

#### Spread Spectrum Technology

<table>
<thead>
<tr>
<th>Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>FHSS (Frequency Hopping Spread Spectrum)</td>
<td></td>
</tr>
</tbody>
</table>

#### Antenna Connection

<table>
<thead>
<tr>
<th>Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ext. Reverse Polarity</td>
<td>SMA, 50 Ohms - Max Tightening Torque: 0.45 N·m (4 lbf·in)</td>
</tr>
</tbody>
</table>

#### Interface

<table>
<thead>
<tr>
<th>Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicators: Two bi-color LEDs</td>
<td>Buttons: Two - Display: Six character LCD</td>
</tr>
</tbody>
</table>

#### Communication Hardware (MultiHop RS-485)

<table>
<thead>
<tr>
<th>Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface: 2-wire half-duplex RS-485</td>
<td>Baud rates: 9.6k, 19.2k (default), or 38.4k via DIP switches; 1200 and 2400 via the MultiHop Configuration Tool</td>
</tr>
<tr>
<td>Data format: 8 data bits, no parity, 1 stop bit</td>
<td>Data format: 8 data bits, no parity, 1 stop bit</td>
</tr>
</tbody>
</table>

#### Packet Size (MultiHop)

<table>
<thead>
<tr>
<th>Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>900 MHz: 175 bytes (85 Modbus registers)</td>
<td>2.4 GHz: 75 bytes (37 Modbus registers)</td>
</tr>
</tbody>
</table>

#### Intercharacter Timing (MultiHop)

<table>
<thead>
<tr>
<th>Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5 milliseconds</td>
<td></td>
</tr>
</tbody>
</table>

#### Housing

<table>
<thead>
<tr>
<th>Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers</td>
<td>Weight: 0.26 kg (0.57 lbs)</td>
</tr>
<tr>
<td>M-Hx and M-HxC models: Mounting: #10 or M5 (SS M5 hardware included)</td>
<td>Max. Tightening Torque: 0.56 N·m (5 lbf·in)</td>
</tr>
<tr>
<td>M-HxE models: Mounting: 1/4-in or M7 (SS M7 hardware included)</td>
<td>Max. Tightening Torque: 0.56 N·m (5 lbf·in)</td>
</tr>
</tbody>
</table>

#### Wiring Access

<table>
<thead>
<tr>
<th>Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-Hx models: Four PG-7, One 1/2-in NPT, One 5-pin threaded M12/Euro-style male quick-disconnect</td>
<td>Wiring Access: M-Hx models: Four PG-7, One 1/2-in NPT, One 5-pin threaded M12/Euro-style male quick-disconnect</td>
</tr>
<tr>
<td>M-HxC models: External terminals</td>
<td>Wiring Access: M-HxC models: External terminals</td>
</tr>
<tr>
<td>M-HxE models: Two 1/2-in NPT ports</td>
<td>Wiring Access: M-HxE models: Two 1/2-in NPT ports</td>
</tr>
</tbody>
</table>

#### Environmental Rating

<table>
<thead>
<tr>
<th>Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-Hx: IEC IP67; NEMA 6</td>
<td>&quot;C&quot; Housing Models: IEC IP20; NEMA 1 &quot;E&quot; Housing Models: IEC IP65; NEMA 4X</td>
</tr>
</tbody>
</table>

#### Operating Conditions

<table>
<thead>
<tr>
<th>Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-Hx and M-HxC models:</td>
<td>−40 °C to +85 °C (−40 °F to +185 °F) (Electronics); −20 °C to +80 °C (−4 °F to +176 °F) (LCD)</td>
</tr>
<tr>
<td>M-HxE models:</td>
<td>−40 °C to +65 °C (−40 °F to +149 °F) (Electronics); −20 °C to +80 °C (−4 °F to +176 °F) (LCD)</td>
</tr>
<tr>
<td>95% maximum relative humidity (non-condensing)</td>
<td>Radiated Immunity: 10 V/m (EN 61000-4-3)</td>
</tr>
</tbody>
</table>

#### Shock and Vibration

<table>
<thead>
<tr>
<th>Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC 68-2-6 and IEC 68-2-27</td>
<td>Shock: 30g, 11 millisecond half sine wave, 18 shocks - Vibration: 0.5 mm p-p, 10 to 60 Hz</td>
</tr>
</tbody>
</table>

#### Certifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE</td>
<td>CE</td>
</tr>
</tbody>
</table>

*See datasheet for model specific details*
MultiHop Modbus—H6

The -H6 MultiHop Modbus Data Radio has a 1-wire serial interface that is designed to transmit data from 1-wire serial sensors, such as the Banner Temperature and Humidity (M12FT4Q) and Vibration and Temperature (QM42VT1) sensors.

Key Features:
- 1-wire serial interface
- Battery-powered models for a completely wireless solution
- Tree topology allows for multiple hops to cover longer distances and circumvent obstacles

### MultiHop Modbus Radios

<table>
<thead>
<tr>
<th>Models</th>
<th>Power</th>
<th>I/O</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80DR9M-H6</td>
<td>D-cell Lithium</td>
<td>Inputs: 1-wire serial interface for one 1-wire</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80DR2M-H6</td>
<td>D-cell Lithium</td>
<td>serial sensing device</td>
<td>2.4 GHz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Used With</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>M12FT4Q</td>
<td>see page 10</td>
<td>Temperature and relative humidity via a 1-wire</td>
</tr>
<tr>
<td>M12FT4Q</td>
<td>see page 10</td>
<td>serial interface</td>
</tr>
<tr>
<td>QM42VT1</td>
<td>see page 8</td>
<td>Vibration and temperature via a 1-wire serial</td>
</tr>
</tbody>
</table>

Courtesy of Steven Engineering, Inc - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com
## MultiHop H6 Modbus Radio Specifications

<table>
<thead>
<tr>
<th><strong>Radio Range</strong></th>
<th>900 MHz, 1 Watt: Up to 9.6 km (6 miles)</th>
<th>2.4 GHz, 65 mW: Up to 3.2 km (2 miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minimum Separation Distance</strong></td>
<td>900 MHz, 1 Watt: 4.57 m (15 ft)</td>
<td>2.4 GHz, 65 mW: 0.3 m (1 ft)</td>
</tr>
<tr>
<td><strong>Radio Transmit Power</strong></td>
<td>900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)</td>
<td>2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP</td>
</tr>
<tr>
<td><strong>Supply Voltage</strong></td>
<td>3.6 V dc low power option from an internal battery</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Compliance</strong></th>
<th>900 MHz Compliance (1 Watt)</th>
<th>FCC ID UE3RM1809: This device complies with FCC Part 15, Subpart C, 15.247</th>
<th>IC: 7044A-RM1809</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.4 GHz Compliance</td>
<td>FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247</td>
<td>IC: 7044A-DX8024</td>
</tr>
<tr>
<td><strong>Spread Spectrum Technology</strong></td>
<td></td>
<td>ETSI/EN: In accordance with EN 300 328: V1.8.1 (2012-04)</td>
<td></td>
</tr>
<tr>
<td><strong>Antenna Connection</strong></td>
<td>Ext. Reverse Polarity SMA, 50 Ohms</td>
<td>Max. Tightening Torque: 0.45 N·m (4 lbf·in)</td>
<td></td>
</tr>
<tr>
<td><strong>Interface</strong></td>
<td></td>
<td>Buttons: Two Display: Six character LCD</td>
<td></td>
</tr>
<tr>
<td><strong>Communication Hardware (MultiHop RS-485)</strong></td>
<td>Interface: 2-wire half-duplex RS-485</td>
<td>Baud rates: 9.6k, 19.2k (default), or 38.4k via DIP switches; 1200 and 2400 via the MultiHop Configuration Tool</td>
<td></td>
</tr>
<tr>
<td><strong>Packet Size (MultiHop)</strong></td>
<td>900 MHz: 175 bytes (85 Modbus registers)</td>
<td>2.4 GHz: 75 bytes (37 Modbus registers)</td>
<td></td>
</tr>
<tr>
<td><strong>Intercharacter Timing (MultiHop)</strong></td>
<td>3.5 milliseconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td>Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weight: 0.26 kg (0.57 lbs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mounting: #10 or M5 (SS M5 hardware included)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Max. Tightening Torque: 0.56 N·m (5 lbf·in)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Wiring Access</strong></td>
<td>One 5-pin threaded M12/Euro-style male quick-disconnect</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environmental Rating</strong></td>
<td>IEC IP67; NEMA 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating Conditions</strong></td>
<td>–40 °C to +65 °C (–40 °F to +149 °F) (Electronics); –20 °C to +80 °C (–4 °F to +176 °F) (LCD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>95% maximum relative humidity (non-condensing)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Radiated Immunity: 10 V/m (EN 61000-4-3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shock and Vibration</strong></td>
<td>IEC 68-2-6 and IEC 68-2-27</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shock: 30g, 11 millisecond half sine wave, 18 shocks</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vibration: 0.5 mm p-p, 10 to 60 Hz</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Certifications

![CE Mark]
Intrinsically Safe Nodes

Key Features:
• The DX99 is a state-of-the-art combination of wireless communication, battery technology and intrinsically safe electronics
• All models are certified for operation in Class I, Division 1 and ATEX Zone 0 locations
• Networks formed using DX80 Performance Gateways installed beyond the hazardous area and one or more Nodes operating in the same frequency band
• Both 900 MHz 150 mW and 2.4 GHz 63 mW models are available

DX99 FlexPower® Nodes — Class 1, Div 1 and Zone 0 (metal housing)

<table>
<thead>
<tr>
<th>Models</th>
<th>I/O</th>
<th>Power Boost</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX99N9X1S2N0M2X0D1</td>
<td>Discrete: Two inputs</td>
<td>10 V</td>
<td>900 MHz</td>
</tr>
<tr>
<td></td>
<td>Analog: Two inputs (0-20 mA)</td>
<td>18 V</td>
<td></td>
</tr>
<tr>
<td>DX99N9X1S2N0M2X0D2</td>
<td>Discrete: Two inputs</td>
<td>10 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Analog: Two inputs (0-20 V)</td>
<td>18 V</td>
<td></td>
</tr>
<tr>
<td>DX99N2X1S2N0M2X0D1</td>
<td>Discrete: Two inputs</td>
<td>10 V</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td></td>
<td>Analog: Two inputs (0-20 mA)</td>
<td>18 V</td>
<td></td>
</tr>
<tr>
<td>DX99N2X1S2N0V2X0D1</td>
<td>Discrete: Two inputs</td>
<td>10 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Analog: Two inputs (0-10 V)</td>
<td>18 V</td>
<td></td>
</tr>
<tr>
<td>DX99N9X1S2N0T4X0D0</td>
<td>Thermocouple: Three inputs, one thermistor input</td>
<td>n/a</td>
<td>900 MHz</td>
</tr>
<tr>
<td></td>
<td>Discrete: Two (NPN) inputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DX99N2X1S2N0T4X0D0</td>
<td>RTD: Four inputs</td>
<td>n/a</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td></td>
<td>Discrete: Two inputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DX99N9X1S0N0R4X0D0</td>
<td>Bridge: Two inputs</td>
<td>n/a</td>
<td>900 MHz</td>
</tr>
<tr>
<td></td>
<td>Discrete: Two inputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DX99N2X1S0N0R4X0D0</td>
<td>RTD: Four inputs</td>
<td>n/a</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td></td>
<td>Discrete: Two inputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DX99N9X1S0B2X0D0</td>
<td>Inputs (Modbus Mode): One RS-485</td>
<td>13 V</td>
<td>900 MHz</td>
</tr>
<tr>
<td></td>
<td>Inputs (Voltage Mode): Two analog, one discrete</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DX99N2X1S0B2X0D0</td>
<td>Additional Input Configurations: One 3-wire 100-Ohm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Platinum RTD, one sinking discrete, and two analog (0-20 mA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DX99N9X1S1N0M3X0D5</td>
<td>Inputs: One analog input with a 29 second warm-up time; one sinking discrete</td>
<td>19 V</td>
<td>900 MHz</td>
</tr>
<tr>
<td></td>
<td>Additional Input Configurations: One 3-wire 100-Ohm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DX99N2X1S1N0M3X0D5</td>
<td>Platinum RTD, one sinking discrete, and two analog (0-20 mA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequency</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>900 MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.4 GHz</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DX99 FlexPower Node Specifications

Radio Range
- 900 MHz, 150 mW: Up to 4.8 km (3 miles)
- 2.4 GHz, 65 mW: Up to 3.2 km (2 miles)

Minimum Separation Distance
- 900 MHz, 150 mW: 2 m (6 ft)
- 2.4 GHz, 65 mW: 0.3 m (1 ft)

Radio Transmit Power
- 900 MHz, 150 mW: 21 dBm (150 mW) conducted
- 2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP

Compliance
- 900 MHz Compliance
  FCC ID TGUDX80 - This device complies with FCC Part 15, Subpart C, 15.247
  IC: 7044A-DX9009
- 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: V1.8.1 (2012-04)
  IC: 7044A-DX8024

Spread Spectrum Technology
- FHSS (Frequency Hopping Spread Spectrum)

RS-485 Inputs
- 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 (even and odd parity selection are available)

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

Link Timeout
- Gateway: Configurable via User Configuration Tool (UCT) software
- Node: Defined by Gateway

Supply Voltage
- 3.6 V dc low power option from an internal battery

Power Consumption
- Consumption: Application dependant

Housing
- Glass and cast aluminium with chromating and chemically-resistant paint (outside only)

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

Interface
- Indicators: Two bi-color LEDs
- Buttons: Two
- Display: Six character LCD

Wiring Access
- Two 1/2-in NPT ports, one 3/4-in NPT port (internal threads)

Environmental Rating
- IEC IP68

Operating Conditions
- –40 °C to +65 °C (–40 °F to +149 °F) (Electronics); –20 °C to +80 °C (–4 °F to +176 °F) (LCD)
- 90% 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

Certifications
- CSA: Class I, Division 1, Groups A, B, C, D; Class II, Division 1, Groups E, F, G; Class III, Division 1 (Ex ia IIC T4 / AEx ia IIC T4)
- Certificate: 2008243
- LCIE/ATEX: Zone 0 (Category 1G) and 20 (Category 1D); Temperature Class T4 (II 1 GD / Ex ia IIC T4/Ex iaD 20 IP68 T82°C)
- Certificate: LCIE 08 ATEX 6098 X

Special Conditions for Safe Use imposed by Intrinsic Safety Certificate LCIE 08 ATEX 6098 X:
- Ambient temperature range is –40 to 70 °C. Sure Cross® DX99 FlexPower devices can only be connected to Intrinsically Safe certified equipment or simple apparatus as defined by EN 60079-11. All connected equipment must comply with the Entity Parameters (Safety Parameters) listed in the Control Drawings (p/n 141513). The device must only use a lithium battery manufactured by XENO, type XL-205F.

K50 and K30 Hazardous Indicators

Banner’s K50 and K30 Indicator Lights for hazardous areas have a smooth 50 or 30 mm diameter dome that provides uniform illumination from all directions.

- Up to three colors in one device and five colors to choose from
- Models rated to IP67 and IP69K for use in harsh environments
- Unique design appears gray when OFF, eliminating false indication from ambient light
- Easy mounting and configuration
- Worldwide IECEx approval for quicker access into countries outside Europe and North America
The DXM100 Controller is an industrial wireless controller developed to facilitate Ethernet connectivity and Industrial Internet of Things (IIoT) applications. Available with an internal DX80 Gateway or a MultiHop Data Radio, this powerful Modbus communications device connects local wireless networks with the internet and/or host systems.

Key Features:
• ISM radios available in 900 MHz and 2.4 GHz for local wireless network
• Converts Modbus RTU to Modbus TCP/IP or Ethernet I/P
• Logic controller can be programmed using action rules and text language methods
• Micro SD card for data logging
• Email and text alerts
• Local I/O options: universal inputs, NMOS outputs, and analog outputs
• Powered by 12 to 30 V dc, 12 V dc solar panel, or battery backup
• RS-232, RS-485, and Ethernet communications ports; and a USB configuration port
• LCD display for I/O information and user programmable LED’s

<table>
<thead>
<tr>
<th>DXM Controllers</th>
<th>Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DXM100-B1R1</td>
<td>DXM100 Controller preconfigured as a protocol converter</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DXM100-B1R3</td>
<td>DXM100 Controller preconfigured as a protocol converter</td>
<td>2.4 GHz</td>
</tr>
</tbody>
</table>
### DXM100 Controllers

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply Voltage</strong></td>
<td>12 to 30 V dc or 12 V dc solar panel and 12 V sealed lead acid battery</td>
</tr>
<tr>
<td><strong>Power Consumption</strong></td>
<td>35 mA average at 12 V</td>
</tr>
<tr>
<td><strong>Solar Power Battery Charging</strong></td>
<td>1 Amp maximum with 20 Watt solar panel</td>
</tr>
<tr>
<td><strong>Radio (ISM Band) Transmit Power</strong></td>
<td>900 MHz at 1 Watt</td>
</tr>
<tr>
<td><strong>Radio Range</strong></td>
<td>900 MHz, 1 Watt: Up to 9.6 km (6 miles)</td>
</tr>
<tr>
<td><strong>Minimum Separation Distance</strong></td>
<td>900 MHz, 1 Watt: 4.57 m (15 ft)</td>
</tr>
<tr>
<td><strong>Antenna Connection</strong></td>
<td>Ext. Reverse Polarity SMA, 50 Ohms</td>
</tr>
<tr>
<td><strong>Radio Transmit Power</strong></td>
<td>900 MHz, 1 Watt: 30 dBm (1 Watt) (up to 36 dBm EIRP)</td>
</tr>
<tr>
<td><strong>Compliance</strong></td>
<td>900 MHz Compliance (1 Watt) FCC ID UE3RM1809: This device complies with FCC Part 15, Subpart C, 15.247, IC: 7044A-RM1809</td>
</tr>
<tr>
<td><strong>Spread Spectrum Technology</strong></td>
<td>FHSS (Frequency Hopping Spread Spectrum)</td>
</tr>
<tr>
<td><strong>Logging</strong></td>
<td>8 GB maximum; removable Micro SD card format</td>
</tr>
<tr>
<td><strong>Protocols</strong></td>
<td>Modbus RTU Master/Slave, Modbus TCP, and Ethernet/IP</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td>Polycarbonate; DIN rail mount option</td>
</tr>
<tr>
<td><strong>Communication Hardware (RS-322)</strong></td>
<td>3-wire full duplex</td>
</tr>
<tr>
<td><strong>Communication Hardware (RS-485)</strong></td>
<td>3-wire half duplex RS-485</td>
</tr>
<tr>
<td><strong>Universal Inputs</strong></td>
<td>Discrete NPN/PNP, 0 to 20 mA analog, 0 to 10 V analog, 10k thermistor, potentiometer sense</td>
</tr>
<tr>
<td><strong>Courtesy Power</strong></td>
<td>One; output at 5 volts , 500 mA maximum</td>
</tr>
<tr>
<td><strong>Switched Power Outputs</strong></td>
<td>Two; output at 5 to 16 Volts, 500 mA maximum</td>
</tr>
<tr>
<td><strong>Environmental Rating</strong></td>
<td>IEC IP67; NEMA 6</td>
</tr>
<tr>
<td><strong>Operating Conditions</strong></td>
<td>–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, 80-2700 MHz (EN 61000-4-3)</td>
</tr>
<tr>
<td><strong>Shock and Vibration</strong></td>
<td>IEC 68-2-6 and IEC 68-2-27 Shock: 30g, 11 milisecond half sine wave, 18 shocks Vibration: 5 mm p-p, 10 to 60 Hz</td>
</tr>
<tr>
<td><strong>Analog Outputs</strong></td>
<td>0 to 20 mA or 0 to 10 V dc output</td>
</tr>
<tr>
<td><strong>NMOS Outputs</strong></td>
<td>Less than 1 A max current at 30 V dc</td>
</tr>
<tr>
<td><strong>Certifications</strong></td>
<td><img src="https://example.com" alt="CE" /></td>
</tr>
</tbody>
</table>

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Additional Devices and Sensors

**DX85 Modbus RTU Remote I/O Devices**
These remote I/O devices have a Modbus interface and are used to expand the I/O of the Gateway or the Modbus host.

<table>
<thead>
<tr>
<th>Models</th>
<th>I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX85M6P6</td>
<td>DX85 Modbus RTU Remote I/O, 6 Discrete IN, 6 Discrete OUT</td>
</tr>
<tr>
<td>DX85M4P4M2M2</td>
<td>DX85 Modbus RTU Remote I/O, 4 Discrete IN, 4 Discrete OUT, 2 Analog OUT (0 to 20 mA)</td>
</tr>
<tr>
<td>DX85M4P8</td>
<td>DX85 Modbus RTU Remote I/O, 4 Discrete IN, 8 Discrete OUT</td>
</tr>
<tr>
<td>DX85M8P4</td>
<td>DX85 Modbus RTU Remote I/O, 8 Discrete IN, 4 Discrete OUT</td>
</tr>
<tr>
<td>DX85M0P0M4M4</td>
<td>DX85 Modbus RTU Remote I/O, 4 Analog IN, 4 Analog OUT (0 to 20 mA)</td>
</tr>
<tr>
<td>DX85M-P7</td>
<td>DX85 Modbus RTU Remote I/O, Up to 12 sinking inputs or up to 12 NMOS sinking outputs (for a total of 12 I/O)</td>
</tr>
<tr>
<td>DX85M-P8</td>
<td>DX85 Modbus RTU Remote I/O, Up to 12 sourcing inputs or up to 12 sourcing outputs (for a total of 12 I/O)</td>
</tr>
</tbody>
</table>

**NOTE:** Add a "C" to the end of any DX85 model to order the I/O mix with an IP20 housing. The IP20 models are Class I, Division 2 certified when installed in a suitable enclosure.

**Sensors Optimized for Use with FlexPower® Devices**

<table>
<thead>
<tr>
<th>Models</th>
<th>I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>SM312LPQD-78447</td>
<td>MINI-BEAM®, Low Power, 5 V, polarized retroreflective, 3 m</td>
</tr>
<tr>
<td>SM312DQD-78419</td>
<td>MINI-BEAM®, Low Power, 5 V, diffuse, 38 cm</td>
</tr>
<tr>
<td>QT50ULBQ6-75390</td>
<td>Ultrasonic, QT50U, 200 mm to 8 m range</td>
</tr>
<tr>
<td>QS30WEQ</td>
<td>WORLD-BEAM® Photoelectric Emitter, QS30 (Max Range: 100 ft, 10x excess gain at 50 ft), 1-wire serial interface</td>
</tr>
<tr>
<td>QS30WRQ</td>
<td>WORLD-BEAM® Photoelectric Receiver, QS30 (Max Range: 100 ft, 10x excess gain at 50 ft), 1-wire serial interface</td>
</tr>
</tbody>
</table>
GPS50M GPS Module

Low power consumption, ability to withstand harsh environments, flexible power supply requirements and Modbus RTU communications makes this module ideal for the industrial market.

- Self-contained GPS Module for industrial use.
- Flexible Power Requirements: 5 to 30 V dc with power consumption as low as 100 mW
- Positional error of less than 2.5 meters
- Self-contained for harsh environment; IP69K-rated

GPS50M GPS Module Specifications

<table>
<thead>
<tr>
<th>Power Requirements</th>
<th>5 to 30 V dc</th>
</tr>
</thead>
</table>
| Current            | Maximum: < 0.5 W  
Power Save Mode ON Typ. Average: 4 mA at 24 V dc  
Power Save Mode OFF Typ. Average: 10 mA at 24 V dc |
| Indicators         | Green flashing: Power ON  
Amber flashing: Modbus communication active |
| Operating Temperature | -40 to +85 °C (-40 to +185 °F) |
| GPS Features       | • SiRF Star IV GPS chip  
• Satellite-based augmentation systems: WAAS, EGNOS, MSAS, GAGAN  
• High sensitivity navigation engine (PVT) tracks as low as −163 dBm  
• Update Rate: 1 Hz |
| Communication      | • Interface: RS-485 serial  
• Baud rates: 9.6k, 19.2k (default), or 38.4k  
• Data format: 9 data bits, no parity (default), 1 stop bit (even or odd parity available)  
• Do not use termination resistor  
• Protocol: Modbus RTU |
| Shock and Vibration| • IEC 68-2-6 and IEC 68-2-27  
• Shock: 30g, 11 millisecond half wave, 18 shocks  
• Vibration: 0.5 mm p-p, 10 to 60 Hz |
| Accuracy           | • Positional error of less than 2.5 m (8') with augmentation  
• Positional error of less than 10 m (33') with no augmentation |

Other Sensors or Sensor Components

<table>
<thead>
<tr>
<th>Models</th>
<th>I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>BWA-THERMISTOR-001</td>
<td>NTC Thermistor, 2.2 KOhms, +/-0.2%C, blue bead (For models: DX80N9X2S2N2T/C, DX99N9X2S2N0T4X0A0, and DX99N9X1S2N0T4X0D0)</td>
</tr>
<tr>
<td>BWA-THERMISTOR-002</td>
<td>NTC Thermistor, 10 KOhms, +/-0.2%C, black bead (For Performance models - P1/C/E, and MultiHop models M-H1/C/E), 2 pack</td>
</tr>
<tr>
<td>BWA-S612-30-100</td>
<td>NoShok Series 612 Submersible Level Transmitter, model 612-30-1-1-N-100, 0 to 30 psig, 100' cable</td>
</tr>
<tr>
<td>BWA-S612-15-100</td>
<td>NoShok Series 612 Submersible Level Transmitter, model 612-15-1-1-N-100, 0 to 15 psig, 100' cable</td>
</tr>
<tr>
<td>BWA-625-5000-1-1-8-25</td>
<td>NoShok Series 625 Intrinsically Safe Pressure Transmitter, model 625-5000-1-1-8-25, 0 to 5000 psig, 1/2-in NPT, 4–20mA, M12 QD</td>
</tr>
<tr>
<td>BWA-625-10000-1-1-8-25</td>
<td>NoShok Series 625 Intrinsically Safe Pressure Transmitter, model 625-10000-1-1-8-25, 0 to 10000 psig, 1/2-in NPT, 4–20mA, M12 QD</td>
</tr>
<tr>
<td>BWA-P-RKGV 5.33T-1727-2.0</td>
<td>Cable, female M12 4-pin, blue PVC, SS connector, for NoShok Series 625 IS Pressure Transmitter</td>
</tr>
<tr>
<td>BWA-ACC-SEN-SDI</td>
<td>Acclima SDI-12 Soil Moisture Transducer</td>
</tr>
</tbody>
</table>

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