Easy to deploy, simple to use, proprietary point-to-point bi-directional radio communication.

- Secure network
- Range from feet to miles
- 900 MHz or 2.4 GHz ISM Band
- No software required
- Discrete and analog I/O
- Scalable: Can support up to 47 nodes
The basic form of wireless network is called point-to-point, consisting of two radios (Gateway and Node), with the Gateway the master. The Gateway handles the communication traffic and controls the network I/O configuration.

Easy to Deploy
Simply replaces discrete, analog, serial and Ethernet signal wires without setup software.
Banner Engineering’s proprietary RF protocol coupled with license-free frequency hopping technology makes for reliable and secure communications.

Sure Cross® Model Series | I/O Signal Type | Preconfigured Network Size
--- | --- | ---
PM Series | Discrete/Analog | 1 Gateway
Performance Board Modules | Discrete/Analog | Up to 2 Nodes
Serial Data Radios | RS232 / RS485 | 1 Master Radio & 1 Slave Radio
Ethernet Data Radios | TCP/IP RS232/RS485 | 1 Master Radio & 1 Slave Radio

Solutions for...
- Call for parts
- Machine status
- Remote indication
- Supervisory control
- Digital or analog wire replacement
- Level, pressure & temperature monitoring
- Robotic equipment monitoring
- Tank level monitoring
- Door monitoring
- Humidity monitoring
- Facility access
- Eyewash/safety shower monitoring
- Water flow and pressure
- Predictive maintenance
- Loading dock notification

Components
DX80G9M6S-PM8 Gateway
DX80N9X6S-PM8L Node
TL50 Tower Lights
K50 Lights
PM gateway with K50 lights is installed in a plant’s control room. The simple system gives management the status of any machine plant-wide, increasing production output by reducing down time.

Application: Machine status monitoring

The simple system gives management the status of any machine plant-wide, increasing production output by reducing down time.
Replacing Wire with Wireless
Banner Wireless provides reliable signal and data transfer over long distances. It’s an ideal solution for remote places and where it is impractical or too costly to run wires and conduit.

Key Features
• Secure, proprietary protocol
• License-free operation
• 900 MHz and 2.4 GHz frequencies
• Ruggedized for extreme environments
• High interference immunity
• Communicate over distances of up to 6 miles

Application: Call for Assembly Parts
Challenge
Assemblers at work stations need a way to call for parts and service that keeps them productive at their stations.

Solution
A wireless node, light and push button at work cell locations allow workers to call for more parts without interrupting the workflow.

Application Notes
A wireless call for parts system eliminates the need for personnel to leave their workstations in search of parts. PM Nodes were installed at each operator station. The I/O from the Node was wired directly into a push button and light to allow the operator to send signals to the supervisor, and a PM Gateway allowed the supervisor to send signals back to the work station.
Sure Cross®
PM SERIES

An I/O radio network that combines long range line-of-sight coverage with ease of deployment and use.

Banner’s PM Series provides a flexible network that easily sets up without software. Setting-up a basic point-to-point network is as easy as pairing a cell phone to a headset. You can replace cables and extend the range of digital and analog signals with minimum effort.

Key Features
- Menu-driven LCD user interface
- No software needed
- IP67-rated housing for demanding environments
- One Gateway is preconfigured to support up to six nodes
- Choose from two I/O configurations
- Select from multiple I/O maps

Components
- DX80G*M6S-PM2 4 Discrete IN, 4 Discrete OUT
- 2 Analog IN, 2 Analog OUT
- DX80G*M6S-PM8 6 Discrete IN, 6 Discrete OUT
- * 9 for 900 MHz or 2 for 2.4 GHz

Nodes
- DX80N*X6S-PM2 4 Discrete IN, 4 Discrete OUT
- 2 Analog IN, 2 Analog OUT
- DX80N*X6S-PM8 6 Discrete IN, 6 Discrete OUT

Application: Pick-to-Light System

Challenge
Reduce or eliminate human error inherent in bin-picking production parts and components.

Solution
The PM gateway sends a signal to the node which has the Banner EZ-LIGHT wired into it. Each node can handle up to six lights.

Application Notes
The PLC sends a signal that illuminates a Banner EZ-LIGHT to indicate from which bin a part should be selected. The line operator selects a part and pushes the button on the EZ-LIGHT which confirms to the controller that the correct part has been picked.

Benefits
SureCross nodes can be equipped with up to six EZ-LIGHT operator indicator lights.
Sure Cross®
PM Kit

Simple wire replacement is even simpler with Banner’s fully integrated kit.
Plug-and-play with one Gateway and one Node, pre-bound and mapped to solve your first wireless challenge, and provide the start of a flexible network that can be expanded as production needs change. Extend the range of digital and analog signals with minimum effort.

Key Features
• Pre-bound and mapped expandable bi-directional radios
• Eight LCD menu selectable I/O mapping options
• IP67-rated housing for demanding environments
• One Gateway is preconfigured to support up to six nodes

Sure Cross®
PB Board Module

Embeddable board modules for connectivity where wired connections are not possible.
Sure Cross PB wireless board-level nodes and gateways can be used in pairs to quickly and easily replace discrete or 4 to 20 mA signal cable and communicate with all Sure Cross radios.

Key Features
• Simple yet highly expandable bi-directional radio
• Map inputs and outputs with dip switches
• Two PNP inputs/outputs
• Two 0 to 20 mA analog inputs/outputs

Kits

<table>
<thead>
<tr>
<th>DX80K*M6-PM2</th>
<th>4 Discrete IN, 4 Discrete OUT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 Analog IN, 2 Analog OUT</td>
</tr>
<tr>
<td>DX80K*M6-PM8</td>
<td>6 Discrete IN, 6 Discrete OUT</td>
</tr>
</tbody>
</table>

* 9 for 900 MHz or 2 for 2.4 GHz

Application: Call for Parts

When a production line is in need of parts, the line operator flips a switch that turns on that line’s color on a tower light in the warehouse. A forklift operator sees the signal tower light and retrieves parts for that line.

Components
DX80G9M6S-PM8 Gateway
DX80N9X6S-PM8L Node
TL50 Signal Tower Light
K30 and K50 Illuminated Touch Button

Application: Door Monitoring

Reed switch status information is transmitted to a central location so that security personnel can monitor doors throughout the facility.

Components
DX80G9M6S-PM8 Gateway
DX80N9X6S-PM8L Node
Magnetic Reed Switch

1-888-373-6767 • bannerengineering.com
Sure Cross®
Serial Data Radio
An industrial serial radio that combines long distance coverage with ease of deployment and use.
Banner wireless Serial Data Radios extend the range of serial networks and are designed to affordably support communication protocols that use RS232 or RS485.

Key Features
- Two models available: 900 MHz and 2.4 GHz
- Flexible: can be a master, a slave or a repeater
- No software required for deployment

<table>
<thead>
<tr>
<th>Serial Data Radios</th>
</tr>
</thead>
</table>
| DX80SR9M-H  | 900 MHz (1 W)  
9.6 km (6 mi) range |
| DX80SR2M-H  | 2.4 GHz (65 mW)  
3.2 km (2 mi) range |

Application: Message Display Sign
A PLC monitors machine status and sends serial communications for display on a message display sign. Due to the expense of wiring and conduit, it is more cost effective to use serial data radios to send the data wirelessly.

Components
DX80SR9M-H — Master
DX80SR9M-H — Slave
Message Display Sign

Sure Cross®
Ethernet Data radio
An industrial Ethernet radio that combines long distance coverage with ease of deployment and use.
Banner Ethernet Data Radios are used to create point to multipoint wireless Ethernet networks, available in 900 MHz and 2.4 GHz.

Key Features
- Flexible: can be a master, a slave or repeater
- No software required for deployment
- Multihop: LCD interface for radio strength diagnostics
- DXER9: Moves large amounts of data over short ranges

<table>
<thead>
<tr>
<th>Multihop Ethernet Data Radios</th>
</tr>
</thead>
</table>
| DX80ER9M-H  | 900 MHz (1 W)  
9.6 km (6 mi) range |
| DX80ER2M-H  | 2.4 GHz (65 mW)  
3.2 km (2 mi) range |

<table>
<thead>
<tr>
<th>Ethernet Data Radio</th>
</tr>
</thead>
</table>
| DXER9  | 900 MHz (1 W)  
9.6 km (6 mi) range |

Application: Ethernet Wire Replacement
The PLC in a food processing facility needs to get data back from a couple of machines in remote locations where it is too expensive to run Ethernet cables. Banner Ethernet Data Radios were a more cost effective solution.

Components
DX80SR9M-H — Master
DX80SR9M-H — Slave
Message Display Sign
Sure Cross®
Replacing Wire with Wireless Data Radio

For a complete listing of accessories, including the printable Antenna and Accessory Specifier’s Guide, please go to our website at www.bannerengineering.com/accessories.

<table>
<thead>
<tr>
<th>Antennas</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BWA-902-D</td>
<td>Dome Antenna, 900 MHz, 2 dBi, SMA Box Mount</td>
</tr>
<tr>
<td>BWA-905-C</td>
<td>Antenna Omni, 902-928 MHz, 5 dBi, Rubber Swivel, RP-SMA Male</td>
</tr>
<tr>
<td>BWA-906-AS</td>
<td>Fiberglass Antenna, 900 MHz, 6 dBi, N Female, 1.3&quot; dia., 23.6&quot; long</td>
</tr>
<tr>
<td>BWA-908-AS</td>
<td>Fiberglass Antenna, 900 MHz, 8 dBi, N Female, 1.5&quot; dia., 63&quot; long</td>
</tr>
<tr>
<td>BWA-9Y6-A</td>
<td>Antenna, Yagi, 900 MHz, 6.5 dBi, N Female</td>
</tr>
<tr>
<td>BWA-9Y10-A</td>
<td>Antenna, Yagi, 900 MHz, 10 dBi, N Female</td>
</tr>
<tr>
<td>BWA-206-A</td>
<td>Antenna, Omni, 2.4 GHz, 6 dBi, N Female, Fiberglass 16&quot;</td>
</tr>
<tr>
<td>BWA-208-A</td>
<td>Antenna, Omni, 2.4 GHz, 8.5 dBi, N Female, Fiberglass 24&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cables</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BWC-4MNFN3</td>
<td>LMR400 Cable, N-Male to N-Female, 3 m</td>
</tr>
<tr>
<td>BWC-4MNFN6</td>
<td>LMR400 Cable, N-Male to N-Female, 6 m</td>
</tr>
<tr>
<td>BWC-4MNFN15</td>
<td>LMR400 Cable, N-Male to N-Female, 15 m</td>
</tr>
<tr>
<td>BWC-1MRSMN05</td>
<td>LMR200 Cable, RP-SMA to N-Male, 0.5 m</td>
</tr>
<tr>
<td>BWA-CG.5-10</td>
<td>Cable gland, 1/2-inch NPT, 10 pack</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power Supplies</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PSDINM-24-10</td>
<td>DC Power Supply, 1.0 Amps, 24 V dc, with DIN Rail Mount</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Accessories</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BWC-LFNBMN-DC</td>
<td>Surge Suppressor, Bulkhead, N-Type, 900 MHz/2.4 GHz, dc blocking</td>
</tr>
<tr>
<td>DIN-35-105</td>
<td>DIN Rail Section, 35mm x 105mm Long</td>
</tr>
<tr>
<td>SMBDX80DIN</td>
<td>DIN Rail Bracket Assembly for PM, Ethernet, and Serial radios</td>
</tr>
<tr>
<td>BWA-AH12106C</td>
<td>Enclosure, Polycarbonate, with Clear Cover, 12&quot; x 10&quot; x 6&quot;</td>
</tr>
<tr>
<td>BWA-HW-034</td>
<td>DIN Bracket and screws for M-HBx</td>
</tr>
<tr>
<td>BWA-AH10DRK</td>
<td>10&quot; DIN Rail Kit, includes two nuts, two screws and DIN Rail</td>
</tr>
</tbody>
</table>
Sure Cross Wireless uses a proprietary protocol to provide the highest level of data security and integrity. Time Division Multiple Access, and Frequency Hopping Spread Spectrum communication technologies work together to ensure the transfer of signals is reliable. This allows Sure Cross to be used effectively in both data monitoring and control applications and can result in significant cost savings.

**What is the benefit of Banner’s proprietary protocol?**
Banner Engineering’s proprietary communication protocol ensures that only I/O data is transmitted within the deterministic Sure Cross wireless network.

**How do I know my data is secure?**
The Sure Cross protocol only carries I/O data, making it impossible for a malicious executable file to be transmitted. This protocol does not operate as an open protocol such as WiFi and is not subject to the same security risks.

**Will it interfere with existing wireless networks?**
To prevent networks from interfering with each other, the gateway and all its nodes exchange a binding code that prevents radios outside the network from communicating with the gateway (similar to pairing a headset to a phone, but more secure). Additionally, gateways and nodes can be configured for multiple channel hop patterns to eliminate data collisions.

**What are the advantages of a deterministic system?**
Banner’s deterministic system defines how network endpoints behave during the loss of communications. The network identifies when the communications link is lost and sets relevant outputs to user defined conditions. Once the radio signal is re-established, the network returns to normal operation.

**How far can the signal travel?**
Banner’s wireless network is designed for long distance applications. The signal for 1 Watt radios will travel up to 6 miles and 250 mW radios will travel up to three miles line-of-sight. To verify range, Banner integrates a site survey tool that displays real-time signal quality results.

**What does “line of sight” mean?**
Line of sight is the unobstructed path between radio antennas; however, signals can penetrate walls, floors and other indoor obstructions. Buildings, trees and large metal objects will impact signal strength in outdoor applications. Always conduct a site survey prior to installing a wireless network.

**How scalable is a Sure Cross wireless network?**
Simple wire replacement products come preconfigured to handle up to 6 nodes (PM8) so that it is easy to set up your network without software. As your needs grow, the Sure Cross wireless network can be expanded to up to 47 nodes using the configuration software.