Features

The Wireless Q120PPB Pendant station is a compact, industrial, battery-powered operator interface device that can be used to wirelessly transmit two discrete inputs to a wireless controller/gateway. These inputs provide for remote control and local LED indication. All configuration is done through internal DIP switches or through the Banner DX80 Performance Configuration Software.

Benefits



- Powerful operator interface device to deliver factory automation and IIoT solutions for many applications including but not limited to:
  - Call for parts, service, or pallet pickup
  - Remote door control
  - AGV control
  - Motor jog control
  - Perimeter gate control, etc.
- Easy-to-use rugged device that can be handheld or mounted to equipment
- Two independent normally open operators for monitoring or control
- Local LED indication can be linked to operator status or to other wireless inputs within the network
- Battery powered for "peel and stick" functionality with a two-year battery life capability
- **Eliminate control wires**—The Sure Cross wireless system is a radio frequency network with integrated I/O that removes the need for power and control wires
- **Reduce complexity**—Machine or process reconfiguration made easier; great for retrofit applications
- **Deploy easily**—Simplify installation on existing equipment enables deployment in remote and hard-to-access locations where implementing a wired solution would be difficult, impractical, or not cost-effective
- Selectable transmit power levels of 250 mW or 500 mW for 900 MHz models and 65 mW for 2.4 GHz models
- DIP switches for user configuration
- Frequency Hopping Spread Spectrum (FHSS) technology ensures reliable data delivery
- Transceivers provide bidirectional communication between the Gateway and Node, including fully acknowledged data transmission
- Diagnostics allow user-defined output settings in the unlikely event of a lost radio signal

Models

Model	ISM Radio	Operator Input 1	Operator Input 2
DX80N9Q120PPB11	900 MHz	Flush button	Flush Button

All other Q120PPB models are discontinued but are covered by the information in this document.

The Wireless Q120PPB Pendant has two operator inputs and one four-color LED indicator light output. Flush button and extended button operators are 22 mm normally open (N.O.) momentary buttons. The contact blocks and actuator come pre-wired. The operator options selected come separately unassembled and can be installed per user preference. A package of five (5) button color inserts are included with each model, allowing for customer customization.

Legend frames and blank plates are included for two positions.

The mushroom head operators are available only in yellow 40 mm and are not intended for safety emergency stop applications. When a mushroom head, two-position selector, or two-position key switch type is ordered, the operator is provided in a separate bag. The existing operator must be exchanged by the installer based on the preferred hole location.

Storage Mode

While in **storage mode**, the device's radio does not operate to conserve the battery. To put any device into storage mode, press and hold the binding button for five seconds. The device is in storage mode when the LEDs stop blinking. To wake the device, press and hold the binding button (inside the housing on the radio board) for five seconds.

Configuration Instructions

Install the Color Inserts or Operators

To install the color inserts (color insert package included):

1. Position the color into the button opening.
2. Gently press until it clicks into place.



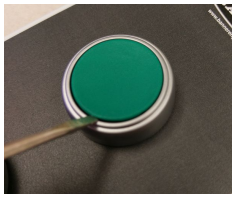
To remove a color insert, use a small, flathead screwdriver and gently pry the color insert out of the holder.

Original Instructions
06-Apr-26

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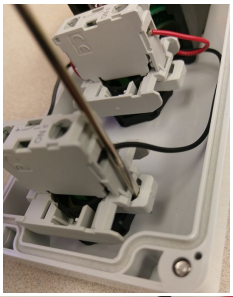
209216
p/n: 209216 Rev. K

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com



To change the operator style or position:

1. Unscrew the PPB cover from the housing.
2. On the back of the cover, use a small, flathead screwdriver to pry the contact adapter off the operator.
3. On the operator, unscrew the plastic nut retaining the operator to the PPB housing color.
4. Remove the operator.
5. Install the new operator style, orienting the operator so that the small stamped symbol is on the right side (as viewed from the back of the PPB cover).
6. Install the plastic retaining nut and hand-tighten. Ensure the operator bezel is flush to the top surface of the housing cover.
7. Install the contact adapter back onto the operator.
8. Mount the PPB cover back into the housing.

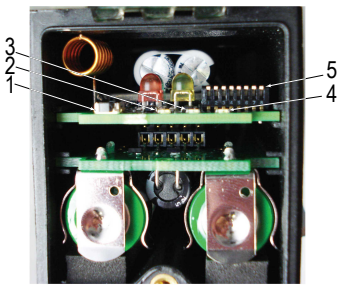




Binding Button and LED Indicators

1. Binding button
2. Red LED (flashing) indicates a radio link error with the Gateway.
3. Green LED (flashing) indicates a good radio link with the Gateway.
4. Amber LED indicates when input 1 is active.
5. DIP switches

Inside the Q45



Q120PPB DIP Switches

After making any changes to any DIP switch position, reboot the Q120 by triple-clicking the binding button, waiting a second, then double-clicking the binding button. As shown in the image above, the DIP switches are in the OFF position. To turn a DIP switch on, push the switch toward the battery pack. DIP switches are numbered from left to right

	DIP Switches							
Device Settings	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
900 MHz transmit power level: 500 mW (27 dBm)	OFF*							
900 MHz transmit power level: 250 mW (24 dBm), DX80 compatibility mode	ON							
Modbus or software configured (overrides DIP switches 3–8)		OFF*						
DIP switch configured		ON						
Both inputs 1 and 2: latch mode			OFF*	OFF*				
Both inputs 1 and 2: momentary mode			OFF	ON				
Inputs alternating interlocked mode			ON	OFF				
Reserved			ON	ON				
Standard mode					OFF*			
Operator lockout mode					ON			

Continued on page 3

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Continued from page 2

	DIP Switches							
Device Settings	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Light mode: flashing (conserves battery life)						OFF*		
Light mode: solid						ON		
Reserved							OFF*	
Reserved								OFF*

* Default configuration

Transmit Power Levels

The 900 MHz radios have a high output option that will transmit at 500 mW (27 dBm). The low output option transmits at 250 mW (24 dBm). The 250 mW mode reduces the radio's range but improves the battery life in short-range applications. For 2.4 GHz models, this DIP switch is disabled. The transmit power for 2.4 GHz is fixed at about 65 mW EIRP (18 dBm).

Modbus/Software or DIP Switch Configured

In Modbus/Software Configured mode, use the DX80 Performance Configuration Software or a Modbus command to change the device parameters. DIP switch positions 3 through 8 are ignored. In DIP Switch Configured mode, use the DIP switches to configure the parameters listed in the table.

Operator Modes

Alternating Interlocked—Both operators cannot be on or off at the same time. Alternating Interlocked and Safety-Error modes are not intended to function together; only one mode should be selected at a time.

Latch mode—If the top operator is on and the bottom operator is pushed, the bottom operator turns on and the top operator latches off. This functions the same in reverse.

Momentary mode—If you push the top operator on, the operator remains on only until it is released.

Safety-Error Mode

Safety-Error Mode prevents both operators from being on at the same time.

When both operators are off, either operator can be turned on. For example, when the top operator is on, the bottom operator will not function or affect the state of the top operator.

Alternating Interlocked Mode and Safety-Error Mode are not intended to function together; only one mode should be selected at a time.

Q120PPB Modbus Registers

I/O #	Modbus Holding Register		I/O Type	I/O Range		Holding Register Representation	
	Gateway	Any Node		Min. Value	Max. Value	Min. (Dec.)	Max. (Dec.)
1	1	1 + (Node# × 16)	Discrete IN 1 (Top Operator)	0	1	0	1
2	2	2 + (Node# × 16)	Discrete IN 2 (Bottom Operator)	0	1	0	1
		...					
7	7	7 + (Node# × 16)	Reserved				
8	8	8 + (Node# × 16)	Device Message				
9	9	9 + (Node# × 16)	Discrete OUT 1 (red light)	0	1	0	1
10	10	10 + (Node# × 16)	Discrete OUT 2 (yellow light)	0	1	0	1
11	11	11 + (Node# × 16)	Discrete OUT 3 (green light)	0	1	0	1
12	12	12 + (Node# × 16)	Discrete OUT 4 (blue light)	0	1	0	1
		...					
15	15	15 + (Node# × 16)	Control Message				
16	16	16 + (Node# × 16)	Reserved				

Bind to the Gateway and Assign the Node Address

Before beginning the binding procedure, apply power to all the devices. Separate the devices by two meters when running the binding procedure. Put only one Gateway into binding at a time to prevent binding to the wrong Gateway.

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1. On the Gateway: Enter binding mode.
    - For housed DX80 Gateways, triple-click button 2 on the Gateway. Both LEDs flash red.
    - For Gateway board modules, triple-click the button. The green and red LED flashes.
2. Assign the Q120 a Node address using the Gateway's rotary dials. Use the left rotary dial for the left digit and the right rotary dial for the right digit. For example, to assign your Q120 to Node 10, set the Gateway's left dial to 1 and the right dial to 0. Valid Node addresses are 01 through 47.
3. On the Q45: Loosen the clamp plate on the top of the Q120 and lift the cover.
4. Enter binding mode on the Q120 by triple-clicking the Q120's button.
   The red and green LEDs flash alternately and the sensor searches for a Gateway in binding mode. After the Q120 is bound, the LEDs stay solid momentarily, then they flash together four times. The Q120 exits binding mode.
5. Label the sensor with the Q120's Node address number for future reference.
6. Repeat steps 2 through 5 for as many Q120s as are needed for your network.
7. On the Gateway: After binding all Q120s, exit binding mode.
    - For housed DX80 Gateways, double-click button 2.
    - For board-level DX80 Gateways, double-click the button.

For Gateways with single-line LCDs: After binding your Q120 to the Gateway, make note of the binding code displayed under the Gateway's *DVCFG menu, XADR submenu on the LCD. Knowing the binding code prevents having to re-bind all Q120s if your Gateway is ever replaced.

Bind to a DXM and Assign the Device ID

Before beginning the binding procedure, apply power to all the devices. Separate the radios by two meters when running the binding procedure. Put only one DXM into binding mode at a time to prevent the server radio from binding to the wrong client radio.

1. On the DXM: Use the arrow keys to select the **ISM Radio** menu on the LCD and click **ENTER**.
2. Highlight the **Binding** menu and click **ENTER**.
3. Use the arrow keys to select the Device ID to bind to the client radio.

   For MultiHop server radios, use IDs (11-60) to assign to the server radio. Modbus Server IDs 01 through 10 are reserved for server devices directly connected to the host (local I/O). Polling messages addressed to these devices are not relayed over the wireless link. Modbus Server IDs 11 through 60 are used for MultiHop client, repeater, and server radios. Up to 50 devices (local servers and remote servers) may be used in this system.
4. On the Q120: Loosen the top clamp plate and lift the cover.
5. Enter binding mode by triple-clicking the binding button.
   The red and green LEDs flash alternately, and the sensor searches for a client radio in binding mode. After the radio binds, the LEDs stay solid momentarily, then they flash together four times. The radio exits binding mode.
6. Label the sensor with the Device ID for future reference.
7. On the DXM: Click **BACK** to exit binding for that specific Device ID.
8. Repeat steps 3 through 7 and change the Device ID for as many Q120s as are needed for your network.
9. On the DXM: After you have finished forming your network, click **BACK** until you reach the main menu.

Latch/Toggle for Host Systems or Scripting

For most models, use the DIP switches to set latch and toggle modes. Not all models have a DIP switch setting for Latch mode. If your model does not have those DIP switch settings, use the DX80 Performance Configuration Software to enable latch or toggle inputs.

1. Set the DIP switch to allow the DX80 Performance Configuration Software to configure the device and ignore the DIP switch settings.
2. Connect the Gateway to the computer with the software installed and launch the software.
    a. Click **Device › Connection Settings**.
    b. Select appropriate connection type (**Serial** or **TCP**).
    c. Select the correct COMM port or enter the IP Address and click **Connect**.
3. Go to **Configuration › Device Configuration**.
4. For the Node you are configuring, click **GET Node** to load all of that Node's parameter settings.
5. Click on the arrow next to the Node to expand the list of that Node's inputs and outputs.
6. For the specific input, click on the arrow next to the input number to expand those parameters.
7. Under the **Serial options** section, select **Latch** or **Toggle** or **None** (momentary) in the **Sync Counter**'s drop-down list.
8. Click **SEND Node** to send the changes to that Node's parameters to the network.

Latch

After an input is activated (set to 1) with a button press or using the messages, the input remains at 1 until cleared or alternated by writing to I/O 15. Latching prevents a successive button press from setting the input to 0.

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Toggle

The input toggles between 0 and 1 with successive button pushes or touches. Write to I/O 15 to clear the toggle or to alternate the current state of the toggle.

To change the latch/toggle register value using a host system, write the following to the Node's I/O point 15:

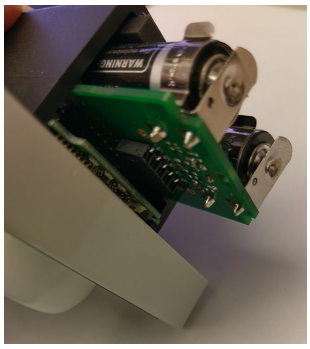
Latch/toggle register values

	Write this decimal value	
For I/O point	To clear the register value	To alternate the state of the latch/toggle register value
1	5377	5505
2	5378	5506
3	5380	5508
4	5384	5512
5	5392	5520
6	5408	5536
All Points	5439	5567

IMPORTANT: DO NOT write these values to I/O 15 if the device is used in momentary mode.

Replacing the Batteries

To replace the lithium "AA" cell battery, follow these steps. As with all batteries, these are a fire, explosion, and severe burn hazard. Do not burn or expose them to high temperatures. Do not recharge, crush, disassemble, or expose the contents to water. Properly dispose of used batteries according to local regulations by taking it to a hazardous waste collection site, an e-waste disposal center, or other facility qualified to accept lithium batteries.



1. Remove the plastic cover.
2. Slide the board containing the batteries out of the Q120 housing.
3. Remove the discharged batteries and replace with new batteries. Use two 3.6 V AA lithium batteries, such as Xeno's XL-60F or equivalent.
4. Verify the battery's positive and negative terminals align to the positive and negative terminals of the battery holder mounted within the case. Caution: There is a risk of explosion if the battery is replaced incorrectly.
5. Slide the board containing the new batteries back into the Q120 housing.

Specifications

Radio Specifications for Performance Internal Antenna

Radio Transmit Power (900 MHz, 500 mW radios)

Conducted: 27 dBm (500 mW)

EIRP with the supplied antenna: < 36 dBm

Radio Transmit Power (2.4 GHz radios)

Conducted: < 18 dBm (65 mW)

EIRP with the supplied antenna: < 20 dBm (100 mW)

Antenna Minimum Separation Distance

900 MHz radios transmitting at ≥ 500 mW: 4.57 m (15 ft) with the supplied antenna

2.4 GHz radios transmitting at 65 mW: 0.3 m (1 ft) with the supplied antenna

Radio Range

A 2 dB antenna ships with this device.

Transmit power and range are subject to many factors, including antenna gain, installation methods, characteristics of the application, and environmental conditions.

Please refer to the following documents for installation instructions and high-gain antenna options.

Installing Your Sure Cross® Radios (151514)
Conducting a Site Survey (133602)
Sure Cross® Antenna Basics (132113)

Link Timeout (Performance)

Gateway: Configurable via User Configuration Software

Node: Defined by Gateway

Spread Spectrum Technology

FHSS (Frequency Hopping Spread Spectrum)

900 MHz Compliance (SX7023EXT Radio Module)

Radio module is indicated by the product label marking

Contains FCC ID: UE3SX7023EXT

Contains IC: 7044A-SX7023EXT

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2.4 GHz Compliance (SX243 Radio Module)

Radio module is indicated by the product label marking

Contains FCC ID: UE3SX243
Radio Equipment Directive (RED) 2014/53/EU
Contains IC: 7044A-SX243

FCC Part 15 Class A for Intentional Radiators

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

(Part 15.21) Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Industry Canada Statement for Intentional Radiators

This device contains licence-exempt transmitters(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil contient des émetteurs/récepteurs exemptés de licence conformes à la norme Innovation, Sciences, et Développement économique Canada. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage.
2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Q120PPB Specifications

Construction

Molded plastic, polycarbonate housing, o-ring sealed gray cover, PC Bayer plastic indicator dome, stainless steel hardware.

Indicators

Red-yellow-green-blue colors configurable in the register

Default Sensing Interval

62.5 milliseconds

Report Rate

On Change of State

Operating Conditions

–25 °C to +70 °C (–13 °F to +158 °F)

90% at +50 °C maximum relative humidity (non-condensing)

Typical Battery Life

Up to 2 years

A typical battery life assumes an average of 20 seconds between sensor changes of state and the default 62.5 millisecond sample rate. Battery life is reduced to 1 year with an average of 2 seconds between changes of state.

Battery life with light continuously flashing: 2 months

Battery life with light continuously solid: 1.5 weeks

Button Input

Sample Rate: 62.5 milliseconds
Report Rate: On Change of State
ON Condition: Button pressed
OFF Condition: Button not pressed

Environmental Rating

IP65

Certifications

CE/UKCA approval only applies to 2.4 GHz models

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Blenheim Court
Wickford, Essex SS11 8YT
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03737-22-04042

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Agência Nacional de Telecomunicações

Accessories

Replacement Batteries (AA Cells)

BWA-BATT-006

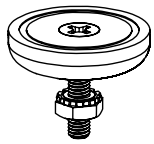
- 3.6 V Lithium AA cell
- Two batteries



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Mounting Brackets

BWA-BK-020
- Includes two 80-lb pull rare-earth magnet mounts and two #10-32 × 1 inch screw mounts
- Used on multiple mounting brackets
- 31.75 mm (1.25 inch) diameter
- CAD Files: DXF, PDF, IGS, STP



Warnings (Internal Antenna Models)

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.** Consult with Banner Engineering Corp. if the destination country is not on this list.

IMPORTANT: Please download the complete Wireless Q120PPB Pendant technical documentation, available in multiple languages, from www.bannerengineering.com for details on the proper use, applications, Warnings, and installation instructions of this device.

IMPORTANT: Por favor descargue desde www.bannerengineering.com toda la documentación técnica de los Wireless Q120PPB Pendant, disponibles en múltiples idiomas, para detalles del uso adecuado, aplicaciones, advertencias, y las instrucciones de instalación de estos dispositivos.

IMPORTANT: Veuillez télécharger la documentation technique complète des Wireless Q120PPB Pendant sur notre site www.bannerengineering.com pour les détails sur leur utilisation correcte, les applications, les notes de sécurité et les instructions de montage.

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:
- **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.

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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For patent information, see www.bannerengineering.com/patents.

Notas Adicionales (con Antena)

Información México: La operación de este equipo está sujeta a las siguientes dos condiciones: 1) es posible que este equipo o dispositivo no cause interferencia perjudicial y 2) este equipo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

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Approved Antennas

BWA-9O2-C--Antena, Omni 902-928 MHz, 2 dBd, junta de caucho, RP-SMA Macho
BWA-9O5-C--Antena, Omni 902-928 MHz, 5 dBd, junta de caucho, RP-SMA Macho
BWA-9O6-A--Antena, Omni 902-928 MHz, 6 dBd, fibra de vidrio, 1800mm, N Hembra
BWA-9Y10-A--Antena, Yagi, 900 MHz, 10 dBd, N Hembra

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Mexican Importer

Banner Engineering de Mèxico, S. de R.L. de C.V. | David Alfaro Siqueiros 103 Piso 2 Valle oriente | San Pedro Garza Garcia Nuevo Leòn, C. P. 66269

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