Q120BL Wireless Node with 6 Buttons and a Light

Features

Sure Cross® Wireless Q120 Nodes use the reliable, field-proven, Sure Cross wireless architecture. Containing a radio, internal battery supply, and optional 10 to 30 V DC power terminals, this product line is truly plug and play.

The Wireless Q120BL Node is a wireless Node with six independently controlled push button inputs and six sets of LED indicator lights. The push buttons can be configured with DIP switches for either toggle or momentary operation; the red and green LED indicator light outputs can be configured for solid or flashing operation.



Benefits

- Powerful device to deliver factory automation and IIoT solutions for many applications including but not limited to:
  - Call for parts, service, or pallet pickup
  - Door/gate control
  - AGV control
  - Motor jog control
  - Forklift door control
- **Deploy easily**—Battery-powered for "Peel and Stick" installation on existing equipment, with large lithium "D" cell for up to 3.5 years of battery life.
- **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 and enables deployment in remote and hard-to-access locations.
- **Reduce complexity**—Machine or process reconfiguration made easier; great for retrofit applications
- Easy-to-use rugged device that can be handheld or mounted to equipment
- Six normally open (NO) push buttons for control of remote devices or system acknowledgment
- Local red and green LED indicators can be linked to button presses or to other wireless inputs within the network
- Transceivers provide bidirectional communication between the Gateway and Node, including fully acknowledged data transmission
- DIP switches are available for easy user configuration

Models

Model	Frequency	Inputs and Outputs
DX80N9Q120BL-RG	900 MHz ISM Radio	Inputs: Six push buttons Outputs: Six LED indicator lights
DX80N2Q120BL-RG NB (battery not included)	2.4 GHz ISM Radio	

The following models are no longer available for order, but are still covered by the information in this document.

Model	Frequency	Inputs and Outputs
DX80N9Q120BL-RG NB (battery not included)	900 MHz ISM Radio	Inputs: Six push buttons Outputs: Six LED indicator lights
DX80N2Q120BL-RG	2.4 GHz ISM Radio	

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.

Original Instructions
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p/n: 194864 Rev. J

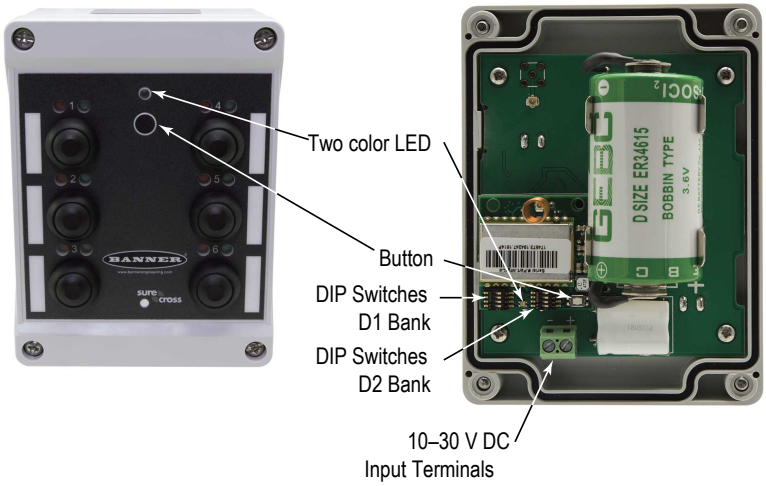
ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

Configuration Instructions

Q120BL Button and LEDs

A flashing green LED indicates a good radio link with the Gateway. A flashing red LED indicates a radio link error with the Gateway.

Buttons, LEDs, and DIP switch locations



Q120BL DIP Switches

Description	D1 Bank			
	1	2	3	4
Transmit power: 500 mW (default position)	OFF*			
Transmit power: 250 mW (compatible with 150 mW radios)	ON			
Reserved (default position)		OFF*	OFF*	OFF*
Ignore DIP switch settings		ON	OFF	OFF

Description	D2 Bank			
	1	2	3	4
Low-Speed Mode (Battery-powered) (default position)	OFF*			
High-Speed Mode (10-30 V DC powered)	ON			
Button mode: toggle (default position)		OFF*		
Button mode: momentary		ON		
Reserved (keep in OFF position) (default position)			OFF*	OFF*

After making any changes to any DIP switch position, reboot the Q120 by triple-clicking the button, waiting a second, then double-clicking the button.

Wiring the Q120BL for DC Power

The Q120 has terminal connections to operate from 10 to 30 V DC power. Connect the power wires through the housing to the terminals shown in "Q120BL Button and LEDs" on page 2. The battery can be removed to operate only from 10 to 30 V DC power or the battery can provide battery backup power.

The Q120 can be put into high speed mode when using 10 to 30 V DC. This will allow for LED indicators to run up to 16 times faster than a battery-powered Node. Operating in high speed mode with battery power significantly reduces the battery life.

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.

1. On the Gateway: Enter binding mode.
    - For housed DX80 Gateways, triple-click button 2 on the Gateway. Both LEDs flash red.

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- 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.

Q120BL 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	0	1	0	1
2	2	2 + (Node# × 16)	Discrete IN 2	0	1	0	1
3	3	3 + (Node# × 16)	Discrete IN 3	0	1	0	1
4	4	4 + (Node# × 16)	Discrete IN 4	0	1	0	1
5	5	5 + (Node# × 16)	Discrete IN 5	0	1	0	1
6	6	6 + (Node# × 16)	Discrete IN 6	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	0	65535	0	65535
10	10	10 + (Node# × 16)	Discrete OUT 2	0	65535	0	65535
11	11	11 + (Node# × 16)	Discrete OUT 3	0	65535	0	65535
12	12	12 + (Node# × 16)	Discrete OUT 4	0	65535	0	65535
13	13	13 + (Node# × 16)	Discrete OUT 5	0	65535	0	65535
14	14	14 + (Node# × 16)	Discrete OUT 6	0	65535	0	65535
15	15	15 + (Node# × 16)	Control Message				
16	16	16 + (Node# × 16)	Reserved				

Set the appropriate discrete output to the following values to control the LED. Values not listed are reserved for future support.

Discrete OUT Holding Register Value	LED Operation
0	LED Off
1	Green LED flashes
2	Green LED on
5	Red LED flashes
6	Red LED on

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**).

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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.

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.

Installation Instructions

Watertight Glands and NPT Ports

To make glands and plugs watertight, use PTFE tape and follow these steps.

1. Wrap four to eight passes of polytetrafluoroethylene (PTFE) tape around the threads as close as possible to the hexagonal body of the gland.
2. Manually thread the gland into the housing hole. Never apply more than 5 in-lbf of torque to the gland or its cable clamp nut. [1]

Watertight glands wrapped in PTFE tape



Seal any unused access holes with one of the supplied plastic plugs. To install a watertight plug:

1. Wrap four to eight passes of PTFE tape around the plug’s threads, as close as possible to the flanged surface.
2. Carefully thread the plastic plug into the vacant hole in the housing and tighten using a slotting screwdriver. Never apply more than 10 in-lbf torque to the plastic plug.

If your device has an unused NPT port, install a watertight NPT plug:

1. Wrap 12 to 16 passes of PTFE tape evenly across the length of the threads.
2. Manually thread the plug into the housing port until reaching some resistance.
3. Using a crescent wrench, turn the plug until all the plug’s threads are engaged by the housing port or until the resistance doubles. Do not over-tighten as this will damage the device. These threads are tapered and will create a waterproof seal without over-tightening.

[1] This is equivalent to the torque generated without using tools. If a wrench is used, apply only very light pressure. Torquing these fittings excessively damages the device.

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Replace the Q120BL Battery

To replace the lithium "D" 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. Unscrew the four corner screws and open the box.
2. Remove the discharged battery and replace with a new battery.
   Use a 3.6 V D cell lithium battery, such as Xeno's XL-205 or equivalent.
3. 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.
4. Reassemble the box and tighten the four corner screws.

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

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.

Q120BL Specifications

Button Input

Sample Rate: 62.5 milliseconds

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

Typical Battery Life

Up to 3.5 years, typical

A typical battery life assumes an average of 60 seconds between sensor changes of state and the default 62.5 millisecond sample rate.

Battery life with LEDs on or flashing:

One green LED flashing: 3.25 years
One green LED on: 1.75 years
All green LEDs flashing: 3 years
All green LEDs on: 1.25 years
One red LED flashing: 3.25 years
One red LED on: 1.25 years
All red LEDs flashing: 2.25 years
All red LEDs on: 0.5 years

Supply Voltage

3.6 V DC (internal battery) or 10 V DC to 30 V DC (Outside the USA: 12 V DC to 24 V DC, ± 10%)

Operating Conditions

–40 °C to +70 °C (–40 °F to +158 °F)
90% at +50 °C maximum relative humidity (non-condensing)

Environmental Rating

IP67; NEMA 6

Indicators

Red and green LEDs (radio function)

Construction

Polycarbonate housing; polyester labels; EDPM rubber cover gasket; nylon buttons
Weight: 0.39 kg (0.85 lbs)
Maximum Tightening Torque: 0.56 N·m (5 lbf·in)

Certifications

ANATEL
Agência Nacional de Telecomunicações
03737-22-04042

ANATEL

Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados. Para maiores informações, consulte o site da ANATEL www.gov.br/anatel/pt-br/

ANATEL
Agência Nacional de Telecomunicações

Accessories

Replacement Batteries

BWA-BATT-011 • 3.6 V Lithium D cell for non-hazardous locations only • 19000 mAH • One battery	

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 Q120BL Node 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 Q120BL Node, 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 Q120BL Node 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.

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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

Mexican Importer

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