Q45U Wireless Sensor Node (Universal 1-Wire Serial)

Features

Sure Cross® Wireless Q45 Sensors combine the best of Banner's flexible sensor family with its reliable, field-proven, Sure Cross wireless architecture to solve new classes of applications limited only by the user's imagination. Containing a variety of sensor models, a radio, and an internal battery supply, this product line is truly plug-and-play.

The Sure Cross Universal 1-Wire Serial Sensor is designed to read the primary inputs of devices in the 1-Wire Serial Sensor family. The Wireless Q45 Universal 1-Wire Serial Sensor Node:

- Reads the 1-Wire Serial Interface sensor
- Determines an efficient power setting
- Includes a red/green/yellow/blue LED to provide local visual indication

Models

Models	Radio Frequency	Description
DX80N9Q45U	900 MHz ISM Band	Must be paired with a 1-Wire Serial interface sensor (sold separately) Supported 1-Wire Serial Interface sensors include but are not limited to: M12FT4Q, M12FTH4Q, QM30VT1, K50UX1ARA, and K50UX1CRA
DX80N2Q45U	2.4 GHz ISM Band	

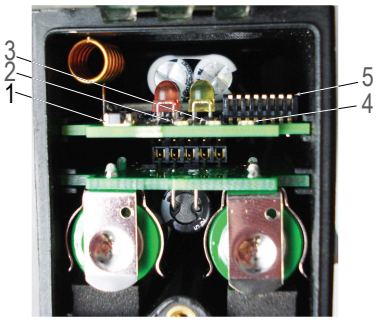
General Operation

For the first 15 minutes after power up, the Node samples the sensor every two seconds (fast sample mode). After 15 minutes, the Node defaults to 5-minute sample intervals. Activate fast sample mode by single-clicking the button (the amber LED is solid).

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.

Button and LEDs



1. 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 is not used.
5. DIP switches

DIP Switches

After making any changes to any DIP switch position, reboot the Wireless Q45 Sensor by triple-clicking the button, waiting a second, then double-clicking the button. By default, the DIP switches are in the OFF position. To turn a DIP switch on, push the switch toward the battery pack. DIP switches one through four are numbered from left to right.

Original Instructions
11-Oct-24

191760
p/n: 191760 Rev. I

Description	DIP Switches							
	1	2	3	4	5	6	7	8
Transmit power: 500 mW (default)	OFF *							
Transmit power: 250 mW (compatible with 150 mW radios)	ON							
Reserved (default)		OFF *	OFF *	OFF *				
Sample/Report Rate: User configured (5 minutes by default)					OFF *	OFF *		
Sample/Report Rate: 16 seconds					OFF	ON		
Sample/Report Rate: 64 seconds					ON	OFF		
Sample/Report Rate: Sample on Demand					ON	ON		
Reserved (keep in OFF position) (default)							OFF *	
Light mode: flash (recommended to conserve the battery) (default)[1]								OFF *
Light mode: solid								ON

Apply Power to the Q45 AA-Cell Models

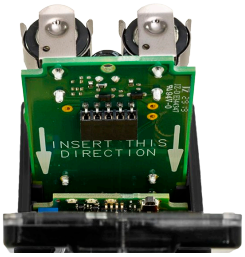
Follow these instructions to install or replace the lithium "AA" cell batteries.

CAUTION:

- **As with all batteries, these are fire, explosion, and severe burn hazards. There is a risk of explosion if the battery is replaced incorrectly.**
- Do not burn or expose them to high temperatures. Do not recharge, crush, disassemble, or expose the contents to water.
- Verify the battery's positive and negative terminals align to the positive and negative terminals of the battery holder mounted within the case.
- Properly dispose of used batteries according to local regulations by taking them to a hazardous waste collection site, an e-waste disposal center, or another facility qualified to accept lithium batteries.

1. Loosen the clamp plate with a small Phillips screwdriver and lift the cover.
2. Slide the battery board out of the Q45 housing.
3. If applicable, remove the discharged batteries.
4. Install the new batteries.
   Use Banner's **BWA-BATT-006** replacement batteries or equivalent 3.6 V AA lithium batteries, such as Xeno's XL-60F.
5. Verify the battery's positive and negative terminals align to the positive and negative terminals of the battery holder mounted within the case.
6. Slide the board containing the new batteries back into the Q45 housing.
7. Close the cover and gently tighten the clamp plate with the small Phillips screwdriver.

Q45 battery board



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.
   - For Gateway board modules, triple-click the button. The green and red LED flashes.
2. Assign the Q45 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 Q45 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 Q45 and lift the cover.
4. Enter binding mode on the Q45 by triple-clicking the Q45's button.
   The red and green LEDs flash alternately and the sensor searches for a Gateway in binding mode. After the Q45 is bound, the LEDs stay solid momentarily, then they flash together four times. The Q45 exits binding mode.
5. Label the sensor with the Q45's Node address number for future reference.
6. Repeat steps 2 through 5 for as many Q45s as are needed for your network.
7. On the Gateway: After binding all Q45s, exit binding mode.

(1)
The light consumes most of the sensor's power. If the light remains off most of the time, the batteries will last much longer. In flashing mode, the light can be on for up to one year on a pair of batteries.

- 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 Q45 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 Q45s if your Gateway is ever replaced.

Q45U Modbus Register Table

I/O #	Modbus Holding Register		I/O Type *	I/O Range		Holding Register Representation	
	Gateway	Any Node		Min.	Max.	Min.	Max.
1	1	1 + (Node# × 16)	1-Wire Serial Sensor Primary Input 1				
2	2	2 + (Node# × 16)	1-Wire Serial Sensor Primary Input 2				
3	3	3 + (Node# × 16)	1-Wire Serial Sensor Primary Input 3				
4	4	4 + (Node# × 16)	1-Wire Serial Sensor Primary Input 4				
5	5	5 + (Node# × 16)	1-Wire Serial Sensor Primary Input 5				
6	6	6 + (Node# × 16)	1-Wire Serial Sensor Primary Input 6				
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				

* These are the default data types that output from the 1-Wire Serial Interface sensor, corresponding to inputs 1 through 6 of the Q45 Node. Refer to the datasheet of the 1-Wire Serial Interface sensor for information about the register function.

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.

Q45U Universal 1-Wire Specifications

Typical Battery Life
See chart

Default Sensing Interval
5 minutes

Connection
One 5-pin M12 female quick-disconnect connector

Construction
Molded reinforced thermoplastic polyester housing, oring-sealed transparent Lexan® cover, molded acrylic lenses, and stainless steel hardware. Designed to withstand 1200 psi washdown.

Indicators
Red and green LEDs (radio function)

Certifications
CE/UKCA approval only applies to 2.4 GHz models

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1831 Diegem, BELGIUM

Turck Banner LTD Blenheim House
Blenheim Court
Wickford, Essex SS11 8YT
GREAT BRITAIN

ANATEL
Agência Nacional de Telecomunicações
03737-22-04042

ANATEL

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Agência Nacional de Telecomunicações

Environmental Specifications for the Q45

Operating Conditions
–40 °C to +70 °C (–40 °F to +158 °F); 90% at +50 °C maximum relative humidity (non-condensing)
Radiated Immunity: 10 V/m (EN 61000-4-3)

Environmental Rating
NEMA 6P
IP67

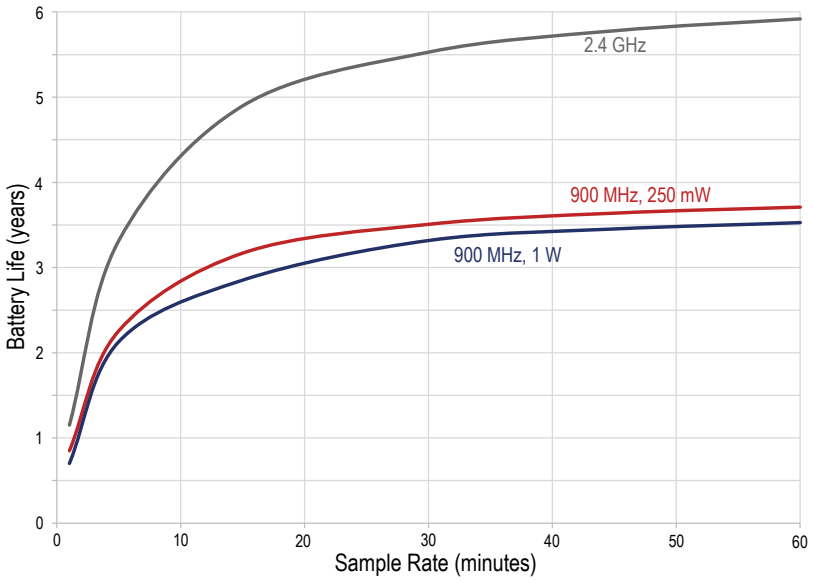
Operating the devices at the maximum operating conditions for extended periods can shorten the life of the device.

Battery Life for a Q45VA or Q45VT/Q45U Node with 1-Wire Serial Sensor

This is the battery life curve for the following models:

- Q45VT or Q45U 1-Wire Serial Interface Node connected to a 1-wire serial sensor (such as a VT1 Vibration/Temperature sensor)
- Q45VTP Node

Battery life for the Q45VA, VT, and U Nodes



Accessories

Replacement Batteries (AA Cells)

BWA-BATT-006
- 3.6 V Lithium AA cell
- Two batteries

Sensors with a Serial Interface

The following sensors are designed to be used with any of the 1-Wire Serial Interface Nodes.

K50UX1ARA U-GAGE Ultrasonic Sensor
- 1-wire serial interface
- Range: 100 mm to 1 m (3.94 in to 39.4 in)
- Datasheet: 191599

K50UX1CRA U-GAGE Ultrasonic Sensor
- 1-wire serial interface
- Range: 300 mm to 3 m (11.8 in to 118 in)
- Datasheet: 191599

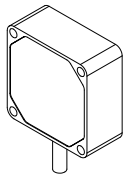
M12FTH4Q Temperature and Humidity Sensor
- ±2% Accuracy, 1-wire serial interface
- (Requires a 5-pin threaded M12 double-ended cordset less than 3 meters long, such as model DEE2R-5*x*D.)
- Datasheet: 162669

M12FT4Q Temperature Sensor
- 1-wire serial interface
- (Requires a 5-pin threaded M12 double-ended cordset less than 3 meters long, such as model DEE2R-5*x*D.)
- Datasheet: 162669

QM30VT1 Vibration and Temperature Sensor
- Aluminum housing
- 2.09 m (6.85 ft) cable with a 5-pin M12 male quick disconnect (QD)
- Datasheet: 212568

QM30VT1-QP Vibration and Temperature Sensor
- Aluminum housing
- 150 mm (6 in) cable with a 5-pin M12 male quick disconnect (QD)
- Datasheet: 212568

QM30VT1-SS Vibration and Temperature Sensor
- Stainless steel housing
- 2.09 m (6.85 ft) cable with a 5-pin M12 male quick disconnect (QD)
- Datasheet: 212568



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 Q45U Universal 1-Wire 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 Q45U Universal 1-Wire 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 Q45U Universal 1-Wire 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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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.

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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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