Vibration and Predictive Maintenance Solutions Guide (MultiHop)

Overview

The MultiHop version of the Vibration Solutions Kit provides visual status of up to 40 Banner vibration and temperature sensors that are wirelessly linked to the included DXM Wireless Controller. The added benefits of a MultiHop style Solutions Kit include longer range capabilities by using repeater radios, wiring multiple sensors to a single radio, and more vibration information available per sensor for advanced applications.

The program takes a data sample every five minutes from the vibration sensors and the software uses the raw data to detect whether an asset is running, create a baseline of the four vibration characteristics (RMS Velocity 10-1000 Hz on Z and X axis and RMS High-Frequency Acceleration 1000-4000 Hz on Z and X axis), and generate warning and alarm thresholds for those characteristics. Only data from an operational asset is used to create the baselines or thresholds and only that data is used to trigger warnings or alarms. Data from assets that are not running/operational appear on the graphs but are not used in the analysis.

RMS Velocity identifies asset imbalance, misalignment, looseness, and other low-frequency machine issues.

RMS High-Frequency Acceleration is used to indicate early bearing wear issues.

Hardware

Solutions Kit Model	Radio Frequency	Units of Measure	Contents
SolutionsKit9-Vibe-MH	900 MHz	Imperial	10" Banner Touch Screen HMI with Ethernet connection DXM700-B1R2 or DXM700-B1R4 Wireless Controller 5-port Ethernet switch 14" x 12" Polycarbonate enclosure , DIN rails, and terminal blocks M12 power input connector
SolutionsKit9-Vibemetric-MH	900 MHz	Metric	
SolutionsKit2-Vibe-MH	2.4 GHz	Imperial	
SolutionsKit2-Vibemetric-MH	2.4 GHz	Metric	

This kit also requires a 24 V DC Class 2 (UL) or a Limited Power Source (LPS) (CE) power supply that is sold separately. Banner recommends model **PSW-24-1** (FCC/CE) or model **PSD-24-4** (FCC/CE) if you are powering additional indicator lights.

Getting Started

1. Connect and plug in the 24 V DC Class 2 or LPS power supply to the Solutions Kit to apply power to the radios.
2. Assign sensor Modbus IDs (see).
3. Bind the radios to the kit (see).
4. Perform a site survey to confirm your signal quality (see).
5. After a radio is bound with a sensor attached, the system begins sampling data to create a baseline for that sensor.

HMI Home Screen

Status icons represent groups of 10 assets for a total of 40 motors. Each icon is a color-coded indication of the status of vibration warnings (yellow) or alarms (red), temperature warnings or alarms, wireless connection status (green), or out of sync (orange) within that group.

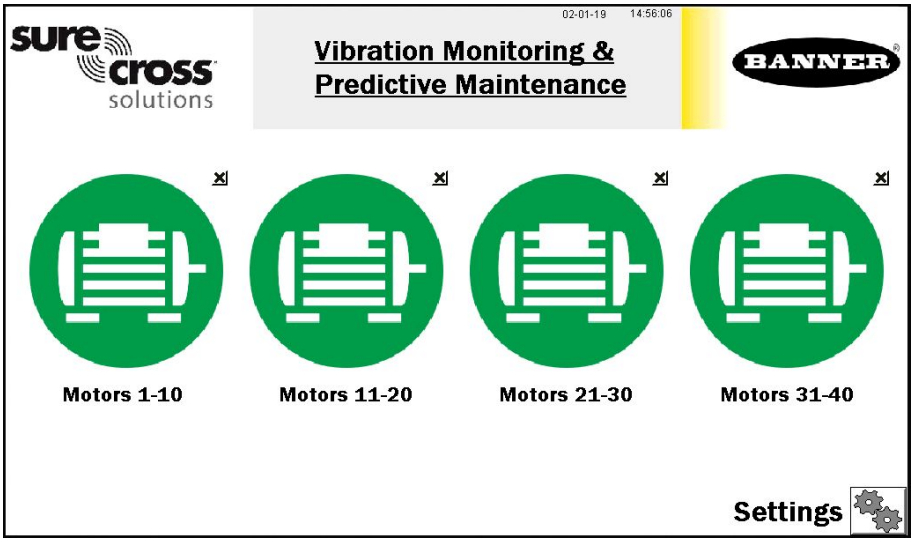
The icon acts as a touch button that brings up the 10 individual icons that represent that assets' status and acts as a touch button to view that assets' screen where detailed data viewing options are available (see).

Original Instructions
10-Oct-24

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p/n: 214301 Rev. H

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com



Press **X** (in the upper right-hand corner of each icon) to hide that group of assets and prevent Node status alerts for any Nodes within that group. Press the icon that appears after pressing **X** to unhide that group for future expansion.

In this MultiHop version, all but motor #1 are hidden for program efficiency. Only unhide sensors that have been added and are in the network.

Press **Settings** to open access to radio binding, radio site survey, asset baselining, log file downloads, and other settings (see).

Touch each asset group label to re-label the icon.

Assign Modbus IDs to the Sensors

To begin configuring the sensors, each sensor must have a Modbus Sensor ID assigned to it. Modbus Sensor IDs must be between 11 and 50.

Each Modbus Sensor ID corresponds to individual sensor icon on the HMI, with ID 11 being Motor 1 and ID 50 being Motor 40. Sensor IDs don't have to be assigned in order and sensor IDs can be skipped if desired.

To assign Modbus Sensor IDs, use either the menu system or the configuration software. To use the radio's menu system, follow these steps. For VT1 sensors, use your M-H10 radio and for VT2 sensors, use one of many radio options, such as M-H, M-H2, etc.

1. Apply power to the radio and connect one sensor at a time.
2. Push button 1 until ***DVCFG** appears, then push button 2.
3. Push button 1 until **-S ADR** appears and push button 2.
4. Push button 1 and wait for the radio to read the current sensor sensor ID.
   A three-digit value appears with the current sensor ID with a blinking cursor.
5. Assign a unique Modbus Sensor ID value from 11 to 50. Use the left button to cycle the value from 0 to 9 and the right button to accept the value and move the cursor to the next digit right.
6. Push and hold button 2.
   The screen says SAVING.
7. To repeat for more sensors, unplug the sensor and plug in the next sensor and repeat steps 3 through 6 with a new device ID.
8. After you have finished, double-click button 2 to return to the main menu.
9. Connect all sensors to be attached to that radio.

To assign the Modbus Sensor IDs using the configuration software, use the Sensor Configuration Software with a computer and either the **BWA-USB1WIRE-001** cable accessory for the VT1 sensor or the **BWA-UCT-900** cable accessory for the VT2 sensor to connect the sensor to the computer.

Follow the instructions in the Sensor Configuration Software Instruction Manual (p/n 170002) to assign the sensor's Modbus ID to a value between 11 and 50.

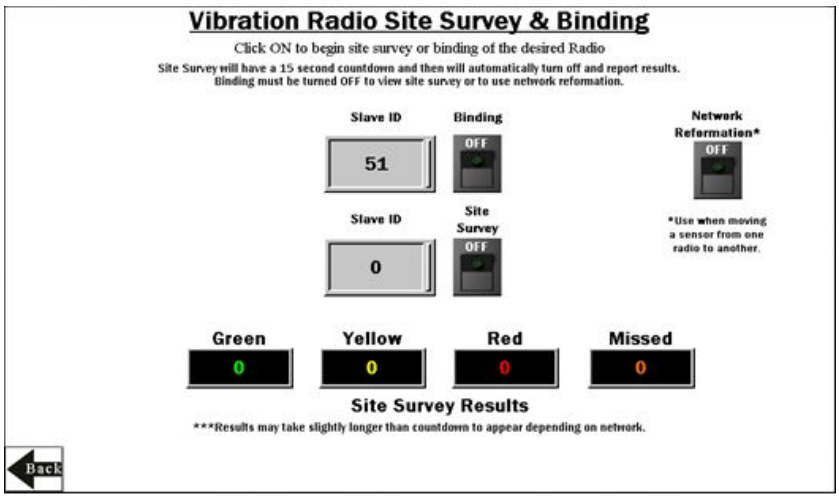
Site Survey and Binding Screen

Banner Wireless radios, such as the battery-powered H10 radio paired with VT1 Vibration and Temperature Sensors or any Banner MultiHop Radio with RS485 connected to VT2 Vibration and Temperature Sensors, must be bound to the DXM Wireless Controller inside the Solutions Kit to begin communicating.

Following the instructions below, the radios are assigned a Modbus ID and begin communicating with the DXM wirelessly. Radios and sensors are purchased separately and after they are combined, must be bound individually. A new radio and sensor can be added to the network at any time by using the binding procedure. **Radios must be bound to IDs 51 through 110.**

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Use the site survey function to measure the signal strength of radios after the solutions kit and radios are installed. Line-powered radios can be used as repeaters to improve signal connection between other nearby radios and the client radio inside the solutions kit. Battery-powered H10 radios should be configured to run only as server radios in transparent mode (DIP switches 6 and 7 ON).



Bind a Node

Follow these instructions to bind each of your radios to the DXM Controller client.

1. On the HMI screen, go to the **Settings › Site Survey & Binding** screen.
2. Enter in the Modbus ID next to the Binding rocker switch and tap that switch to turn it ON.
3. Enter binding mode on the radio.
   - If your radio has rotary dials, set the rotary dials to the same Modbus ID value entered on the HMI, then triple-click button 2 to enter binding mode.
   - If your radio does not have rotary dials, triple-click button 2.

   The Node enters binding mode. After the Node is bound, the LEDs stay solid momentarily, then they flash together four times. The radio automatically exits binding mode.
4. On the HMI, touch the same ON/OFF rocker switch to turn the switch to **OFF**.
   The DXM exits binding mode. After the DXM is out of binding mode, the radio's indicator LED flickers green when the Node is in sync with the DXM.
5. Repeat steps 1–4 for as many radios as are needed for the system.

   Note that entering binding mode causes all radios to go out of sync with the DXM until after the DXM exits binding mode. The radios will resume communicating with the DXM within a few seconds.

Network Reformation

Use the **Network Reformation** rocker switch any time a sensor is moved from one radio to another to help the network reform without requiring a reboot. The switch will turn OFF when the reformation is complete.

Perform a Site Survey

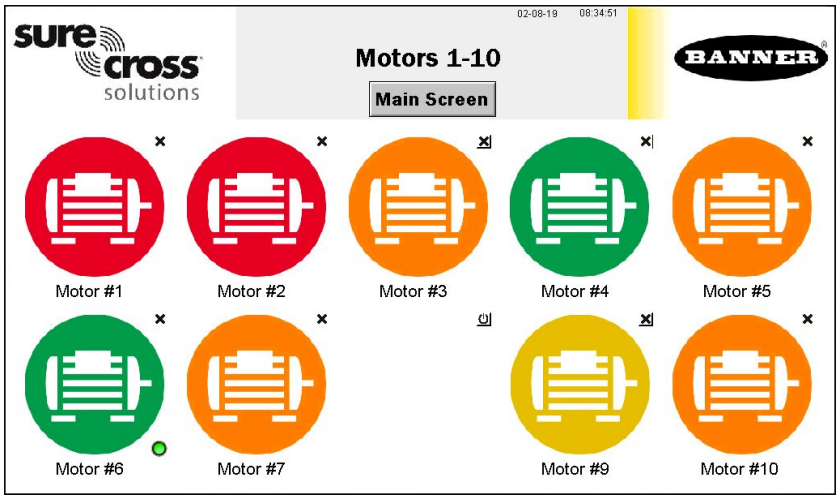
Follow these steps to perform a radio signal quality check.

1. On the HMI screen, enter in the Modbus ID of the radio (51-110) next to the Site Survey rocker switch and tap that switch to turn it ON.
   A 15-second timer appears next to the switch and counts to 15. After the timer is complete (it may take longer depending on signal quality or if the radios are going through repeaters), the results of the site survey appear in the Green, Yellow, Red, and Missed boxes. The results are shown as a percentage and add up to a total of 100.
2. Follow the interpreting section of the Conducting a Site Survey and Interpreting the Results technical note on bannerengineering.com to determine what your results mean for your application.

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Vibration Node Group Screens

Each asset group on the main page has a screen of icons, one for each sensor/radio pair. These icons represent the status of the motor with colored icons.



Touch any icon to bring up the individual sensor's screen that includes graphs, raw data, and alert descriptions (see).

Touch **X** (upper right hand corner of each icon) to hide that asset and prevent connection status alerts from that senspr/radio from appearing on the main HMI screen. Use the button that appears after pressing **X** to unhide that group for future expansion. For example, asset #8 is hidden in the sample screen.

Touch each asset label to re-label the icon. That label remains in non-volatile memory and appears on the Node's status screen, binding screen, site survey screen, and baselining screens.

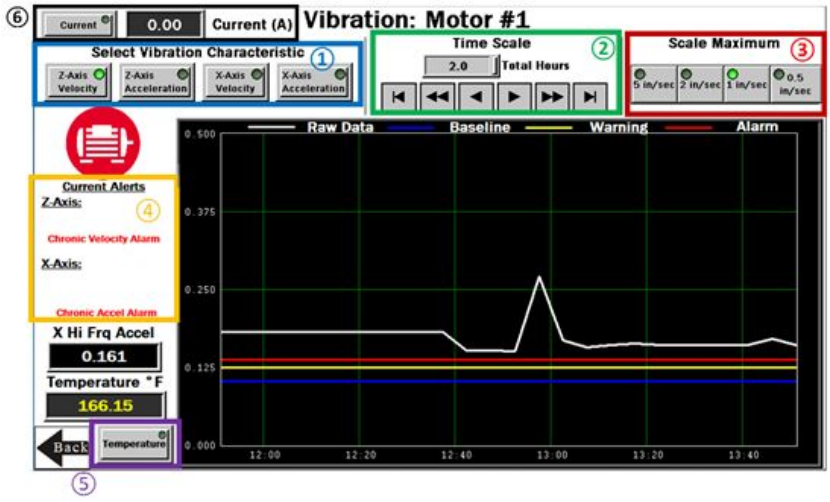
A small green lamp in the bottom right corner of a Node's icon indicates when that Node is baselining. Only temperature warnings and alarms appear during the baselining phase. After baselining is complete, the threshold levels are established and vibration alerts may begin to appear.

If a sensor appears out of sync (orange), that means the radio it is attached to is no longer in sync with the main controller. This may indicate you need to replace the battery in the radio or interference is preventing the radio from remaining in sync. After replacing the battery or improving the radio's site survey results, use the network reformation button (see).



Individual Radio (Asset) Status Screen

Select a sensor/radio icon to open that sensor/radio's status screen. Use the **Back** button to return to the previous screen.



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Select Vibration Characteristic (1)

Use **Select Vibration Characteristic** to graph raw data.

Options include: Z-Axis Velocity, Z-Axis High Frequency Acceleration, X-Axis Velocity, and X-Axis High Frequency Acceleration. The bottom left of the screen shows a real-time readout of the selected characteristic. Velocity is displayed in in/s (mm/s for Vibemetric versions) and acceleration is displayed in g. Note: Velocity values of 6.5535 and/or acceleration values of 5.355 indicate a sensor error. The system ignores these data points to avoid affecting the saved baseline or trended data. The system will not baseline when the raw data values appear as those values. Contact Banner support for troubleshooting.

Time Scale (2)

Select the **Time Scale** of the graph from 1 to 168 total hours.

Use the arrow keys to scroll right or left to see different periods of the collected data. The maximum viewable data on the HMI is 168 hours or 7 days. The graphing data loggers have a fixed number of data points. If you are using the DEMO MODE button on the Settings page, the increased sample rate reduces the number of data points available for viewing until those data points have rolled off the end of the timeline.

Scale Maximum (3)

Select the data **Scale Maximum**. For acceleration, the range is 0.25 g to 5 g (g-force). For velocity, the range is 0.5 in/s to 5 in/s (10 mm/s to 60 mm/s for metric versions).

Current Alerts (4)

The **Current Alerts** section shows any warnings or alarms based on the Axis, Vibration Characteristic, and type (Chronic or Acute) that the system is detecting.

Acute alerts are those crossing the threshold for five samples in a row (or the user setting on the Settings screen) and Chronic alerts are when a 100 point moving average crosses the thresholds. Only data from an operational asset is used to calculate averages and alerts.

Select Temperature (5)

Use **Select Temperature** to view the temperature graph over the selected time period.

Directly above the button is the current temperature in degrees Fahrenheit of the selected Node. The readout color is white if it's nominal, yellow if it's in a warning state, and red if it's in an alarm state. The warning and alarm temperature settings are 158 °F and 176 °F respectively. A raw temperature value of 327.67 indicates a sensor error. Contact Banner's technical support for troubleshooting.

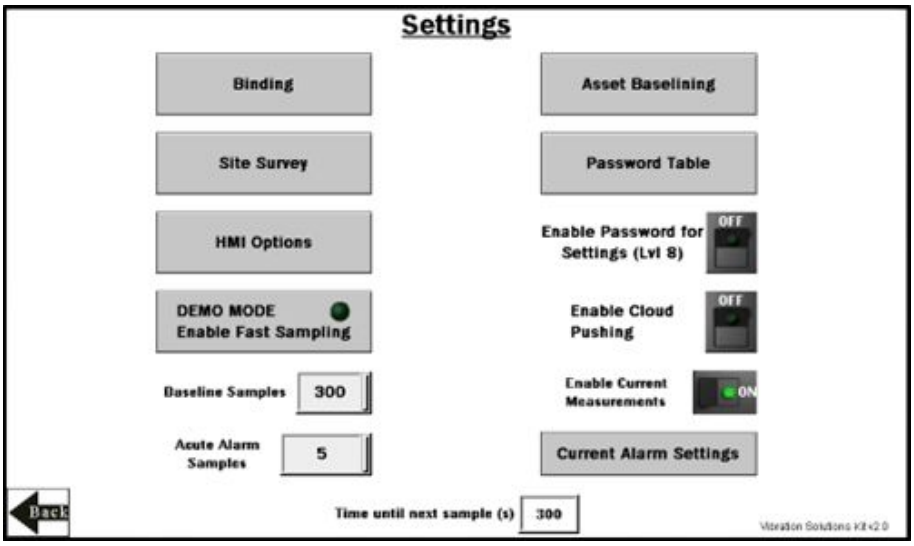
Select Current (6)

Use **Select Current** to view the current graph over the selected time period.

Directly to the right of the button is the raw current reading in Amps of the selected Node. The readout color is white if it's normal, yellow if it's in a warning state, and red if it's in an alarm state. Requires the use of the Banner CM1L Condition Monitoring VT/CT node. This option only appears if **Enable Current Measurements** is turned on within the **Settings** screen. Warning and alarm settings are set on the **Current Alarm Settings** screen within the **Settings** page.

In the upper right corner of the screen is the Sensor's Modbus ID and the radio ID to which the sensor is attached. This can be useful in finding which radio a sensor is connected to if the orange Out of Sync status icon appears. Signal quality or battery replacement may be necessary for a radio that loses connection status.

Settings Screen



Acute Alarm Samples

The default number of samples above the warning or alarm threshold before an alert is triggered is five consecutive samples. Use the numeric entry box to adjust the default value up or down.

Asset Baselining

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Sensors bound into the system automatically begin baselining. This button opens a screen to enable creation of new baselines and thresholds of each sensor Node individually, displays the remaining samples in the current baseline, and allows manual threshold limits to be set for both vibration and temperature on each sensor (see).

Baseline Samples

The Solutions Kit takes a baseline of the first 300 running samples of an asset. This can be adjusted up or down by clicking on this numeric entry box to any desired sample. Samples are taken at a fixed five-minute interval.

DEMO MODE

Use only for demonstration purposes when fast sampling is required. Demo mode enables the Teach mode on all the bound sensor Nodes, putting them into a 2 second sample rate and changing the HMI graphs to log at a 2 second sample rate for 15 minutes (status indicated by the green light within the button).

We also recommend you reduce the Baseline Samples to less than 30 for demonstration purposes. Using **Demo Mode** drains the battery faster and creates a larger log file that fills up memory quicker, so only use this mode when to demonstration the kit, not during standard operation.

Always use the stop operation safely button on the HMI Options screen before powering down and especially if powering down after using the Demo Mode button.

Enable Cloud Pushing

Turn ON/OFF the switch to enable to the DXM to begin pushing data to a cloud webserver at five-minute intervals. This requires additional set up and modification of the XML file in the DXM to point to the correct web server with the correct site ID. Cloud pushing also requires connecting the DXM to a local network via Ethernet or a separately sold cellular modem.

DO NOT set the cloud push interval in the XML file because the script triggers the push.

Enable Password for Settings (Lvl 8)

Turn ON/OFF the switch to enable/disable a password to access the settings menu. The default password for User Level 8 is “88888888”. This can be modified by clicking the Password Table button above and changing the password for level 8 to any number password up to 9 numbers long.

Enable Sensor Discovery

Use in the following situations: 1) When a sensor shows the orange "Out of Sync" icon to see if there was a signal interference issue that has since recovered; or 2) After correcting a sensor out of sync error (battery replacement, signal adjustment, etc.) to begin sampling again or when a new sensor is added to an existing radio.

The switch turns off when discovery is complete. When a sensor goes out of sync, the sensor is only checked again every four hours to keep timeouts down to a minimum.

HMI Options

Provides access to copy/manage HMI log files, HMI configuration for advanced options, functional HMI options, and an Icon Legend and Graph Legend.

Site Survey & Binding

Opens a screen to allow binding, site survey, and network reformation of each radio to the Solutions Kit (see).

Time until next sample (s)

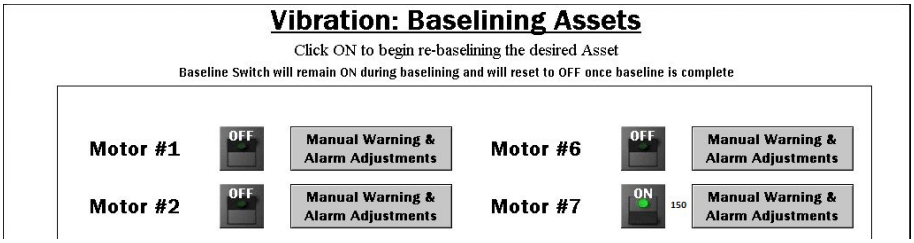
Displays the time (in seconds) until the Solutions Kit samples data from all bound sensors and updates graphs and other visual indicators.

Baseline a Sensor/Radio (Asset)

After the sensor/radio is installed and the system is powered on, the software automatically begins collecting data and determines if the asset is running.

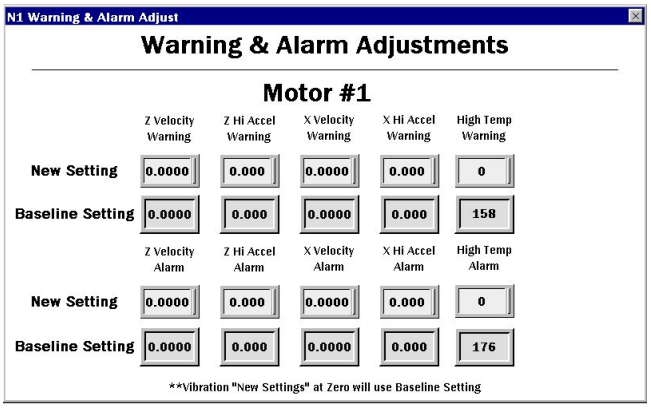
The software generates a baseline and thresholds based on the first 300 data samples or about 24 hours of asset running time (unless modified on the Settings page).

When an asset is replaced, repaired, or has heavy maintenance done, create a new baseline. If the sensor is moved after the initial baseline is calculate, generate a new baseline.



1. Turn on baselining for the appropriate Nodes if a new baseline needs to be generated.
   The initial baseline is generated any time a new sensor is connected to the system (or bound to the controller radio) and begins sending data without the need to trigger these switches. The number of baseline samples remaining displays next to the ON/OFF switch. The baseline switch remains on during baselining and resets to off after the baseline is complete.
2. Use the tabs Assets #1-10, Assets #11-20, Assets #21-30, and Assets #31-40 to access the baseline switches for the sensors/radios.
3. Use the corresponding **Manual Warning & Alarm Adjustments** button for each sensor/radio to open an individual windowed screen where current baseline threshold settings are visible.

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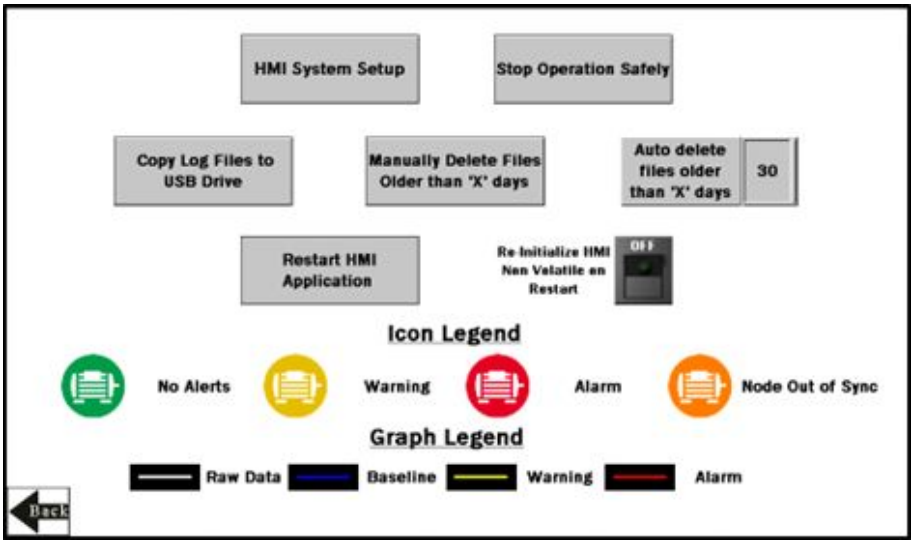


4. Touch the numeric entry box in any of the **New Settings** rows to manually enter a new value for any or all the warning or alarm thresholds, including temperature.
5. Set vibration settings back to zero to use the original baseline setting.
6. Manually set the temperature back to the baseline setting by entering 158 °F (70 °C) for warning or 176 °F (80 °C) for alarm. Temperature is not a baselined value. Although it displays a baseline value, the value is for reference if the new setting is changed.

HMI Options Menu Screen

The HMI Options screen provides some added HMI functionality along with icon and graph legends.

The HMI provides data logging of all the raw data, baselines, and thresholds. This data is saved to a file every 30 minutes and a new file is generated every day and stored in monthly folders. The HMI has storage for about 45 days of log files.



Auto Delete Files Older than 'X' Days

The HMI automatically deletes files older than the selected number of days.

is 30 days with a maximum of 45 days for MulitHop radio kits and 60 days for Performance radio kits.

Copy Log Files to USB Drive

Plug a USB drive into the back of the HMI and click here to select the log files or folders to copy.

HMI System Setup

Enters HMI Panel Setup.

Use for setting Time, Date, and Advanced Options. Entering this screen will clear any logged data from the graphs but will not clear any data saved to files.

Manually Delete Files Older than 'X' Days

Deletes files older than a specified number of days immediately.

Use this option if the HMI is warning about an inability to save data or a lack of storage space. Shortening the auto delete days parameter may be necessary.

Re-Initialize HMI Non-Volatile on Restart

Flip the switch to ON before restarting the HMI to reinitialize default settings and labels.

Restart HMI Application

Restarts the HMI application, which clears all graphed data but retains the saved logs.

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Stop Operation Safely
Stops HMI operation safely without data corruption before you power off the HMI.

Always use this button before powering down to avoid data file corruption. If a **Failed to write logged data to file** or **Failed to save** message appears, this is because of a power loss during the saving process. You must delete this file (from the day of the power loss) by using the HMI System Setup menu.

VNC Viewing on Laptop and Mobile Devices

The Solutions Kit HMI can be viewed and controlled through a VNC application on either a mobile phone, tablet, or laptop connected to the same network as the Solutions Kit. Follow the steps in the Tech Note to set up VNC remote viewing and control: View Solutions Kit Data on a Mobile Device or PC (b_4492805)

This creates continuity between the site created on the website with the DXM. If the DXM has network connection, it will upload data on its next cloud push interval.

To access a Demo version of the website, contact your local Banner distributor and follow the instructions in the technical note Connecting DXM Wireless Controller to Banner Web Services Demo Site for modified instructions on how to send data to the Demo site.

For additional advanced options using the DXM, such as sending email or SMS/text alerts, refer to the Vibration & Predictive Maintenance Solution Guide on the Banner Engineering website. NOTE: The files used in the Solutions Kit are slightly different than those used with the Solutions Guide and should NOT be installed on the DXM being used with the HMI. Use the DXM Configuration Software and perform a **Device › Get XML configuration from DXM** to make modifications to the file pre-loaded to the DXM in the Solutions Kit.

For additional information on any products, visit www.bannerengineering.com.

Optional Configuration Steps

Additional Vibration Information

The vibration solutions kit provides machine learning for baseline and alerting on RMS Velocity and High Frequency Acceleration for both the X and Z Axis. For each of these register tables, S is the sensor ID number (between 1 and 40).

However, the vibration sensor contains many additional registers of vibration information that are stored in the local registers and can be polled by any host connected to the same network or the data can be sent to the cloud.

Additional vibration local registers

Register Number	Description
6141 + S × 10	Z Axis Peak Acceleration
6142 + S × 10	X Axis Peak Acceleration
6143 + S × 10	Z Axis Peak Velocity Frequency
6144 + S × 10	X Axis Peak Velocity Frequency
6145 + S × 10	Z Axis RMS Low Frequency Acceleration
6146 + S × 10	X Axis RMS Low Frequency Acceleration
6147 + S × 10	Z Axis Kurtosis
6148 + S × 10	X Axis Kurtosis
6149 + S × 10	Z Axis Crest Factor
6150 + S × 10	X Axis Crest Factor

Spectral banding information for three bands of each axis at 1x, 2x, and 3x–10x the rotational speed of the motor is available based on a dynamic speed input. To use this feature, have a host system or read rule from a MultiHop radio with speed input place the speed in Hz into registers 6581–6620 (sensor IDs 1–40) at a rate of no more than once per hour.

The following spectral band information are available in floating point registers 1001–1960. For more information, please read the Spectral Banding Technical Note (p/n b_4510565) on the Vibration and Temperature sensor Web page. Only the default configuration of 1x, 2x, 3–10x is available on the Solutions Kit.

Spectral band floating point registers 1001–1960

Register Number	Description
1001 + S × 36	Z Axis Velocity 1x Band
1003 + S x 36	Z Axis Peak Velocity 1x Band
1005 + S × 36	Z Axis Velocity Peak Frequency 1x Band
1007 + S × 36	Z Axis Velocity 2x Band

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Register Number	Description
1009 + S x 36	Z Axis Peak Velocity 2x Band
1011 + S × 36	Z Axis Velocity Peak Frequency 2x Band
1013 + S × 36	Z Axis Velocity 3x-10x Band
1015 + S x 36	Z Axis Peak Velocity 3x-10x Band
1017 + S × 36	Z Axis Velocity Peak Frequency 3x–10x Band
1019 + S × 36	X Axis Velocity 1x Band
1021 + S x 36	X Axis Peak Velocity 1x Band
1023 + S × 36	X Axis Velocity Peak Frequency 1x Band
1025 + S × 36	X Axis Velocity 2x Band
1027 + S x 36	X Axis Peak Velocity 2x Band
1029 + S × 36	X Axis Velocity Peak Frequency 2x Band
1031 + S × 36	X Axis Velocity 3x–10x Band
1033 + S x 36	X Axis Peak Velocity 3x–10x Band
1035 + S × 36	X Axis Velocity Peak Frequency 3x–10x Band

Additional Vibration Information

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However, the vibration sensor contains many additional registers of vibration information that are stored in the local registers and can be polled by any host connected to the same network or the data can be sent to the cloud.

Additional vibration local registers

Register Number	Description
6141 + S × 10	Z Axis Peak Acceleration
6142 + S × 10	X Axis Peak Acceleration
6143 + S × 10	Z Axis Peak Velocity Frequency
6144 + S × 10	X Axis Peak Velocity Frequency
6145 + S × 10	Z Axis RMS Low Frequency Acceleration
6146 + S × 10	X Axis RMS Low Frequency Acceleration
6147 + S × 10	Z Axis Kurtosis
6148 + S × 10	X Axis Kurtosis
6149 + S × 10	Z Axis Crest Factor
6150 + S × 10	X Axis Crest Factor

Spectral banding information for three bands of each axis at 1x, 2x, and 3x–10x the rotational speed of the motor is available based on a dynamic speed input. To use this feature, have a host system or read rule from a MultiHop radio with speed input place the speed in Hz into registers 6581–6620 (sensor IDs 1–40) at a rate of no more than once per hour.

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Spectral band floating point registers 1001–1960

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1001 + S × 36	Z Axis Velocity 1x Band
1003 + S x 36	Z Axis Peak Velocity 1x Band
1005 + S × 36	Z Axis Velocity Peak Frequency 1x Band
1007 + S × 36	Z Axis Velocity 2x Band
1009 + S x 36	Z Axis Peak Velocity 2x Band
1011 + S × 36	Z Axis Velocity Peak Frequency 2x Band
1013 + S × 36	Z Axis Velocity 3x-10x Band

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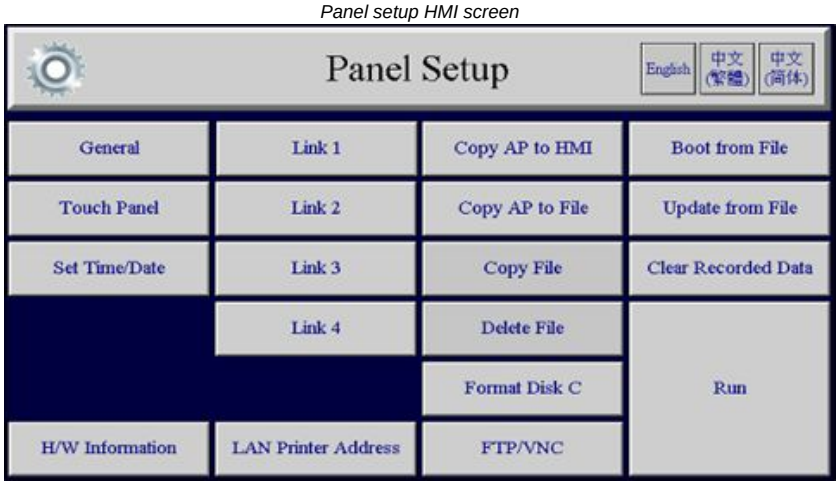
Register Number	Description
1015 + S x 36	Z Axis Peak Velocity 3x-10x Band
1017 + S × 36	Z Axis Velocity Peak Frequency 3x–10x Band
1019 + S × 36	X Axis Velocity 1x Band
1021 + S x 36	X Axis Peak Velocity 1x Band
1023 + S × 36	X Axis Velocity Peak Frequency 1x Band
1025 + S × 36	X Axis Velocity 2x Band
1027 + S x 36	X Axis Peak Velocity 2x Band
1029 + S × 36	X Axis Velocity Peak Frequency 2x Band
1031 + S × 36	X Axis Velocity 3x–10x Band
1033 + S x 36	X Axis Peak Velocity 3x–10x Band
1035 + S × 36	X Axis Velocity Peak Frequency 3x–10x Band

Connect the DXM and HMI to a Wide Area Network (WAN)

By default, the HMI and DXM Controller are configured to communicate using static IP addresses. To connect to a WAN, configure the two devices to have a new static IP address on the new network or to acquire their own IP address via DHCP.

Connecting to a WAN allows the devices to be configured by any computer on the network and allows the DXM to be configured to push data to a cloud webserver for remote monitoring.

Panel setup HMI screen



1. Open the enclosure and connect an Ethernet cable from the WAN to the Ethernet switch inside the enclosure.
2. On the DXM: With power applied to the DXM, use the arrow keys to select **System Config**. Press **Enter**.
3. Use the arrow keys to select **Ethernet**.
4. Set the IP address.
    - If you are using a static IP address, select the IP address shown and press **Enter**. Then use the arrow and **Enter** keys to set the new static IP address.
    - If you are using DHCP, press **Enter** on DHCP. Use the arrow keys to select DHCP ON and press **Enter**.

    A device reboot is requested if any changes are made to these settings.
5. If you are using DHCP, navigate to the **System Info › Ethernet** and write down the IP address to enter into the HMI. The subnet mask can be adjusted here as well if needed.
6. On the HMI: From the main screen, go to the **HMI Options** screen and choose **HMI System Setup**.
7. In the **Panel Setup** screen, select **General**.
8. On the pop-up screen that appears, set up DHCP in one of two ways:
    - Type in the IP address and network information for a static IP address by selecting the appropriate fields.
    - Toggle from false to true in the field next to **Get an IP address automatically**, then press **OK**.
9. Press **Link 1** and select the IP address field.
10. Enter in the IP address of the DXM from earlier and press **OK**.
11. Press **Run**.

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Push Information to BannerCDS

The DXM Wireless Controller can connect to the Web via Ethernet or an internal cell module. The controller pushes data from the DXM to be stored and displayed on a website.

The Banner platform for storing and monitoring the system's data is https://bannercds.com. The Banner Cloud Data Services website automatically generates dashboard content for the application that is populated onto the Dashboard. Email alerts can be configured using the Alarms screen.

To push data to the cloud, change register 844 to one (1).

For more information on creating accounts on and using the Banner Cloud Data Services (CDS) system, please refer to the Banner CDS Quick Start Guide (p/n 201126).

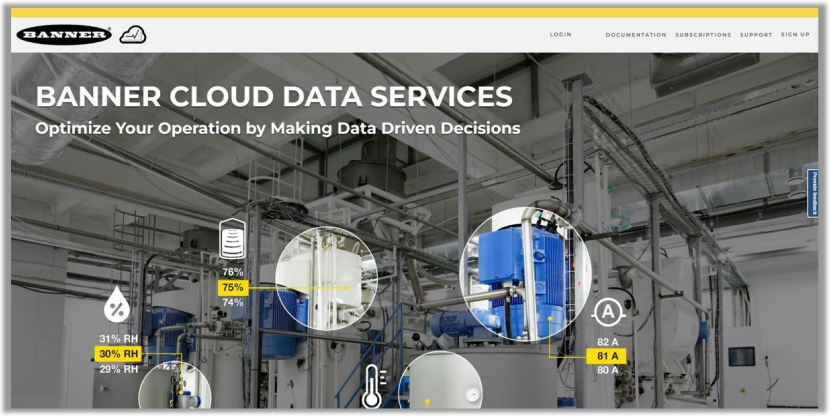
Logging into the Web Service

The web server captures data from the DXM using either a cellular connection or an Ethernet connection. Users collect and view the data or update and manage the DXM using a web browser.

Within a few minutes of your purchase, you will receive an email with your authorization code and details regarding the data subscription service. If the authorization code is not received within 10 minutes, please check your spam folder or contact Banner Engineering at 1-888-373-6767 to obtain the code.

Use both the website and the DXM Configuration Software to set up and configure your data collection. Use the latest version of your browser (Google Chrome is recommended) and enter the URL: https://bannercds.com. The login page appears.

Banner CDS home screen



Create a New Gateway

After you log into the Banner Cloud Data Services website, the **Overview** screen displays. Follow these steps to create a new monitoring site.

1. Click on **New Gateway** (top right corner of the **Overview** screen).
   Create a new Gateway for each DXM Controller that sends data to the web server.
   A **New Gateway** prompt appears.
2. Verify **Traditional** is selected for the **Gateway Type**.
3. Enter a **Gateway Name**.
4. Select the **Company** from the drop-down list.
5. Copy the **Gateway ID** number located within the prompt window to your computer's clipboard.
   The **Gateway ID** number created by the web server is a required parameter in the configuration of the DXM. The **Gateway ID** is the address the webserver uses to store the data pushed from the DXM.
6. Click **Submit** to close the prompt window.

Connect the DXM700 to the Software and Download the Existing Configuration

Follow these steps to connect your DXM to the configuration software and download the existing configuration file from your DXM to your hard drive.

1. On the computer, download the DXM Configuration Software v4 from the Banner Engineering website and install it.
2. On the DXM: Apply power to the DXM.
3. Connect the DXM Controller to the computer with a USB cable or skip if the DXM is connected to the same network as the computer.
4. On the computer: Launch the DXM Configuration Software.
5. From the **DXM Model** drop-down list, select DXM700.
6. On the menu bar, go to **Device › Connection Settings**.

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- If you are using the USB cable, select **Serial**, then select the COM port that the USB cable is plugged into. Click **Connect**. If you are unsure which COM port and multiple appear, attempt to connect to each one of them until successful.
- If you are connected to the same network as the DXM, select **TCP/IP** and enter the DXM IP address. Click **Connect**.

7. After the DXM is connected to the software, click **Device › Get XML configuration from DXM** to download the current XML file.
8. Name and save the file to the computer.

Configure the DXM to Push Information to the Cloud

1. Within the DXM Configuration Software, go to the **Settings › Cloud Services** screen.
2. Set the **Server name/IP** to push.bannercds.net.
3. Select the appropriate **Push interface** to either Cellular or Ethernet.
   - To set up Ethernet, use the **Settings › Network** screen.
   - To set up cellular, refer to the Activating a Cellular Modem (p/n 205026) technical note.
4. Leave the **Cloud push interval** and **Sample count** unchanged. The DXM script controls this to push every 5 minutes.
5. Modify the **Cloud Permissions** for the registers.

   Registers are preselected to push to the cloud. Some registers can be removed if you are not using all 40 Nodes. Additional registers can be added by going to the Local Registers tab on the left. The preselected READ registers are 1-200 for the raw Node data, 201-240 for vibration failure mask info, 281-320 for Node connection status, and 5181-5660 for baseline/threshold data. The preselected READ/WRITE registers are 321-360, which are the re-baselining registers. READ/WRITE is used so the Baseline registers can be updated from the website from a 0 to a 1 to trigger a new baseline remotely.
   - Click on each register and edit the **Cloud Permissions** at the bottom of the screen; or
   - Choose the **Modify Multiple Registers** tab at the bottom of the **Local Register** screen to edit the **Cloud Permissions** for a block of registers
6. In the Web Server section, keep the **Site ID** is drop-down selection as GUID and paste the copied ID from the webpage into the **Site ID** field.

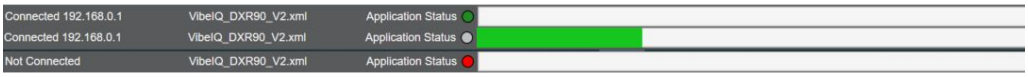
Save and Upload the Configuration File

After making any changes to the configuration, you must save the configuration files to your computer, then upload it to the device.

Changes to the XML file are not automatically saved. Save your configuration file before exiting the tool and before sending the XML file to the device to avoid losing data. If you select **DXM › Send XML Configuration to DXM** before saving the configuration file, the software will prompt you to choose between saving the file or continuing without saving the file.

1. Save the XML configuration file to your hard drive by going to the **File › Save As** menu.
2. Go to the **DXM › Send XML Configuration to DXM** menu.

Status indicator bar



- If the Application Status indicator is red, close and restart the DXM Configuration Tool, unplug and re-plug in the cable and reconnect the DXM to the software.
- If the Application Status indicator is green, the file upload is complete.
- If the Application Status indicator is gray and the green status bar is in motion, the file transfer is in progress.

After the file transfer is complete, the device reboots and begins running the new configuration.

Upload the XML Configuration File to the Website

To upload an XML configuration file to the website, follow these instructions.

1. On the BannerCDS website, select **Gateways** on the **Overview** screen.
2. On the row displaying your **Gateway**, click the **Details** under **View**.
3. Select **Edit Gateway**.
   The **Edit Gateway** prompt appears.
4. Click **Select File** under **Update XML**.
5. Select the file that was just updated to the DXM and click **Open**.
   After the XML file is loaded into the webserver, the webserver uses the register names and configurations defined in the configuration file. The same XML configuration file is now loaded on both the DXM and the Website. After some time, the data should be seen on the website.
6. To view the data from the Gateway's screen, click on the **Details** link for each **Gateway**.

   The Gateway **Details** screen lists the **Sensor** objects and default **Alarms** for that gateway. You may view the individual register information by selecting **Registers**.

Completing these steps creates continuity between the **Gateway** created on the website with the DXM used in the field. The DXM pushes data to the website, which can be viewed at any time.

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Specifications for the Vibration Solutions Kit

Supply Voltage

24 V DC (±10%) (use only with a Class 2 (UL) power supply or a Limited Power Source (LPS) (CE) power supply)

Power Consumption

9 W average; 30 W maximum

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)

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 Transmit Power

900 MHz Conducted: 27 dBm (500 mW); EIRP with the supplied antenna: < 36 dBm

2.4 GHz Conducted: < 18 dBm (65 mW); EIRP with the supplied antenna: < 20 dBm (100 mW)

Antenna Connection

Ext. Reverse Polarity SMA, 50 Ohms

Max Tightening Torque: 0.45 N·m (4 lbf·in)

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

Mounting

A mounting system that provides for various mounting options has been provided with this enclosure.

To connect the mounting brackets, turn the enclosure such that the backside is visible. Place the mounting brackets over the octagon bosses either horizontally, diagonally, or vertically, and fasten them with the ¼”-20 x 0.25” SS, countersunk Philips drive screws provided (torque limit = 30 in. lbs.). The enclosure can be mounted vertically (on a wall) or horizontally (tabletop)

Operating Conditions

HMI: 0 °C to +50 °C (+32 °F to +122 °F)

DXM: –40 °C to +85 °C (–40 °F to +185 °F)

DXM LCD: –20 °C to +80 °C (–4 °F to +176 °F)

Micro SD Card (if applicable): –25 °C to +85 °C (–13 °F to +185 °F)

90% maximum relative humidity (non-condensing)

Certifications

CE/UKCA approval only applies to 2.4 GHz models

Banner Engineering BV
Park Lane, Culliganlaan 2F bus 3
1831 Diegem, BELGIUM

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

ANATEL
Agência Nacional de Telecomunicações
03737-22-04042

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.

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

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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

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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