Temperature and Humidity Solution Kit Quick Start Guide

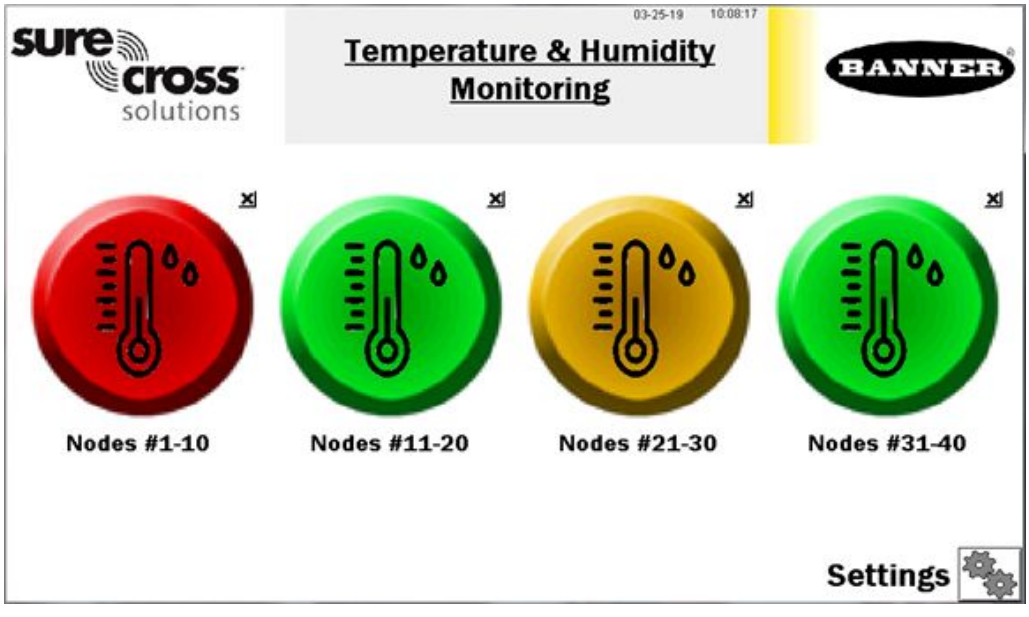
Temperature and Humidity Monitoring Solution Kit

The Temperature and Humidity Monitoring Solution Kit provides visual status of up to 40 Banner M12FTH4Q Temperature and Humidity Sensors attached to Performance Series Nodes communicating to the included DXM Wireless Controller to provide a simple and effective way of monitoring the temperature and humidity of many locations into a single centralized point.

This kit uses a unique version of the Banner Temperature and Humidity Monitoring Solutions Guide software to program the DXM Controller. The sensor Nodes take a data sample every five minutes and the software uses the raw data to compare to user-entered low or high warnings and/or alarms for visual indication of a potential problem. There is also an indication of Node communication status and calculated dew point values for each sensor Node.

Included with the Temperature and Humidity Monitoring Solutions Kit:

- 10” Banner Touch Screen HMI with Ethernet connection
- DXM700-B1R1 Wireless Controller (900MHz) or DXM700-B1R3 (2.4 GHz)
- 5-port Ethernet switch
- M12 power input connector
- 14”x12” Polycarbonate enclosure, DIN rails, and terminal blocks
- 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)



Four top-level icons represent groups of 10 assets. Each icon is a color-coded indication of the status of temperature and humidity warnings or alarms, or wireless Node connection status within that group. It is also a touch button that brings up the 10 individual icons that represent that asset’s status and is also a touch button to view that asset’s screen where detailed data viewing options are available.

Touch the “X” button 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. Use the button that appears after pressing the X to unhide that group for future expansion.

The **Settings** button opens access to Node binding, Node site survey, alarm settings, log file downloads, and many additional settings.

Each asset group label can also be touched to re-label the icon.

Original Instructions
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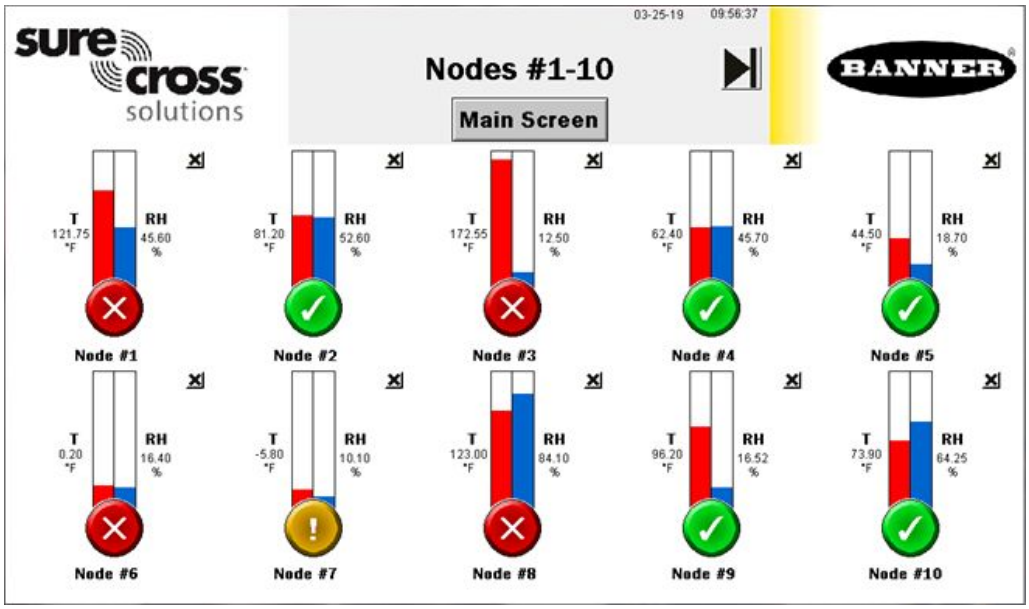
p/n: 215581 Rev. G

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

Temperature and Humidity Node Group Screens

Each asset/Node group on the main page has a screen of 10 individual icons, one for each sensor/Node. These icons use colored icons to represent the alarm status. A temperature and humidity gauge and raw sensor readings are also displayed.



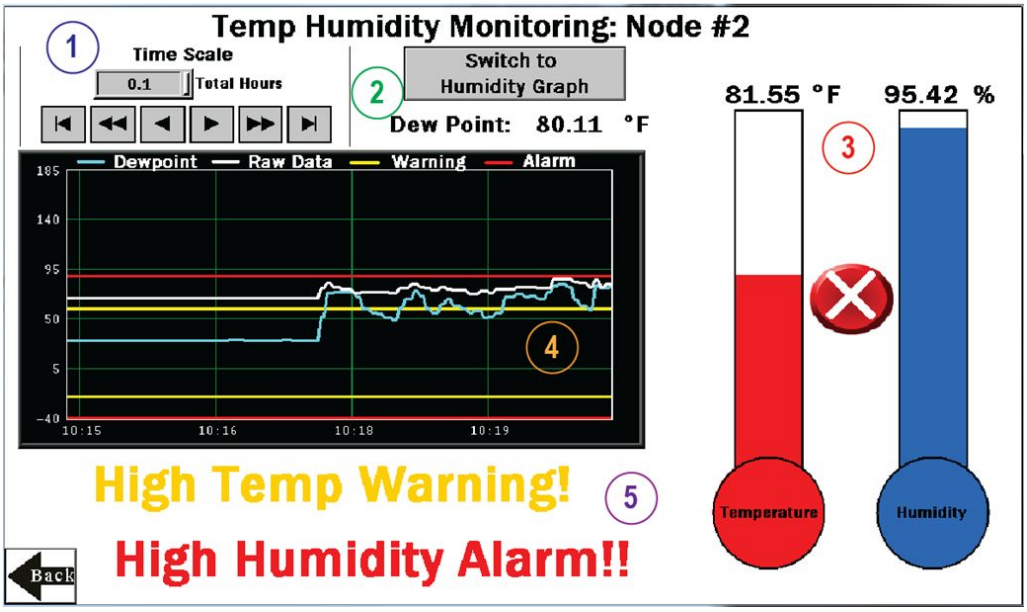
Touch any icon to bring up the individual sensor Node's screen that includes historic graphs, dew point value, and raw data.

Touch the X button in the upper right-hand corner of each icon to hide that asset and prevent Node status alerts from that Node from appearing on the main HMI screen. Use the button that appears after pressing the X button to unhide that group for future expansion.

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

Individual Node Status Screen

Selecting an individual node icon brings up that Node's status screen along with other information.



1. Select the time scale of the graph from 0.1 to 168.0 total hours. The arrow keys scroll right or left to see different periods of the collected data. Up to 168 hours or 7 days is the maximum for viewable data on the HMI.
2. This area includes the raw dew point data and a button to switch between the temperature and dew point graph to the humidity graph.

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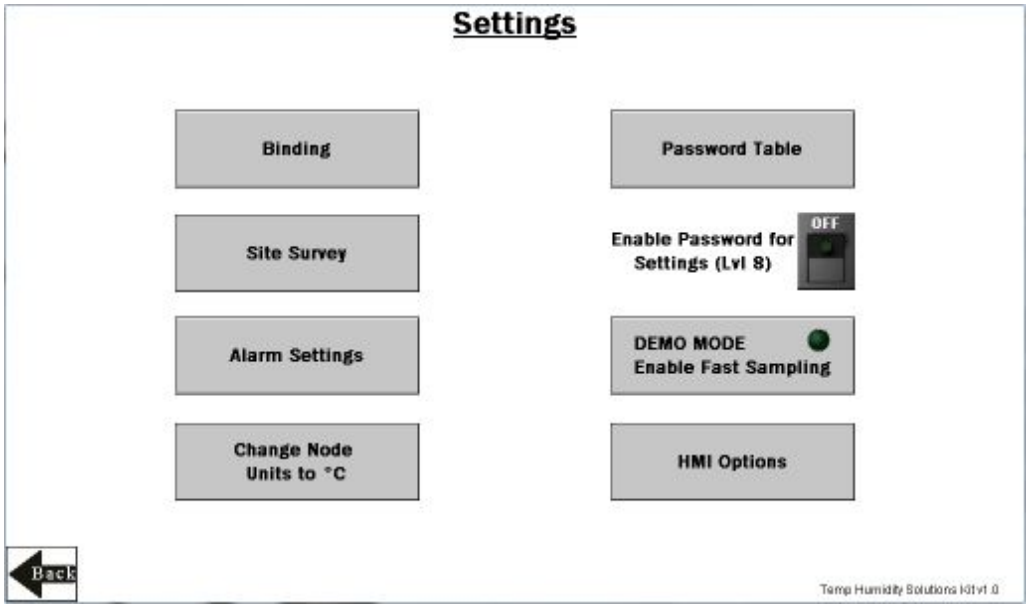
3. Gauges and raw data of the temperature and humidity levels. Also contains a green, yellow, and red icon indicating the warning or alarm state of the node based on the thresholds set on the alarm settings screen.
4. Graphical representation of temperature, dewpoint, humidity, warning levels, and alarm levels.
5. Indication of any current warnings or alarms will display here.

Settings Screen



Binding – Opens a screen to bind each sensor Node to the Solutions Kit's controller.

Site Survey – Opens a screen to perform a site survey on any sensor Node bound to the kit. (page 5)

Alarm Settings – Set alarm and warning thresholds for both temperature and humidity on both high and low levels. (page 6)

Change Node Units – Changes the default Node units from °F to °C; displays raw data and scaling of graphs and gauges.

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". To change the password, click the Password Table button. The password for level 8 may be any numbered password up to nine numbers long.

DEMO MODE – Used only for demonstration purposes when fast sampling is required. This enables Teach mode on all the bound sensor Nodes, puts them into a two-second sample rate, and changes the HMI graphs to log at two-second sample rate for 15 minutes (status indicated by the green light within the button. Using Demo Mode drains battery life faster and creates a larger log that fills up memory quicker, so it is only recommended to use when running a demonstration, not during standard operation. You must use the Q45U Node for fast sample mode; the Q45TH will not go into fast sample mode.

HMI Options – Provides the ability to copy/manage HMI log files, configure the HMI for advanced options and functional HMI options, and displays an icon and graph legend.

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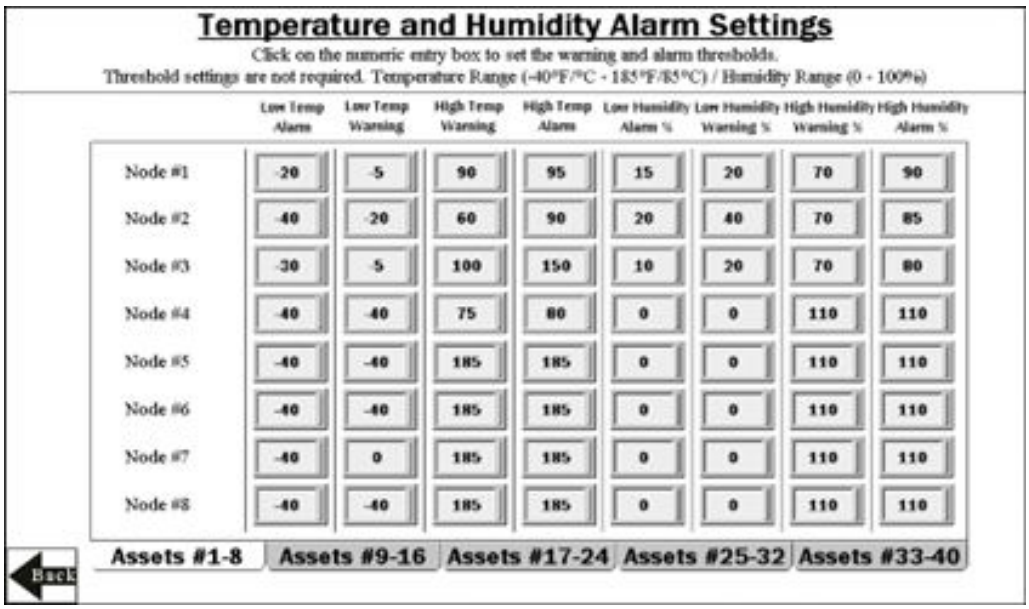
Alarm Settings Screen

Each temperature and humidity sensor Node reports back data in Fahrenheit or Celsius and relative humidity percent. The operating minimums and maximums are -40 °F to +185 °F (-40 °C to +85 °C) and 0-100%.



Each temperature and humidity sensor Node can have low and high warning and/or alarm levels. Set those values between -40°F to 185°F (or -40°C – 85°C if the **Change Node Unit to °C** button has been used) and 0–100% for humidity. Leave the values at -40°F/C or 0% for Low, and 185°F/85°C or 110% for High if you are not using that warning or alarm.

Use the tabs **Assets #1-8**, **Assets #9-16**, etc to access alarm settings for up to 40 sensor Nodes. Alarm Settings are saved in non-volatile memory and remain through a power outage or reboot.

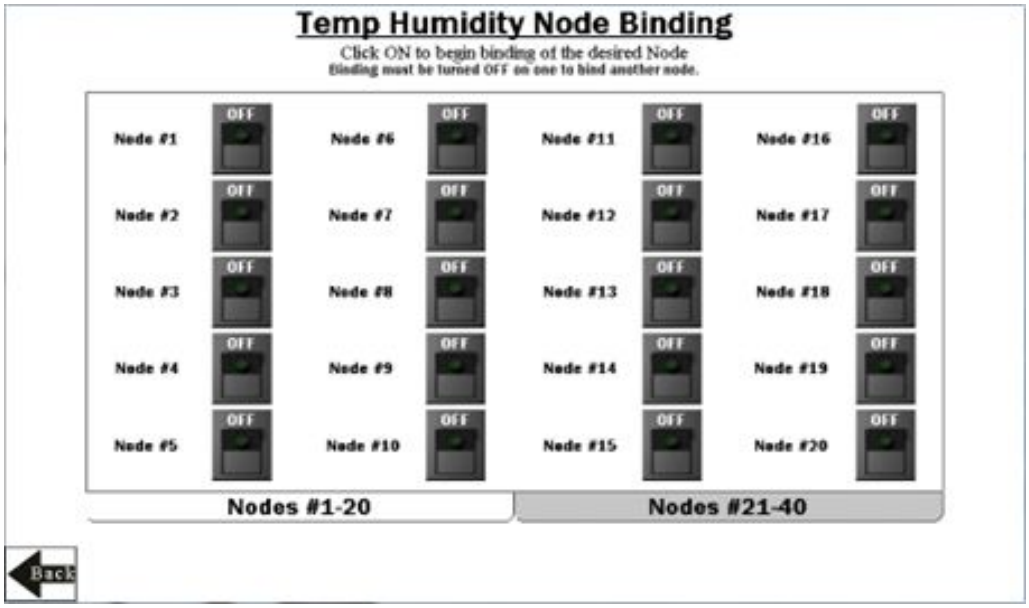
Site Survey and Binding Screen

Banner Wireless Q45 or P6(L) Nodes combined with Banner M12FTH4Q sensors must be bound to the DXM Wireless Controller to begin communicating.

After you run the binding procedure, the Q45/P6(L) Nodes are assigned a Node address and begin communicating with the DXM. Nodes and sensors are purchased separately and after they are combined, must be bound individually.

Run the binding procedure at any time to add a new Node and sensor to the network.

Perform a site survey on each Node after they are installed to ensure proper radio communication between the Nodes and DXM.



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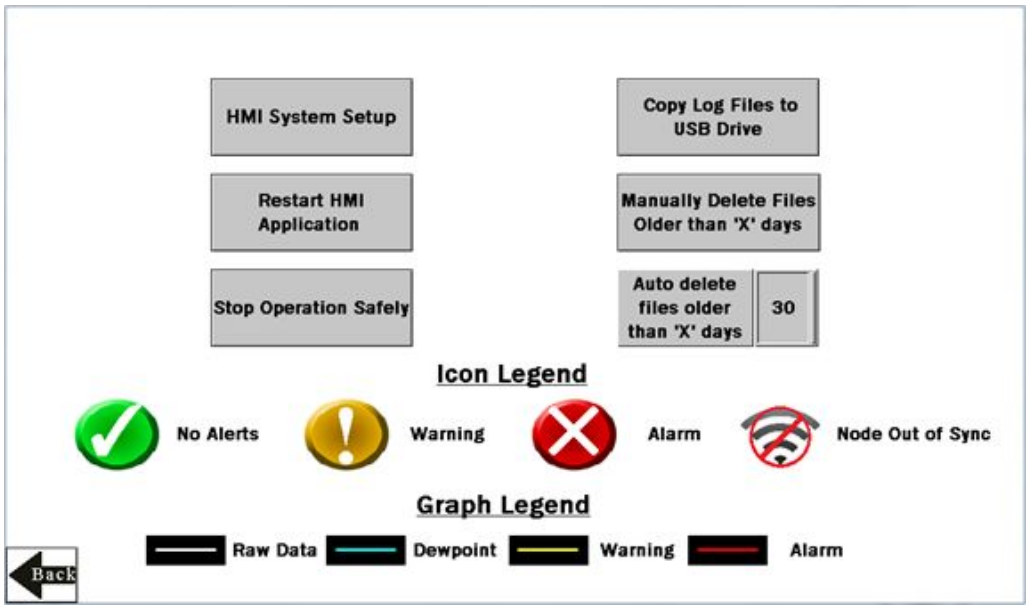
Bind a Node

1. Touch the ON/OFF rocker switch on the HMI screen for the desired Node to turn on binding mode.
2. On the Node, connect the M12FTH4Q sensor.
3. Enter binding mode by triple-clicking the binding button under the Q45 lid or by triple-clicking button 2 on a P6 or P6L. For the P6, follow the Node's datasheet to set the rotary dials before binding.
   After the Node is bound, the LEDs are on briefly, then flash four times. The Node automatically exits binding mode.
4. On the HMI: Touch the same ON/OFF rocker switch on the HMI screen to turn the switch to off.
   The DXM exits binding mode. After the DXM exits binding mode, the indicator LED on the Node flashes green when the Node is in sync with the DXM.
5. Repeat steps 2 through 4 for as many Nodes as are needed for the system.

   Use the **Nodes #1-20** and **Nodes #21-40** tabs to access binding switches for up to 40 sensor Nodes. Note that entering binding mode causes all the Nodes to go out of sync until the DXM exits binding mode. They will re-sync with the client radio within a few seconds.

HMI Options Menu Screen

This screen provides some added HMI functionality along with an icon and graph legend.



HMI System Setup – Enter HMI Panel Setup, which clears logged data from the graphs but will not clear any data saved to files. Restart HMI Application – Restarts the HMI application, which removes all graphed data but retains saved logs.

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

The HMI provides data logging of all the temperature and humidity levels, warning or alarm settings, and any triggered warnings and/or alarms (in a bit-packed register). This data is saved to a file every 30 minutes and a new file is generated daily and stored in monthly folders. The HMI has storage for about 45 days of log files. Below are some options for managing and retrieving those files.

Copy Log Files to USB Drive – Plug in a USB drive to the back of the HMI and click here to select the log files or folders to copy.

Manually Delete Files Older than 'X' Days – Delete 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 may be necessary.

Auto Delete Files Older than 'X' Days –The HMI automatically deletes files older than the selected number of days.

Advanced Options

Install a Warning or Alarm Light

Add a tower light or indicator light (such as a K70, TL50, TL70, etc.) to the solution box for added local indications of all clear, warnings, or alarms.

The DXM Controller uses PNP outputs with a maximum of 100 mA per output. An interposing relay may need to be added to accommodate higher amperage lights.

1. Cut a hole in the box and mount the light accordingly.

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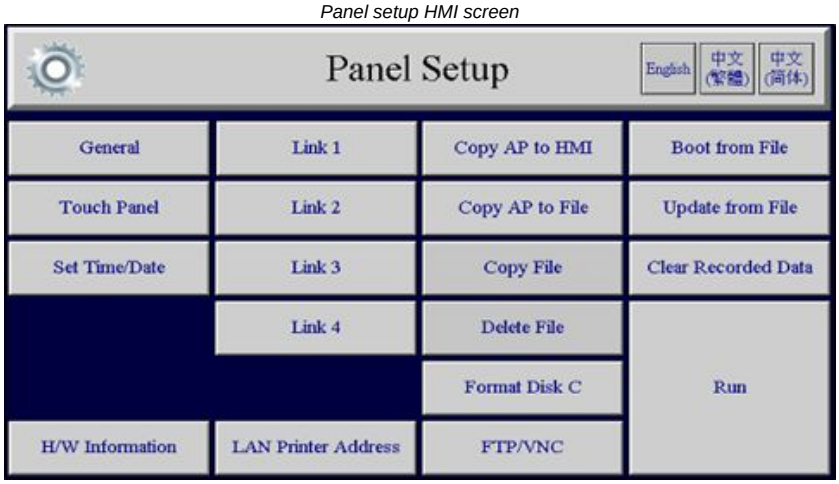
2. Wire the DC ground to the light or an interposing relay from the bottom row of the gray two-row terminal blocks inside the kit on the DIN rail adjacent to the DXM Controller.
3. Wire the input of the light or interposing relay to the DXM.
    a. O1 – Pin 5 – indicates a radio/asset in an Alarm condition.
    b. O2 – Pin 6 – indicates a radio/asset in a Warning condition.
    c. O3 – Pin 7 – indicates a radio/asset in either a Warning or an Alarm condition.
    d. O4 – Pin 8 – indicates no Warning or Alarm conditions exist.

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**.

Push Information to BannerCDS

The Key definition for "LONG_PRODUCT_NAME" not found in the DITA map. can connect to the Web via Ethernet or an internal cell module. The controller pushes data from the Key definition for "SHORT_PRODUCT_NAME" not found in the DITA map. 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).

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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).

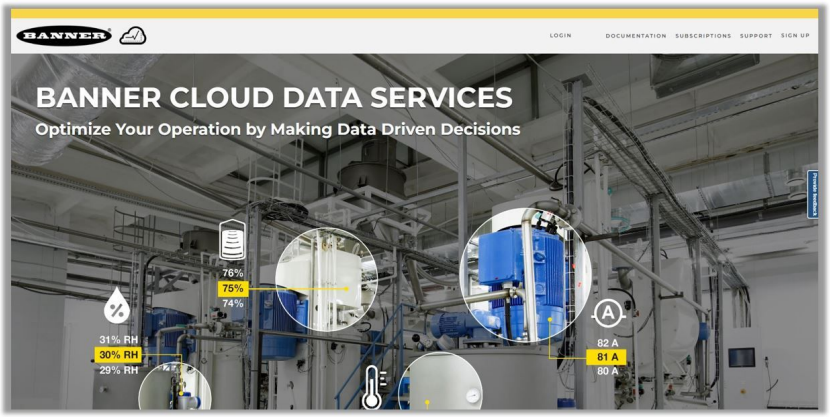
Logging into the Web Service

The web server captures data from the Key definition for "SHORT_PRODUCT_NAME" not found in the DITA map. using either a cellular connection or an Ethernet connection. Users collect and view the data or update and manage the Key definition for "SHORT_PRODUCT_NAME" not found in the DITA map. 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 Key definition for "SOFTWARE_NAME" not found in the DITA map. 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 Key definition for "SOFTWARE_NAME" not found in the DITA map..
5. From the **DXM Model** drop-down list, select DXM700.
6. On the menu bar, go to **Device › Connection Settings**.
   - 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.

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Configure the DXM to Push Information to the Cloud

> **IMPORTANT:** Do not adjust the Cloud Push Interval. The push frequency is controlled by the script. Adjusting the cloud push interval through this configuration may result in excessive amounts of data being pushed to Banner CDS.

1. Within the DXM Configuration Software, go to the **Local Registers in Use** screen.
2. Set the **Value Type** of register 844 to **Constant** and a value of 1 to enable the data push.
3. Go to the **Settings › Cloud Services** screen.
4. Set the **Server name/IP** to push.bannercds.com.
5. In the **Web Server** section, paste the **Gateway ID** copied from the BannerCDS configuration screen into the appropriate field.
6. Use the **File › Save** menu to save the XML file to your hard drive.
7. Send the updated XML to the DXM Controller using the **DXM › Send XML Configuration to DXM** menu.

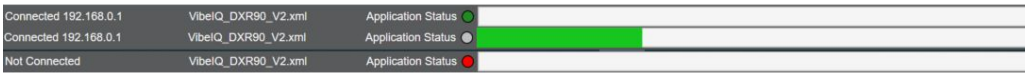
Save and Upload the Configuration File

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.

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.

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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.

Specifications

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)

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 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

Spread Spectrum Technology

FHSS (Frequency Hopping Spread Spectrum)

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 (table top).

Operating Conditions

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

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

–20 °C to +80 °C (–4 °F to +176 °F) (DXM LCD) Micro SD Card (if applicable)

–25 °C to +85 °C (–13 °F to +185 °F)

90% maximum relative humidity (non-condensing)

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

Certifications

CE/UKCA approval only applies to 2.4 GHz models

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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/

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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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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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