

Guide Features and Benefits

CALL FOR PARTS/SERVICE/PALLET PICK-UP	Up to 18 work stations using a K70 touch can have a single call for parts, service, pallet pickup, etc.
CALL RESPONSE	Up to 6 sets of three Q120 6-button boxes can be used to respond to requests; Each set can be placed on a forklifts/Hi-Lo
EVENT COUNTERS	Count the number of times each station sends a request
REQUEST AND ACKNOWLEDGE TIME	Total length of request time and time to acknowledge requests are tracked for each station
REMOTE MASTER LIGHT	Use a master light to show combined status of all light modules
SMS TEXT/EMAIL ALERTS	Generate SMS text and/or email alerts based on specific events
EFFICIENCY METRICS	Produce efficiency metrics with provided data
CLOUD MONITORING	Push data to Cloud Webserver or PLC (via LAN or Cellular connection) for remote viewing, alerting, and logging.

Increase production efficiency by developing a wireless call-for-parts/service/pallet pick-up system that allows for up to 18 work stations to call out to six forklifts/Hi-Los using the EZ-Light K70 Touch to Q120 six-button boxes. This provides for quicker responses from forklift drivers and/or supervisors to indicate a request has been accepted. When creating a call system using wireless indicators, work stations can maintain a steady workflow and resolve critical issues quickly.

Total time of requests, number of requests, and total time to acknowledge requests are tracked, allowing analysis of average delivery and acknowledgement times for each station. Each station has a single call (K70 Touch) with a lighted response that is initially red upon request and becomes green after it is acknowledged by the Q120 six-button box.

On the six-button boxes, each station has a corresponding button that flashes red above the button when a request is made. To accommodate up to 18 stations, three sets of boxes per forklift are used, for a total of 18 buttons. When the corresponding button is pressed to accept the job, the light above the button flashes green to indicate the job has been accepted and stops flashing on all other boxes. This system provides the information necessary to react quickly to work station requests and drive efficiency improvements based on data that was previously unavailable.

Equipment



Model	Description
K70DXN2T2GRYQ or K70DXN9T2GRYQ	EZ-LIGHT K70 Wireless Touch Select either 900 MHz or 2.4 GHz ISM radio to match the DXM100
DX80N9Q120BL-RG or DX80N2Q120BL-RG	Sure Cross Wireless Q120 Six-Button Box Select either 900 MHz or 2.4 GHz ISM radio to match the DXM100
DXM100-B1C1R1 or DXM100-B1C1R3	DXM100 Wireless Controller with Cell Select either 900 MHz or 2.4 GHz ISM radio to match the Q120s and K70s C1 only necessary if cellular communication is desired

A PDF of this Solutions Guide is available at <https://goo.gl/4lnsjm>

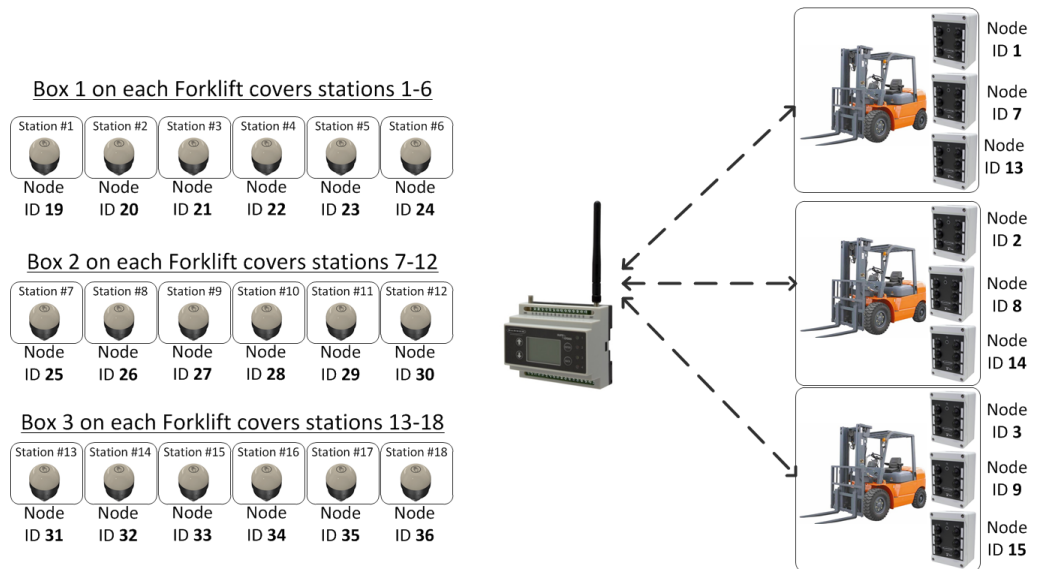
The following guide demonstrates how to bind the wireless six-button boxes and K70 Touch to the DXM and load a preconfigured XML file and script for 18 stations. The XML file only requires some minor modifications to be customized for any site.

On each forklift:

- Box #1: Used for Stations 1-6
- Box #2: Used for Stations 7-12
- Box #3: Used for Stations 13-18.

In the example, three forklifts are being used for 18 stations.

All the necessary Node IDs are shown. Up to three more forklifts could be added using the information provided in Step 1.



Step 1: Bind the System and Assign Addresses

Binding the Q120 six-button boxes to the DXM100 establishes a secure radio connection and assigns a specific network address to each box in the wireless network. The first 18 Nodes in the system are reserved for binding the Q120 boxes and they must be bound in a specific order. Each set of boxes on forklifts needs to be bound according to the table shown below.

1. Apply power to the DXM.
2. On the DXM: Use the arrow button to select the **ISM Radio** menu on the DXM’s LCD. Press **Enter**.
3. Select **Binding** and press **Enter**.
4. Select **Bind to > 1** (the first Node) and press **Enter**.
5. On Q120 Node 1: Triple-click the binding button between buttons 1 and 4. The LED flashes four times after it binds to the DXM. This Node is now bound as Node ID 1. Label the Q120 for future reference.
6. On the DXM: Press **Back** to return to the main menu.
7. To bind additional Q120s, select **Bind to > X** (use the table to determine the Node ID) and press **Enter**.
8. On the second Q120: Triple-click the binding button.

	Node IDs		
	1	2	3
1	1	7	13
2	2	8	14
3	3	9	15
4	4	10	16
5	5	11	17
6	6	12	18

If more Q120s are used in the system, continue binding until all Q120s are bound to the DXM with each having their own Node ID.

Bind the K70 Touch lights for each station as Nodes 19 through 36, with Node 19 being station 1 and Node 36 being station 18.

1. Apply power the K70s.
2. Apply power to the DXM.
3. On the DXM: Use the arrow button to select the **ISM Radio** menu on the DXM’s LCD. Press **Enter**.
4. Select **Binding** and press **Enter**.
5. Select **Bind to > 19** (the first Node) and press **Enter**.
6. On K70 Station 1: Remove the base section by holding the lighting modules and twisting the base clockwise. Triple-click the binding button.
The LED flashes four times after it binds to the DXM. This Node is now bound as Node ID 19. Label the K70 for future reference.
7. Reconnect the K70’s base to its light module.

8. On the DXM: Press **Back** to return to the main menu.
9. To bind additional K70s, select **Bind to > 20** and press **Enter**.
10. On K70 Station 2: Repeat steps 6 through 8.

When you are finished binding, press **Back** on the DXM until the DXM returns to the main menu.

Step 2: Run a Site Survey

Verify the wireless connection between your Q120s, K70s, and the DXM by running a site survey on the DXM100.

1. On the DXM: Use the arrow buttons to select the **ISM Radio** menu. Push **Enter**.
2. Select the **Site Survey** submenu and press **Enter**.
3. Select each Node ID within the system to verify the wireless connection between the Node and the DXM.
4. When you are finished running the site survey, press **Back** twice to return to the main menu.

Step 3: Configure the System

To customize the system to an actual application, some basic modification to the template files is necessary. There are two files uploaded to the DXM: the XML file sets the DXM’s initial configuration and the ScriptBasic file reads the status of call request, controls the output to the Q120 requests, acknowledges request, times request and acknowledgement, establishes a reset function for each K70s timers and counts, and organizes the information in logical and easy-to-find registers in the DXM.

Loading these files and making adjustments requires Banner’s DXM Configuration Tool software and the “Call For ...” files available using in the links below.

1. [Download](https://goo.gl/x2hLto) the preconfigured files. (<https://goo.gl/x2hLto>)
2. Extract the ZIP files into a folder on your computer. Note the location where the files were saved.
3. Connect the DXM using the supplied USB cable to a computer containing the DXM Configuration Tool software or [download](#) the software and install it on a computer.
4. Launch the DXM Configuration Tool software.
5. Load the “Call For...” XML file by going to the **File > Load** menu and choosing the configuration files.
6. Connect the software to the DXM by going to the **Device > Connection Settings** menu. Select **Serial** and then select the COM port that the USB cable is plugged into. Click **Connect**. If you are unsure which COM port and several appear, attempt to connect to each one of them until successful.
7. Upload the “Call For...” script file by going to the **Settings > Scripting** screen. Click **Upload Script** and select the file.
8. Select the uploaded file in the window to the right of the **Upload Script** button. Click **Add Selected to Startup**; the DXM will run this script every time it restarts.
9. Save the XML file using the **File > Save** menu. Save the XML file any time the XML has been changed because the tool does not autosave.

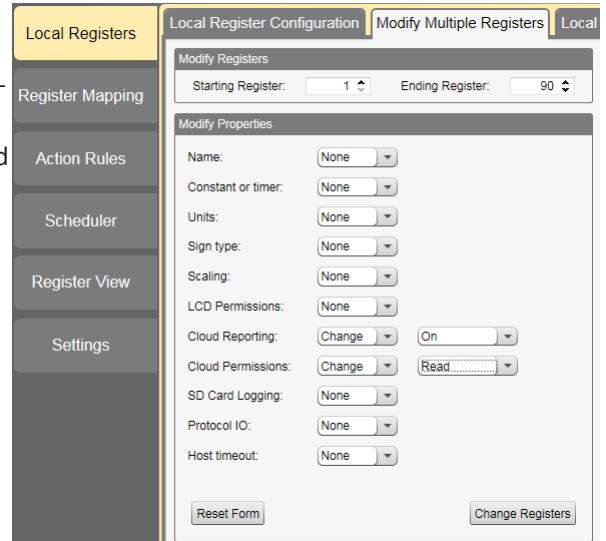
Optional Steps: Customize the XML file

1. Within the DXM Tool, go to the **Local Registers > Local Registers in Use** screen.
2. Rename the stations using the text boxes within the **Register Name** column. Because there are five registers per station, copy and paste names for efficiency.

To display the station status, count, or timer on the website, you must change the **Web** column drop-down lists to **Read** and **Cloud Reporting** to **ON** for each stations’ information (status, timer, count, etc.) that you would like to appear on the website.

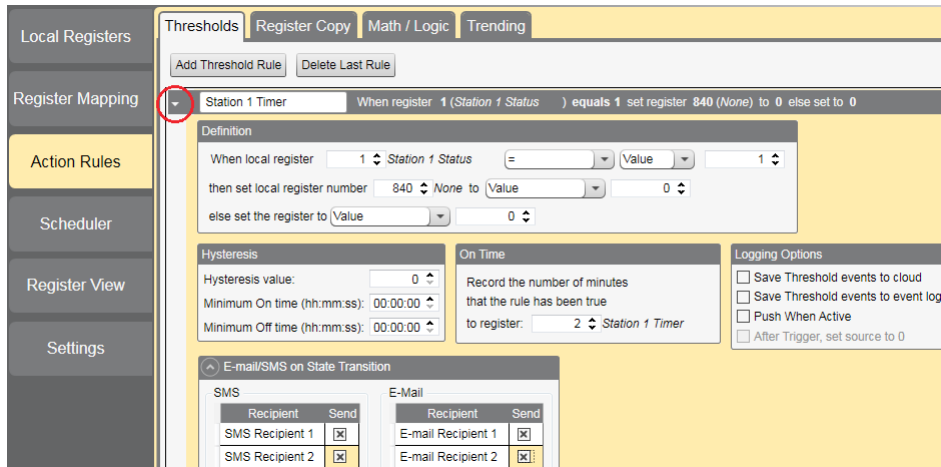
#	Register Name	Units	Signed	Constant of Timer	Cloud Reporting	LCD	Web	Protocol Conversion	Log Files
1	Station 1 Status	None	<input type="checkbox"/>	None	Off	None	None	None	None
2	Station 1 Timer	None	<input type="checkbox"/>	None	Off	None	None	None	None
3	Station 1 Count	None	<input type="checkbox"/>	None	Off	None	None	None	None
4	Station 1 Time to Ack	None	<input type="checkbox"/>	None	Off	None	None	None	None
5	Station 1 OFF Time	None	<input type="checkbox"/>	None	Off	None	None	None	None

3. To display the statuses for each Station on the website, change the cloud permissions.
 - a) On the **Modify Multiple Registers** screen, select **Change** in the drop-down list next to **Cloud Permissions and Cloud Reporting**.
 - b) In the drop-down list to the right, select **ON** for **Cloud Reporting** and **Read** for **Cloud Permissions**.
 - c) Set the **Starting Register** to 1 and the **Ending Register** to the value equal to 5 × Number of Stations in the system (for example, set the ending register to 90 for 18 stations).
 - d) Click **Change Registers** at the bottom right of the section.



4. Configure to Receive Email or Text Alerts based on an Action Rule.
 - a) Click on the **Action Rules** tab and expand any rule using the arrow next to the rule OR create a new action rule using the **Add Threshold Rule** button on the top.
 - b) Click on the arrow next to **Email/SMS on State Transition**.
 - c) Select the recipient of the SMS and/or email upon the action rule becoming true.

In the example shown, both SMS Recipient 1 and 2 and Email Recipient 1 and 2 will receive a message when the action rule meets its criteria.



Step 4: Set up the Ethernet or Cellular Connection

By default, the XML file configures the DXM100 with an Ethernet Push interface with the ability to send emails and push the data registers to a webserver. The device can also be configured to use a cellular push if the DXM Controller contains a cellular module and data plan. This section is only necessary if the user wants to receive or display information beyond just the DXM Controller's LCD.

1. If the DXM will text, email, or push to the cloud webserver, set up the push interface.
 - a) On the DXM Configuration Tool, go to the **Settings > Cloud Services** screen.
 - b) Select the appropriate **Push Interface** (Ethernet or Cell) from the drop-down list.
Selecting Cell requires a cellular module be installed in the DXM Controller and a wireless plan be set up for sending data.
2. The **Cloud Push Interval** determines how often the DXM pushes the current status data to the webserver. By default, this interval is set to zero and should not be changed. If data is being pushed to the cloud, set the **Cloud Push Interval** to 00:15:00 (15 minutes).
3. Set up the email and text messages. SMS works only if the DXM has a cellular module. Expand the **Email Recipients** and **SMS Recipients** to enter up to 10 email addresses and 10 phone numbers, along with a custom message.
 - a) Go to the **Settings > Mail and Messaging** screen.
 - b) All SMTP fields should remain set to their default values, except the Password field. Enter "sxiemail1" into the password field.
 - c) Click **Send SMTP Password**.
 - d) Click **Yes** when asked to reboot the device.

The screenshot shows the configuration interface for email and SMS. Under 'E-mail Recipients', there are 10 rows, each with a 'Subject' and 'Message' field. The first row is expanded, showing 'Subject: Light Active' and 'Message: Light is Active'. Below this is the 'SMS Recipients' section, which is also expanded to show 'Name: SMS Recipient 1', 'Recipient: 7635551234', and 'Message: Light is Active'.

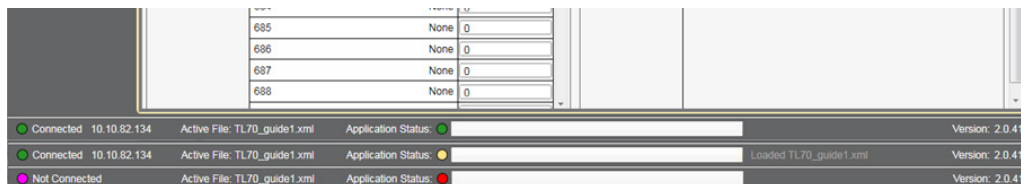
Step 5: Save and Load the XML File

When changes are made to the XML file, save the changes. To apply the changes, load the XML file to the DXM.

1. Save the file by going to the **File > Save** menu.
2. Load the file onto the DXM by going to the **Device > Send Configuration to Device** menu.

Because of the size of the XML file, the file may take up to three minutes to load. Verifying the file is loading by looking at the Application Status indicator in the status bar.

If the Application Status indicator is red, close and restart the DXM Configuration Tool, unplug and re-plug in the USB 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 yellow, the file transfer is in progress.



Step 6: Push Information to the Cloud

The DXM100 can connect to the web via Ethernet or an internal cell module to push data from the site to display on a website. To enable this capability for remote monitoring and alarms settings, modify the XML file.

The website for storing and monitoring the system's data is <https://data.sensonix.net/>.

1. Connect the DXM to a computer with the DXM Configuration Tool software.
2. Launch the software and connect to the DXM.
3. Load the saved XML file.
4. Go to the **Settings > Cloud Services** screen.
5. Visit the Sensonix Web Services website (<https://data.sensonix.net/>) and log into an existing account or register a new account.
6. Click **+ New Site** and name your site.
7. Go to the **Settings > Sites** webpage.
8. Highlight and copy the Site ID.
9. On the DXM Configuration Tool: Return to the **Settings > Cloud Services** screen and paste the copied ID into the Site ID field.
10. Save the XML file (**File > Save**).
11. Upload the file to the DXM (**Device > Send Configuration to the Device**).
12. On the Sensonix Web Services website, click **Send XML to Web** and select the XML file that was just saved and uploaded to the DXM.

This creates continuity between the site created on the website and the DXM used in the field. The DXM pushes data to the website, which can be viewed at any time. Refer to the Sensonix Web Services Instruction Manual to review all the features available for monitoring, comparing data, and establishing warnings/alarms on the website.

Edit	Send XML	Get XML	Site Name	Site ID	Last Push	Method	Authentication	Poll Interval	Push Interval	Register Estimate
			Call For Parts/Service/Pickup	0ac243d1-b7c1-4622-9cc2-d27da1004f3a	1d 16h 20m	Ethernet	OFF	00:00:00	00:00:00	0
			Tank Monitoring	fc61818c-fe87-400a-810a-44b4f64cd9f	69d 22h 40m	Cellular	OFF	00:00:00	00:15:00	140160

Additional Features

Resetting the Timer and Counts

Each station in the system has a reset register available from the DXM's menu system and via the website. Setting this register to 1 resets all the counts and timers on that particular station.

Resetting from the DXM

1. On the DXM: Use the arrows to select **Registers**. The registers are labeled **Reset X** (where X is the K70 station number you want to reset). There is also a **Reset All** that resets all statistics for all stations.
2. Select the appropriate register to reset.
3. Click the **Enter** button.
4. Change the value to 1 then click **Enter** three times. The reset register automatically returns to zero after the stations reset.

Resetting from the Website

1. Go to the **Dashboard > Sites** screen.
2. Click **Update Device** for the site where the particular station exists.
The **Update** pop-up window appears.
3. From the **Type** drop-down list, select **Register**.
4. From the **Register Name** drop-down list, select the station you want to reset.
5. Enter 1 into the **Value** field and click **Queue**.
6. Repeat steps 4 and 5 for each station that needs to be reset or select the **Reset All** register in step 4.
When the next data push occurs, the chosen units reset. The reset register value automatically returns to zero after the station is reset.

Configuring Time Stamped Logging

To setup time-stamped logging, follow these steps.

1. Go to the **Local Registers > Modify Multiple Registers** screen.
2. Click **Reset Form**.
3. From the **SD Card Logging** drop-down list, select **Change**.
4. Select **Log 1** in the drop-down list that appears to the right.
5. Set the **Starting Register** to 1 and the **Ending Register** to the value equal to $5 \times \text{Number of Stations in the system}$ (for example, use ending register 90 for 18 stations).
6. Click the **Change Registers** button on the bottom right portion of the section.

Retrieving a Log File

1. Connect the DXM to the computer via USB or Ethernet. Connect the DXM Configuration Tool software to the DXM using the **Device > Connection Settings** menu.
2. Go to the **Settings > Logging** screen.
3. Click **Refresh List**.
4. In the **Log File Management** window, select the file to save.
5. Click **Save Selected** to save the file to a folder on your computer.

Local Registers

	Local Register #	Description
Station Information	$1 + 5 \times (N - 1)$	Current Request Status
	$2 + 5 \times (N - 1)$	Total Timer from beginning of Requests
	$3 + 5 \times (N - 1)$	Total Count of Requests
	$4 + 5 \times (N - 1)$	Time to Acknowledge Requests
	$5 + 5 \times (N - 1)$	OFF Time Total
K70 Output 1	100–117	K70 1–18 Output 1
K70 Output 2	118–135	K70 1–18 Output 2
Acknowledge	136–153	Acknowledge Station Status
Acknowledge Time	154–171	Time After Acknowledge set
Box Input Status	200–217	Box 1 thru 18 Input 1
	218–235	Box 1 thru 18 Input 2
	236–253	Box 1 thru 18 Input 3
	254–271	Box 1 thru 18 Input 4
	272–289	Box 1 thru 18 Input 5
	290–307	Box 1 thru 18 Input 6
Box Connection Status	308–325	Box Connection Status
Box Output Status	326–343	Box 1 thru 18 Output 1
	344–361	Box 1 thru 18 Output 2
	362–379	Box 1 thru 18 Output 3
	380–397	Box 1 thru 18 Output 4
	398–415	Box 1 thru 18 Output 5
	416–433	Box 1 thru 18 Output 6
Resets	452	Reset All Stations
	453–470	Reset Station 1–18

Where N represents the station number.



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