

Overview

A DXM Controller with a cellular modem can send text messages on defined conditions and can receive text messages to trigger actions.

This short example uses the DXM Configuration Tool to create text alerting messages and SMS commanding.

For more DXM Controller information, refer to the appropriate instruction manual.

- DXM Configuration Tool Instruction Manual (p/n [158447](#))
- DXM100-Bx Wireless Controller Instruction Manual (p/n [190037](#))

A complete XML configuration file is available for this technical note. The XML configuration file uses a dummy phone number. Use the DXM Configuration Tool to replace the dummy phone number with your phone number.

Hardware requirements:

- A DXM Controller model with a cellular modem installed (the cell modem must have a wireless plan and be provisioned on the cellular network)
- DXM Configuration Tool software downloaded from www.bannerengineering.com

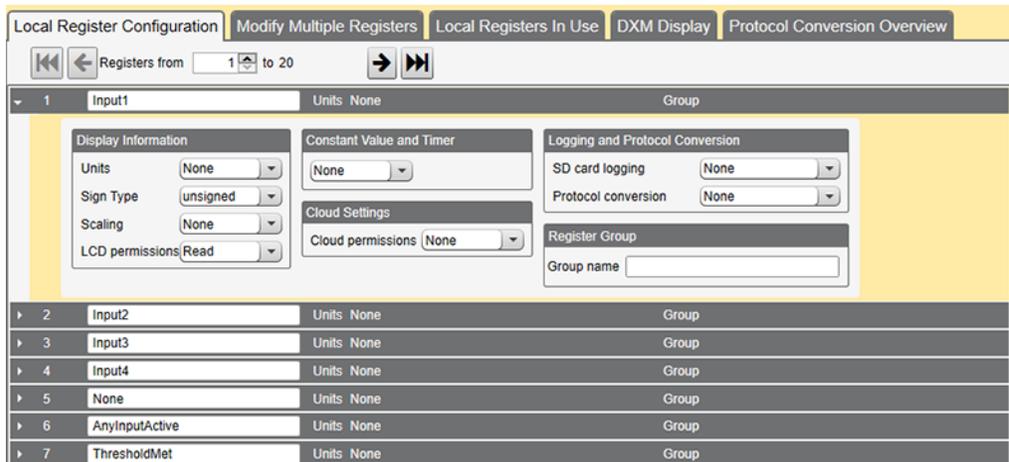
This example configuration:

1. Reads four discrete inputs from the I/O board of the DXM Controller.
2. Writes the values into Local Registers 1 through 4.
3. Defines a math rule to logically 'OR' the input values.
4. Uses a threshold rule to define when to send a text message.

Configure the Local Registers

After defining each Local Register, set the LCD Permissions flag to Read to display the register data on the DXM Controller's LCD.

1. Define Local Registers 1 through 4 to hold the read data from the four discrete inputs on the I/O board.
2. Define Local Register 6 to hold the results of the logical OR math rule.
3. Define Local Register 7 to hold the results of the threshold rule.



Create the Read and Math/Logic Rules

The I/O board is Modbus device ID 200.

1. Create the Read Rule to read the I/O board inputs.

- a) Go to the **Register Mapping > Read Rules** screen.
 - b) Create a Read Rule that reads data from I/O board and writes it to Local Registers 1 through 4.
 - c) Set the **Frequency** to one second.
2. Create the Math/Logic Rule to determine when the send the text message.

- a) Go to the **Action Rules > Math/Logic** screen.
 - b) Write a logic rule that ORs Local Registers 1 through 4 and stores the result in Local Register 6.
If any of the Local Registers is 1, a 1 is written into Local Register 6.
3. Create the Threshold Rule to send the text message.

The Threshold Rule defines the condition to send a text message using an if-then-else structure.

If Local Register 6 is greater than zero, **then** set Local Register 7 to a value of 1, **else** set Local Register 7 to a value of 0.

4. Under the **Email/SMS on State Transitions** section, select the defined phones to email or text.
5. Select the **Minimum on time** and **Minimum off time**. This example sets both to 5 seconds.
The threshold rule must be active or inactive for at least 5 seconds before a text message is sent.

Define the SMS Recipients

1. On the DXM Configuration Tool software, go to the **Settings > Mail and Messaging** screen.

2. Click on the arrow next to the SMS Recipients section.
The list of recipients displays.
3. Enter a name, phone number, and message into the fields.
After these fields are defined, the information displays in the threshold rule.

Define the General and Cloud Services Parameters

1. On the **Settings > General** screen, set the time zone.
This allows the correct time to display on the DXM's LCD.
2. On the **Settings > Cloud Services** screen, set the **Push interface** drop-down to **Cell**.
3. On the **Settings > Network** screen, set up the cellular firewall as shown.

In our example, phone number 111-222-3333 sends text messages to the DXM Controller. For your configuration, change this phone number for both sending text messages and sending commands via text message.

The default input settings on the I/O board are set to sinking (NPN). Connecting a switch to ground to any of the inputs should cause a text message to be sent. View the value of each Local Register defined in the configuration file by using the DXM's LCD, under the **Registers** menu.

Save and Upload the Configuration File

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

Changes to the XML file are not automatically saved. Any adjustments require that the file be manually saved before exiting the tool and/or before sending the XML file to the DXM Controller.

1. Save the XML configuration file to your hard drive by going to the **File > Save As** menu.
2. Upload the configuration file to your DXM Controller.
 - a) Verify your DXM Controller is connected to the Windows-based PC running the DXM Configuration Tool.
 - b) Go to the **Device > Send XML Configuration to DXM** menu.

The DXM Controller reboots and begins running the new configuration.

SMS Commands

The DXM Controller with a cellular modem can be remotely accessed using SMS messages. Simple text messages can:

- Push data to the cloud
- Reboot the DXM Controller
- Read to or write from Local Registers

The incoming firewall provides security; only defined phone numbers are permitted to access the DXM Controller. Responses may take 20 seconds or more, depending upon the cellular network.

A DXM Controller requires a few minutes after powering up before it can accept SMS messages. Initial cellular connection times vary based on the wireless network. An SMS message sent to the controller while a push session is active delays any response or the SMS message may be dropped based on the length of the push session.

push

Triggers an http push to a webserver. The DXM Controller accepts the message, executes the action, and sends an acknowledgement text message back to the user.

Example: Texting push forces defined local registers to be sent to a webserver.

push <send>

DXM Controller acknowledgement text message: Register push requested

reboot

Triggers the DXM Controller to reboot. The processor reloads the XML configuration file and zeroes all local register data. This does not affect the other components of the DXM Controller (ISM radio, I/O board, cellular modem). The DXM Controller accepts the message, executes the action, and sends an acknowledgement text message back to the user.

Example: Texting reboot forces the processor to reboot.

reboot <send>

DXM Controller acknowledgement text message: rebooting...

grN

Gets register number N (DXM Local Register) and sends a text with the value back to the user. The response text message shows the value in floating point format regardless of register number.

Example: Texting gr1 retrieves the value for register 1

gr1 <send>

DXM Controller acknowledgement text message: Register 1 is 0

srN,X

Sets a register value, where N is the register number and X is the value. The DXM Controller responds with a SMS message indicating the register was set.

Example: Texting sr1,10 sets register 1 to value of 10

sr1,10 <send>

DXM Controller acknowledgement text message: Register 1 has been set to 10

Cell Number — The cell phone number to text (DXM Controller's cell number) is found on the DXM LCD display under the **System Info > Cell** menu.

The cell phone number is not available on the DXM LCD display until the DXM Controller has sent a message to the cellular network. This is done by a push to a webserver or a text message sent from the DXM Controller. The cell phone number can also be acquired from the cellular plan provider.