

NATIONAL CONTROL DEVICES

Push Notification - WiFi Quick Start Guide

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Push Notification WiFi Quick Start Guide

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Notice: Portions of this manual require internet access.

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Introduction

What is the Push Notification Series?

The push notification series was designed for customers requiring contact closure input monitoring via push notification rather than a query based method. This means your application is free to process other tasks while listening for input status change. This opens the door to many new and exciting applications such as email/text message notification, data logging, security monitoring, and much more. These controllers can be configured to send information to a specific server via internet connection when their input status changes, or alternatively they can broadcast their input status change across all devices a local area network so many applications can be informed of the recent closure.

What can this device be used for?

The possibilities are endless. Just think, a closure generated by someone walking through a door could trigger a notification on 5 managers' Android devices informing them a customer has entered the building. A notification could be sent to a small local server such as the WiNet which can in turn send an email notification when the float switch on a reservoir has been tripped by excess water.

Several types of devices can be connected to the Push Notification Series product's inputs such as motion detectors, push buttons, switches, relay outputs, float switches, virtually any device that generates a dry contact closure. The Push Notification series offers controllers with 1, 2, 4, and 8 contact closure inputs.

We believe this product is the missing link in so many applications. When combined with our current products such as the WiNet and Fusion series your imagination really is the limit to what can be done.

How do Push Notification series products work?

PN series products send a packet via TCP or UDP sockets when the status of their inputs change. They can be configured to send this packet when the input is open/closed, opened, or closed. Setup of the socket and a breakdown of the packet will be covered later in this guide.

Getting Started

WiFi Module Configuration

Setup of the WiFi module configures it for connection to your wireless network. It also specifies where the notification packet is sent. This configuration is very simple using our NCD Base Station Software.

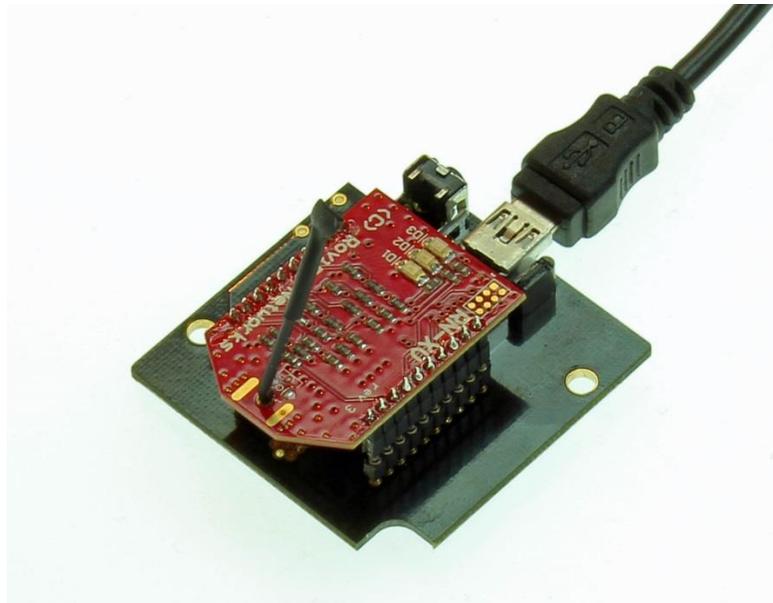
Things you will need

- Push Notification series controller with included WiFi module
- WiFi configuration kit (Zigmo configuration board and USB cable)
- A windows based computer (XP, 7, or 8)

WiFi Network Setup

Step 1: Install the Wi-Fi module into the WiFi Module Configuration board (Zigmo)

Step 2: Connect USB cable from Zigmo board to computer



Step 3: Install NCD Base Station Software for configuration/testing purposes

<http://www.controlanything.com/start>

Step 4: Launch NCD Base Station Software. On the Select Connection window that appears click the drop down menu under com port, select the USB Serial port which was created when the Zigmo board was connected to the computer. Make sure Baudrate is set to 115200. Click the More button in the upper right corner of the window to expand it. Click the MirCC WiFi Module Setup button.

Step 5: The MirCC WiFi Module configuration window will read the stored settings in your module at launch. These settings need to be changed for your particular network.

- Making sure the WiFi module is within wireless range of the network you wish to attach it to click the Scan for Networks Button. A window will pop up displaying all wireless networks within range, select the network you wish the module to connect to, then click the Select button.
- Type the passphrase for your WLAN network in the Enter Network Passphrase box.
- Enter a device name in the Enter Device Name box if you wish.
- Enter the TCP port you wish the module to listen on in the Device Local TCP Port box (this will be used for connecting to the module and reading its input's status if needed).
- We recommend that you leave the Join Network On Power Up box checked, this means as soon as the module powers up it will associate with the network stored. Alternatively if you do not check this box it will only connect to the network when it needs to transmit data.
- You can enable a socket connection timeout on the module which is recommended by checking the Enable TCP Socket Timeout, then type a timeout duration in the box that appears in seconds. When enabled the module will forcibly close any TCP socket connections after no data is transmitted or received for the specified period of time.
- Select DHCP or Static IP. DHCP is recommended whenever possible but you may store a static IP address into the controller if desired. If you do not know what a Static IP address is leave DHCP enabled.

This concludes configuration of the module for your WLAN. Don't press the Save to WiFly button yet though.

Step 6: Now we will configure where the controller is to transmit its input status on change. There are two main methods for this (TCP or UDP). IF the module will be transmitting its data to a remote server or if security is a concern TCP should be used. UDP is a good solution if multiple devices on the network need to receive information (UDP Broadcast).

TCP Notification Setup

Select the Send Notification via TCP radio button. A window will appear allowing you to enter the destination IP address and Port Number. A listener application will need to be present at that location listening on the specified port number.

UDP Notification Setup

Select the Send Notification via UDP radio button. A window will appear with three variables: a checkbox for Use UDP broadcast, a Server IP, and a Port. When Use UDP broadcast is checked and device on the network can receive the broadcast since the IP is set to 255.255.255.255. When not checked you must specify a specific Server IP address. A port number must be specified in the Port text box, your listener application(s) will need to listen for USP broadcasts on this port number.

Step 7: Click the Save to WiFly button. You will see several commands exchanged between Base Station and the WiFi module in the Log window. At the end you should see Associated, and then farther down a line that says IP = the address next to this line will be the IP address of your module. If a Static IP address was assigned it will say using specified static IP. You should also now see the Green LED on you WiFi module flashing slowly which means it is associated with your network.

Step 8: Close Base Station. Disconnect the Zigmo from your computer. Remove the WiFi module from the Zigmo configuration board. With no power applied install the WiFi module into your Push Notification series controller, then to apply power using a regulated 12VDC power supply (see Power Supply specifications section under Hardware Reference for more info on Power supply requirements). You should see the busy and ready LEDs on the PM controller turn on solid initially, after a moment you will see them flash as well as the amber LED on the WiFi module, once this flashing stops and the Ready LED on the controller turns on solid you are ready.

Initial Testing

Step 9: (This will only work if the module was configured for UDP broadcast or if this is done on the computer specified as the server IP). For testing purposes open Base Station once more on a windows computer connected to the same network as the PN controller. Click the More button in the upper right corner of the select connection window. Click the Com Operator button which appears below. When asked to register you can specify register later. Click the Chain icon button in the upper left corner of Com operator to open a new connection. If you set the module up for UDP broadcast click the UDP tab, enter the port number specified as the notification port in the WiFi module in the Listen Port box, then click OK. If you setup the module for a TCP socket connection click the TCP Server tab and enter the port number specified during setup as the server port number in the Listen port box and click ok. You will now see a send/receive window. Trip and input on the controller using a dry contact and you should see data received in Com operator. This concludes the setup of your controller.

Hardware Reference

Compatible Sensors (Understanding Inputs)

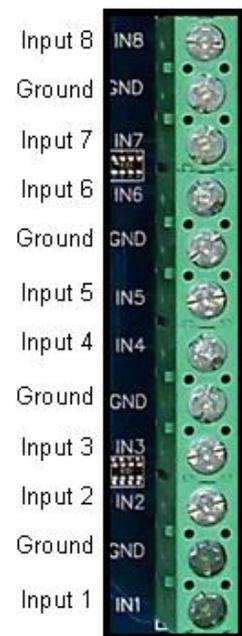
Warning

Users must NEVER apply any voltage to an input on PM series product!

Inputs are for dry contact closures only!

Inputs are capable of reading Contact Closure generating devices such as buttons and switches. A wire connected from the ground terminal to the input terminal would trigger in the input, as this would be considered a contact closure. Any device that generates a dry contact closure can be used to trop the inputs on PM series controllers.

Push Notification Inputs play a vital role in the use of a PM series controller. Before we begin using the controller, it is essential that users understand the role of these inputs. Improper use of these inputs can cause Irreparable Damage to the PM controller.



Power Supply Specifications

PM controllers require a 12VAC or 12VDC power supply to power the logic and relays of the controller. The PWR12 is our stock power supply suitable for use with ALL PM Series controllers. While it is possible to operate from an automotive 13.8V power supply, higher voltages are not recommended. Additional power filtering may be required for proper operation in automotive electrical systems. The absolute minimum recommended operating voltage is 11VAC or 11VDC. PM controllers require approximately 100ma for standby and 60ma for each activated relay. Communication Modules may require up to an additional 240ma, this is documented on the Electrical Specifications Page.

Power polarity is not important on the PM Series controllers. There is no positive or negative terminal. Simply apply power to the controller as it is convenient to make wired connections. The PM controller will rectify your power supply and attempt to filter noise to safe levels for proper operation.

Environmental Specifications

Certain components of a PM controller may run at temperatures exceeding 120° Degrees Fahrenheit. This is normal for a PM controller and does not indicate a defect.

The recommended operating temperature for all PM controllers is -25 to +85° C. This temperature rating is based on temperature specifications of the components used to build a PM controller and is not based on actual testing. We have speculated that PM controllers may be able to withstand lower temperatures due to the fact that PM controllers tend to have hot components in critical areas of the design.

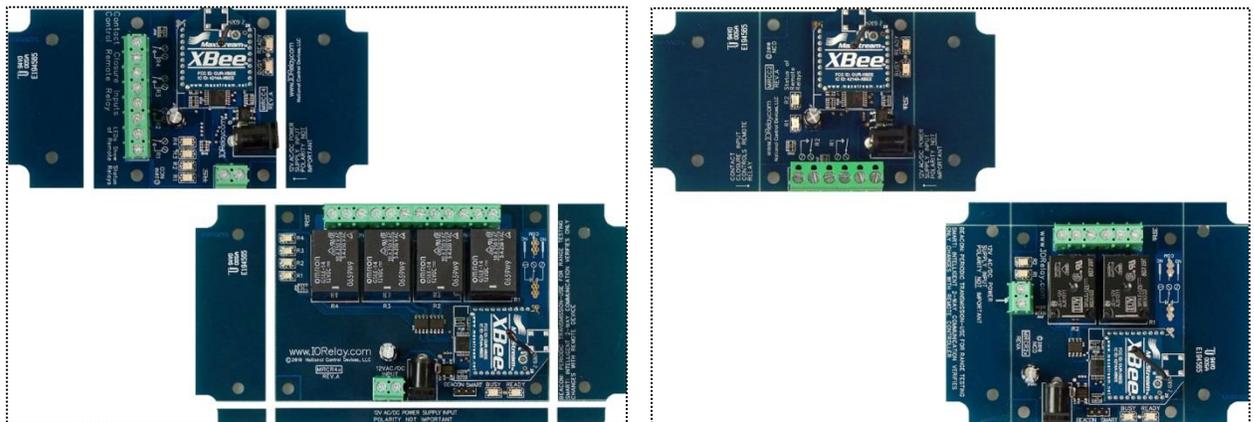
Break-Away Tabs

Physically, most MirC controllers are actually 2 sizes. When you receive your MirC, the unusual shape and size ensures the MirC can fit into a standard enclosure. Optionally, you can make the controller smaller by breaking away the out tabs. Break Away tabs are useful in applications where space may be a concern. This allows your MirC to offer the same functionality in the smallest possible profile. Break Away tabs are unique to the NCD product line and are a standard option for most devices released in 2010 and later.

Before breaking the tabs on your controller, please be advised that your MirC controller will not be returnable for refund or credit if the Break Away Tabs have been removed.

To break away the tabs, gently but firmly grab each break-away tab with a pair of pliers and bend the tab back and forth until it breaks away from the main circuit board. This will NOT damage the controller in any way.

Breaking the Tabs from a controller DOES NOT VOID the warranty. Please see the [NCD return policy if you would like more information on the policies that apply to Surface Mount devices.](#)



Communication Overview

Sensor Packet Breakdown

The packet transmitted by the controller contains 22 bytes of data. Below is a breakdown of the packet:

Byte Position

Byte	0	1	2-3	4-9	10-17	18	19	20	21
Data Type	Header	ID	F. ver	MAC	User Def.	Status Type	Prior state	Current state	Chk sum

Byte 0 is a header byte. This will always be 180 for PN series products.

Byte 1 is a transmission id. This id will increase 1 increment for each broadcast sent by the controller. Note that this will reset after power cycle.

Bytes 2-3 indicate the controller's firmware version. 01 00 would indicate v1.0

Bytes 4-9 indicate the WiFi module's Mac address. Convert these bytes to Hexadecimal bytes for Mac format.

Bytes 10-17 are user definable. This can be used for any purpose required by the customer. These bytes can be customized under Scratch pad memory in Base Station.

Byte 18 indicates the transmission data type. For current PN products this will be 1 indicating this is the status of contact closure inputs.

Byte 19 indicates the status of inputs prior to the input status change which triggered this notification.

Byte 20 indicates the status of inputs after the input status change which triggered this notification.

Byte 21 is a checksum for the whole packet. See API Codec guide which explains how this check sum is calculated.

Direct query command set

The only command required for this product is to query the status of the inputs if needed. This may need to be done after a server reboot in order to get the current status of inputs on the controller. This will be done via a TCP socket connection to the controller's IP address on the port number configured in the Listening Port field during WiFi module setup in Base Station. While these are technically A/D inputs we are simply using them as contact closure inputs. All inputs are pulled low on the controller so if the input is not tripped its value will be 0. When the input is tripped it will be pulled high and its status will be 255. It is recommended that you assume any input above 200 is tripped with a contact.

Reads the 8-Bit Analog Input of Channels

This command will read the Analog Input value of the specified input and return a value from 0-255.

Send Bytes:	Byte 1:	Byte 2:
Function:	Command	Parameter (Channel 1-8)
Decimal Values:	254	150-157
Hex Values	0xFE	0x96 - 0x9D

Receive Byte:	Decimal:	0-255
	Hex:	0x00-0xFF

Multi Channel 8-Bit

Reads all 8 Analog Input Channels and replies with 8 bytes indicating the 8-bit value of each Analog Input.

Send Bytes:	Byte 1:	Byte 2:
Function:	Command	Returns AD1 - AD8
Decimal Values:	254	166
Hex Values	0xFE	0xA6

Receive Byte:	Decimal:	0-255 (AD1-AD8)
	Hex:	0x00-0xFF

Advanced Configuration

Input Configuration

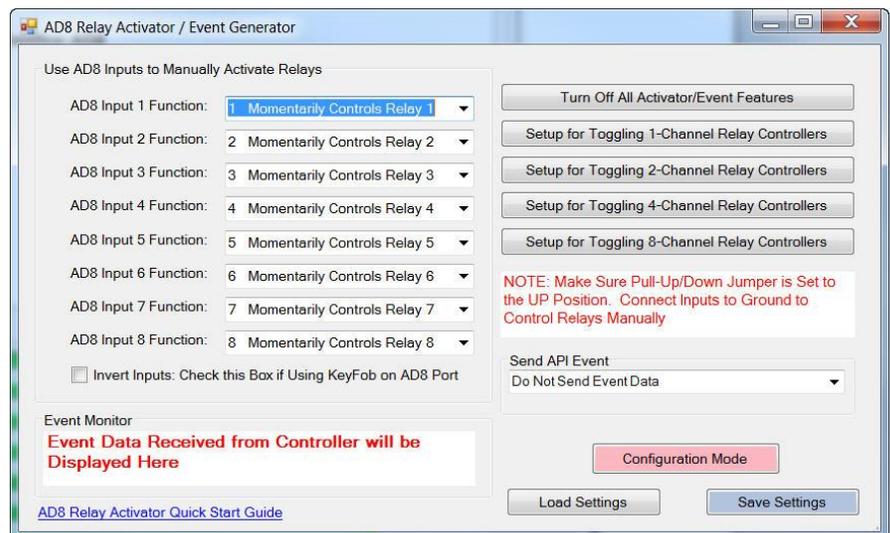
Inputs on PN series controller can be configured to send notifications when the input is opened or closed, only when they are closed, or only when they are opened. This configuration is done through Base Station as follows:

Step 1: Open Base Station, Select the Network Radio button on the Select Connection window. Enter the IP address of the WiFi module in the IP address text field. Enter the Port defined as the TCP Listener port in the WiFi module (by default this is set to 2101). Then click the OK button below.

Step 2: Base Station will communicate to the controller and display a window with control software options. Select AD8 Relay Activator/Event Generator.

Step 3: The AD8 Relay Activator/Event Generator window will now be displayed. You will notice that each input can be tied to a function. The functions are labeled for controlling relays but just know that rather than switch a relay we will be triggering the notification. Inputs should only be set to momentary or toggle at this time. If Input 1 function is being configured you may set to Momentarily Control Relay 1 or Toggle Relay 1. Do not set it to any other feature or set it to a different relay number as this will cause confusion.

Step 4: Once settings are configured click the save settings button in the bottom right corner to save the changes to the controller.



User Definable Transmitted Bytes

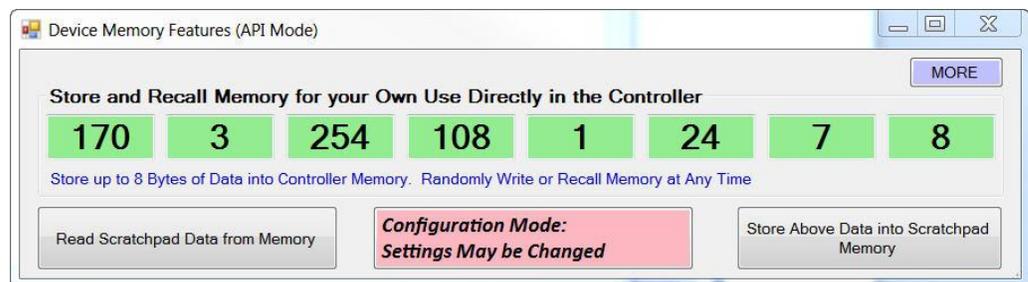
8 bytes in the Notification packet are definable by the user. These bytes can be used in any way required by the user. Configuration of these bytes is done using Base Station as follows:

Step 1: Open Base Station; Select the Network Radio button on the Select Connection window. Enter the IP address of the WiFi module in the IP address text field. Enter the Port defined as the TCP Listener port I the WiFi module (by default this is set to 2101). Then click the OK button below.

Step 2: Base Station will communicate to the controller and display a window with control software options. Select Scratchpad Memory Command Set.

Step 3: A new window will appear with 8 byte positions. The user may change any of the 8 bytes as required.

Step 4: After configuration is complete click the Store Above Data into Scratchpad Memory to store the changes into the controller.



Troubleshooting

Problem: Zigmo device does not appear in drop down Com Port box in Base Station.

Fix: Make sure USB cable is good. USB LED on Zigmo should be on solid. If not download driver from FTDI here:

http://www.ftdichip.com/Drivers/CDM/CDM20830_Setup.exe

Problem: WiFi module will not associate with network.

Fix: Make sure the Network SSID does not contain a Space such as My Network (This should be changed to My_Network). Temporarily disable network security, there are known compatibility issues between WiFly modules and WPA security.

Problem: Broadcast transmission from controller is not received on server/computer.

Fix:

- Make sure you do not have any type of antivirus software which could block TCP/UDP sockets (McAfee is known for this).
- Windows firewall can also sometimes block these socket connections, you can open a port number in Windows Firewall under configuration.
- Check Settings in module for server connection. Ensure server is listening on the transmit port used by the controller.
- Make sure WiFi module is associated with network, the flashing green LED on the module indicates valid connection with the network.
- If server/computer is on a remote/sub network (separate network from the module) make sure port forwarding is configured correctly.
- Make sure sensor connected to controller is functioning properly using a continuity tester (volt meter).

Technical Support

Technical support is available through our website, controlanything.com. **AccessNCD** is the way we connect NCD engineers to our customers.



*Click on the **AccessNCD** button located on the top right of the header of each page of our website.*

For technical support and application information, contact Travis Elliott, our technical engineer. If you feel that you have discovered a bug in the firmware of our controllers, contact Ryan Sheldon, our hardware developer. If you have programming-related questions or have discovered a bug in our software, please contact Shirui Xu, our software engineer.



Click the 'Tech Support Staff' tab and click on the appropriate engineer link for assistance. Click on our 'Forum' tab if you would like to post publicly or review problems that other customers have had and our recommended solutions.

Our engineers monitor questions and respond continually throughout the day. Before requesting telephone technical support, we ask that customers please try to resolve their problems through **AccessNCD** first. However, for persistent problems, NCD technical support engineers will schedule a phone consultation.

Contact Information

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Open 9 a.m. - 4 p.m. CST

All orders *must* be placed online at our website, www.controlanything.com

Notice:

The only authorized resellers of NCD products are

- www.controlanything.com
- www.relaycontrollers.com
- www.relaypros.com
- www.amazon.com

All other websites are not authorized dealers; we have noticed some retailers offering our products fraudulently.