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AN-861500

Intrusion Detection & Warning

Document No.: AN-861500, Rev 1.00
Applicable Products: ComView NX(S/M/L/X)
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Introduction

This application note is intended to demonstrate a simple technique in using input and output ports of ComView device to detect intrusion and automatically warn intruder(s) with audible/visual device. This technique can also be used to detect physical tampering of equipment (as in equipment theft detection) based on its vibrations due to movement.

This application note focuses mainly on Inputs app alarm configuration and its functional description to help users get familiar with how this app is used and apply it to other monitoring applications.

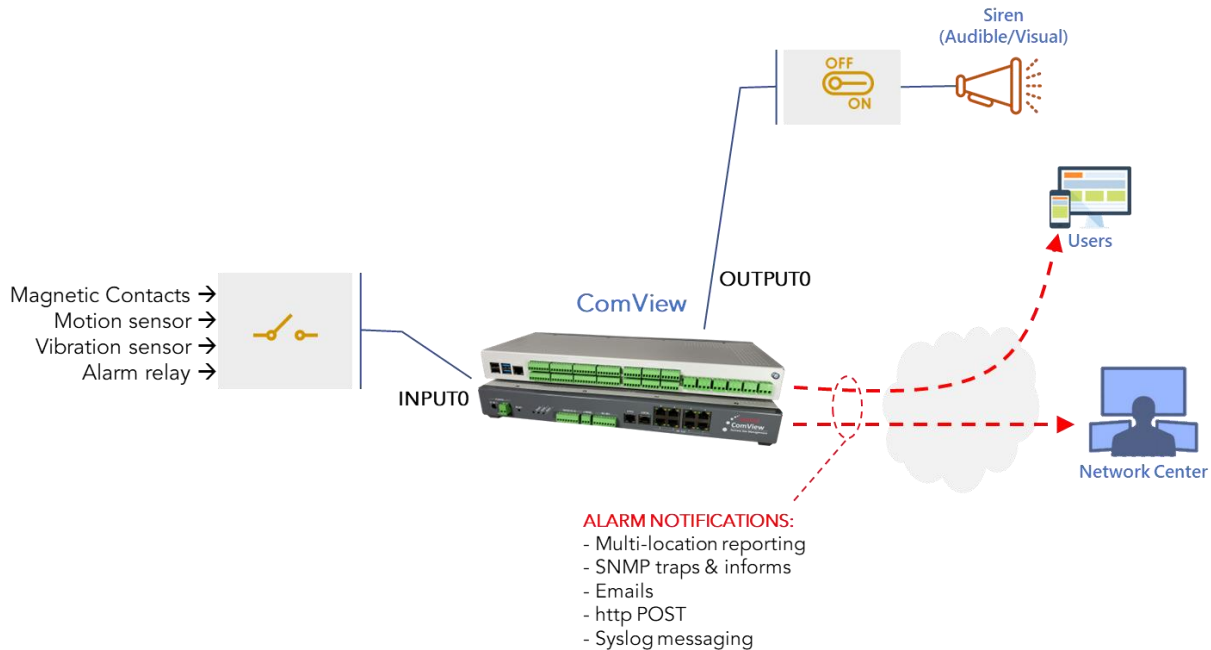
This application note does not provide detailed description of how to use ComView, its connectivity and configuration, and other supporting information, as these are beyond the scope of this document. Refer to other resources for more details.

References:

- [1]. ComView - User Guide
- [2]. ComView - Configuration Parameters

Setup Overview

The diagram below illustrates the setup used in this application note.



Intrusion Detection & Warning Setup

In this setup,

- INPUT0 is used to detect contact input from external sensor. This sensor can be magnetic contacts, motion sensor output relay, vibration sensor, or alarm relay from any sensor used. Note that only INPUT[0..3] of ComView NX can be used with vibration sensors due to their frontend hardware support.
- OUTPUT0 is used to control external audible/visual device with siren as shown in the diagram by switching on its power supply. Note that ComView NX output ports are relay-driven outputs with SPDT (1 FORM C), 10A/250VAC rated general purpose relays.

Our goal (as an example) is to set up ComView device to monitor INPUT0 for Low (0) state for closed contacts for 5 seconds as an alarm condition and set OUTPUT0 to Low (On) on alarm for 2 minutes and 30 seconds to energize its relay to turn on the siren.

Inputs App

Inputs app lets users monitor the states of relay contacts from various external devices, such as magnetic contacts, smoke alarm, motion alarm, sensor output relays, equipment alarm relays, and other dry contact-based sensors/systems. Depending on ComView NX model, up to 36 inputs are available (4 non-isolated and 32 isolated) for connecting to external devices to be monitored.

Users can define the following parameters, relevant to this application note:

Polling Interval

This is the time interval in seconds (default 1) that the app reads the states of all input ports. For each read, it samples all inputs 5 times with a sampling interval of 5mS. After sampling, the app performs a majority vote on the state High (1) or Low (0) on the 5 samples for each input. The input is assigned a state that has a majority count. This assigned state is then reported as the final state for that input. This sampling is used as contact debounce, which is based on a typical relay contact bounce period of less than 5mS.

Alarm Conditions

This consists of the input state (High or Low) and alarm trigger, which can be defined as edge (state transition only) or timed duration (sustained state)

In response to an alarm condition, users can define the following actions for the application to take automatically:

- Deliver alarm to a single or multiple locations/users using email, SNMP trap/inform, HTTP POST, and Syslog notifications
- Activate output relay(s), such as turning On/Off power, audible/visual warning devices, or other controls
- Execute user-specific bash script pre-programmed to perform specific tasks such as logging in equipment being monitored (e.g., via serial console port) to auto administrate it

For auditing purposes, Inputs app logs the input states in CSV-formatted records with timestamps in its raw data file that can be automatically pushed to a remote server for storage and/or further user-specific data processing.

Configuration

You can configure Inputs app using one of the following:

- Online web interface
- Online editing of text-based device configuration file
- Uploading device configuration file

In this application note, we use web interface to define alarm condition 0 to detect INPUT0 for Low state for at least 5 seconds and set OUTPUT0 to 'On' for 2 minutes and 30 seconds to meet our goal as stated previously.

To do this, you log on ComView via its web interface and navigate to 'CONFIGURATION -> INPUTS APP'. For ease of use, an app is configured on one web page only. The section of interests is shown in the screenshot below. Click and set values in the fields accordingly.

csstel ComView

INPUT ALARM DEFINITIONS

*Input alarm condition is defined using the following logic:
Condition= when (input) detects (state) for (duration), set (output) to (state) for (duration) and take (action), log event as (description)*

Select Conditions: 0-9

Condition	Input	Detects	For (MM:SS)	Set Output	To	For (MM:SS)	And	Description
0	0	Low	00:05	0	On	02:30	Alarm	Intrusion detected at zone 0
1	0	Low	00:05	X	X	00:00	Script	Intrusion task script
2	0	None	00:02	X	X	00:00	None	
3	3	None	00:02	X	X	00:00	None	
4	4	None	00:02	X	X	00:00	None	
5	5	None	00:02	X	X	00:00	None	
6	6	None	00:02	X	X	00:00	None	
7	7	None	00:02	X	X	00:00	None	
8	8	None	00:02	X	X	00:00	None	
9	9	None	00:02	X	X	00:00	None	

If 'Script' is selected for a condition above, enter its script filename below:

Condition	Script Filename
0	/home/cvuserapps/alarmscript.sh
1	/home/cvuserapps/intrusionruntask.sh
2	
3	
4	
5	
6	
7	
8	
9	

Refresh Apply

Inputs app implements the following expression to help users define an alarm condition more clearly and easily:

Condition= when (**input**) detects (**state**) for (**duration**), set (**output**) to (**state**) for (**duration**) and take (**action**), log event as (**description**)

The expression above is then mapped to columnar format for user entries as shown in the screenshot. These columns have the following syntax and usage:

Input: Dropdown list [0..35] to select input port number 0 to 35 (we selected 0)

Detects: Dropdown list [None, Low, High] to define input alarm state (we selected Low)

- None: Condition not used. Default value to mark the end of list of conditions. Subsequent conditions, if defined, will be ignored.
- Low: to monitor for Low state (signal read as '0') as alarm condition
- High: to monitor for High state (signal read as '1') as alarm condition

For (MM:SS): in MM:SS format for Min:Sec, the time duration to validate the input state for alarm condition (we set to 00:05):

- Valid time range is [00:00 - 59:59]
- Value 00:00 acts as an edge-trigger condition, i.e., alarm is validated immediately on change of input state

Set Output: Dropdown list [X,0..5] to select output number to set when an alarm is detected (we selected 0):

- X: for 'not used' (i.e., no output selection)
- 0..5: to use Output[0..5]

To: Dropdown list [X, On, Off] to select the state to set the selected output port (i.e., output relay) on detected alarm (we selected On):

- X (uppercase): for no change to current state
- On: to set output to On; i.e., output relay is energized
- Off: to set output to Off; i.e., output relay is deenergized

For (MM:SS): in MM:SS format for Min:Sec, the time duration to set output state (we set it to 02:30):

- Valid time range is [00:00 - 59:59]
- Value 00:00 sets the output state without resetting it

And: Dropdown list [None, Alarm, Script] to select action to take on alarm condition (we selected Alarm to also report alarms in addition to setting output):

- None: no action to take
- Alarm: send alarm notifications via methods enabled
- Script: full pathname to user-specific bash script file (e.g., '/home/cvuserapps/myscript.sh') to execute immediately on alarm condition

Description: user description of input condition (we entered 'Intrusion detected at zone 0'):

- Up to 30 characters (including space)
- Comma ',' not allowed (since comma is used as data field separator)

Note that you can trigger multiple outputs to control other onsite devices/systems and/or run your script to carry out specific functions by defining additional conditions using the same INPUT0 alarm detection. Similarly, you can activate one warning device from various input alarm conditions. Generally, one input can drive multiple outputs or multiple inputs can drive a single output.

Summary

This application note illustrates how ComView can be easily configured using its simple web page to detect intrusion alarm and activate a warning device. More broadly, with the description of how Inputs app detects input alarm using its simple logical expression, users can readily apply it to other monitoring requirements based on contact sensing.

About CSSTEL

CSSTEL is a privately held developer and manufacturer of ComView hardware and software solutions for secure, remote infrastructure site management since 1997 with installations in over 30 countries around the world.

We offer ComView solutions that are scalable and customizable to monitor and manage virtually the entire spectrum of remote site infrastructure and site conditions.

We help telecom service providers, carriers, financial institutions, healthcare providers, government agencies, utilities, and other public and private sector organizations maintain constant visibility and control over their remote site infrastructure.



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Revision History

Revision	Date	Description
1.00	2023-01-08	Initial release

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