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## SATEL NMS PC Monitoring

### HOWTO Configure triggers and actions

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#### Document version

Version	Created by	Date	Description
V0.1	Samuli Aura	30.10.2007	First version
V0.2	Samuli Aura	5.11.2007	Added new variables, modified example using new variables, minor updates
V0.3	Samuli Aura	15.11.2007	Added email sending. Renamed document

## 1 Introduction

### 1.1 Purpose of the document

This document describes Triggers and Actions and shows with an example how to configure the SATEL NMS PC system to

- write custom log files based on triggers and actions.
- send Email alarms

### 1.2 Software used

The network was designed and all configuration settings were made using SATEL NMS PC Setup V2.0.3. The log was created by SATEL NMS PC Monitoring V2.0.3.

## 2 Designing the network

A simple two-modem network was designed for the demonstration using SATEL NMS PC Setup. The usual network design method, following the To-Do list, was used. This step is skipped to keep this document concise. Please refer to SATEL NMS PC documentation. The resulting network topology is seen in Figure 1.

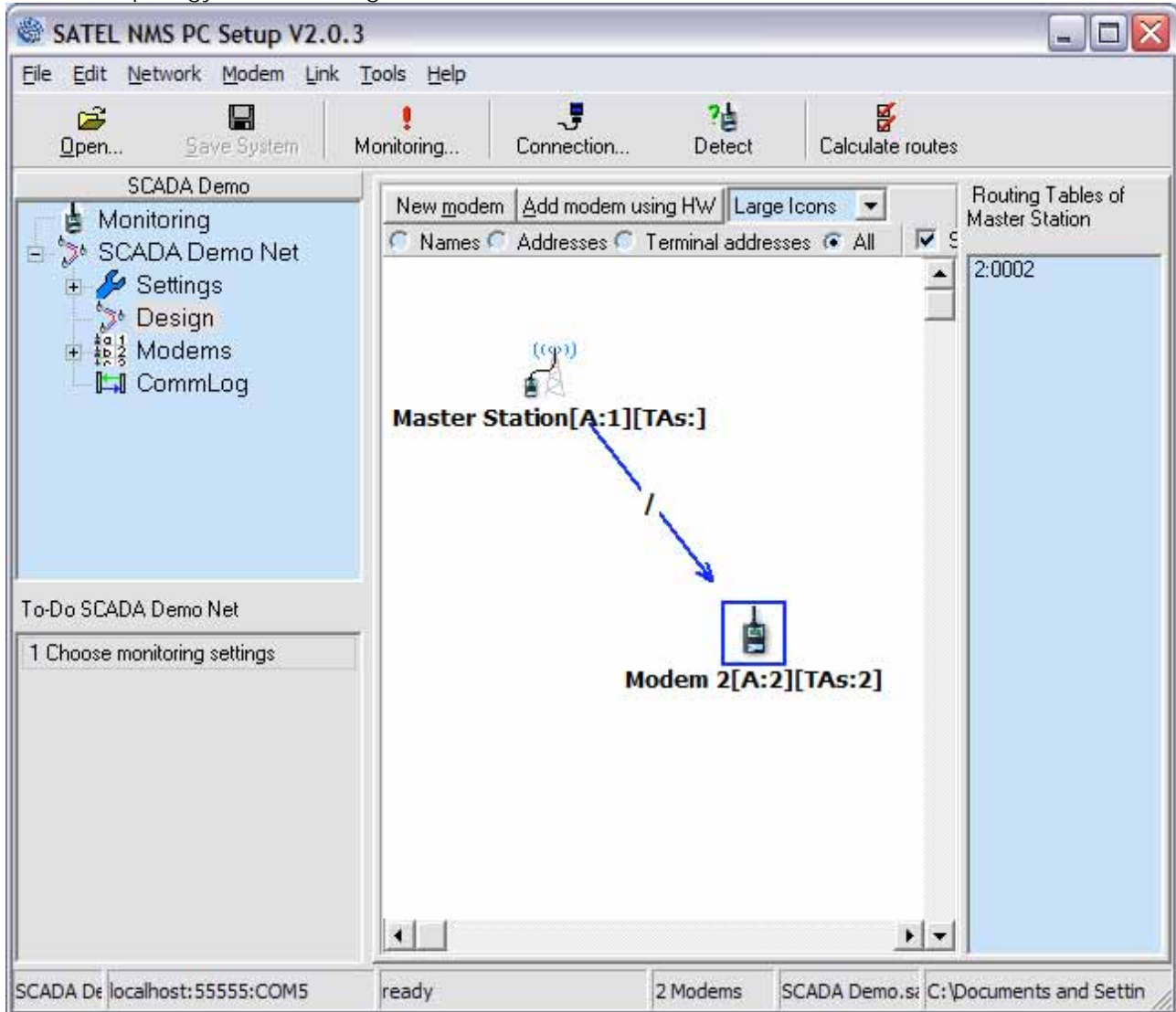


Figure 1

### 3 Defining Monitoring Settings

The Monitoring Settings View (Figure 2) is used to define all monitoring settings, including the custom log file settings.

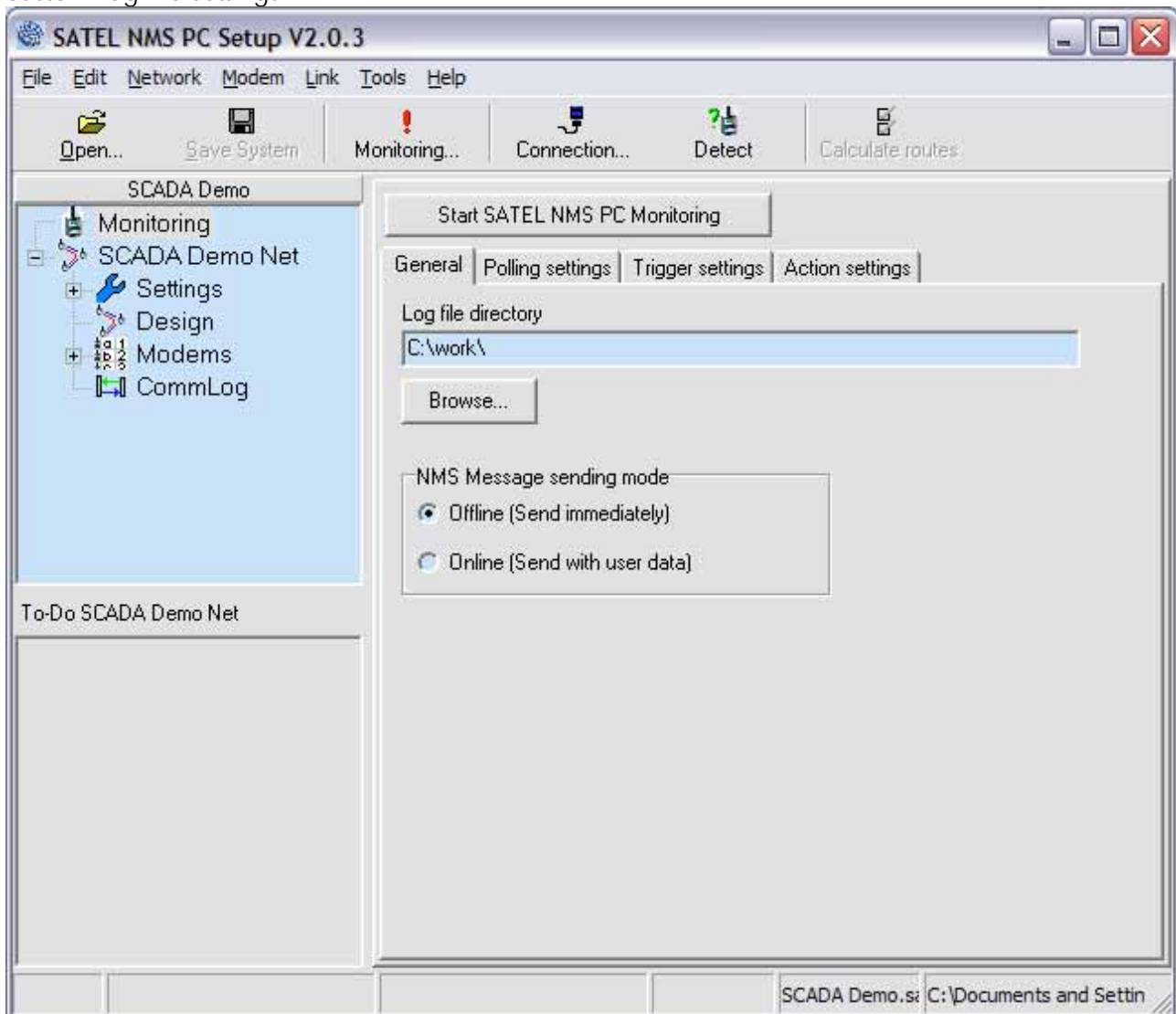


Figure 2

#### 3.1 General Monitoring Settings

The "General" tab in the Monitoring Settings View (Figure 2) has two settings:

- Log file directory
- NMS Message sending mode

NOTE: This log file directory setting ONLY affects the directory where the default SATEL NMS PC Monitoring log files are stored. These log files contain all information received from the NMS modem network, and are different from the Custom log files that will be defined later in this document.

- Use "offline" mode when there is no DATA traffic.
- Use "online" mode when there is DATA traffic.

### 3.2 Polling Settings

In this tab (Figure 3) the polling settings are defined.

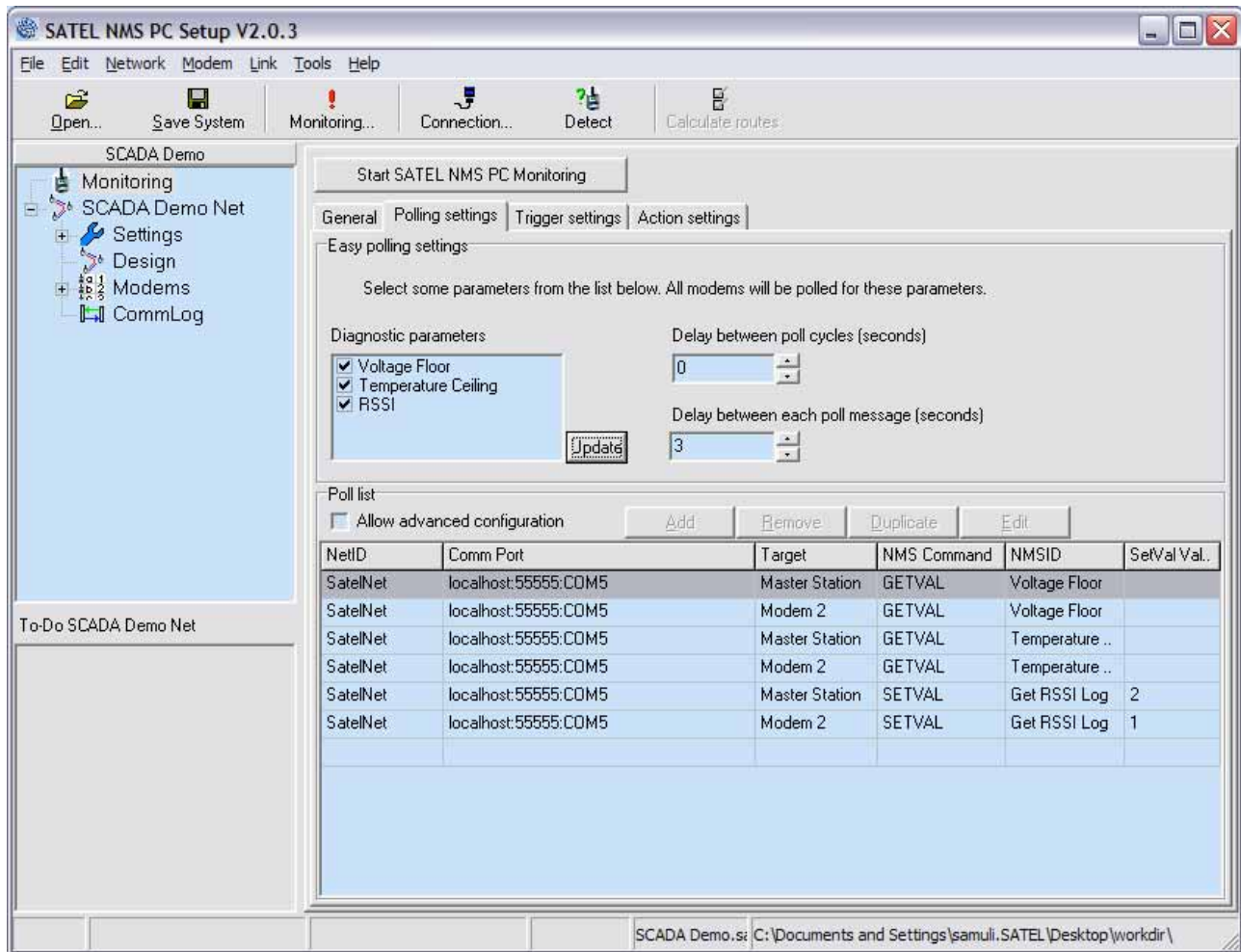


Figure 3

A typical configuration is to select all three parameters in the “Diagnostic parameters” box, after which the program automatically updates the *Poll list*. The poll list shows the order in which the various parameters are requested from the modem network by SATEL NMS PC Monitoring, when the monitoring is started.

In the example configuration Modem Temperature and Voltage parameters are monitored, as well as link RSSI in both directions.

### 3.3 Trigger Settings

The trigger settings tab (Figure 4) shows defined triggers and allows adding, removing and editing triggers.

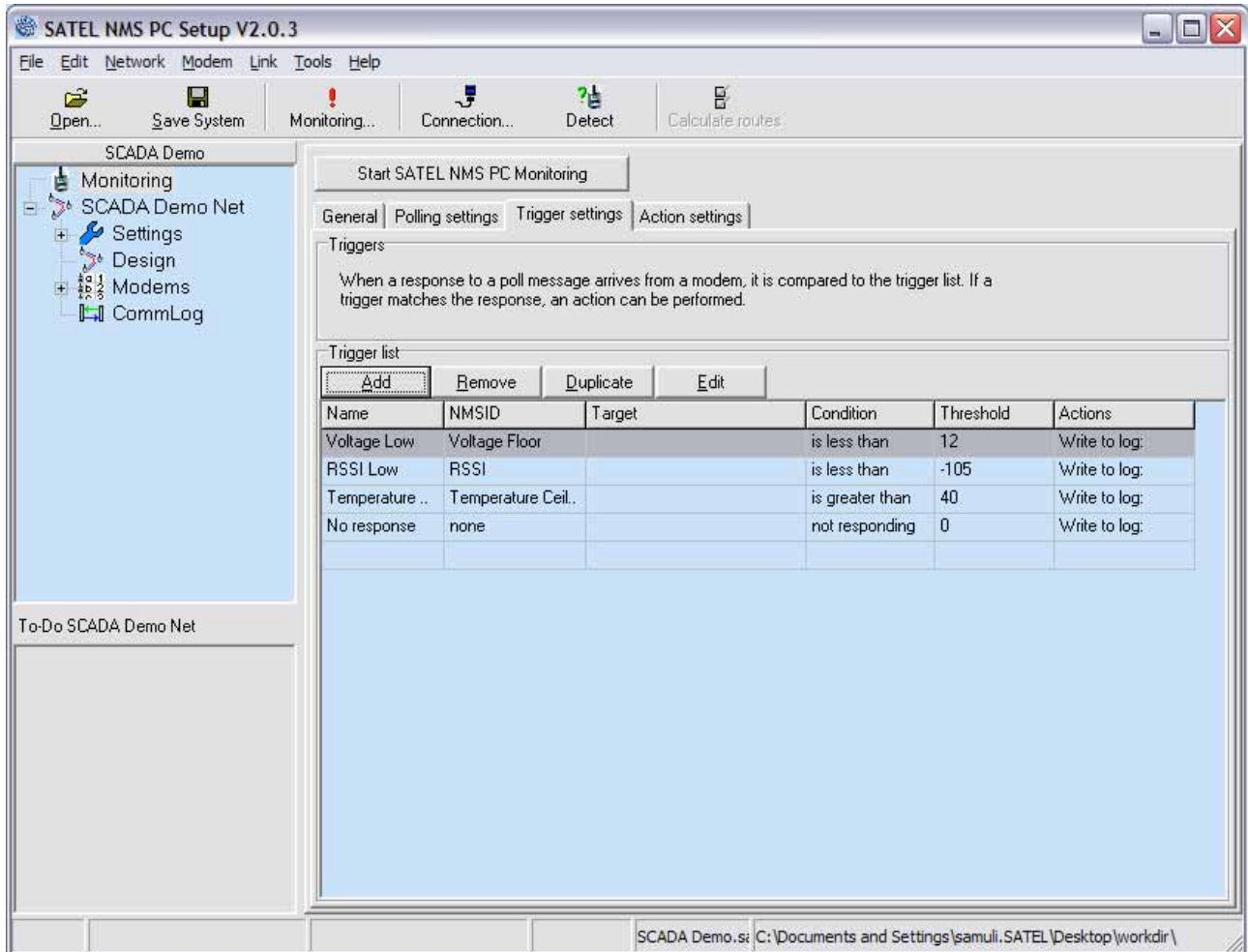


Figure 4

A Trigger specifies a condition which, if it exists in the network, will cause an Action to be executed and/or an alarm to be activated inside SATEL NMS PC Monitoring.

Every Diagnostic message (NMS message response) received as a response to a poll message from the modem network will be compared against all the defined Triggers. If a Trigger matches the response, the Action(s) specified in the Trigger is executed.

#### 3.3.1 Editing a Trigger

When "Add" or "Edit" button in the Trigger settings tab is clicked, the *Edit trigger* Dialog (Figure 5) appears.

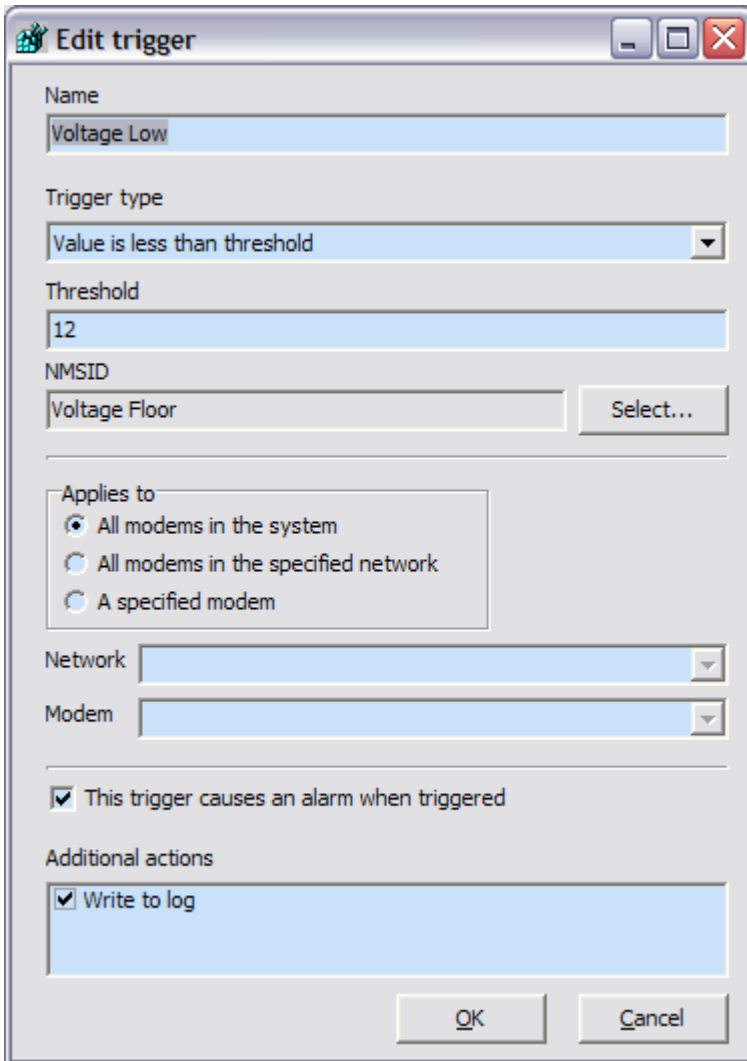


Figure 5

### 3.3.1.1 Name

This is a freely chosen string which is used to name the trigger.

### 3.3.1.2 Trigger type

This setting specifies what kind of comparison is made when the trigger is compared to a value received from the network

Setting	Description
Value is less than threshold	The Trigger matches if a received NMS Parameter has the same NMSID as this trigger AND the NMS value is less than the specified threshold
Value is greater than threshold	The Trigger matches if a received NMS Parameter has the same NMSID as this trigger AND the NMS value is greater than the specified threshold
A NMS Message timeouts	The Trigger matches if an NMS query sent to the network does not receive a response. NMSID and Threshold are ignored in this case.

### 3.3.1.3 Threshold

A number the received value is compared to determine if the Trigger matches.

### 3.3.1.4 NMSID

The trigger is only compared to received values with the same NMSID as in the Trigger definition. Click the "Select" button to select the NMSID.

NOTE: A Trigger will never match if the same NMSID does not exist in the *Poll List*. (Because in that case the value is never received from the network)

### 3.3.1.5 Applies to

Which modems the trigger applies to.

It is usual to select all modems in the system, but in some cases it may be useful to match a trigger only to values received from a specific network or modem. For example, it may be permissible for some substations to reach temperatures of 40 degrees, but important repeaters and master modems must remain at 35 degrees or below. (Note: these are arbitrary numbers used as an example only.)

In these cases, specific triggers may be defined for each different case.

### 3.3.1.6 This trigger causes an alarm when triggered

This setting causes an alarm in SATEL NMS PC Monitoring when the Trigger matches. The alarm is shown in the alarms view of Monitoring, a red message is displayed in the window and an alarm log is written into the directory specified in General Monitoring Settings (3.1)

### 3.3.1.7 Additional Actions

Select all Actions that should be executed when the Trigger matches.

NOTE: This list is empty until some Actions have been defined in the Actions tab of Monitoring Settings.

### 3.4 Action Settings

Action settings are defined in the Action settings tab (Figure 6)

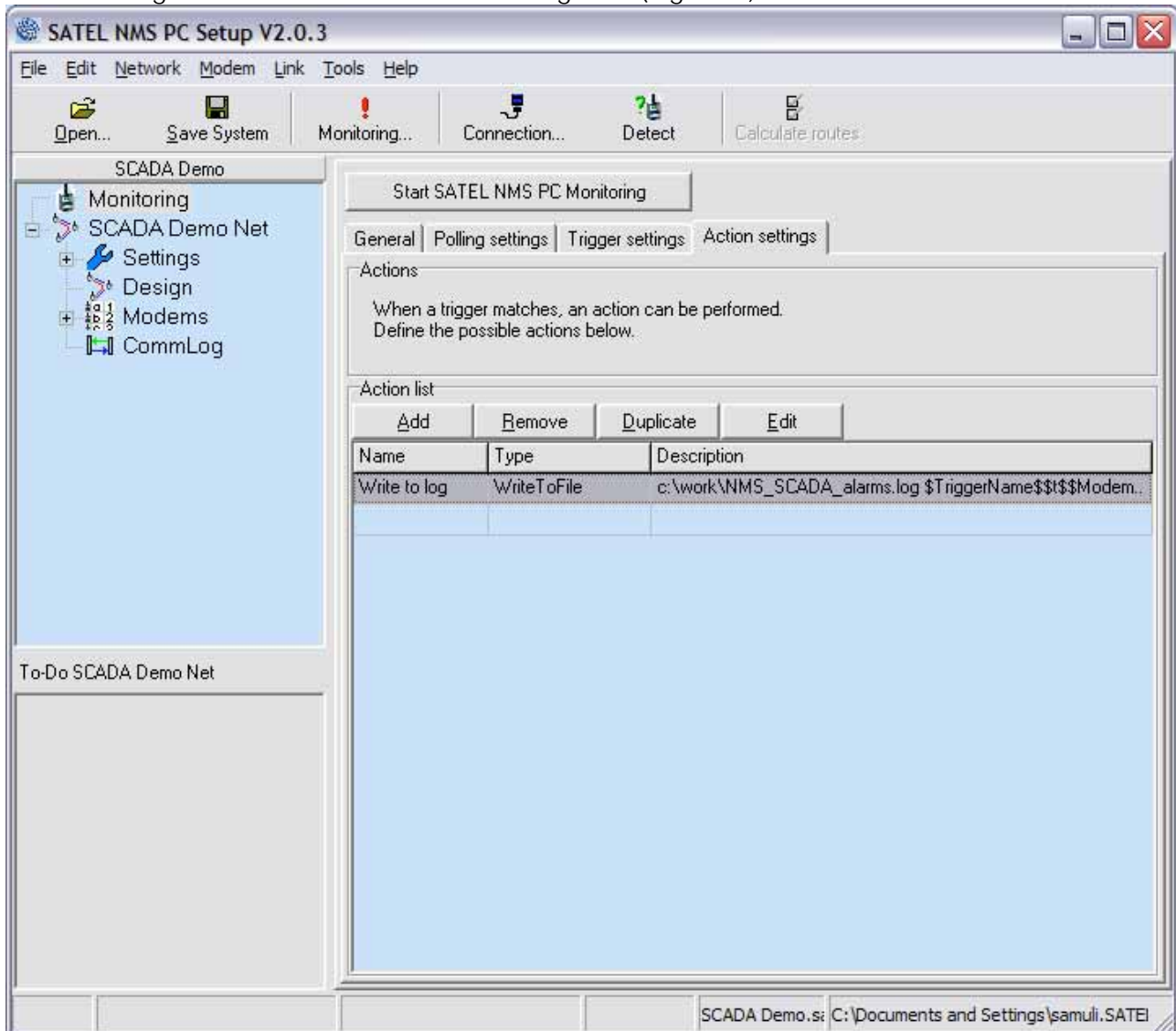


Figure 6

Similar to Triggers, Actions may be Added, Removed, Edited and Duplicated in this view using the buttons.

#### 3.4.1 Adding an Action

When "Add" button in the Action settings tab is clicked, the *Action definition* Dialog (Figure 7) appears. Note that if the "Edit" button is clicked the view is slightly different because the type of an action cannot be changed after it has been created.

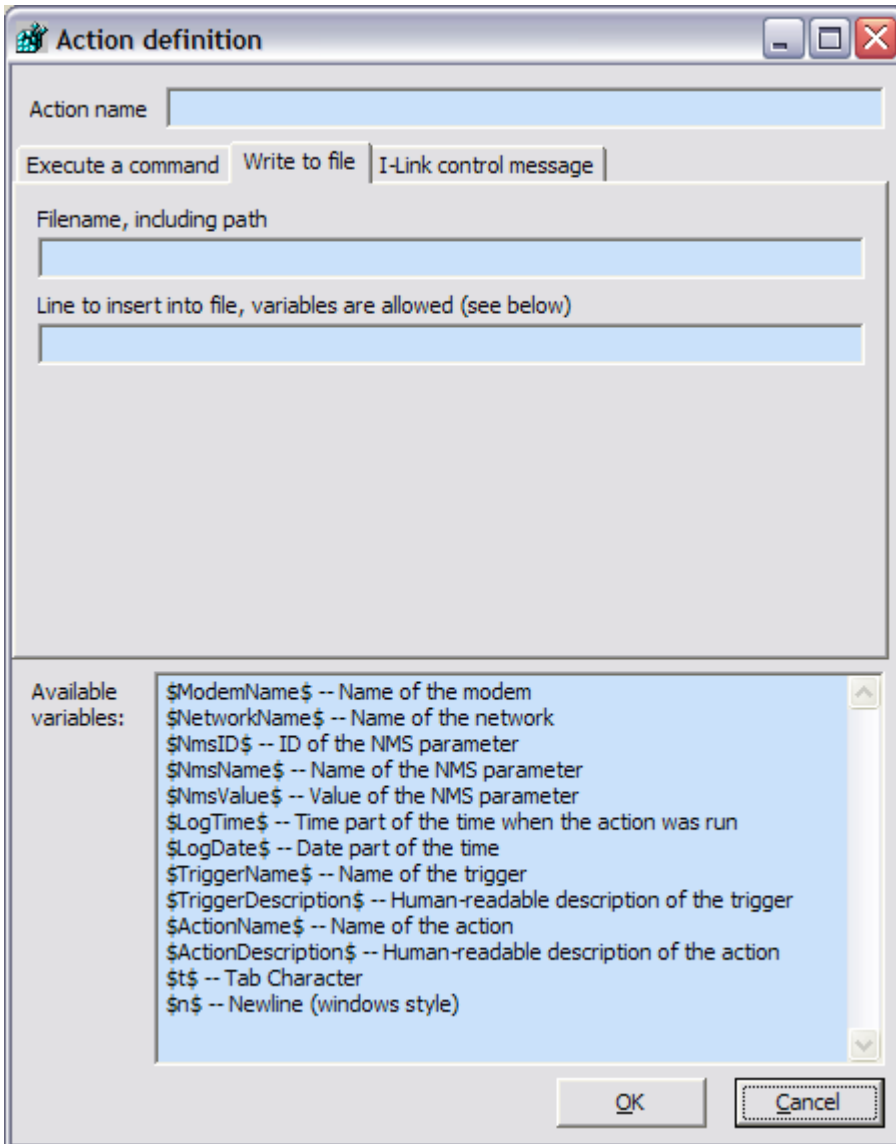


Figure 7

### 3.4.1.1 Action name

This is a freely chosen string describing the Action.

### 3.4.1.2 Tabs: Execute a command and Write to file

Select the action type by selecting the appropriate tab.

Tab	Description
Execute a command	A command line command is executed.
Write to file	A text string will be written into a file.
I-LINK control message	<i>Not supported as of SW V2.0.3</i>

### 3.4.1.3 Filename

The full name, including path, of the file where the log line is written. The file will be opened, written into, and then closed immediately.

### 3.4.1.4 Line to insert into file

The text that will be written into the file. A Windows-standard line feed will be added automatically. The text may consist of **any text** and/or any number of the **variables** defined below.

### 3.4.1.5 Available variables

These variable names may be used on the Line field. The variable will be replaced by the appropriate value when the log line is written into the file.

Variable	Description	Examples
\$t\$	Tab Character	
\$n\$	Additional Newline (windows style linefeed)	
\$ModemName\$	Name of the modem	<i>Master Station</i>
\$NetworkName\$	Name of the network	<i>SCADA Demo Net</i>
\$NmsID\$	ID of the NMS parameter	<i>1.86</i>
\$NmsName\$	Name of the NMS parameter	<i>Temperature Ceiling Voltage</i>
\$NmsValue\$	Value of the NMS parameter	<i>28</i>
\$NumValue\$	Numeric value Including the minus sign if the value is negative and a decimal point and an appropriate number of decimals if applicable	<i>12 -10.2 -105</i>
\$LogTime\$	Time part of the time when the action was run. hh:mm:ss:msec	<i>13:55:53:0354</i>
\$LogDate\$	Date part of the time. yyymmdd	<i>20071030</i>
\$TriggerName\$	Name of the trigger which executed this action	<i>Voltage Low</i>
\$TriggerDescription\$	Human readable description of the trigger, including most of the other parameters	
\$ActionName\$	Name of the action	<i>Write to log</i>

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\$ActionDescription\$	Human readable description of the action, including most of the other parameters	
\$Unit\$	The unit of the parameter in short form. Not all parameters have an unit	V C dBm
\$OtherModem\$	The modem which originated the transmission whose signal strength was measured by \$ModemName\$. Applicable only with the RSSI NMS Parameter, otherwise this will be an empty string.	Modem 2

## 4 Custom Log File: Example Trigger and Action definitions

These example settings cause the following functionality:

- Diagnosed parameters are
  - Voltage of each modem
  - Temperature of each modem
  - RSSI of each link in both directions
- An entry will be written in a *Custom Log file* when (and ONLY when):
  - The Voltage of a modem drops below 12 Volts
  - The Temperature of a modem rises above 40 degrees Celsius
  - The RSSI of a Link drops below -105 dBm
  - An NMS message timeouts
- The filename of the custom log file is "C:\work\NMS\_SCADA\_alarms.log"

### 4.1 Polling settings

These settings are defined in the Polling settings tab (3.2).

All three Diagnostic parameters are checked. Other settings are left as they are.

### 4.2 Actions

One Action, "Write to Log" will be defined. This is done first, so that the Action may be added straight away to the Trigger definitions.

Use the Action settings tab (3.4). Click Add and use the following values:

<b>Action name</b>	Write to Log
<b>File name</b>	c:\work\NMS_SCADA_alarms.log
<b>Line to insert</b>	\$TriggerName\$\$ModemName\$\$NmsName\$\$NmsValue\$\$LogTime\$\$LogDate\$

The line consists of the following variables, separated by ASCII tab characters: TriggerName, ModemName, NmsName, NmsValue, LogTime, LogDate. A linefeed is automatically added after every line written into the log.

The line could also have included any text, additional linefeeds and/or multiples of the same variable.

### 4.3 Trigger settings

Four triggers will be defined. This is done in the Trigger settings tab (3.3). Click "Add" and select the correct values according to the following table. Then Click OK and repeat for the next Trigger.

Name	Type	Threshold	NMSID	Applies to	Cause Alarm	Actions
Voltage Low	less than	12	Voltage Floor	All modems in system	Yes	Write to Log
RSSI Low	less than	-105	RSSI			
Temperature High	greater than	40	Temperature Ceiling			
No response	NMS msg timeouts	0	-			

#### 4.4 Example log file

To create this example, the settings defined in chapter 4 were loaded into SATEL NMS PC Monitoring and the network was allowed to run for a few minutes. At first, modem 2 was without power, which caused the No response entries in the log. The Voltage was kept below 12 Volts for both modems, which caused the Voltage Low entries. The radio connection was poor (No antennas & low TX power), which caused the "RSSI Low" entries in the log.

Voltage Low	Master Station	Voltage Floor	109	13:53:43:0197	20071030
No response	Modem 2	Voltage Floor	No response	13:53:55:0041	20071030
No response	Modem 2	Temperature Ceiling	No response	13:54:09:0432	20071030
RSSI Low	Master Station	RSSI	-109 dBm, From 2	13:54:19:0088	20071030
No response	Modem 2	RSSI	No Response	13:54:23:0822	20071030
Voltage Low	Master Station	Voltage Floor	110	13:54:29:0463	20071030
No response	Modem 2	Voltage Floor	No response	13:54:34:0197	20071030
No response	Modem 2	Temperature Ceiling	No response	13:54:48:0572	20071030
RSSI Low	Master Station	RSSI	-109 dBm, From 2	13:54:58:0213	20071030
No response	Modem 2	RSSI	No Response	13:55:02:0948	20071030
Voltage Low	Master Station	Voltage Floor	109	13:55:08:0604	20071030
No response	Modem 2	Voltage Floor	No response	13:55:13:0338	20071030
No response	Modem 2	Temperature Ceiling	No response	13:55:27:0713	20071030
RSSI Low	Master Station	RSSI	-109 dBm, From 2	13:55:37:0370	20071030
Voltage Low	Master Station	Voltage Floor	110	13:55:42:0698	20071030
Voltage Low	Modem 2	Voltage Floor	107	13:55:47:0448	20071030
RSSI Low	Master Station	RSSI	-109 dBm, From 2	13:55:53:0354	20071030

#### 4.5 Notes

The files used in this example should have accompanied this document.

- NMS\_SCADA\_alarms.log – the log file
- SCADA Demo.sax – the SATEL NMS PC system file

The tab character should be used as a delimiter in the custom log file, since the NMS values may contain other characters typically used as separators, such as commas (,) and semicolons (;). The \$NumValue\$ variable only contains numbers, the minus sign '-' and the decimal point '.'.

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## 5 Send email: Alarm Definitions

This chapter shows example settings which can be used to send email messages

*NOTE: The email sending functionality is not included in SATEL NMS PC. An external email sending application must be used. In this example, a program called sendemail.exe is used. SATEL is not affiliated with the maker of this program in any way, and does not offer user support for the program beyond this document.*

### 5.1 Preparation

Define the network and polling and trigger settings similarly to the previous chapters.

### 5.2 Action setting to send email

Install the sendemail program (<http://caspiandotconf.net/menu/Software/SendEmail/>)

Test the program using the windows shell (Start->Run->cmd.exe) first. When you know which command line options are needed to send email in your environment, you are ready to define the Action.

Go to Monitoring->Action settings tab (see 3.4). Click Add. Select the Execute a command Tab, and fill in the fields.

- Command is the full name including path to the sendemail.exe
- Parameter list is the command line including all the options necessary
  - You may use the SATEL \$variables\$ to include information about the alarm in the email message

The screenshot below gives an example command line.

**Action definition**

Action name

Execute a command

Command

Parameter list, variables allowed (see below)

Available variables:

- \$t\$ -- Tab Character
- \$n\$ -- Newline (windows style)
- \$ModemName\$ -- Name of the modem
- \$NetworkName\$ -- Name of the network
- \$NmsID\$ -- ID of the NMS parameter
- \$NmsName\$ -- Name of the NMS parameter
- \$NmsValue\$ -- Value of the NMS parameter
- \$NumValue\$ -- Numeric value of a NMS Parameter
- \$LogTime\$ -- Time part of the time when the action was run
- \$LogDate\$ -- Date part of the time
- \$TriggerName\$ -- Name of the trigger
- \$TriggerDescription\$ -- Human-readable description of the trigger
- \$ActionName\$ -- Name of the action
- \$ActionDescription\$ -- Human-readable description of the action
- \$Unit\$ -- "V" for Volts, "C" for Celsius, "dBm", etc. as applicable
- \$OtherModem\$ -- The modem which originated the transmission whose signal strength was measured by \$ModemName\$. Applicable only with the RSSI NMS Parameter, otherwise this will be an empty string.

OK Cancel