

# General Description

## Network Management System (NMS)

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|---------------------------------------|--|
| Content:                              | Network Management System (NMS)<br>General Description   |
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| Program version:                      | v3.x / 03.2010   |
| Document version:                     | v1.1 / 02.2013   |
| Manufacturer<br>& registered address: | Strowger<br>344 NW Capital Dr.<br>Lees Summit,<br>MO 64086<br>Phone: (816) 272 1826<br>Fax: (646) 607 1052<br>e-mail: s.vogel@strowger.com<br>web: <a href="http://www.Strowger.com">http://www.Strowger.com</a> |

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# 1 Preface

## 1.1 Highlight

This document describes the Network Management System and the necessary hardware (NEM) and software (Mmonitor) elements.

## 1.2 Structure

The following chapters can be found in this description:

1. Preface  
Basic information about the document contents.
2. General  
System overview and system elements.
3. Device reference  
Electrical parameters, user interfaces, environmental conditions, etc.
4. Installation of the software  
First steps of software installation and connections.
5. Common user interface  
The basic frame of the program.

## 1.3 Revisions

| Release   | Date       | Comments                                     |
|-----------|------------|--|
| NMS3 v1.1 | 15-02-2013 | Adding local monitoring option for DAR / DVR |
| NMS3 v1.0 | 25-04-2012 | Basic description of NMS3                    |

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## 2 General

### 2.1 System overview

The Network Management System has basically 2 accesses to the devices: direct and remote.

The plug-in *Network Element Manager (NEM)* card is able to provide direct and remote supervision possibilities based on IP protocol. Both accesses require a client software installed on the PC or notebook called *Management Monitor program*. It makes the real time monitoring, shows the electric and digital parameters of the connected systems, collects event logs and creates the visual view all of measured parameters.

There is a 3<sup>rd</sup> option for monitoring: connecting the remotely installed equipment directly with an USB-serial converter. With this option the DAR or DVR located on the field can be configured immediately after the fixing without Exchange access, the NEM card is not necessary. With this process it is not possible to monitor the units installed at the Exchange (like RPF card).

## 2.2 Operation method

The NMS concept is the following:

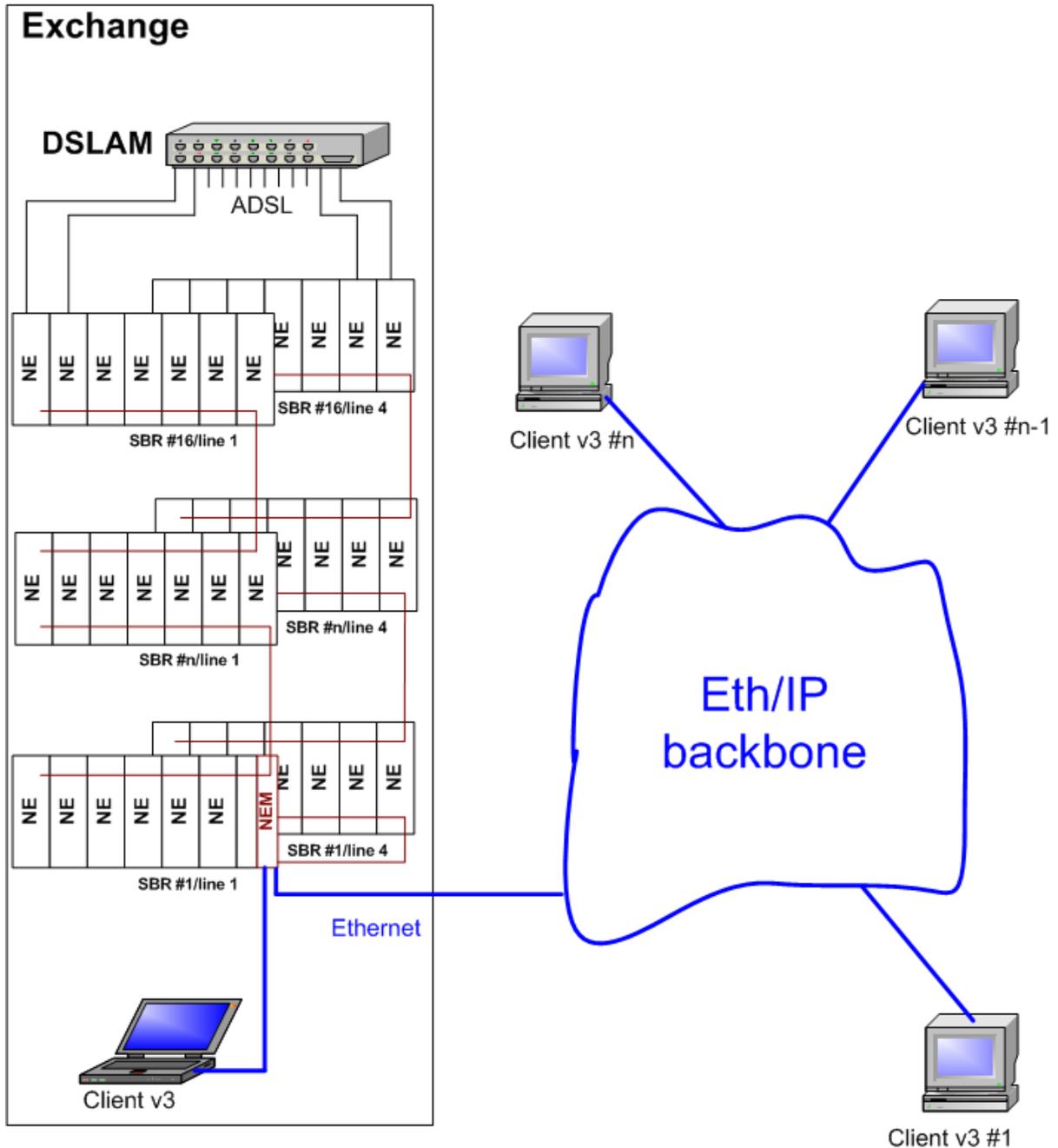


Figure 1. – NMS configuration

The Central Unit (CU) or Exchange Unit (EU) – as the first information node – collects and forwards the events of the complete system to the NEM. The communication inside the system is managed via EOC channel.

The NEM collects and stores the NEM events and all other events coming from the central units. The connection is provided by standard RS485 protocol. The central unit forwards the data immediately to NEM however it is capable of storing the events (if the NEM is unavailable). It has 4096k buffer which is enough to store the events for 2-3 days as average (depends on the event frequents).

The NMS Client program is connected to the NEMs and continuously collects their events. It is done via special protocol (Q77). The information is stored at the server computer. In case of communication loss between the NEM and the computer where the client program runs the NEM stores the events during the fault and all information is forwarded after recovery of the communication link. The buffer size is 12 Mbyte.

The NMS Client can connect the NEM card (with its authentication) and can query the necessary and related data.

The communication link supports to make events available from the total communication line (from remote end to NEM). The events are stored in the server computer and can be displayed at Clients' GUI (inventory data, system basic settings, operational parameters, special settings, alarms at NEs, alarms at lines, etc).

Alternatively – in case of local monitoring purposes – the user can connect the NEM card directly using the monitor program.

The NEM cards have 4 serial communication lines. One communication line can string 16 SBR-14 sub-racks which means 895 slots [(4 lines)x (16 sub-racks)x (14 slots) – NEM slot]. This is maximum 3580 subscriber ports in case of full loading. The server computer with the NMS Server program can connect unlimited number of NEM card.

### 2.2.1 System elements

|          |   |
|----------|---|
| NEM      | Network Element Manager card for local/remote supervision |
| Mmonitor | Client program of NMS                                     |

The NEM card handles the monitoring, configuring features. It has Ethernet interfaces where the PC or IP network can be connected. The related software (Monitor program) provides major controlling functions like:

- monitoring and configuring the systems,
- alarm notification,
- event logging,
- performance and quality statistics.

## 3 Device Reference

### 3.1 General

The NEM card is a connection device between the NEs and client software (Monitor program) and uses real-time multi-tasking OS with TCP/IP protocol stack. It can be plugged-in to the rightmost (14<sup>th</sup>) slot of the SBR-14 sub-rack (see document *GenDesc SBR v1.0*).



*Figure 2. – NEM*

Towards the client Monitor program (PC) it has 2 Ethernet interfaces, one is at Ethernet connector on the sub-rack's backplane (SID) and one is at front panel (RJ45). The sub-rack provides the continuous 4-wires connection to the IP network and the front panel connector can be used for temporarily local access using standard Ethernet cross cable.

The configuration of NEM is possible from the client program.

## Basic features

- TCC
- 128/256 Mbyte SDRAM
- 4/8 Mbyte SST flash
- 16/32Mbit SST flash
- Eeprom
- 2x Ethernet interface
- 4x RS485 interface
- Operation of NEM

### 3.1.1 Ethernet ports

The 2 Ethernet ports are used:

- The sub-rack's Ethernet interface is basically designed for remote connection of the NMS.
- The front panel's RJ45 port is mainly for the local connections (connecting notebook using cross-link Ethernet cable). The remote management is also possible (p.e.: with ADSL router).
- The sw provides the same services on both ports even in parallel operation mode.
- The NEM selects the ports where the query arrived and sends the answers accordingly. It learns not just the NE's addresses but the port numbers, too.

IP access modes:

- Default IP address mode. Factory default IP setting.
- Fix IP address mode. Must require the IP address, the mask and the default Gateway on only one interface.

### 3.1.2 Reset IP settings to factory default

If the user has no any knowledge about the current settings of the NEM card, the default settings can be achieved by pushing the ACK button on the front panel for 30 s or more during power on.

## 3.2 Power consumption

|                    |              |
|--------------------|--------------|
| Input voltage:     | 36 .. 76 Vdc |
| Power consumption: | max 3 W      |
| Power dissipation: | max 3 W      |

### 3.3 User interface

The NEM card has the following user interface.

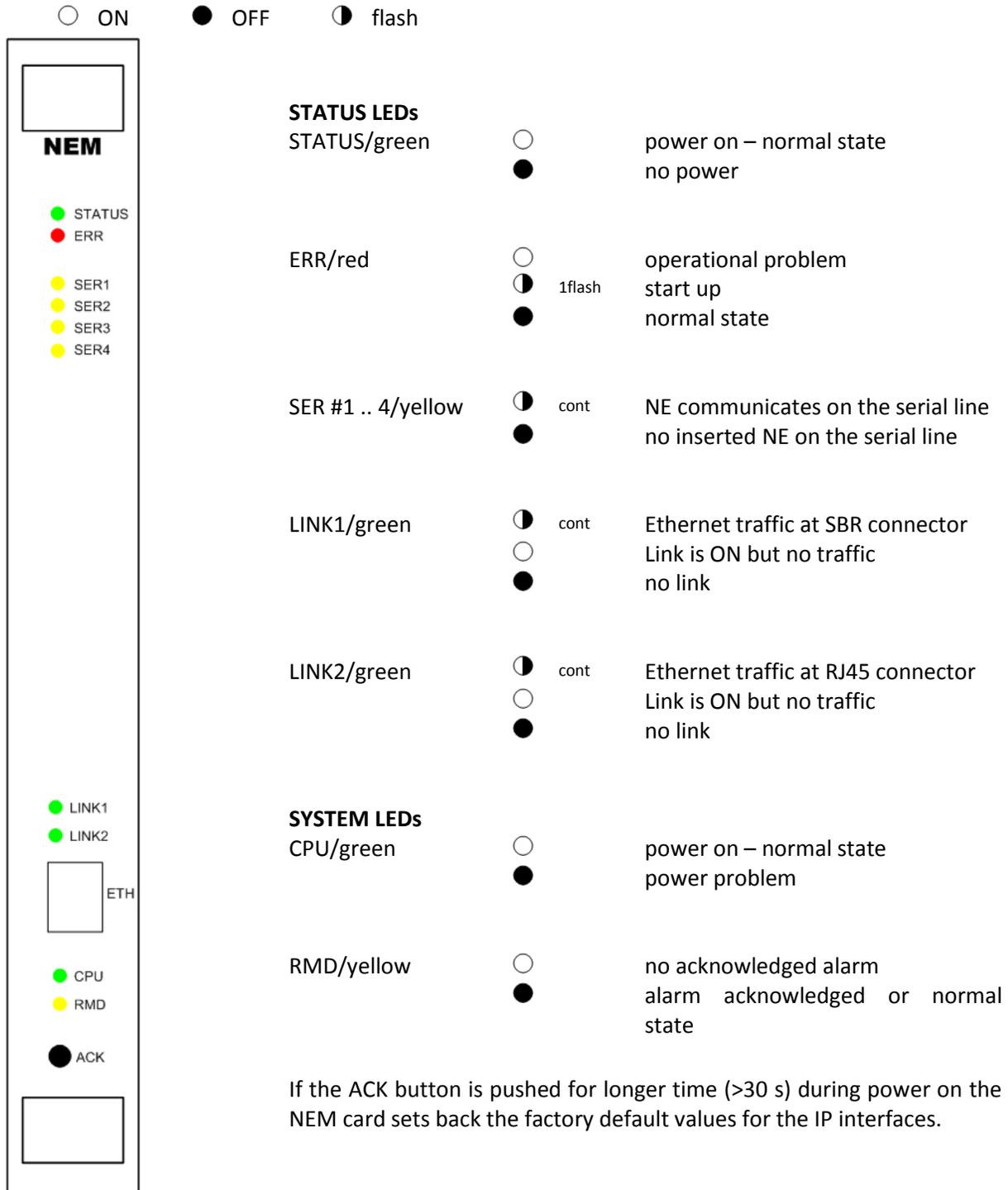


Figure 3. – NEM user interface

### 3.4 Mechanical parameters

The mechanical properties of the unit are the followings:

|                         |                                   |
|-------------------------|-----------------------------------|
| Dimensions (H x W x D): | 262 x 30 x 225 mm                 |
| Weights:                | 430 g                             |
| Installation:           | SBR-14 sub-rack designed Strowger |

### 3.5 Environmental conditions

The NEM card was designed and tested to meet the following environmental requirements of ETSI standards:

|                          |                                |
|--------------------------|--------------------------------|
| Operation:               | ETSI ETS 300 019-1-3 class 3.1 |
| Storage:                 | ETSI ETS 300 019-1-1 class 1.2 |
| Transport:               | ETSI ETS 300 019-1-2 class 2.2 |
| Operational temperature: | -10 .. +50 °C                  |
| Relative humidity:       | 0 .. 95 % non-condensing       |
| Protection:              | IP20                           |

## 4 Installation of the software

The Management Monitor program is suitable to operate with the USB-serial converter and with the Network Element Manager (NEM) card, too.

Running environment:

- OS platform NT based (Server2003, XP, Vista, Win7),
- RAM min 256 Mb (recommended 512 Mb),
- Intel compatible 1.6 GHz processor,
- screen resolution 800 x 600 x 16,
- 100BaseT LAN interface,
- 10 Mb free space on HDD for installation.

### 4.1 Local monitoring with NEM card

1. Run the Mmonitor install file and go through the installation by the wizard.
2. Adjust the IP settings of your computer at Control Panel/Network window at TCP/IP protocol.  
Select "Static IP" and set the following addresses:  
IP address: 192.168.1.5 (for REAR connection) or 192.168.2.5 (for FRONT connection)  
IP mask: 255.255.255.0
3. Connect the Ethernet cross cable between the PC and the NEM's interface.
4. Run the program by clicking on the Mmonitor.exe file then login by the given user name and password. The default is admin/admin. In the treeview panel the 'Summary' sign appears. Right clicking on this sign the user can give new NEM card ('Add NEM' command) with its IP address and can login to the access platform (see details in paragraph 5.2.1).
5. The configuration platform can be seen at the NEM's tabs. If it is needed set the IP configuration of the interfaces for the remote access according to the local environment.

### 4.2 Remote monitoring with NEM card

1. Run the Mmonitor install file and go through the installation by the wizard.
2. Run the program by clicking on the Mmonitor.exe file then login by the given user name and password. The default is admin/admin. In the treeview panel the 'Summary' sign appears. Right clicking on this sign the user can give new NEM card ('Add NEM' command) with its IP address and can login to the access platform (see details in paragraph 5.2.1).
3. The configuration platform can be seen at the NEM's tabs.

*Notes*

- (1) *Do not remove the Ethernet cable while the program runs.*
- (2) *The NEM's frontpanel RJ45 interface is recommended for local monitoring while the rear interface is more suitable for remote supervision.*

- (3) *For remote monitoring of the NEM card requires an external ADSL router to be installed before the NEM's suitable Ethernet interface which provides the physical link between the NEM and the IP network and builds up the PPP connection. New versions of NEM already contain built-in routers.*

### 4.3 Direct monitoring of remotely installed devices

There is an optional path to monitor and configure the remotely installed equipment using an USB-serial converter. This makes possible the configuration of the unit immediately after the fixing. It doesn't need NEM card and it is necessary the pre-installation of Exchange devices.

1. Run the Mmonitor install file and go through the installation by the wizard. During the installation the driver of the USB-serial device and the running environment will be installed as well.
2. Connect the USB-serial converter between the unit (serial interface) and the laptop (USB interface).
  - Unit part: The cable tail contains 20 pairs in 2 binders – the blue one with 10 pairs is for the line and power connections, the orange one (4 wires only) for CAL / ESEL hardware settings (*see manual*). In orange binder 2 wires out of 4 (white and grey) should be used for connecting the RS485 serial part of the converter.
  - Laptop part: Simple USB A-B cable is necessary for the connection.
3. Adjust the port settings of your computer at Control Panel/System/Hardware window at Device Manager tab.
4. Select the suitable USB port and in the „Advanced“ window you must reduce the port latency to 1 (this value is 16 by default). Then click on the 'Cancel If Power OFF'.
5. Edit the 'localnem.ini' file found in the Mmonitor installation folder. The default number must be actualized by the used COM port number.
6. Run the program by clicking on the Mmonitor.exe file then login by the given user name and password. The default is admin/admin. In the treeview panel the 'Summary' sign appears. Right clicking on this sign the user can give new local entry ('Add NEM' command) with 'localhost' and can login to the access platform (see details in paragraph 5.2.1).

## 5 Common user interface

The client area consists of four panels. The **Title bar** is a regular Windows section with the main system menus. Below, there is the **Treeview Panel** representing the rack list. The rack list contains the list of the equipment's type strings.

The **Component Panel** occupies the rest of the client area. This panel contains the screen components of the selected equipment. It has a header that contains the position string and the type string of the selected component.

Down below there is a **Status bar** with the settings.

The user can manually adjust the height and the width of the screen panels. There is a vertical splitter in the client area between the rack list and the component panel.

### 5.1 Title bar

The title bar contains the icon of the system menu (Restore, Minimize, Close, etc...), the name of the program and the standard icons aligned to the right side of the title bar.

### 5.2 Treeview panel

At the first level of the tree there is the 'Summary'. The user can add NEM cards and Groups to the Treeview by right mouse clicking.

It is possible to acknowledge the alarms related to the remote access.

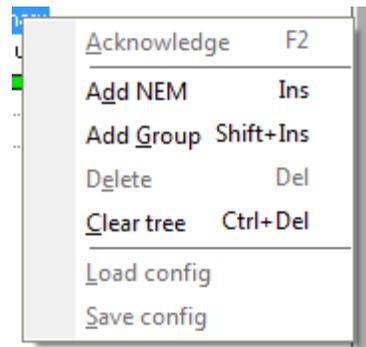


Figure 4. – Quick menu

|             |   |
|-------------|---|
| Acknowledge | Acknowledge of alarms in the monitor program ONLY.  |
| Add NEM     | Addition of new NEM card to Treeview.   |
| Add Group   | Addition of new groups to Treeview according to their locations.  |
| Delete      | Deletion of the elements from the program given by the other two commands.  |
| Clear tree  | Delete all elements from the tree.  |
|             | Load the already saved configuration to the selected elements.<br>Necessary conditions: same firmware in the new system and |

|             |  |
|-------------|--|
| Load config | same channel number.                           |
| Save config | Save the configuration of the selected system. |

### 5.2.1 Addition of NEM card and login

Selecting the 'Add NEM' command from the quick menu the following window appears.

Figure 5. – Add NEM

|                                   |   |
|-----------------------------------|---|
| State                             | The added NEM card (and the systems behind it) is continuously monitored (default).                                 |
| Normal login                      | “Normal”  |
| Wrong username                    | „Authentication failure” „Invalid user”   |
| Wrong password                    | „Authentication failure” „Wrong password”   |
| Duplication                       | „Authentication failure” „User is already logged in”  |
| Username                          | Name of the authenticated user.   |
| Password                          | Password belonging to the user name.  |
| Right                             | User access right (admin, operator, viewer). In case of unsuccessful login the “Not authenticated” message appears. |
| Login ( <i>button</i> )           | Login execution.  |
| Old password                      | Old password in case of changing password process.  |
| New password                      | New password in case of changing password process.  |
| Confirm                           | New password again in case of changing password process .   |
| Change password ( <i>button</i> ) | Change password execution.  |
| Name                              | Name of the new NEM card, min 3 character.  |

|                         |  |
|-------------------------|--|
| MDFID                   | Identification code or number of the Exchange.   |
| Store ( <i>button</i> ) | Adding NEM card.   |
| IP or Host name         | IP address or host name of the new NEM card. In case of local connection: 'localhost'. |
| Notes ( <i>window</i> ) | Possibility for comments.  |

If the monitoring target is a small territory it is enough to add the NEM card(s) directly to the Treeview. The user can see clearly the network structure.

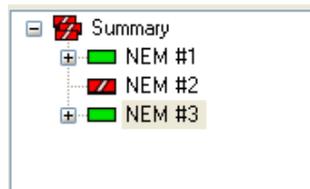


Figure 6. – NEM list

In this case the NEM card and the monitored devices are on the second level of the Treeview. All systems are under the NEM and the lowest position is the NEM's configuration surface.

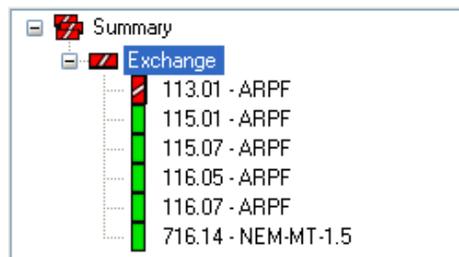


Figure 7. – System list

The position corresponds to the individual address of the equipment. The numbering of the equipment consists of a supervision line, the sub-rack number and the slot position. The indication is the following: LRR.SS where:

- L The serial line of the NMS device  
The NEM card has 4 communication lines (L=1 .. 4).
- RR The address of the sub-rack of the serial line (RR=1 .. 16).
- SS The slot number in the sub-rack (SS=1 .. 14)

The Figure 7. shows RPF cards on the first supervision line, 13., 15. and 16. racks', slot positions. Each entry in the rack list can be associated to a treenode screen components. Before the entries there are small icons to indicate the status of the system (normal, alarm, test, etc).

The program continuously communicates with the NEM card and asks the statuses of the connected devices. If the time period between 2 answers exceed 2 seconds the program consider the NEM as it is removed from the sub-rack. When the next successful answer arrives it appears again. The device's remove/not remove status can be followed by this communication. The devices are contacted directly by the Mmonitor program only when they appear or during monitoring. Connecting the NEM card at first time the Mmonitor program reads its buffer. A % counter runs after the NEM card at treenode which shows the read status of the buffer.

The follow up of the lost entry can be done at the syslog.txt file in the installation folder. This file contains the data from the last program run. The earlier events are in the 'Events' window.

## 5.2.2 Addition of groups

Selecting the 'Add Group' command from the quick menu the following window appears.

Figure 8. – Add group

### Overview

|                         |   |
|-------------------------|---|
| Name                    | Name of the new group, min 3 character. |
| Store ( <i>button</i> ) | Adding group.                           |
| Notes ( <i>window</i> ) | Possibility for comments.               |

In the lower part of the window a list appears with the systems supervised by the NEM with selection possibilities according to the Position, State and Device.

The sense of creating groups is to separate the regional territories when the supervision covers huge networks with more NEM cards in each network segment. It is not possible to add new groups to that level where NEM location is already added. Groups cannot be run under the same name.

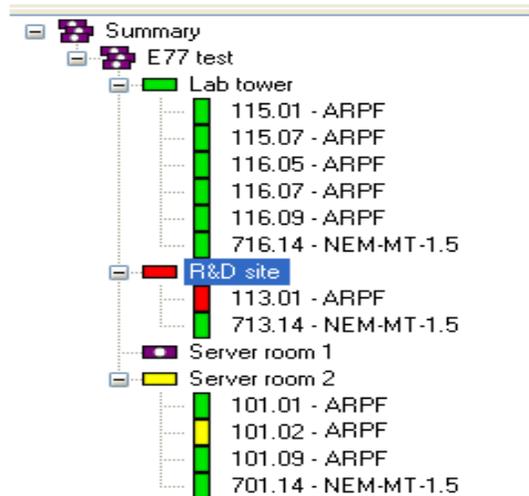


Figure 9. – Group list

The Treeview levels can be structured without limit and new NEM or new groups can be added at any level. The addition process is the same as in 'Summary' level and the added element will appear one level lower (pe.: In *Figure 9.* there is 'E77 test' at second level. Clicking on it by right mouse NEM or group can be added to the third level 'Lab tower', 'R&D', etc. On this picture there are only NEM access points on this level, no any group).

### 5.2.3 Icons

Adding new group or new NEM the icons are horizontal rectangles.

The groups have three horizontal rectangles and the NEM locations have one. After user login to NEM location the Monitor program recognizes the devices. At this time the devices' strings will have vertical rectangles.

The color of the icons indicates the actual operating state.

|   |   |
|---|---|
|  | Normal operation.   |
|  | Alarm.  |
|  | Communication problem with the device, the Monitor program lost the device. |
|  | Modification by user or test state.   |
|  | Acknowledged alarm or start-up phase in Setup Mode.                         |
|  | The user has no rights to monitor the devices.                              |

### 5.3 Component panel common elements

The Component Panel contains the selected equipment's screen components. The panel consists of three parts. It has a header panel, a page control component and the events. The header panel contains the address string and the type string of the selected equipment.

ARPF at REGtest on 107.11

Figure 10. – Component panel / Device Identification

The page control component contains the screen components. The components which belong together are in the same tab.

#### Monitor

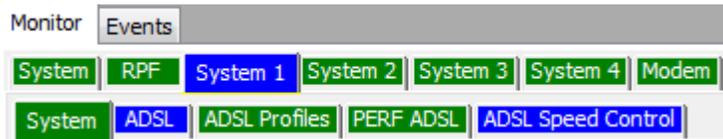


Figure 11. – Component panel / Tabs

The page control component contains the screen components for each device. The components which belong together are in the same tab. The variety of the tabs depends on the monitored equipment. The *Figure 11.* shows an example.

The NEM card has the following tabs:



Figure 12. – Component panel / NEM configuration

|          |  |
|----------|--|
| System   | System parameters and basic configuration. |
| Ethernet | Configuration of the Ethernet interfaces   |
| Users    | Access authentications.                    |

The colors indicate the status of the systems or function groups. Green – normal operation, red – alarm, yellow – first start-up phase.

## Events

This shows the list of the events belonging to the selected system or NEM card.

|       | Time                | Fu/Sys | Event   |
|-------|---------------------|--------|---|
| 0001. | 2011-11-17 13:00:05 | SYS#4  | TimeSync (i:01321531202)  |
| 0002. | 2011-11-17 13:00:05 | SYS#4  | ADSL perf (CPE side) ch:4 (ds/us): AMP= 900, LOSS= 0, LOSWS= 0, C |
| 0003. | 2011-11-17 13:00:05 | SYS#2  | TimeSync (i:01321531202)  |
| 0004. | 2011-11-17 13:00:05 | SYS#2  | ADSL perf (CPE side) ch:4 (ds/us): AMP= 900, LOSS= 0, LOSWS= 0, C |
| 0005. | 2011-11-17 13:00:05 | SYS#4  | ADSL perf (CPE side) ch:3 (ds/us): AMP= 900, LOSS= 0, LOSWS= 0, C |
| 0006. | 2011-11-17 13:00:04 | SYS#2  | ADSL perf (CPE side) ch:3 (ds/us): AMP= 900, LOSS= 0, LOSWS= 0, C |
| 0007. | 2011-11-17 13:00:04 | SYS#4  | ADSL perf (CPE side) ch:2 (ds/us): AMP= 900, LOSS= 0, LOSWS= 0, C |
| 0008. | 2011-11-17 13:00:04 | SYS#2  | ADSL perf (CPE side) ch:2 (ds/us): AMP= 900, LOSS= 0, LOSWS= 0, C |
| 0009. | 2011-11-17 13:00:04 | SYS#4  | ADSL perf (CPE side) ch:1 (ds/us): AMP= 900, LOSS= 0, LOSWS= 0, C |
| 0010. | 2011-11-17 13:00:04 | SYS#2  | ADSL perf (CPE side) ch:1 (ds/us): AMP= 900, LOSS= 0, LOSWS= 0, C |
| 0011. | 2011-11-17 13:00:03 | SYS#4  | ADSL perf (DSLAM side) ch:4 (ds/us): AMP= 900, LOSS= 0, LOSWS= 0  |
| 0012. | 2011-11-17 13:00:03 | SYS#2  | ADSL perf (DSLAM side) ch:4 (ds/us): AMP= 900, LOSS= 0, LOSWS= 0  |

Figure 13. – List of events

On the upper part of the tab the user is able to filter the events. The character line can be selected with logical “and” connection.

Figure 14. – Event filtering

|   |   |
|---|---|
| Apply ( <i>button</i> )                     | Start filtering.  |
| Clear ( <i>button</i> )                     | Cancel filter selection.  |
| Refresh ( <i>button</i> )                   | Changing screen of Monitor and Event tab the user can upgrade the list of events. Switching to this tab from other system the event list refreshes automatically. |
| Export ( <i>button</i> )                    | Save the result of filtering.   |
| Clear events ( <i>button</i> )              | Delete all collected events.  |
| Number of events                            | Total number of events.   |
| Function unit/sys<br>( <i>roll window</i> ) | Built-in selection possibilities by systems (1 .. 4).   |

## 5.4 GUI of Network Element Manager

Using the plug-in NEM card for the supervision the user has 2 accesses (Front and Rear) to configure the IP interfaces of the NEM card. It is recommended to configure the unused port to enable the later connection.

### 5.4.1 System

At the first part the user can select the configuration access (Config ON-OFF). The access of this command can be set by the Admin. The main reason of its function is to avoid of more modifications from different remote locations at the same time. Enable the configuration access (the user has right to configure and the system is not under modification by other user) the name of the actual user will appear after the button.

The screenshot displays the 'System' tab of the NMS GUI. At the top, there are navigation tabs for 'Monitor', 'Events', 'System', 'Ethernet', and 'Users'. The 'System' tab is active. Below the navigation, there is a section for 'NMS' with a 'Config ON' button, a text field containing 'admin', and buttons for 'Restore', 'Store', and '1AA3'. The 'NEM equipment' section contains several input fields: 'Serial number' (0000258), 'Date of SW' (2008-07-01), 'CHKsum of SW' (C656), 'Date of HW production' (2008-03-05), 'HW version' (SMU11A5), and 'System uptime' (00:12:31). The 'General system status' section shows 'System Status' as 'NORMAL' in a green box, with buttons for 'System RESET', 'Alarm acknowledge', 'Restore ALL factory defaults', and 'Restart ALL counters'. There is also an 'Event query' section with a checked checkbox and a 'Clear' button. Other fields include 'Network Time' (2008-07-02 10:19:06), 'Local Time' (2008-07-02 12:19:06), 'System set-up last changed' (2008-07-02 12:09:30), 'NEM IP address' (192.168.164.9), and 'NMS IP address' (192.168.165.90).

Figure 15. – NEM / Device / System tab

Restore (*button*)                      The user can load back the parameters last stored in the Eeprom.

Store (*button*)                         Save the modified parameters into the Eeprom. Leaving the device without pushing this button the executed modifications will be lost.

During modification by any user a “MODIFICATION” (blue) signal appears after the buttons.

Enable the configuration access the name of the actual user will appear after the button. During one's configuration period the other users have no access for any configuration.

### Notes

*(1) In order to save the modifications it is necessary to push the 'Store' button. Leaving the surface of the modified system without using this button the configuration changes will be lost.*

*(2) When the communication is lost between the system and the monitor program then the program shows the last known state of the system. When the system hadn't been detected at all yet the SYSTEM tab will be red and the equipment data is missing.*

On the system tab the user can monitor basic parameters there are the general inventory information like serial number, software/hardware date, hardware type, software checksum and operation time.

### General system status

|                                     |   |
|-------------------------------------|---|
| System status                       | Operational status of NEM   |
| “NORMAL”/green                      | Normal operation.   |
| “TEST/MODIF”/blue                   | Data under modification.  |
| “ALARM”/red                         | System under alarm.   |
| “ACK. ALARM”/yellow                 | Acknowledged alarm.   |
| Event query ( <i>checkbox</i> )     | Enable or disable to collect all the events of all the connected systems. In order to collect different type of events they must be enabled on the system itself. |
| Clear ( <i>button</i> )             | Delete the collected and stored events of all the connected systems.  |
| Network time                        | Actual GMT (Greenwich Mean Time).   |
| Local time                          | Actual real time in the area.   |
| System set-up last change           | Time since last reset.  |
| NEM IP address                      | IP address of the Network Element Manager card.   |
| NMS IP address                      | IP address of the Network Management System.  |
| System reset ( <i>button</i> )      | System re-start.  |
| Alarm acknowledge ( <i>button</i> ) | Alarm state is acknowledged.  |

Restore ALL factory defaults (button) Re-set the factory default values of the NEM.

Restart ALL counters (button) Re-set all counters to zero.

## 5.4.2 Ethernet

On the Ethernet tab there are the configuration surface for both (REAR and FRONT) Ethernet interfaces.

There are separate setting surfaces for REAR and FRONT interfaces. Selecting the “Manual Settings” the configuration fields will be active (separately for the interfaces) where the user can set the interfaces' IP parameters.

The screenshot displays two side-by-side configuration panels for Ethernet interfaces. The left panel is titled 'REMOTE Ethernet Interface Config(REAR)' and the right panel is titled 'LOCAL Ethernet Interface Config(FRONT)'. Both panels have a 'Config Mode' dropdown menu set to 'Manual Setting'. The REAR panel has the following values: Set IP Address (192.168.1.2), Set IP Mask (255.255.255.0), Set GateWay Address (192.168.1.1), Set DNS Address (0.0.0.0), and Set SNTP Address (0.0.0.0). The LOCAL panel has the following values: Set IP Address (192.168.2.2), Set IP Mask (255.255.255.0), Set GateWay Address (0.0.0.0), Set DNS Address (0.0.0.0), and Set SNTP Address (0.0.0.0). Both panels have an 'Apply changes:' label and an 'Apply Changes' button.

Figure 16. – NEM / Device / Ethernet tab / Interface IP configuration

### Ethernet Interface Config

|                        |   |
|------------------------|---|
| Config mode            | Ethernet interfaces' settings   |
| Manual Setting         | Static IP addressing.   |
| Set IP Address         | The IP address of the interface.  |
| Set IP Mask            | The IP mask of the interface.   |
| Set GateWay Address    | The Gateway address of the interface.   |
| Set DNS Address        | Domain Name Server. Not in use.   |
| Set SNTP Address       | The time can be set in the NEM via the NTP protocol. Not in use.                      |
| Apply changes (button) | Accept modifications. The program require confirmation on a pop-up window (YES – NO). |

Factory default addresses:

REMOTE (REAR): IP Address: 192.168.1.2/24  
IP Mask: 255.255.255.0

LOCAL (FRONT): IP Address: 192.168.2.2  
IP Mask: 255.255.255.0

The GW Address can be set ONLY in one interface. Because of more user-friendly reasons the REAR interface is recommended. The FRONT interface is rather for local monitoring.

If there is discrepancy between the given IP address and Gateway warning message appears on yellow background. If the IP Address is modified on the connected link the connection with the NEM card will be interrupted. The program must be re-started and the new path must be given as it is described in par 3.2.1.

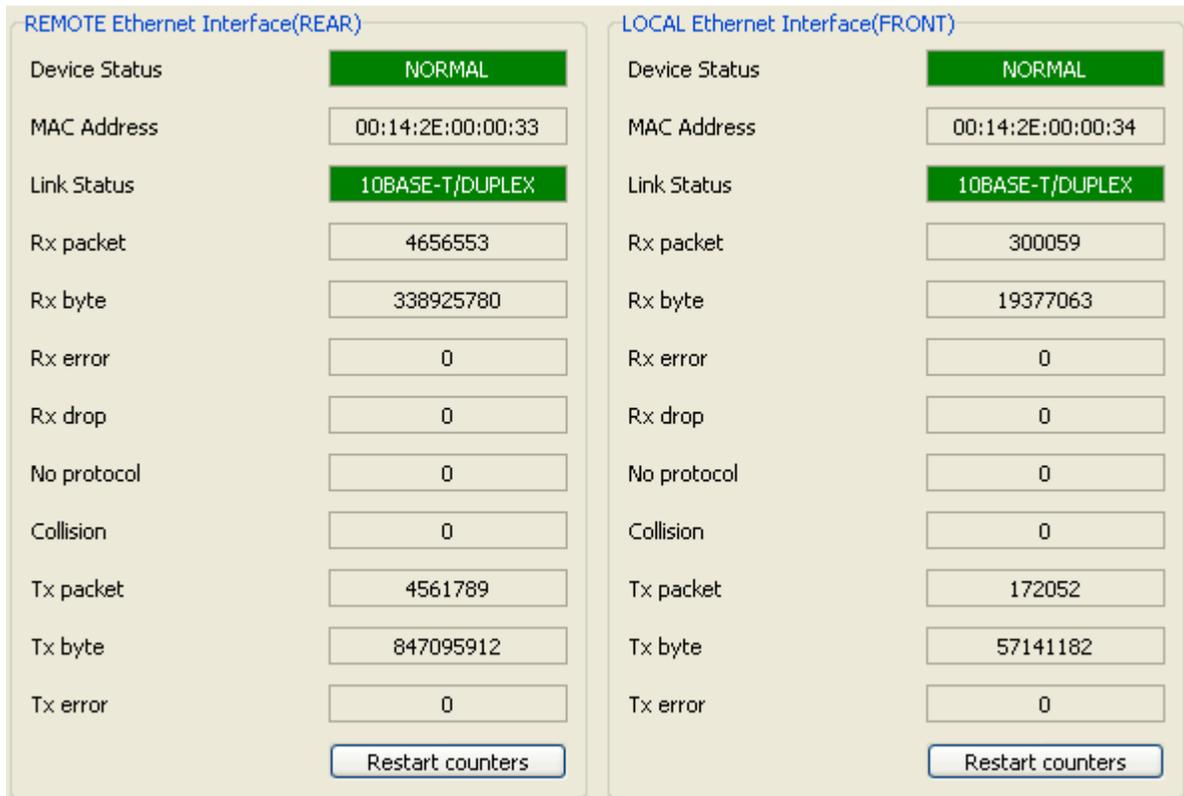


Figure 17. – NEM / Device / Ethernet tab / Interface status

Ethernet Interface

Device Status  
 "NORMAL"/green  
 "Modified by the supervisor"/blue  
 "ERROR"/red

Status of the NEM card  
 Regular operation.  
 Data under modification.  
 No valid IP address (in case of DHCP)

---

|                                    |   |
|------------------------------------|---|
| MAC Address                        | The MAC address of the interface.           |
| Link Status                        | Status of the Ethernet interface.           |
| "10BASE-T/ DUPLEX"/green           | Connected.                                  |
| "10BASE-T/ SIMPLEX"/green          | Connected.                                  |
| "DISCONNECT"/yellow                | No connection.                              |
| Rx packet                          | Received Ethernet packets.                  |
| Rx byte                            | Received data.                              |
| Rx error                           | Received faulty packets.                    |
| Rx drop                            | Dropped packets.                            |
| No protocol                        | No defined communication protocol.          |
| Collision                          | Packets in collision (in half-duplex mode). |
| Tx packet                          | Transmitted Ethernet packets.               |
| Tx byte                            | Transmitted data.                           |
| Tx error                           | Transmitted faulty packets.                 |
| Restart counters ( <i>button</i> ) | Restart all counters.                       |

### 5.4.3 Users

On this tab the user with the highest authentication rights (administrator) can give further access rights to other users and the parameters (IP source, traffic) of the supervision links can also be seen here.

Users config

Active connections:

| Server   | IP:   | Connection time:    | Requests:           | Packets: |        |
|--|---|---------------------|---------------------|----------|--------|
|  | 0.0.0.0                                     | 1970-01-01 00:00:00 | 0                   | 0        |        |
| Util user  | 217.20.134.68                               | 2009-06-04 10:08:24 | 0                   | 4099     |        |
| Admin, password : <input type="text" value="*****"/> | Admin inf. <input type="text" value="ALL"/> | 217.20.134.68       | 2009-06-15 14:26:22 | 0        | 102862 |

| User name | User password | User rights | User inf. | IP:           | Connection time:    | Requests: | Packets: |
|-----------|---------------|-------------|-----------|---------------|---------------------|-----------|----------|
| operator  | *****         | Operator    | ALL       | 217.20.134.68 | 2009-06-15 14:26:22 | 0         | 85115    |
| viewer    | *****         | Viewer      | ALL       | 192.168.2.5   | 2009-06-15 14:26:22 | 0         | 19770    |
|           |               | None        | ALL       | 0.0.0.0       | 1970-01-01 00:00:00 | 0         | 0        |
|           |               | None        | ALL       | 0.0.0.0       | 1970-01-01 00:00:00 | 0         | 0        |
|           |               | None        | ALL       | 0.0.0.0       | 1970-01-01 00:00:00 | 0         | 0        |
|           |               | None        | ALL       | 0.0.0.0       | 1970-01-01 00:00:00 | 0         | 0        |
|           |               | None        | ALL       | 0.0.0.0       | 1970-01-01 00:00:00 | 0         | 0        |
|           |               | None        | ALL       | 0.0.0.0       | 1970-01-01 00:00:00 | 0         | 0        |
|           |               | None        | ALL       | 0.0.0.0       | 1970-01-01 00:00:00 | 0         | 0        |
|           |               | None        | ALL       | 0.0.0.0       | 1970-01-01 00:00:00 | 0         | 0        |
|           |               | None        | ALL       | 0.0.0.0       | 1970-01-01 00:00:00 | 0         | 0        |
|           |               | None        | ALL       | 0.0.0.0       | 1970-01-01 00:00:00 | 0         | 0        |
|           |               | None        | ALL       | 0.0.0.0       | 1970-01-01 00:00:00 | 0         | 0        |
|           |               | None        | ALL       | 0.0.0.0       | 1970-01-01 00:00:00 | 0         | 0        |
|           |               | None        | ALL       | 0.0.0.0       | 1970-01-01 00:00:00 | 0         | 0        |

Figure 18. – NEM / Device / User tab

The tab shows the number of the possible users. This is maximum 16 including the Server, Util user and Admin accesses. The number of the active users is 8 at the same time where one link is always reserved to the Server connection.

In the left upper corner of the window there is the number of the actually active users (Active connections).

Below there are 16 rows for the possible connections.

|             |  |
|-------------|--|
| Server      | Possibility to connect a remote server.  |
| Util user   | Connection path for any kind of maintenance (pe.: remote firmware upgrade).  |
| Admin       | User connection with the highest access rights. This user can define the user names, passwords and rights for other users. |
| Other users | Maximum 13 further users can have access to each NEM cards selected by the Administrator. These users can modify their     |

(13 rows) passwords during login session but the Admin can overwrite it at any time. These users cannot change their names and their rights.

All connection links have their own access parameters.

|                                    |  |
|------------------------------------|--|
| User name                          | The Server, Util user and Admin are factory defaults, the other 13 usernames are given by the Admin.   |
| Password                           | The Server and Util user passwords are factory settings the others are free (the Admin has priority over all passwords). The Server has reserved link to access the NEM cards. |
| User rights ( <i>roll window</i> ) | The Server, Util user and Admin have the highest access. The other user's rights are defined by the Admin  |
| "Admin"                            | The highest unlimited access.  |
| "Operator"                         | Configuration rights, no access to other users.  |
| "Viewer"                           | Only monitoring, no configuration rights.  |
| "None"                             | No rights to login.  |

#### Notes

*(1) In case of new user it is necessary to define its access right first then the user name and the password. With 'None' right it is not possible to fix nor user name neither password. Switching the already existing user's right to 'None' the user will be deleted from the entry list.*

|  |  |
|--|--|
| Admin inf./User inf.<br>( <i>roll window</i> ) | The access(es) for the interface(s): ALL, REMOTE. LOCAL.   |
| IP   | The actual or last connected IP address of the user. If this address is 0.0.0.0, the user never accessed the NEM.  |
| Connection time                                | The arrival date of the last udp package to the NEM according to the Network time. During connection the timer goes on, in case of logout the timer stops. After new login the timer synchronizes to the network time again. |
| Requests                                       | The actual pending questions from Monitor program to NEM.  |
| Packets  | The forwarded packets from the user during the last active connection.   |

At first step the Admin built up the tree and then gives the user names, passwords and access rights to the other users. After this process (knowing the NEMs' IP addresses) the other users can reach their authenticated locations.

## Appendix A - Events

All system is able to generate events and performance data which can be seen in the Event window next to the configuration surface of the equipment. Some events displayed and stored automatically without any settings others can be enabled or disabled in the SYSTEM tab.

Auto generated events:

|                    |  |
|--------------------|--|
| System RESET       | Restart of system. Basic data appears (Firmware, SerialNo, Hardware, Date of HW production).   |
| Reachable          | The lost system reachable. Generated by NEM and connects to the position where the system is. In case of NEM it is generated by the NMS program in the name of NEM.  |
| Unreachable        | Device is lost. Generated by NEM and connects to the position where the system is. In case of NEM it is generated by the NMS program in the name of NEM.   |
| User               | Shows the login user, its right (None, Viewer, Operator, BuiltInUser, Administrator, EqAdmin), its status (Login, Logout, Invalid user, Wrong password, Already logged in, Connection num. exceed, Password changed, Forced logout), its location and time and its type (Udp). |
| NMS Config mode    | Indicates the beginning and end of configuration (OFF, ON) and the name of the user. In case of lack of name the system is logged out by itself in order not to stack in configuration mode and not to block other users.  |
| New User Added     | Adding new user accesses to the NEM. Appearing the right and the name (Id, Name).  |
| Config, NMS Server | <p>Loading or saving the configuration (download from, upload to, mismatches on, misses from).</p> <p>Higher level server connection (fail, success, Wait for store acknowledge).</p> <p>This event is generated only by the connected server.</p>                             |

|                         |  |
|-------------------------|--|
| Activated alarm contact | Alarm state.   |
| ALARM acknowledged      | Alarm state acknowledged.  |
| System works fine       | Normal operation.  |
| System modification     | Modification of system parameters (OFF, ON).   |
| Config store            | Save modified parameters.  |
| Config restore          | Reload the parameters existing before modification.  |
| Config default          | Reload factory defaults.   |
| Config store ERROR      | Error during saving new parameters.  |
| Config read ERROR       | Error during reading existing parameters.  |
| SYSTEM in setup mode    | Selection of system start-up mode (OFF, ON).   |
| Timesync                | Time synchronization command was started.  |
|                         |  |
| ALARM                   | Indication of different alarm reasons (OFF, ON)  |
| SYSTEM NEM HW error     | NEM hardware problem.  |
| RPF                     | Remote power feeding problem where appears the following data: overload, open circuit, undef load, asym, over current, over voltage, external voltage. |
| POTS HW error           | HW error at voice channel.   |
| POTS line termination   | Termination error at voice channel.  |
| ON hook                 | POTS is ON-HOOK, high impedance state.   |
| OFF hook                | POTS is OFF-HOOK, low impedance state.   |

|               |  |
|---------------|--|
| ring          | Telephone calls or is called.                  |
| ADSL HW error | HW error at ADSL channel.                      |
| Temperature   | Temperature is too high at the indicated item. |

Dedicated events – can be enabled or disabled

|                         |   |
|-------------------------|---|
| <i>ADSL</i>             | <i>ADSL events</i>  |
| went into ON (SHOWTIME) | ADSL synchron ready, indicating the profile (DS [kbps], US [kbps]).                                 |
| went into OFF state     | ADSL disconnected with its reason (DYING GASP)(RU lost).  |
| resync                  | ADSL resynchronization.   |
| rateset                 | ADSL profile re-synchron (DS [kbps], US [kbps]) when CU and RU sides don't match.                   |
|                         |   |
| <i>RPF</i>              | <i>Remote power feeding events</i>  |
| ON state                | Channel is powered, +/- 80 Vdc on the line.   |
| OFF state               | Channel is turned off.  |
| Wakeup                  | RPF checks the presence of DAR.   |
| RPF main generator      | It can be turned ON, OFF or ALARM.  |
|                         |   |
| <i>POTS</i>             | <i>Voice events</i>   |
| POTS                    | Analog voice channel statuses (channel, Ringing time [s], OFFhook time [s], max.Ringing, RingFail). |

|                       |   |
|-----------------------|---|
|                       |   |
| <i>POWER</i>          | <i>Power events</i>   |
| RPF power data        | Remote power statuses (RPF: #1 [V], #2 [V], DAR input: [W], [V], #1 [mA], #2 [mA]).                   |
|                       |   |
| <i>Performance</i>    | <i>Performance data</i>   |
| <i>ADSLcu, ADSLru</i> | <i>ADSL channels performance data</i>   |
| ADSL performance      | ADSL channels performance data (channel, DN-UP, AMP, LOSS, LOSWS, CRC, ES, SES, SNRmin, SNRmax, CNT). |

|                    |                              |
|--------------------|------------------------------|
| <i>CAL</i>         | <i>Cabinet Assigned Loss</i> |
| CAL configured via | HW, NMS                      |