General Description

Network Management System (NMS)

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Manufacturer & registered address:	Strowger 344 NW Capital Dr. Lees Summit, MO 64086 Phone: (816) 272 1826 Fax: (646) 607 1052 e-mail: s.vogel@strowger.com web: http://www.Strowger.com

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1 Preface

1.1 Highlight

This document describes the Network Element Manager (NEM) its configuration.

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. GUI of Network Element Manager

   Configuration of the card.

1.3 Revisions

Release	Date	Comments
NEM v1.0	07-12-2012	Basic description of NEM

2 General

2.1 System overview

The Network Management System has 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 are 2 versions of the related monitor program:

- version 3: simple monitoring device with client program
- version 4: server – client architecture with 2 different program

The v3 program and the client part of v4 have the same GUI.

2.1.1 System elements

NEM	Network Element Manager card for local/remote supervision
Mmonitor v3	Client program of NMS3
Mmonitor-Server v4	Server program NMS4
Mmonitor-Client v4	Client program NMS4

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 (14th) slot of the SBR-14 sub-rack (*see document GenDesc SBR v1.0*).

Figure 1. – 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 monitor 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 with the built-in ADSL modem.
- 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.

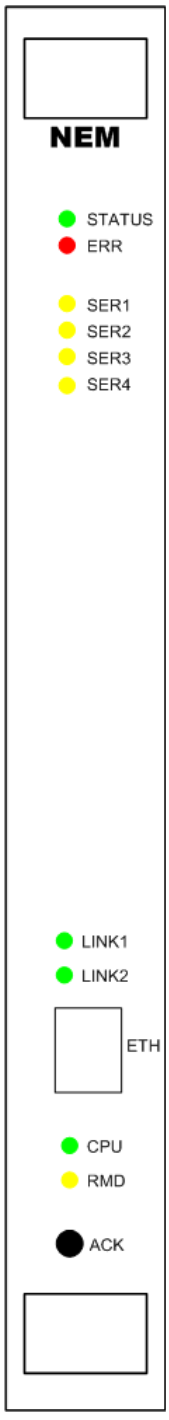
3.2 Power consumption

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.

- ON
- OFF
- flash



STATUS LEDs

STATUS/green
- power on – normal state
- no power

ERR/red
- operational problem
- 1flash start up
- normal state

SER #1 .. 4/yellow
- constant NE communicates on the serial line
- no inserted NE on the serial line

LINK1/green
- constant Ethernet traffic at SBR connector
- Link is ON but no traffic
- no link

LINK2/green
- constant Ethernet traffic at RJ45 connector
- Link is ON but no traffic
- no link

SYSTEM LEDs

CPU/green
- power on – normal state
- power problem

RMD/yellow
- no acknowledged alarm
- alarm acknowledged or normal state

If the ACK button is pushed for longer time (>30 s) during power on the NEM card sets back the factory default values for the IP interfaces.

Figure 2. – 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 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 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.

4.1 Device

4.1.1 System

When the configuration is enabled the user can save the modifications or restore the previous one at the top of the window. The functions of the buttons are independent of the hierarchy level.

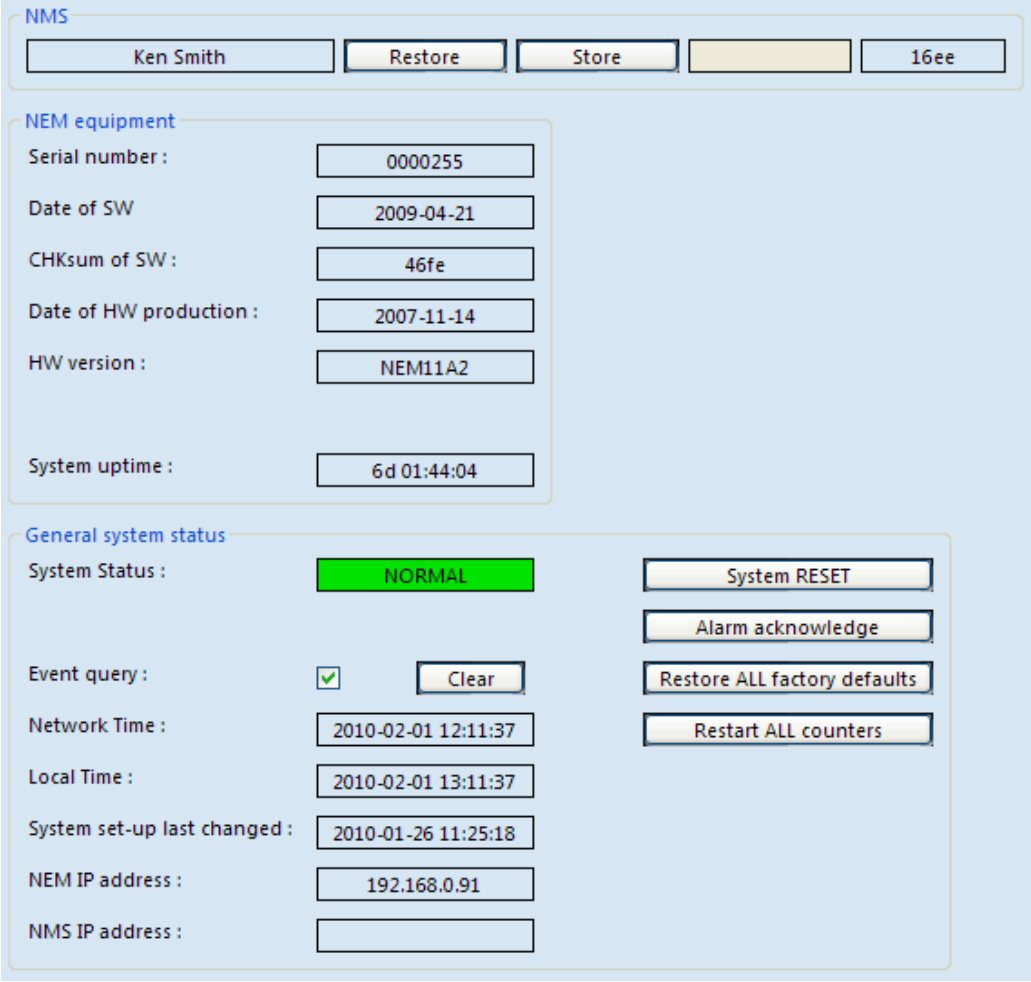


Figure 3. – Device / System tab

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 (*checkbox*)	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 (*button*)	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 (*button*)	System re-start.
Alarm acknowledge (*button*)	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.

4.1.2 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.

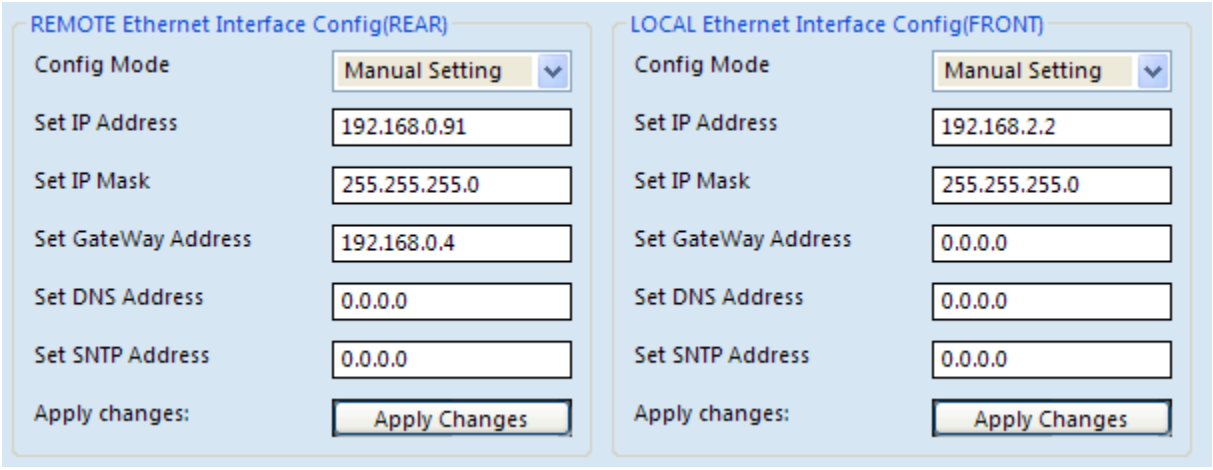


Figure 4. – Device / Ethernet tab / Interface IP configuration

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:

REMORE (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 Client must be re-started and the new path must be given as it is described in par 4.3.5.

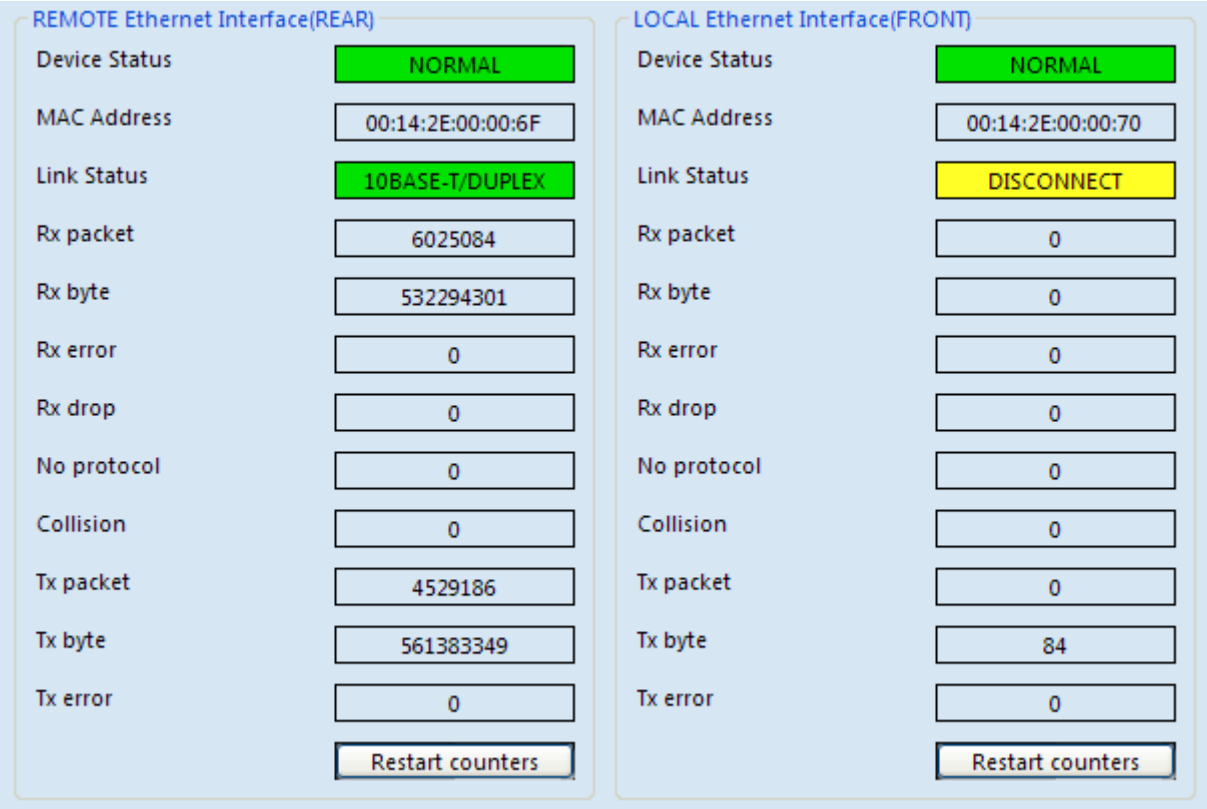


Figure 5. – Device / Ethernet tab / Interface status

Ethernet Interface

Device Status	Status of the NEM card
"NORMAL"/green	Regular operation.
"Modified by the supervisor"/blue	Data under modification.
"ERROR"/red	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 (*button*)	Restart all counters.

4.1.3 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.

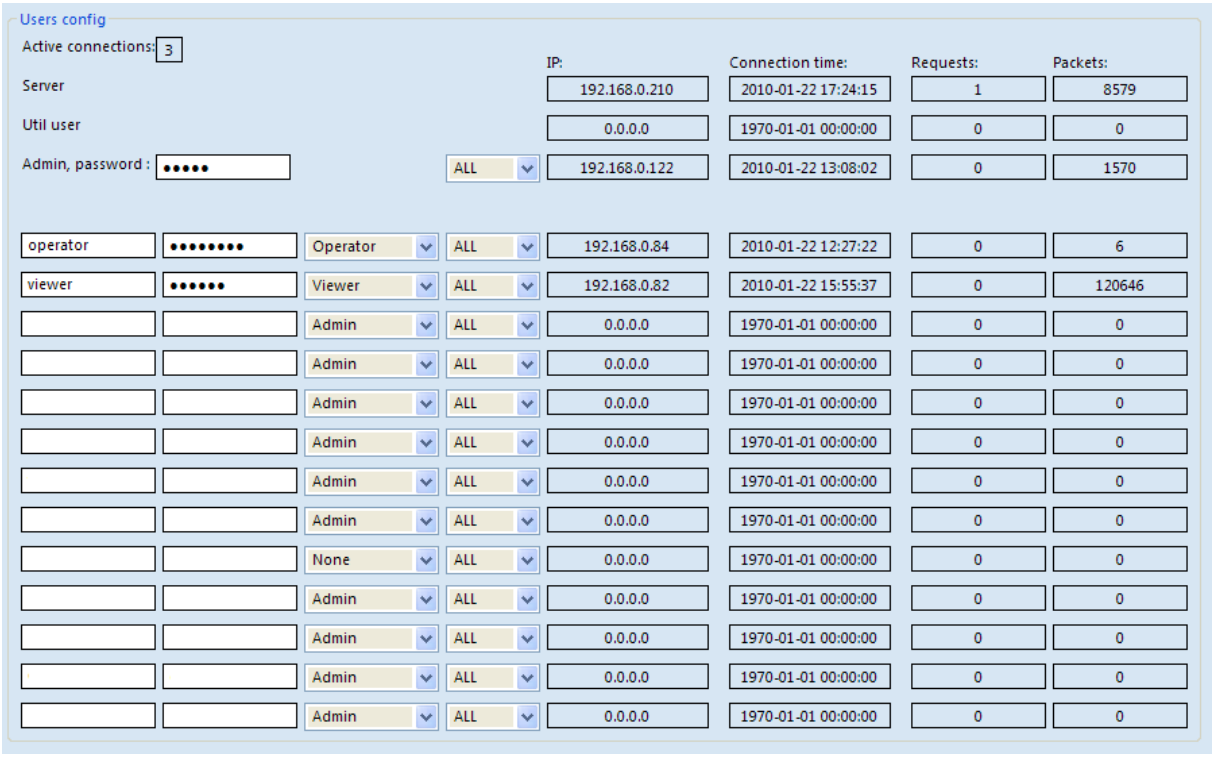


Figure 6. – Device / User tab

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.

The users using the NMS4 (Server-Client structure) always connect the NEM via the Server link. The other added users on this platform can connect the NEM card directly using the NMS3.

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 (13 rows)	Maximum 13 further users can have access to each NEM cards selected by the Administrator. These users can modify their passwords during login session (see document NMS3) 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 (*roll window*)	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

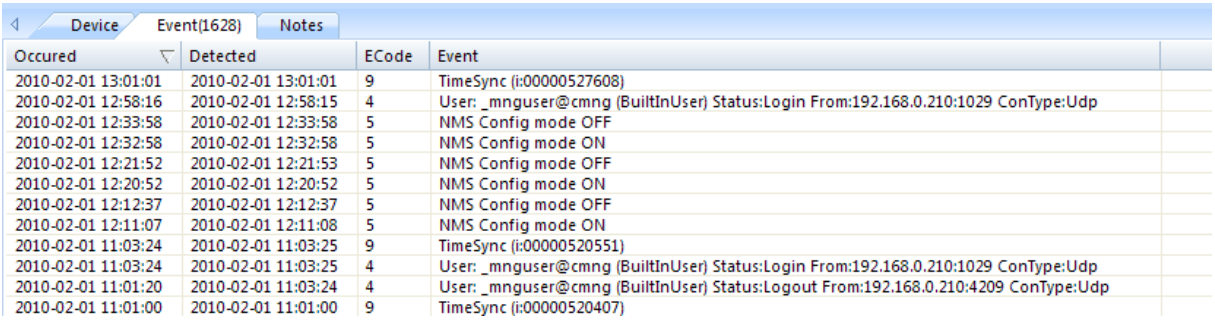
(1) In case of new user it is necessary to define its access right first then the user name and the password. With 'None' right it is not possible to fix nor user name neither password. Switching the already existing user's right to 'None' the user will be deleted from the entry list.

Admin inf./User inf. (*roll window*)	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.

4.2 Event

At Events tab the list of the occurred events are shown.



Occured	Detected	ECode	Event
2010-02-01 13:01:01	2010-02-01 13:01:01	9	TimeSync (i:00000527608)
2010-02-01 12:58:16	2010-02-01 12:58:15	4	User: _mnguser@cmng (BuiltInUser) Status:Login From:192.168.0.210:1029 ConType:Udp
2010-02-01 12:33:58	2010-02-01 12:33:58	5	NMS Config mode OFF
2010-02-01 12:32:58	2010-02-01 12:32:58	5	NMS Config mode ON
2010-02-01 12:21:52	2010-02-01 12:21:53	5	NMS Config mode OFF
2010-02-01 12:20:52	2010-02-01 12:20:52	5	NMS Config mode ON
2010-02-01 12:12:37	2010-02-01 12:12:37	5	NMS Config mode OFF
2010-02-01 12:11:07	2010-02-01 12:11:08	5	NMS Config mode ON
2010-02-01 11:03:24	2010-02-01 11:03:25	9	TimeSync (i:00000520551)
2010-02-01 11:03:24	2010-02-01 11:03:25	4	User: _mnguser@cmng (BuiltInUser) Status:Login From:192.168.0.210:1029 ConType:Udp
2010-02-01 11:01:20	2010-02-01 11:03:24	4	User: _mnguser@cmng (BuiltInUser) Status:Logout From:192.168.0.210:4209 ConType:Udp
2010-02-01 11:01:00	2010-02-01 11:01:00	9	TimeSync (i:00000520407)

Figure 7. – Event

Occurred	Date and time of the event.
Detected	Detection date and time of the event.
ECode	Internal registration number of the event.
Event	The event itself.

The counter on the tab shows the number of stored events.

The explanation of each event can be found at Appendix A at the end of this document.

4.3 Notes

The users can insert comments to each NEM card (p.e.: location, connected switch, etc). It is possible to search for these notifications by using the Search option at the top of the Treeview panel.

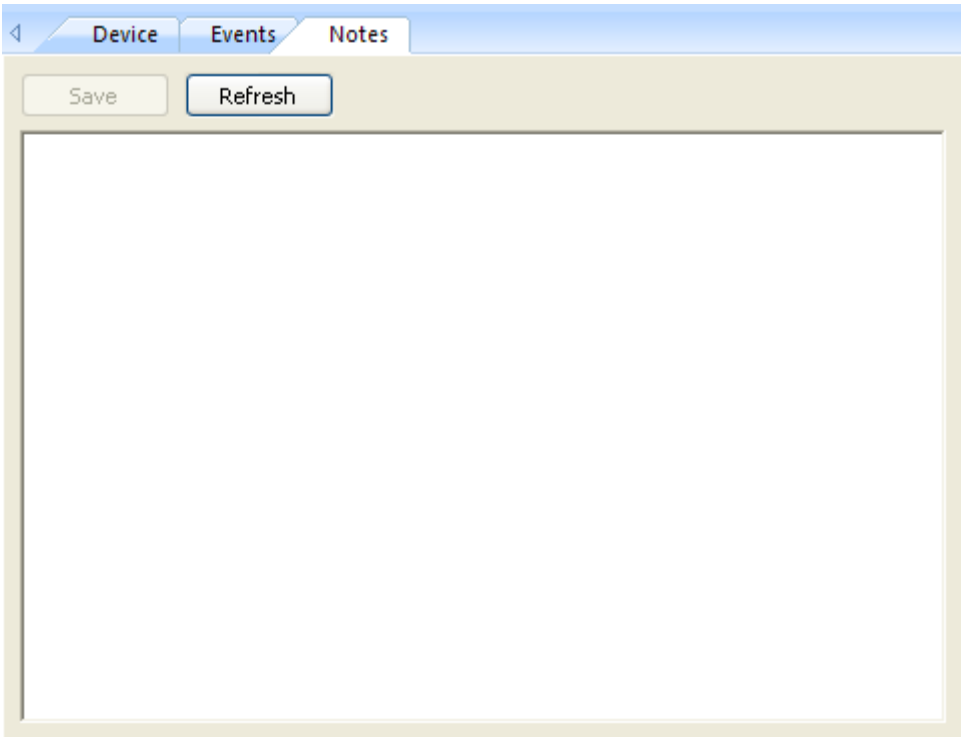


Figure 8. – Notes

Save (*button*)	Save of the comment.
Refresh (*button*)	Refresh the content of the field in case of recent notes should be visible.
Empty field	Place of the comments.

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	Loading or saving the configuration (download from, upload to, mismatches on, misses from). Higher level server connection (fail, success, Wait for store acknowledge). This event is generated only by the connected server.
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

ADSL	*ADSL events*
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.
RPF	*Remote power feeding events*
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.
POTS	*Voice events*
POTS	Analog voice channel statuses (channel, Ringing time [s], OFFhook time [s], max.Ringing, RingFail).
POWER	*Power events*
RPF power data	Remote power statuses (RPF: #1 [V], #2 [V], DAR input: [W], [V], #1 [mA], #2 [mA]).
Performance	*Performance data*
ADSLcu, ADSLru	*ADSL channels performance data*

ADSL performance	ADSL channels performance data (channel, DN-UP, AMP, LOSS, LOSWS, CRC, ES, SES, SNRmin, SNRmax, CNT).

CAL	*Cabinet Assigned Loss*
CAL configured via	HW, NMS