

NLB 60E

Third Party Integration

Protocol Description

(Revision 2B)

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FIGURE 1 *A MESSAGE SESSION*.....5

Terminology & Acronyms

Device Control	Lab.gruppen application for control and monitoring of a NomadLink network.
GPI	General Purpose Input, ports on the back of NLB 60E that can trigger certain actions on the NomadLink network
NLB 60E	Network bridge between an Ethernet and NomadLink network
Subnet	Denotes a NLB 60E and its connected amplifiers.
Subnet topology	All the amplifier in the subnet and the way they are connected in the subnet

1 Protocol overview

The described protocol in this document is both an extension and a revision of the previous 3rd party protocol for the NLB 60E. The following is a short summary of controllable and monitorable parameters.

- Mute/Un-mute
 - Individual channels
 - Subnet
- Power On/Off
 - Individual amplifiers
 - Subnet (sequentially)
- Status
 - Subnet (number of amplifiers, power, mute, GPI1-3, faults)
 - Amplifier (power, PAL, various channel-level faults and warnings)

2 Connection management

The NLB 60E 3rd party control is using text based TCP communication which enables it to be controlled from a basic text terminal such as a Telnet client. It acts as a server and accepts one connection at a time. Trying to connect another 3rd party client while there still is an active connection will force the previous connection to be dropped, i.e. an active connection would never block newer incoming 3rd party connections.

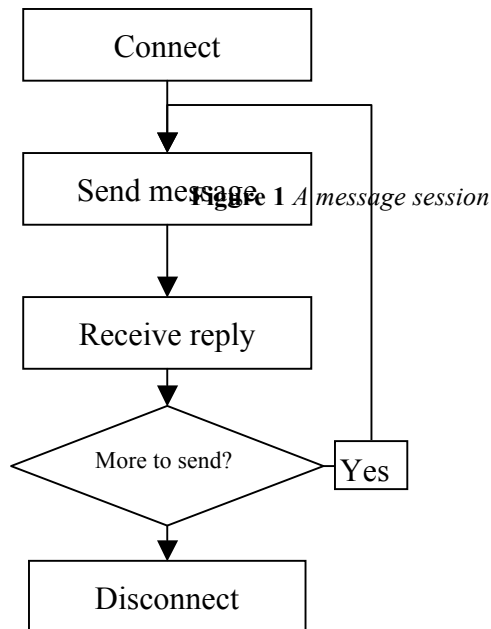
The NLB 60E can only be connected to *one control application at the same time* (e.g. DeviceControl or a 3rd party control client).

Application	NLB 60E Port
3 rd party control	65010

Although the sockets co-exist, a 3rd party client receives an error reply if it tries to connect while the Device Control application is connected to the NLB 60E.

2.1 Message sequencing

From a clients view, a message session adheres to the following sequence. After establishing a connection it is possible to send one or multiple messages to the NLB 60E. The messages will be handled sequentially in the order they are sent and responses will be sent back accordingly. An alternative scheme is to connect and disconnect between each sent message and received reply.



3 Addressing

3.1 Addressing a bridge

The bridge is addressed using its IP-number. For fixed installations relying on static IP addresses it is highly recommended that bridges have fixed IP addresses instead of using DHCP.

3.2 Addressing an amplifier

An individual amplifier is addressed using its 'Virtual Device Name' (VDN). This is a user configurable name that is being held by the bridge (see Virtual Device Name Management in chapter 6) that corresponds to a specific amplifiers' serial number. Thus, if an amplifier is replaced only the VDN table needs to be altered in order to make the system work properly again for that particular device. The bridge can contain up to 60 'virtual device names'. Observe that a serial number should only be associated with *one* VDN and all VDNs should be unique.

A 'virtual device name' can contain up to 10 alphanumeric characters and special characters where the allowed characters are:

- A..Z, 0..9, '@', and '-'

Please observe that whitespaces, and the string 'Subnet' is not allowed in VDNs.

Example of valid names are:

"B1-zone2-1"

"B01-Z-2-1"

"B1@Zone2-1"

"Bldg1Zone1"

Where as the following is not allowed:

"Building 1-zone 2-1" (contains a whitespace and too many characters)

4 Message overview

The commands are divided into two main categories: device messages and subnet messages. As the names indicate they addresses either a single amplifier or all amplifiers in the subnet. To address the connected subnet, the address context should be "subnet" and to address a specific amplifier within that subnet the amplifiers' VDN is used as context.

The reply to any "set" message (=) is the same as the reply for the "get" operation (?) hence status is always returned in the same format as if the parameter's value was queried.

All 3rd party messages follow the same layout, requests as well as replies. They are all alphanumeric *case insensitive* strings which are terminated with a newline (CR+LF).

Address		Operation	Value(s)
Context	Parameter		
[Subnet/VDN]	.	[Parameter]	
		=	To set a value
		?	To get a value
			[Value]

Table 1 - Message format

4.1 Example communication

For example, to mute the subnet the following string is sent (*note that it ends with a newline character!*):

Subnet.Mute = 1

The reply would then be (*also ending with a newline character*):

1

to indicate that it was successfully changed, hence new status is '1'.

And to get current subnet mute status, simply send:

Subnet.Mute ?

To set the power status for an individual amplifier with VDN "B01-Z.2-1" the following string is sent:

B01-Z.2-1.Power = 1

For replies that contain more than one value these are noted as whitespace separated values read from left to right ending with a newline character, for example:

5 12 0 1 0 1 1

5 Message reference

5.1 Error replies

If an error occurs the bridge responds with 'ERROR! [Message]' where the message part is a more detailed description of the error.

The following errors may occur:

1. 'ERROR! Unable to parse – [additional information about parsing error]'
 - a. There was an error when parsing the command
2. 'ERROR! VDN does not exist'
 - a. The VDN that was referred to does not exist
3. 'ERROR! Device not found'
 - a. The physical device linked to the VDN does not exist on the network
4. 'ERROR! Device Control is connected'
 - a. Device control is currently connected (i.e. not accepting 3rd party messages)
5. 'ERROR! Channel number is out of range'
 - a. The channel that was referred to was outside the range for that device
6. 'ERROR! Internal error [internal error code]'
 - a. Internal error, please note code for further assistance and troubleshooting

5.2 Subnet messages

The following messages affect all devices in a subnet.

5.2.1 Subnet Power

Use to set / get power status for all devices in a subnet. After changing status the result of the subnet power command is usually "In transition" meaning that the changes are taking place but are not yet completed.

Address	Op.	Value
Subnet.Power	=	0 – Turn off all devices 1 – Turn all devices on
		Reply
	?	0 – All devices are off 1 – All devices are on 2 – Mixed, some are on and some are off 3 – In transition, one or more devices are changing their power status

5.2.2 Subnet Mute

Sets / gets subnet mute control (mutes or un-mutes all devices in the subnet)

Address	Op.	Value
Subnet.Mute	=	0 – Un-mute subnet 1 – Mute subnet
		Reply
	?	0 – Subnet is un-muted 1 – Subnet is muted

5.2.3 Subnet StatusOk

Gets if there are any faults in a subnet.

Address	Op.	Value
Subnet.StatusOk		
		Reply
	?	1 – No faults present in subnet 0 – Faults are present in subnet

5.2.4 Subnet Status

Gets full status for entire subnet.

Address	Op.	Value	
Subnet.Status			
		Reply (values from top to bottom)	
	?	[XX] – Subnet number	
		[XX] – Number of connected devices	
		0 – Subnet is un-muted 1 – Subnet is muted	
		0 – Subnet is open loop 1 – Subnet is closed loop	
		0 – GPI1 is low 1 – GPI1 is high	
		0 – GPI2 is low 1 – GPI2 is high	
		0 – GPI3 is low 1 – GPI3 is high	
		<i>Power status:</i> 0 – All devices are off 1 – All devices are on 2 – Mixed, some are on and some are off 3 – In transition, one or more devices are changing their power status	
		<i>Faults present:</i> 0 – No faults present in any of the devices in the subnet 1 – Faults present in one or more devices in the subnet	
		<i>Fault device list, if any devices has faults, a list of their VDNs are presented.</i>	
	Examples		
	For a subnet (number 12) with 10 devices and where 2 are failing, the reply may look like: 12 10 0 0 0 0 0 1 1 B01.Z01.2 B01.Z01.5		

5.2.5 Subnet Serial at Position

Gets serial number for an amplifier at the position given by the 'value' field.

Address	Op.	Value
Subnet.SerialAtPosX <i>Where X is a number ranging from 1 to 60, addressing the 60 possible device positions in the NomadLink network.</i>		
		Reply
	?	[Serial number] Note: If no amplifier is present at the position in the subnet topology that is addressed zero is returned as serial number.
Examples		
Getting the serial number for device at position 5 using: Subnet.SerialAtPos5 ? the reply might look like 12345678		

5.3 Device messages

The commands in this section affect single devices. All addresses starts with the virtual device name for the addressed device.

5.3.1 Power

Sets / gets the new desired power state for the address amplifier

Address	Op.	Value
[VDN].Power	=	0 – Set desired power status to off 1 – Set desired power status to on
		Reply
	?	0 – Desired power status is off 1 – Desired power status is on

5.3.2 Mute

Set / get mute control for an individual channel

Address	Op.	Value
<i>[VDN].MuteX</i> <i>Where X is output channel A, B, C, D, E, F, G or H.</i>	=	0 – Set to un-muted 1 – Set to muted
		Reply
	?	0 – Un-muted 1 – Muted
Examples		
To mute channel B for device “B01-Z01-2”: B01.Z01.2.MuteB = 1		

5.3.3 Mute Status

Get mute status for individual channels for one device

Address	Op.	Value
[VDN].MuteStatus		
		Reply
	?	[Mute status] – for channel A 0 – Un-muted 1 – Muted
		[Mute status] – for channel B 0 – Un-muted 1 – Muted
		[Mute status] – for channel C 0 – Un-muted 1 – Muted
		[Mute status] – for channel D 0 – Un-muted 1 – Muted
		[Mute status] – for channel E 0 – Un-muted 1 – Muted
		[Mute status] – for channel F 0 – Un-muted 1 – Muted
		[Mute status] – for channel G 0 – Un-muted 1 – Muted
		[Mute status] – for channel H 0 – Un-muted 1 – Muted

Examples

To get the mute status for the device “B01-Z01-2”:

B01.Z01.2.MuteStatus ?

For a four channel device with A & B muted and C & D unmated the reply would be:

1 1 0 0

5.3.4 Status

Gets overall status and metering information for a device.

Address	Op.	Value
[VDN].Stat us		
		Reply (values from top to bottom)
	?	0 – Device has no faults present 1 – Device has faults present
		0 – Power state is corresponding to desired power state 1 – Power state warning, device on but should be off 2 – Power state fault, device off but should be on
		0 – PAL inactive 1 – PAL active
		For each channel of the device (CH A, B, ...)
		[<i>-X</i>] – Current attenuation for channel X as a negative dB number relative max output level. Possible values are: -100 (silent), -44, -29, -28, ..., -1 and 0 is (VPL) clip.
		0 – VPL (clip) for channel X not active 1 – VPL (clip) for channel X active
		0 – CPL for channel X not active 1 – CPL for channel X active
		0 – VHF fault not present 1 – VHF fault present
		0 – DC fault not present 1 – DC fault present
		0 – Load shorted fault not present 1 – Load shorted fault present
		0 – Temperature fault not present 1 – Temperature fault present
		0 – High impedance warning not present 1 – High impedance warning present
		0 – Temperature warning not present 1 – Temperature warning present
Examples		
For a (4 channel) device where channel A is clipping, and channel C has a temperature warning present (no faults) the reply would be:		
0 0 0 0 1 0 0 0 0 0 0 -44 0 0 0 0 0 0 0 0 -27 0 0 0 0 0 0 0 0 1 -26 0 0 0 0 0 0 0 0		

5.4 Virtual Device Name Management

5.4.1 Subnet VDN

Sets / gets a VDN entry i.e. virtual device name and associated serial number.

This command is only supplied as an alternative way for administration of the VDN table. The administration of the VDN table should normally be done using the VDN Manager application (see Chapter 6).

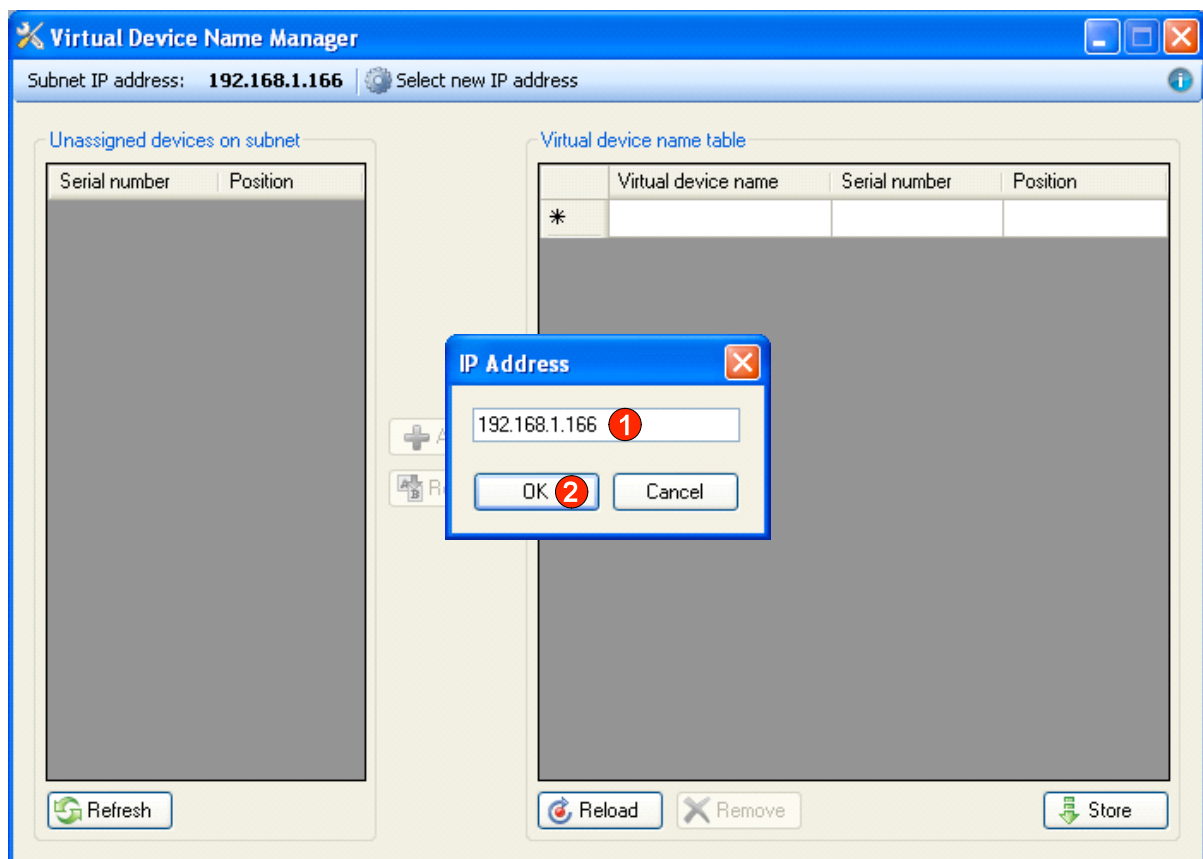
Address	Op.	Values (values from top to bottom)
Subnet.VDNX <i>Where X is a number ranging from 1 to 60, addressing the 60 possible VDNs.</i>	=	[VDN] - Virtual device name
		[SN] – Serial number to be associated with VDN
		Reply (values from top to bottom)
	?	[VDN] - Virtual device name, a '*' means it is unassigned
[SN] – Serial number associated with VDN, , a '*' means it is unassigned		
Examples		
<p>Subnet.VDN1 = B1-zone2-1 123456789</p> <p>To "clear" a VDN position simply assign it to nothing</p> <p>Subnet.VDN1 =</p> <p>The reply would be the same as getting an empty VDN i.e.:</p> <p>* *</p>		

6 Virtual Device Name Manager – Operations manual

6.1 The VDN Manager application

The VDN application is a stand-alone program that is not part of the DeviceControl software package. It can be found and downloaded from our website at www.labgruppen.com/support.

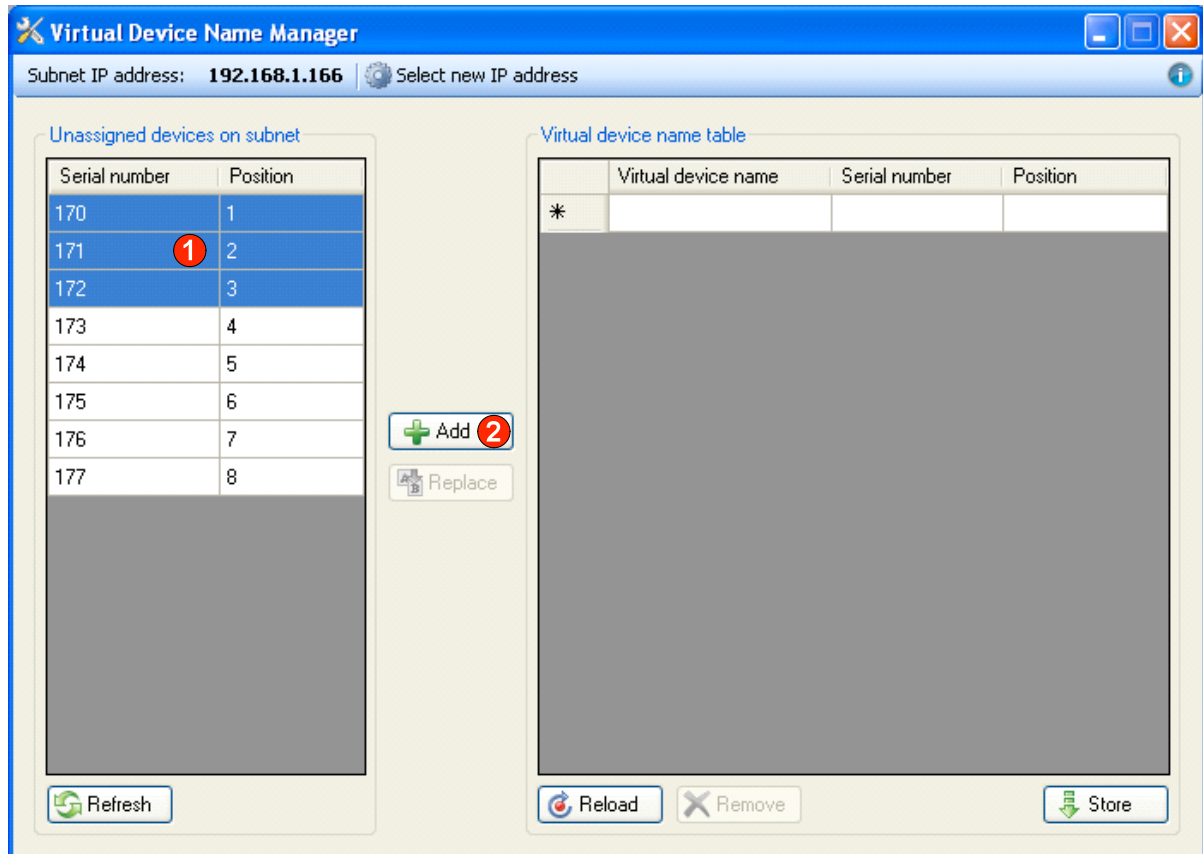
6.2 Connecting to the NLB60E



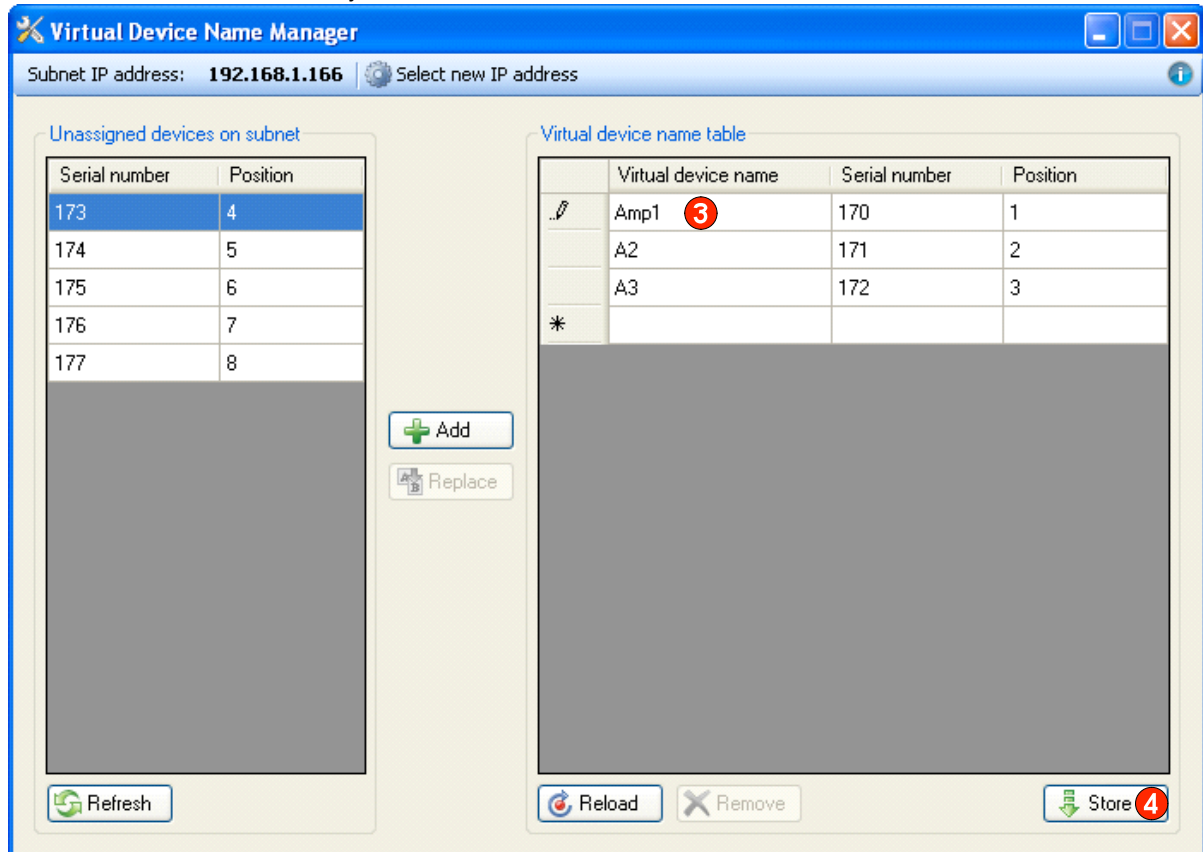
1. Enter the IP address of the NLB60E that you wish to connect to.
2. Press the OK button. The application will now load the virtual device name table and all unassigned devices from the selected NLB60E.

6.3 Adding devices to the virtual device name table

6.3.1 Adding devices that are present on the NomadLink network



1. Select the devices that shall be added to the virtual device name table.
2. Press the Add button. The selected devices will now be added to the virtual device name table, each entry being assigned a default name (A1, A2 etc.).



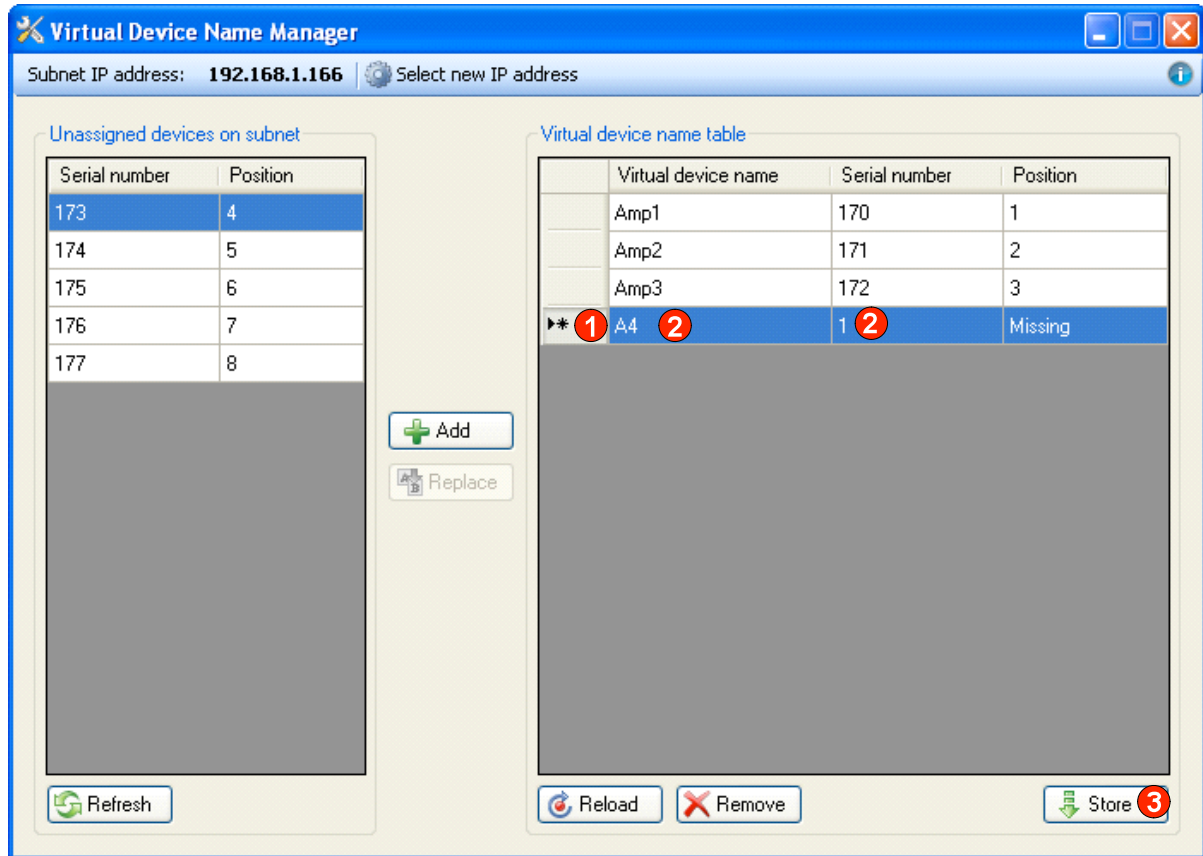
3. Edit the virtual device name by selecting the cell and typing the desired name. The name must:

- a) only include characters A-Z, a-z, 0-9, @ and -
- b) not start with the name "Subnet".
- c) be 1 to 10 characters in length..

4. Press the Store button to store the virtual device name table in the selected NLB60E.

Note: The text used for naming virtual devices is converted to all upper case when saved to the NLB60-E

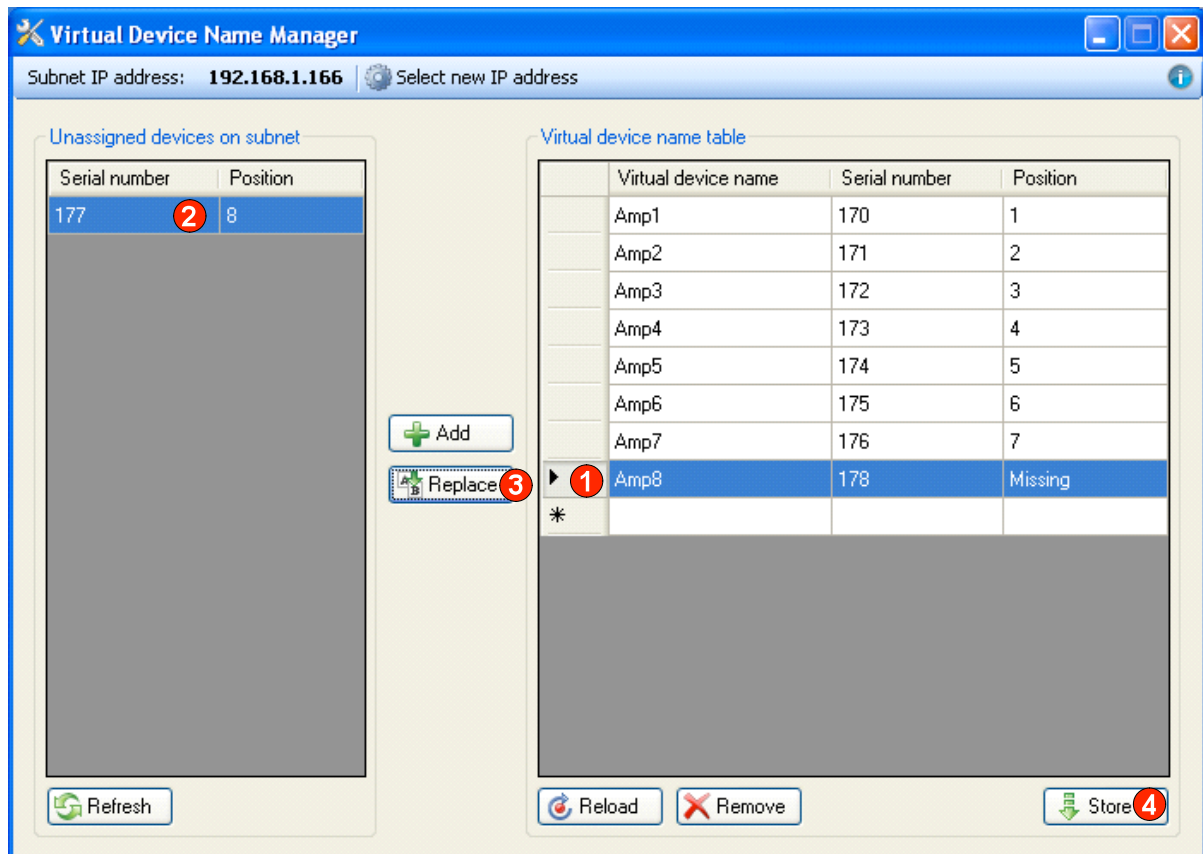
6.3.2 Adding devices that are not present on the NomadLink network



1. Click on the row marked by a star to add a new entry to the virtual device name table. The Position column will state “Missing” for the new entry since it is not present on the NomadLink network.
2. Edit the new entry to give it a suitable virtual device name and serial number.
3. Press the Store button to store the virtual device name table once all desired changes are made.

6.4 Replacing a device in the system

6.4.1 Replacing with a device that is already present on the NomadLink network



1. Selected the missing device that shall be replaced.
2. Select the device that shall be a replacement for the missing device.
3. Press the Replace button to replace the serial number of the missing device with that of the selected unassigned device. The selected unassigned device will now disappear from the list of unassigned devices.
4. Press the Store button to store the virtual device name table once all desired changes are made.

6.4.2 Replacing with a device that is not present on the NomadLink network

If the replacement device is not yet connected to the NomadLink network you can simply edit the serial number of the missing device to match that of the replacement device.