

# NLUTIL MANUAL



## **NEWRON SYSTEM**

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# INTRODUCTION

Thank you for choosing **NLUtil** software member of NLSuite.

We are happy to help you in your LonWorks integration job. All softwares of NLSuite are often updated for correcting bugs and improve performances. We propose to you to check version on Web site [www.newron-system.com](http://www.newron-system.com).

## **NL220**

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It is LonWorks LNS Manager tools.

## **NLFacilities**

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It is graphical tool for managing your living spaces.

## **NLOPC-MIP**

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It is a very fast OPC server with embedded tool for tuning your Scada.

## **NLOPC-VNI**

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It is a LNS OPC server. It can manage directly iLon interfaces.

## **NLUtil**

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It is window node utility. It is used before installation for checking channel and other LonWorks products.

# INSTALLATION OF PROGRAM

This section explains how to install the NLUtil program

## Configuration requirements

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The table below shows the minimum configuration and the recommended configuration for the installation and correct functioning of the program.

<b>Equipment</b>	<b>Minimum</b>	<b>Recommended</b>
Operating system	Windows 95, 98, Me,NT, 2000, Xp	Windows NT, 2000, Xp
Computer	Pentium III 350 Mhz, 800 x 600 screen	Pentium III 750 Mhz, 1024 x 768 screen
Memory	64 M octets	128 M octets
Hard disk	5 Mo	5 M octets
CD ROM	Required for installation	Required for installation
Interface network	Type MIP or NSI card	Type MIP or NSI card

Table 1 The equipment

## Installation

---

A setup program will guide you through the installation procedure and will ask you for any information necessary.

### Installation of program

1. Insert the CDRom in the CD reader
2. If no window appears on the screen open: D:\index.htm
3. Picture 1 will appear on the screen.
4. Select **Software** on main Menu
5. Picture 2 will appear on the screen.
6. Select **NLUtil** on center of screen.
7. Picture 3 will appear on the screen.
8. Select **Click to install NLUtil on your PC**, Picture 4 will appear on the screen.

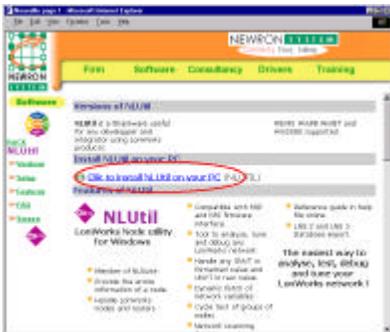
9. Select **run this program** from its current location and click on **OK** button.



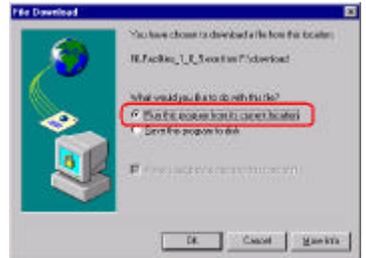
Picture 1 Install Step 1



Picture 2 Install Step 2



Picture 3 Install Step 3

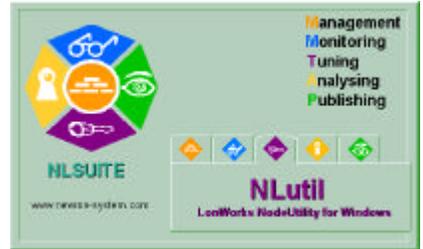


Picture 4 Install Step 4

The installation program will now be readied and Picture 5 will appear on the screen. Follow the instructions until you arrive at type of installation choice on Picture 8.



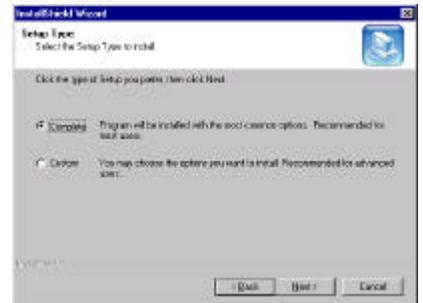
Picture 5 Install Step 5



Picture 6 Install Step 6



Picture 7 Install Step 7



Picture 8 Install Step 8

You have the choice between the following installations:

<b>Installation</b>	<b>Details</b>
Complete	Complete installation of NLUtil and SNVT Master List.
Custom	You can choose the module to be installed

Table 2 Type of installation

You should restart your PC at the end of the installation, according to the instructions

# NETWORK INTERFACE

The network interface allows a physical link to be created between the PC and LonWorks network.

## Valid interfaces

---

Type of interface	Maker	Connection	MIP	NSI
PCC10	Echelon	Slot PCMCIA	X	X
PCLTA10	Echelon	Slot ISA	X	X
PCLTA20	Echelon	Slot PCI	X	X
SLTA10	Echelon	Port RS232	X	X
LonDongle	D&H gmbh	Parallel port		X
LPP	Gesytec	Slot ISA	X	X
LPC	Gesytec	Slot PCI	X	X

Table 3 Type of PC interface

\* On require

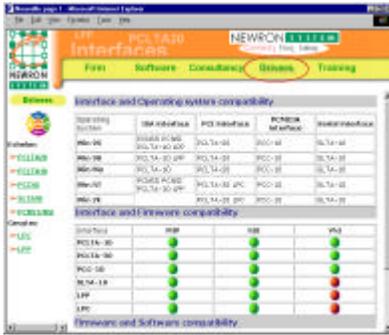
To work, NLUtil needs a Firmware MIP or NSI interface

## Driver for interface

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Some drivers are available on CD on **Driver** main menu see: Picture 9.

Choose you network interface in the selection grid. Click on the appropriate interface in the vertical left menu. In Picture 10 we have selected PCLTA20. Choose the good operating system and follow instruction for setup.



Picture 9 Driver installation Step 1



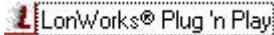
Picture 10 Driver installation Step 2

## Verifying interface function

To function correctly, NLUtil must have a type MIP or NSI interface as shown in Table 3.

### Verifying PCC10, PCLTA10, PCLTA20

1. Open the configuration panel and launch the icon



### Verifying SLTA10

1. Activate: *Start/Programs/LonWorks SLTA10/SLTALink Manager*
2. The SLTA Link Manager menu bar must be as in Picture 11 with a green warning light, if it is red, or if the menu bar is like Picture 12, the interface is not working. Repeat the configuration steps, following the instructions carefully



Picture 11 SLTA10 connected



Picture 12 SLTA10 unconnected

### Verifying LonDongle

3. Plug the NLUtil Dongle in first, the LondonGle in second position.
4. Open the configuration panel and launch the icon «LondonGle Configuration Utility» 
5. Launch Diagnostics.. option.

## Verifying LPP

1. Open the configuration panel and launch the icon  Easylon PCI Interface
2. If a check box is valid, the interface is show by the system like in Picture 13



Picture 13 Valid LPP windows

## Contents

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### Knowledge's

For an optimal use of NLUTIL, it is recommended to have the following knowledge's:

- Notions of LonWorks network.
- LonTalk protocol notions.
- EEPROM table knowledge.

This utility can be used in a lot of cases and configurations.

It can be used from a little network to a very big network.

It can be used from a simple way to a very advanced expert mode.

A note about messages generated by NLUtil:



All messages sent by NLUtil use NeuronId addressing.

The only time you can send a message with another addressing is using the Send messages option.

## Basis

---

- 1) First you must create a site.

You can create a new site, open an existing one or finally import a LNS database.

All these options are found in the File menu.

In all case you have to select the network driver used. NLUtil cannot work without a network interface. NLUtil will display all available drivers on your machine. Select one and continue.

2) You can work with your local interface.

Select one option in the Local interface menu.

3) You must now add nodes into your database.

You can :

- Create a database from a LNS expor
- Scan the network to found nodes and routers on the network.
- Press the service pin of any node.  
The node is automatically added into your database
- Manually add a node from its Neuronid: Select option Add a node in the Network menu.

To display nodes and routers NLUtil have several views and filters.

4) You can now work individually on any node or router.

You can:

Right click on the node in the list to open a popup menu.

There are three types of popup menus:

Node popup menu

Router popup menu

Undefined node popup menu

Select an option in the Node menu

5) Nw you can too work on several selected nodes in one operation.  
See Working with selection topic.

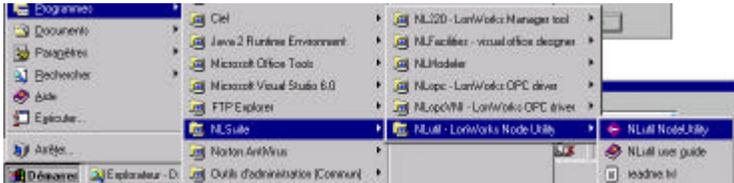
6) Finally do not forget to save your site before exiting (option Save the site in the File menu)

For more information about all options in menu see the General menu section.

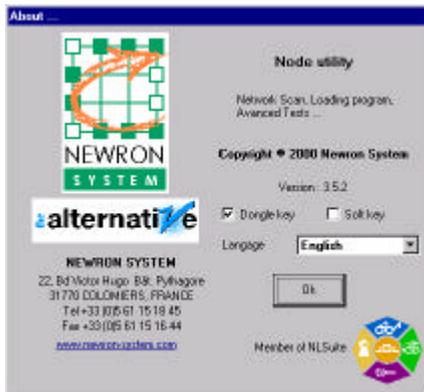
# STARTING NLUTIL

## Start

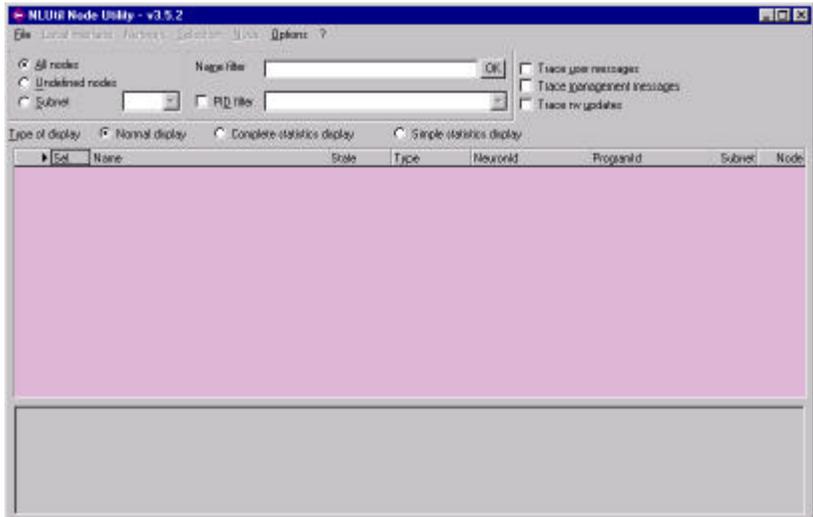
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When you launch NLUTIL the tool ask for the language:



Then you enter the main screen view:



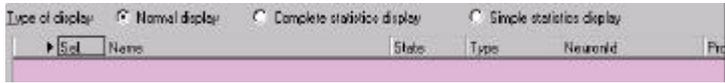
You are now ready to use the entire NLUTIL features

# Views

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NLUtil includes three type of view for displaying the nodes.

The nodes displayed depend on the filter you set.



You can change the sort of any column by left clicking on a column header.

Several click on same column header change the sort direction.

## Normal display

This view displays the general information of each node.



The columns are:

**Sel** ..... X if the node is selected, empty if not selected.

**Name** ..... Name of the node

**Type** ..... Type of the node:  
ND Node  
RTN Router near  
RTF Router far

**Neuronid** ..... Neuron id of the node

**Programid** ..... Program id of the node

**Subnet** ..... Subnet id of the node

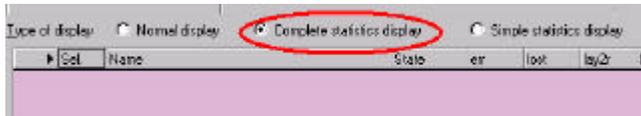
**Node** ..... Node id of the node

**State** ..... State of the node. If undefined then the state is ???.

## Complet statistics display

This view displays complete statistics of each node.

This view is useful in selection auto test feature.



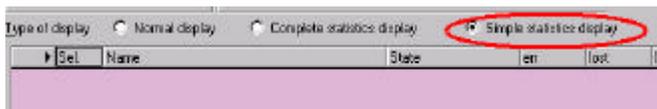
The columns are:

<b>Sel.</b>	.....	X if the node is selected, empty if not selected.
<b>Name</b>	.....	Name of the node
<b>State</b>	.....	State of the node. If undefined then the state is ???.
<b>err</b>	.....	Number of CRC detected during packet reception.
<b>lost</b>	.....	Number of messages discarded because there was no application buffer available. If an incoming message is too big for the application buffer the last error log is changed but the lost messages counter is not incremented.
<b>lay2r</b>	.....	Number of layer 2 messages received. Layer 2 messages are correct CRC messages addressed to ANY node
<b>lay3r</b>	.....	Number of layer 3 messages received. Layer 3 messages are correct CRC messages addressed to THIS node
<b>lay3t</b>	.....	Number of messages transmitted from layer 3 of the Neuron Chip. Includes network variable updates, explicit messages, acknowledgements, retries, reminders, service pin and ny other type of messages.
<b>missed</b>	.....	Number of messages discarded because there was no network buffer available. If an incoming message is too big for the network buffer this counter is increment.

<code>timeout</code>	.....	Number of times the node failed to receive acknowledge or response after retrying the configured number of times.
<code>rcv full</code>	.....	Number of times an incoming packet was discarded because there was no room in the transaction database. This may be due to excessively long receive timers.
<code>retries</code>	.....	Number of retries sent by this node. Do not include the repeats for unacknowledged repeat messages.
<code>backlog</code>	.....	Number of time the backlog reaches its maximum value of 63.
<code>late ack</code>	.....	Number of acknowledge received after the transmit transaction had expired.
<code>collision</code>	.....	Number of occurrences of collision detection or collision resolution (if enabled).
<code>eeeprom</code>	.....	State of EEPROM lock. If one then the checksummed EEPROM on the node is protected against memory write.

## Simple statistics display

This view displays some statistics of each node.



See Complete statistics display for description.

This view is useful in selection autotest feature

# Menus

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## General menu

The menu contains :

- Menu File
- Menu Local interface
- Menu Network
- Menu Selection
- Menu Node

The popup menus are:

- Node popup menu
- Router popup menu
- Undefined node popup menu

## Network Menu

This menu contains special options to work on the network.



Networks scan ..... Scan the network for new nodes  
All new found nodes will be added into the list.

Network parameters ..... Change network communication timers.

Send a message ..... Send explicit messages.

Add a node ..... Manually add a node from its NeuronId.

Place all the nodes ..... Place all undefined nodes.

Automatic download ..... Download several nodes in one operation.

The different state of a node are:

Application less .....No application is loaded.  
The application does not run.  
The node is not configured.  
The service LED is steadily on.

Unconfigured .....The node is not configured.  
The application is loaded and runs.  
The service LED flashes at one second rate.

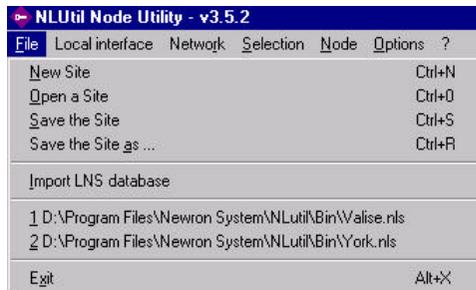
Configured online.....Normal node state.  
The node is configured.  
The application is loaded and runs.  
The service LED is steadily off.

Configured hard offline ...The node is configured.  
The application is loaded but does not run.  
The service LED is steadily off.

Configured soft offline.....The node is configured.  
The application is loaded but does not run.  
The service LED is steadily off.

## Menu File

This menu contains all options for using site files.



New site ..... Create a new site.

Open site..... Open an existing site.

Save the site..... Save the current site.

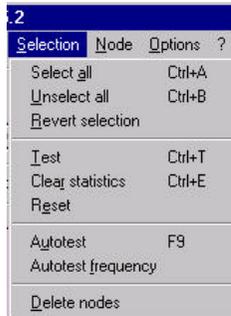
Save the site as ..... Save the current site selecting another file.

Import LNS database..... Import a LNS database.

Exit..... Exit NLUtil.

## Menu Selection

This menu contains all options to work with selected item.



Select all..... Select all nodes displayed in list

Unselect all..... Unselect all nodes displayed in list

Revert selection ..... Revert selection for the nodes displayed in list

Test..... Test all displayed selected nodes.

Clear statistics ..... Clear statistics of all displayed selected nodes.

Reset ..... Reset all displayed selected nodes.

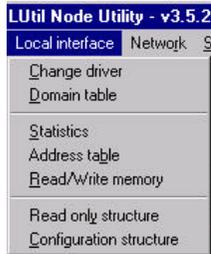
Autotest..... Launch the autotest.

Autotest frequency ..... Change the autotest frequency.

Delete nodes ..... Delete all displayed selected nodes from database.

## Menu Local interface

This menu contains all options to handle the network local interface.



Change driver ..... Change the used driver.

Domain table ..... View/update domain table of the local interface.

Statistics..... Statistics of the local interface.

Address table..... View/update address table of the local interface.

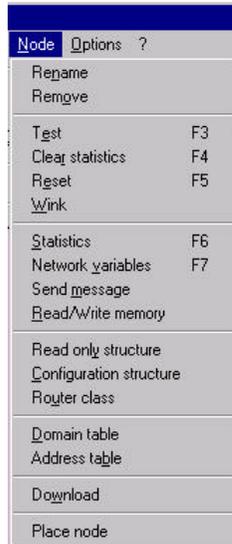
Read/write memory ..... Read and write memory from and into the local interface.

Read only structure ..... View/update read only structure of the local interface.

Configuration structure ... view/update configuration structure of the local interface.

## Menu Node

This menu contains all operations you can use on a node or router.



After selecting an option in the menu a window will open to select the node you want to operate.

All these operations can be accessed (popup menu) directly right clicking on a node or router in the list. In this case you will not have to select the node.

You have three different popup menus :

- Node popup menu
- Router popup menu
- Undefined node popup menu

Rename..... Change the name of a node.

Remove..... Remove a node from the database

Test..... Test a node and display results in list

Clear statistics ..... Clear statistics of a node

Reset ..... Reset a node

Wink..... Wink a node

Statistics.....Display statistics window of a node

Network variables.....Display network variables window of a node

Send messages .....Send explicit messages to a node

Read/write memory .....Read/write memory from/into a node

Read only structure .....View and update read only structure of a node

Configuration structure ...View and update configuration structure of a node

Router class.....View and update class of a router

Domain table .....View and update domain table of node

Address table.....View and update address table of a node

Download .....Download an application into a node

Place node .....Place an undefined node

## **Node popup menu**

This menu is displayed when right clicking on a node in the list.

There are three different popup menus:

- Node popup menu
- Router popup menu
- Undefined node popup menu

Rename.....Change the name of the node.

Remove.....Remove the node from the database

Test.....Test the node and display results in list

Clear statistics .....Clear statistics of the node

Reset .....Reset the node

Wink.....Wink the node

Statistics.....Display statistics window of the node

Network variables ..... Display network variables window of the node

Send messages ..... Send explicit messages to the node

Read/write memory ..... Read/write memory from/into the node

Read only structure ..... View and update read only structure of the node

Configuration structure ... View and update configuration structure of the node

Domain table ..... View and update domain table of the node

Address table..... View and update address table of the node

Download ..... download an application into the node

## Undefined node popup menu

This menu is displayed when right clicking on an undefined node in the list.

There are three different popup menus :

- Node popup menu
- Router popup menu
- Undefined node popup menu

Rename..... Change the name of the node.

Remove..... Remove the node from the database

Place node ..... Place the node

Place all the nodes ..... Place all undefined nodes

## Router popup menu

This menu is displayed when right clicking on a router (near or far) in the list.

There are three different popup menus :

- Node popup menu

- Router popup menu
- Undefined node popup menu

Rename.....	Change the name of the router.
Remove.....	Remove the router from the database
Test.....	Test the router and display results in list
Clear statistics .....	Clear statistics of the router
Reset .....	Reset the router
Statistics.....	Display statistics window of the router
Read/write memory .....	Read/write memory from/into the router
Router class.....	View and update class of a router
Read only structure .....	View and update read only structure of the router
Configuration structure ...	View and update configuration structure of the router
Domain table .....	View and update domain table of the router
Address table.....	View and update address table of the router
Router class.....	View and update class of the router

# Filters

---

NLUtil have several filters on the nodes to be displayed.

## Filters the nodes on subnet

In the left upper part of the screen you can select the nodes to display.



All nodes ..... Display all nodes

Undefined nodes ..... Display undefined nodes

Subnet ..... Display nodes belonging to one subnet. You can select the subnet you want.

## Filtering nodes on name and programId

In the center upper part of the screen you can filter the nodes on name and/or program id.

..... Filter on name. You must click on  to set the filter.

Can be :

\*NAME ..... Nodes with names that end with NAME.

NAME\* ..... Nodes with names that begins with NAME.

\*NAME\* ..... Nodes with names that includes with NAME.

NAME ..... Nodes with names equal to NAME

EMPTY ..... No filter

PID filter ..... Check this to filter the nodes on one programid. You can select the programID you want.

# Options

---

You can view and change the option in the options screen.

To access this feature select the options menu.

The options are:

- ..... Language of NLUtil.
- ..... SNVT master list path.
- ..... Percent of crc for warning bitmaps.  
Nodes in the list with a percent of the number of crc (err) by the number of received messages (layer2r) will be displayed with a warning icon (⚠).  
For example if you set the percent as 5 then if number of crc / number of layer2 received is greater or equal to 0.05 then the node will be display with warning icon (⚠).
- ..... If checked NLUtil will cache the configuration of the network variables of each node.The network variables configuration will be loaded only one time when opening the network variables window. After the first time NLUtil will use the memorize data.
- ..... If checked NLUtil will save the memorized network variables configuration for each node in the site file (when saving).  
This greatly increments the time to save and load a site file.

The commands are :

- ..... Save the options
- ..... Cancel and return

# CREATE NLUTIL DATABASE

## Introduction

---

1) First you must create a site.

You can create a new site, open an existing one or finally import a LNS database.

All these options are found in the File menu.

In all case you have to select the network driver used. NLUtil cannot work without a network interface. NLUtil will display all available drivers on your machine. Select one and continue.

2) You can work with your local interface.

Select one option in the Local interface menu.

3) You must now add nodes into your database.

You can:

- Create a database from a LNS expor
- Scan the network to found nodes and routers on the network.
- Press the service pin of any node.  
The node is automatically added into your database
- Manually add a node from its Neuronid: Select option Add a node in the Network menu.

To display nodes and routers NLUtil have several viewsand filters

For more information about all options in menu see the General menu section.

## Working with sites

---

A site is a place where a network is existing and commissioned

NLUtil works with sites.

You can make a new site or open an existing one.\$

You can copy a site from a pc to another. A simple NLS file composes a site.

To create a new site select the option New site in the File menu  
To open a new site select the option Open site in the File menu.

## Select driver

---

You can access this feature when:

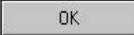
- Creating a new site (option New site in File menu)Opening a site (option Open site in File menu)Importing a LNS database (option Import LNS database in File menu)
- Selecting the option Change driver in the Local interface menu.

In this window you can select the driver used.

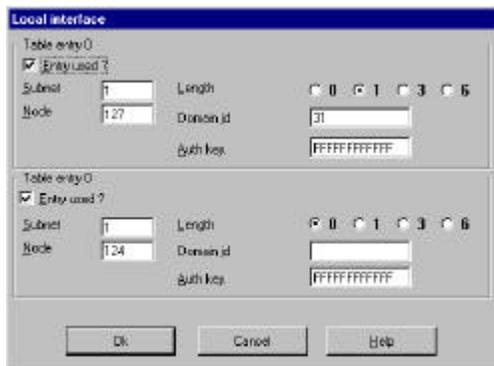


The list includes all available drivers on your machine.

The commands are:

-  ..... Select and open the driver
-  ..... Cancel and return

Then you parameter the network interface domain table



# Network parameters

---

This feature enables you to change the timers of NLUtil.

To access this feature select the option Network parameters in the Network menu

The parameters are split in two groups.

The group Parameters are the parameters used to communicate with the nodes.

The group Scan parameters are the parameters used to make a network scan.

In the two groups the options are:

- TxTimer ..... Transmit timer in thousands of second.  
The transmit timer is the time between two retries in acknowledge or request mode.
- RptTimer ..... Repeat timer in thousands of second.  
The repeat timer is the time between two repeats in unacknowledged repeat mode.
- Retry Count ..... Number of retries (ack or request) or of repeats (unack repeat).

Plus one final option:

- Non group timer interface ..... Non-group timer in thousands of second.  
The non group timer is the time the local interface keeps a transaction for unicast messages.

The commands are:

- ..... Save the parameters
- ..... Cancel and return

## Scanning network

---

This is the first method to create a database : This allows you to scan a network and create a database from this scan.

To access this feature select the option network scan in the Network menu

Please be sure you provided

- The correct domain Id for the PC interface card: NLUTIL will scan in this domain.
- The correct communication parameters and timers for the PC interface card. (You need to update these timers at the slowest media reference).

NLUTIL finds any node and router on the network and display them on the current windows one by one. At the end it tells the user how many nodes have been found.

## Importing a LNS database

---

This is the second way to create a database.

This feature enables you to import a LNS database made with any LNS manager tool like NL220.

With this method you retrieve the node name of the LNS database.

To access this feature select the option Import LNS database in the File menu

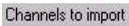
4) First you must select the  you want to import

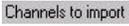
Then click on .

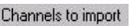
The list  will be fill with all channels of the LNS database.

You must select the channel you want to import.

5) Select the channel in the left list and click on  to add the channel in the  list.

Click on  to add all channels into the  list.

Select the channel in the right list and click on  to remove the channel from the  list.

Click on  to remove all channels from the  list.

6) After selecting channels you can:

 ..... Import LNS database

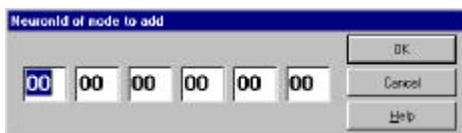
 ..... Cancel and return

## Adding a node

You can add any node in the windows by:

- Pressing the service PIN of the node
- Provide the Neuron Id of this node

To add a node providing Neuron Id select the option Add a node in the Network menu. This window enables you to manually add a node from its NeuronId.



You must enter here the NeuronId of the node you want to add.

# NODES INFORMATION

## Introduction

---

You have now nodes in the windows. To display nodes and routers remember that NLUtil have several views and filters

You can now work individually on any node or router.

You can :

Right click on the node in the list to open a popup menu.

There are three types of popup menus:

Node popup menu

Router popup menu

Undefined node popup menu

Select an option in the Node menu



Important note : Please note that a network interface is a node on the network. So this chapter describes also local interface commands.

7) Now you can too work on several selected nodes in one operation.

See Working with selection topic.

8) Finally do not forget to save your site before exiting (option Save the site in the File menu)

For more information about all options in menu see the General menu section.

## Select the node

---

Select the node for the operation you select. Click on its line



Only the nodes affected by the operation are displayed.

For example for changing the router's class only the routers are available in the list.

## Removing a node

---

This option removes the node from NLUTIL database

## Renaming a node

---

This window enables you to rename a node.

To access this feature you can:

- Select the option Rename in the Nodes menu.
- Right click on a node and select the option Rename

Enter the new name of the node.

Undefined nodes are nodes added manually (option Add node in Network menu) that NLUtil cannot find on network when added.



**This is useful when you want to add nodes offsite.**

When going on the site you must place the nodes with:

- Option Place all nodes in Network menu
- Option Place node in Node menu
- Right click on undefined node and select option Place node.

To display undefined node check the option  Undefined nodes.

## Test

---

This option tests the node and update the column “State”

## Clear statistics

---

This option clear the statistic of the internal EEPROM node

## Reset

---

This option reset the node

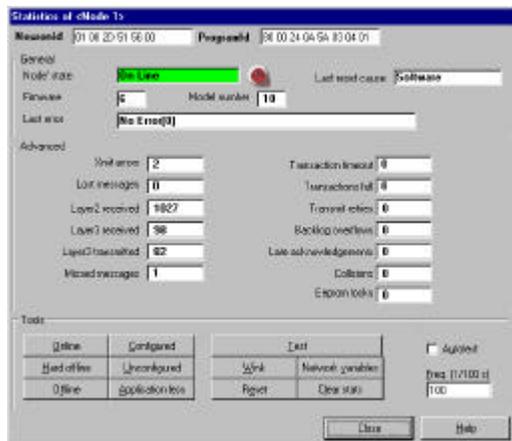
## Wink

---

This option send a wink command to the node

## Statistics

---



This feature can be used to view statistics and manage the local interface or a node.

To access this feature you can :

- Select the option Statistics in the Local interface menu.
- Select the option Statistics in the Node menu.
- Right click on the node and select Statistics option.

The statistics are :

<b>NeuronId</b>	.....	Neuron id.
<b>ProgramId</b>	.....	Program id.
<b>Node state</b>	.....	State of the node
<b>Firmware</b>	.....	Firmware version.
<b>Model number</b>	.....	Model number.
<b>Last error</b>	.....	Last error logged in eeprom.
<b>Last reset cause</b>	.....	Cause of the last reset. Can be Power up, external, watchdog, software or cleared.
<b>Xmit errors</b>	.....	Number of CRC detected during packet reception.
<b>Lost messages</b>	.....	Number of messages discarded because there was no application buffer available. If an incoming message is too big for the application buffer the last error log is changed but the lost messages counter is not incremented.
<b>Layer2 received</b>	.....	Number of layer 2 messages received. Layer 2 messages are correct CRC messages addressed to ANY node
<b>Layer3 received</b>	.....	Number of layer 3 messages received. Layer 3 messages are correct CRC messages addressed to THIS node
<b>Layer3 transmitted</b>	.....	Number of messages transmitted from layer 3 of the Neuron Chip. Includes network variable updates, explicit messages, acknowledgements, retries, reminders, service pin and any other type of messages.
<b>Missed messages</b>	.....	Number of messages discarded because there was no network buffer available. If incoming messages is too big for the network buffer this counter is increment.
<b>Transaction timeout</b>	.....	Number of times the node failed to receive acknowledge or response after retrying the configured number of times.

Transactions full	.....	Number of times an incoming packet was discarded because there was no room in the transaction database. This may be due to excessively long receive timers.
Transmit retries	.....	Number of retries sent by this node. Do not include the repeats for unacknowledged repeat messages.
Backlog overflows	.....	Number of time the backlog reaches its maximum value of 63.
Late acknowledgements	.....	Number of acknowledge received after the transmit transaction had expired.
Collisions	.....	Number of occurrences of collision detection or collision resolution (if enabled).
Eeprom locks	.....	State of EEPROM lock. If one then the checksummed EEPROM on the node is protected against memory write.

## Autotest

You can launch an autotest on the node. This will launch a normal test continuously and display dynamically the results on the screen.

Check the option  Autotest .

You can change the frequency of the autotest in  .

The commands are :

<input type="text" value="Iest"/>	.....	Test the node and display results on screen.
<input type="text" value="Online"/>	.....	Put the node online.
<input type="text" value="Hard offline"/>	.....	Put the node hard offline
<input type="text" value="Offline"/>	.....	Put the node offline
<input type="text" value="Configured"/>	.....	Put the node configured
<input type="text" value="Unconfigured"/>	.....	Put the node unconfigured
<input type="text" value="Application less"/>	.....	Put the node application less

Wink	.....	Wink the node
Reset	.....	Reset the node
Network variables	.....	Show network variables of the node
Clear stats	.....	Clear statistics
Close	.....	Close and return

# Network variables

---

In this window you can read and write the network variables of a node.

To access this feature you can :

- Select the option Network variables in the Node menu.
- Right click on the node and select Network variables option.
- Click on the button Network variables in the Statistics window of the node

The SNVT are formatted using the standard SNVT master list.

The path of the master list can be changed in the options screen.

The columns of the list are :

Mark	.....	Contains  when NLUtil is polling the network variable, else nothing. Marked network variables are automatic polled and refreshed on the screen.
Idx	.....	LonWorks index of the network variable (based 0).
Name	.....	Name of the network variable. If the node doesn't keep the name of the network variable (pragma enable_sd_nv_names) then NLUtil will generate automatic names.
Dir	.....	Direction of the variable.
Value	.....	Current value of the variable. If the variable is marked then the value is continuously refreshed. If an error occurs when polling the variable the value is <b>*****</b> .(star in red)
Type's name	.....	Type of the network variable. UNVT for user type.
Sel	.....	Selector.

Turn	1 if the network variable is bound in turnaround that means bound with another network variable of the same node.
Serv	Default service.
Auth	Default authentication.
Addr	Address index for bound nv. 15 if not bound.
Prior	Default priority.
Poll	1 if the network variable is a polled input network variable, 0 else.
Offline	1 if the node must be offline to change the input network variable, 0 else.
CfgAuth	1 if a manager tool can change the authentication of the network variable, 0 else.
Config	1 if the network variable is a configuration network variable, 0 else.
CfgPrior	1 if a manager tool can change the priority of the network variable, 0 else.
CfgSvc	1 if a manager tool can change the service of the network variable, 0 else.
Sync	1 if the network variable is synchronous, 0 else.
SNVTid	SNVT id. Zero for user type.
Description	Self documentation of the variable.

## Marking/Unmarking network variables

You can mark/unmark variables for the automatic polling. Marked network variables will be continuously polled on the network. You can change the frequency of the polling in `Polling frequency (1/100 s)`.

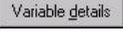
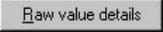
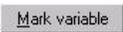
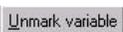
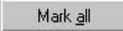
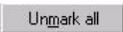
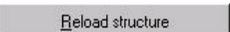
The marked variables appear in bold in the list.

The commands are :

A left click on a network variable will select the variable. The selected variable is preceded by .

A left double click on a network variable marks/unmarks the variable for automatic polling.

A right click on a network variable opens the details window of the network variable.

	.....	Open the details window of the selected variable (equivalent to right click). This button is disabled for UNVT.
	.....	Display the raw value window of the network variable. If the type of the variable is a user type then the raw
	.....	Mark the selected variable for automatic polling.
	.....	Unmark the selected variable for automatic polling.
	.....	Mark all variables for automatic polling.
	.....	Unmark all variables for automatic polling.
	.....	Force NLUtil to reload network variables configuration. Useful when using the network variables caching system (see options).

If the button blinks it means NLUtil have used the memorized configuration.

## SNVT details

This window is used to read and write a network variable using the SNVT format.

For accessing this feature you have to open the network variables window and right click on a network variable.

The SNVT is decomposed on fields. These fields are displayed on the right list of the window.



When you select a field the properties of the field are displayed (min, max, scales, offset, length, ...).

These properties are displayed ONLY for information. You do not need to use them to change the value. NLUtil does all need conversions.

When you select each field you can view its value in the  box.

For an input network variable you can change the value of each field.

The  in the left lower part of the screen display the resulting raw value for the network variable.

The commands are :

..... Read the network variable on network and refresh the fields values.

..... Write the network variable on network (only for input network variable).

..... Close window and return.

## RAW details

This window is used to read and write a network variable in raw format.

To access this feature you have to open the network variables window, select the variable and click on .

The screen displays the value of a network variable in hexadecimal raw format.

The  contains one field for each byte of the network variable.

If the variable is an input network variable then you can change any of these bytes.

The commands are :

- ..... Read the network variable on network and refresh the bytes values.
- ..... Write the network variable on network (only for input network variable).
- ..... Close window and return.

## Send a message

---



This window can be used to send explicit message using Neuron Id addressing to the selected node.

To access this feature you can :

- Select the option Send message in the Node menu.
- Right click on a node and select Send message option.

The options are :

..... Send a unicast message using neuronid addressing  
 In this case you have :  
 Neuronid of the destination

..... Code of the message

..... Service of the message

..... Length of the data to send

..... Data. Use  to list all data bytes.

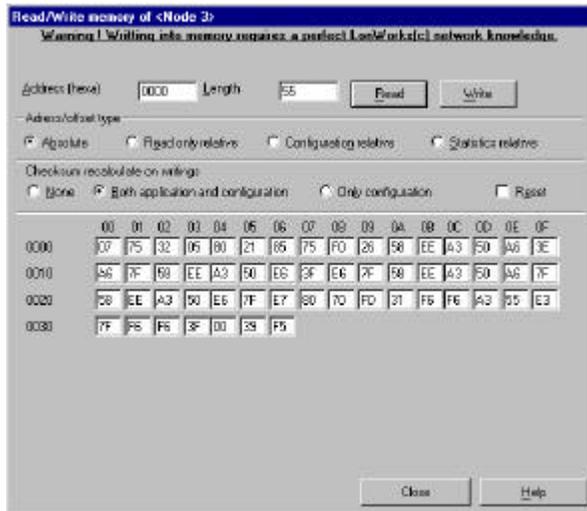
The commands are :

..... Send the message

..... Cancel and return

## Read/write memory

---



This feature is useful to read and write memory of a node.

To access this feature you can :

- Select the option Read/Write memory in the Node menu.
- Right click on the node and select Read/Write memory option.



**BEWARE!** Writing memory requires a perfect knowledge about LonWorks(c) network.

The options are :

..... Offset of read/write operation relative to the type of addressing (see below).  
If the type of addressing is Absolute then this is an absolute address and not an offset.

..... Type of addressing.

- Absolute** ..... The offset is an absolute address.
- Read only relative** ..... The offset is relative to the read/only structure
- Configuration relative** ..... The offset is relative to the configuration structure.
- Statistics relative** ..... The offset is relative to the statistics structure.
- Checksum recalculate on writings:** ..... Type of checksum recalculate after a write.
  - None** ..... Checksum are not recalculate after writes.
  - Both application and configuration** ..... Application and configuration checksums are recalculated after writes.
  - Only configuration** ..... Configuration checksum are recalculate after writes.
- Reset** ..... If checked the node is reset after write and checksum recalculate.

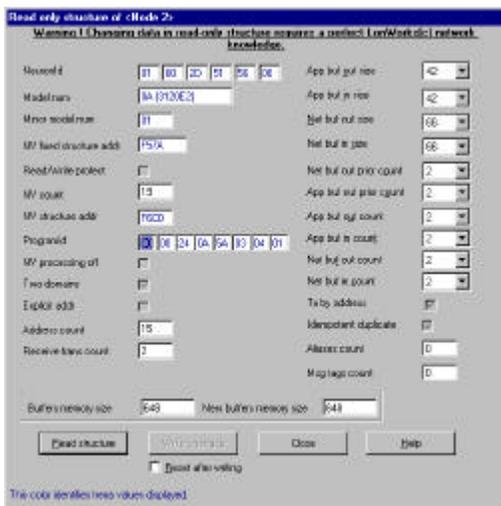


**Note:** To be able to write memory you have first to read the memory bytes you want to write.

The commands are:

- ..... Read memory
- ..... Write memory
- ..... Close and return

# Read only structure



This feature can be used to view and change the read only structure of the local interface or a node.

To access this feature you can:

- Select the option Read only structure in the Node menu.
- Right click on the node and select Read only structure option.

Take attention! Changing data in read only structure requires a perfect knowledge about LonWorks(c) network.

The configuration structure fields are:

- Neuronid** ..... Neuron id.  
You cannot change this.
- Model num** ..... Model of the Neuron Chip.  
You cannot change this.
- Minor model num** ..... Minor model of the Neuron Chip.  
You cannot change this.
- NV fixed structure addr** ..... pointer to the Network Variable fixed data table.  
You cannot change this.

Read/write protect	.....	If set (pragma read_write protect) then memory of the node cannot be read or written over network. Only read only structure, the SNVT structures, the configuration structure can be read and only the configuration structure can be written. You cannot change this.
NV count	.....	Number of network variable. Zero for host node based. You cannot change this.
NV structure addr	.....	Pointer to the SNVT data structure. Zero if the self information is not present (pragma disable snvt_si). FFFF for a host based node. You cannot change this.
Program id	.....	Program id.
NV processing off	.....	Set if the network variables processing is performed off chip in a host based node. You cannot change this.
Two domains	.....	Set if the node has two entries in the domain table. You cannot change this.
Explicit addr	.....	Set if the node uses explicit message addressing. You cannot change this.
Address count	.....	Number of entries in the address table. You cannot change this.
Receive trans count	.....	Number of receive transactions. Each transaction uses 13 bytes RAM. You cannot change this.
App buf out size	.....	Size of application output buffers.
App buf in size	.....	Size of application input buffers
Net buf out size	.....	Size of network output buffers.
Net buf in size	.....	Size of network input buffers.
Net buf out prior count	.....	Number of network output priority buffers. Can be zero if the node do not send priority messages.
App buf out prior count	.....	Number of application output priority buffers. Can be zero if the node do not send priority messages.
App buf out count	.....	Number of application output buffers.
App buf in count	.....	Number of application input buffers.

Net buf out count	.....	Number of network output buffers.
Net buf in count	.....	Number of network input buffers.
Tx by address	.....	Set if the node maintains a separate outgoing transaction space for each unique destination address in the address table. You cannot change this.
Idempotent duplicate	.....	Set if the Neuron Chip sets the idempotent retry bit in the application buffer when a request retry is sent up by the application. You cannot change this.
Aliases count	.....	Number of aliases. You cannot change this.
Msg tags count	.....	Number of bindable message tags. You cannot change this.
Buffers memory size	.....	Memory size used by buffers before changes.
New buffers memory size	.....	Memory size used by buffers after changes. Be careful ! If the new buffers memory size is greater than the buffers memory size it may cause the node to disfunction.

The commands are :

Read structure	.....	Read the node's read only structure and refresh the screen.
Write changes	.....	Write the changes into the read only structure of the node. Checksum are correctly updated after writing. If <input type="checkbox"/> Reset after writing is checked then the NLUtil will reset the node after the write.
Close	.....	Close and return

## Domain table

---

This feature enables you to change the domain table of the local interface or a node

For accessing this feature you can :

- Select the option Domain table in the Local interface menu.
- Select the option Domain table in the Node menu.
- Right click on the node and select Domain table option.

You can enter the properties how the two entries of the domain table.

Note : If the node has only one domain in the table then the second entry properties are not visible.

For each domain entry you have :

- Entry used ? ..... Checked if the domain entry is used.
- Subnet ..... Subnet id of the node.
- Node ..... Node id of the node.
- Length ..... Length of the domain id (0,1,3 or 6).
- Domain id ..... Domain id in hexadecimal form.
- Auth key ..... Authentication key.

The commands are :

- ..... Update the domain table of the node
- ..... Cancel and return

## Configuration structure

---

This feature can be used to view and change the configuration structure of the local interface or a node.

For accessing this feature you can :

- Select the option Configuration structure in the Local interface menu.
- Select the option Configuration structure in the Node menu.
- Right click on the node and select Configuration structure option.



**BEWARE!** Changing data in configuration structure requires a perfect knowledge about LonWorks(c) network.

The configuration structure fields are :

- ..... Channel id. Not really used but can be useful when recovering a network.

Location	Location id. Six bytes length in hexadecimal form.
Communication clock	For direct mode transceivers specifies the ratio between Neuron Chip input clock oscillator frequency and the transceiver bit rate. For special purpose mode transceivers specifies the rate of the bit clock between the Neuron Chip and the transceiver. You cannot change this.
Input clock	Oscillator frequency (input clock). You cannot change this.
Communication type	Type of transceiver. You cannot change this.
Communication port pins	Direction of the Neuron Chip's communications port pins. You cannot change this.
Preamble length	Length of the preamble for direct mode. Zero for special purpose mode transceivers. The time formula is : $[209..223]+(32) * \text{value}]$ cycles Cycles=.6 microsecond for 10MHZ, 1.2 microsecond for 5 MHZ and so on.
Packet cycle	Packet cycle duration for counting down the backlog. Time formula for direct mode is : $1675 * \text{value}$ Time formula for special purpose mode is : $1794 * \text{value}$
Beta2 control	Beta2 slot width. Time formula is : $40 + 20 * \text{value}$
Xmit interpacket	Interpacket padding after transmitting. Time formula is : $(41 * \text{value} \text{ cycles})$ if values < 128 Time formula is : $(145*(128-\text{values}) \text{ cycles})$ if values $\geq 128$
Receive interpacket	Interpacket padding after receiving. Time formula is : $(41 * \text{value} \text{ cycles})$ if values < 128 Time formula is : $(145*(128-\text{values}) \text{ cycles})$ if values $\geq 128$
Priority slots	Priority slot used by the node when sending priority messages.

Must not be greater than the number of priority slots on the channel.  
If zero the node has no priority slot allocated.

Channel priorities	Number of priority slots on the channel. Max value is 127.
Collision detect	Specifies if the pin CP4 are used to monitor a collision on the network.
Synchronous bits	Number of logic on bits received that are to be interpreted as the bit sync indicating the start of a packet.
Filter	For differential mode transceivers specifies the setting of the receive glitch filter.
Hysteresis	For differential mode transceivers specifies the setting of the receive hysteresis filter.
Collision end packet	Controls how close to the end of a packet the collision detect signal is checked in a transmitting Neuron Chip. It is set as a function of the bit rate and the input clock rate.
Collision detect tail	Specifies that collisions are to be detected at the end of the transmitted packet following the code violation.
Collision detect preamble	Specifies that collisions are to be detected during the preamble at the beginning of the transmitted packet. When used the packed is cancelled if collision is detected during the preamble.
XCVR params	Five last transceiver specific parameters for special purpose mode transceiver. The first two bytes are composed by the fields from Collision detect to Collision detect preamble. You cannot change this.
Non group timer	Time of a transaction for unicast or broadcast messages.
Authenticated	If set the network management messages are to be authenticated.
Preemption timeout	Maximum time the node will wait for a free buffer in preemption mode.

In preemption timeout the node will log the error and reset.

The commands are :

- |   |       |  |
|---|-------|--|
| <input type="button" value="Read structure"/> | ..... | Read the node's configuration structure and refresh the screen.  |
| <input type="button" value="Write changes"/>  | ..... | Write the changes into the configuration structure of the node.<br>Checksum are correctly updated after writing.<br>If <input type="checkbox"/> <input type="button" value="Reset after writing"/> is checked then the NLUtil will reset the node after the write. |
| <input type="button" value="Close"/>          | ..... | Close and return   |

# Address table

---

This feature enables you to change the address table of the local interface or a node

For accessing this feature you can :

- Select the option Address table in the Local interface menu.
- Select the option Address table in the Node menu.
- Right click on the node and select Address table option.

If the node does not have any address then the window will automatically closed.

The window will display from one to 15 address entries depending of the number of entries declared on the node.

For each entry you have :

Type	Type of the address. Can be : <input type="button" value="unbound"/> no address <input type="button" value="Sb/Nd"/> Subnet/Node <input type="button" value="Bcast"/> Broadcast <input type="button" value="Group"/> Group <input type="button" value="TrnArnd"/> Turn around
Size	Size of the group. Only for <input type="button" value="Group"/> addressing.
Domain	Domain index 0/1.
Member or node	Member number for <input type="button" value="Group"/> addressing. Node id for <input type="button" value="Sb/Nd"/> addressing.
Rpt timer	Repeat timer. Time between two repeat in unacknowledged repeat messages.
Retries	Number of retries (or repeat for unacknowledged repeat messages).
Rcv timer	Receive timer for <input type="button" value="Group"/> addressing. Time for complete transaction.

**Tx timer** ..... Transmit timer. Time between two retries in acknowledge or request messages.

**Group or subnet** ..... Group id for  addressing.  
 Subnet id for  addressing.  
 Subnet id for  addressing. 0 for domain broadcast.

The commands are :

..... Update the address table of the node

..... Close and return

## Downloading a node

---



This feature can be used to download an application file into a node.

To access this feature you can :

- Select the option Download in the Node menu.
- Right click on the node and select Download option.

Be careful! Downloading a node overwrites any configuration as the bindings, specials configurations (cps), ...

The options are:

**N:F file** ..... Interface file used for downloading. Click on  to select the file.

**N:XE file (INTEL format)** ..... Application file used for downloading. Click on  to select the file.  
 Important note : The application file must be in INTEL format.

Download only if same program id

Check this if you want to download only if the programID is the same in the application file

The commands are:

Launch the download

Cancel and return

## Changing the router class

---

This feature can be used to change the class of a router.

For accessing this feature you can:

- Select the option Router class in the Node menu
- Right click on the router and select Router class option.

The class available are :

- Configured** ..... Put the router in configured mode.  
In this mode the router will forward messages depending on its forward tables (group and subnet)
- Learning** ..... Put the router in learning mode.  
In this mode the router will reset its forwarding tables at reset and fill this table depending on the messages received.
- Bridge** ..... Put the router in bridge mode.  
In this mode the router will forward any messages from one side to the two domains of the other side.  
This can be useful to spanning one or two domains.
- Repeater** ..... Put the router in repeater mode.  
In this mode the router will forward any messages.

The commands are :

Change class ..... Launch the download  
Close ..... Cancel and return

# COMMANDS ON SELECTIONS

## Introduction

---

You have nodes in the windows and you know how to handle them separately. This chapter deals with the commands applied to a selection of nodes

Now you can indeed work on several selected nodes in one operation.

You can select or unselect nodes in the view. Several operations can be launch on the selected nodes (menu Selection)



ALL THE OPERATIONS ON SELECTED NODES WORK ONLY ON NODES PRESENT IN THE VIEW (NOT FILTERED).

You can have not displayed selected nodes (from example with a filtered name). These nodes are not concerned by selection operations.

## Select All

---

Option Select all in selection menu

To select all node select the option Select all in the Selection menu.

## Unselect All

---

Option Unselect all in selection menu

To unselect all node select the option Unselect all in the Selection menu.

## Reverse selection

---

Option Reverse in selection menu

To revert the selection, check the option Revert selection in the Selection menu. All selected node will be unselected. All unselected node will be selected.

## Select / Unselect a node

---

To select or unselect a node, double click on the node in the list.

A selected node is preceded by an icon (column `Sel.`) in the list and is display in bold.

If not selected, the node is in not bold and no icon preceded it.

The icon may be :

-  ..... The state of the node is undefined. You must test the node at least one time.
-  ..... The node is configured online.
-  ..... The node is present but not configured online or the node have a great percent of crc (see ).
-  ..... The node is absent.

If the icon is preceded by  it means NLUtil is working on this node.

## **Test selected nodes**

---

Option Test in selection menu

This option launches a test on all displayed selected nodes.

The results on the test are displayed in the list.

## **Clear statistics of selected nodes**

---

Option Clear statistics in Selection menu

This option clears all stats of all displayed selected nodes and then tests the nodes.

The results on the test are displayed in the list.

## **Reset selected nodes**

---

option Reset in Selection menu

This option reset all displayed selected nodes.

## **Autotest on selected nodes**

---

Option Autotest in Selection menu

This option launches a continuous test on all displayed selected nodes.

The results of the tests are dynamically refreshed in the list.

You can change the frequency of the test with the option Autotest frequency in the Selection menu.

## Autotest frequency

---

This feature is used to change the frequency for testing node in main window.

For accessing this feature select the option Autotest frequency in the Selection menu.

The unit of the frequency is one hundredth of second.

The commands are:

..... Change the frequency  
 ..... Cancel and return

## Delete selected nodes

---

Option Delete in Selection menu

This option deletes from database all displayed selected nodes.

## Sending a message

---

This window can be used to send explicit message using unicast, groupcast or broadcast.

For accessing this feature you can :

- **Select** the option Send message in the Network menu.
- Select the option Send message in the Nodes menu.
- Right click on a node **and** select Send message option.



If you use the option Send Messages on a node then you will only be able to send a message to the selected node using NeuronId addressing.

The options are :

..... Send a unicast message using subnet/node addressing  
In this case you have :

Destination subnet id

Destination node id

..... Send a unicast message using neuronid addressing

In this case you have :

Neuronid of the destination

..... Send a message using group addressing

In this case you have :

Group id

Size of the group (0 for a huge group)

..... Send a message using broadcast

In this case you have :

0 for broadcast domain else subnet id for subnet broadcast

..... Code of the message

..... Service of the message

..... Length of the data to send

..... Data. Use  to list all data bytes.

The commands are :

..... Send the message

..... Cancel and return

## Automatic download

---

Automatic download can be used to download an application file to all nodes with the same programID.

To access this feature select the option Automatic download in the Network menu.



Be careful ! Downloading a node overwrites any configuration as the bindings, specials configurations (cps), ...

The options are :

..... Program id of the nodes to download

- F file** ..... Interface file used for downloading. Click on  to select the file.
- NXE file (INTEL format)** ..... Application file used for downloading. Click on  to select the file.  
Important note : The application file must be in INTEL format.
- Download only if same program id** ..... Check this if you want to download only if the programID is the same in the application file
- Download only selected nodes** ..... Check this if you want to only download the selected nodes.
- Download only nodes of one subnet** ..... Check this if you want to only download nodes of a specific subnet.  
In this case you have to enter the subnet number.
- Stop downloading on error** ..... Check this if you want to stop all downloads at the first error.  
If unchecked NLUtil will continue to download other nodes after an error of a given node.

The commands are:

- ..... Launch the download
- ..... Cancel and return

# TERMINOLOGY

<b>NETWORK ADDRESS</b>	LOGICAL ADDRESS OF THE NETWORK NODES (DOMAIN, SUBNET NODE) ASSIGNED WITH A LONWORKS INSTALLATION TOOL. A NODE WITH A LOGICAL ADDRESS IS CONFIGURED.
<b>Configuration</b>	EEPROM ADDRESS TABLE OF THE NEURON CHIP.
<b>Binding</b>	LOGICAL LINK BETWEEN NETWORK VARIABLES CREATED WITH A LONWORKS INSTALLATION TOOL.
<b>Channel</b>	A CHANNEL CORRESPONDS TO A NETWORK INTERFACE, WHICH LINK YOUR PC TO A LON NETWORK.
<b>DLL</b>	DYNAMIC LINK LIBRARY .
<b>Driver</b>	SYSTEM FILE DRIVING A PERIPHERAL
<b>Identifier</b>	NULL TERMINATED STRING (1 TO 30 CHARACTERS), WHICH EXCLUSIVELY IDENTIFIES A GATE (VARIABLE OR MODULE).
<b>Network Interface</b>	PERIPHERAL WHICH INTERFACES THE PC TO A <b>LONWORKS</b> NETWORK. COULD BE A SLTA, A PCLTA OR A PCNSS.
<b>Library</b>	LIBRARY OF FUNCTIONS USABLE BY AN APPLICATION. A LIBRARY COULD BE STATIC (.LIB) OR DYNAMIC (DLL).
<b>Explicit Message</b>	LONWORKS MESSAGE USING EXPLICITLY ADDRESSING SEND OR RECEIVED BY A NODE.
<b>Node</b>	HARDWARE OBJECT LINK TO THE NETWORK WITH A LOGICAL ADDRESS (DOMAIN, SUBNET, NODE).
<b>Network Variable</b>	VARIABLE OF A NODE ACCESSIBLE BY LONWORKS NETWORK MANAGEMENT MESSAGES (POLL, FETCH, UPDATE).