xtramus

NuApps-2544-RM User's Manual

USM Ver 1.3

Foreword

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Revision History

Date	Version	Software	History
Sept, 2010	1.0		First draft version
2010/10/06	1.1		1. Change Revision History date format. 2. Add NuApps-2544-RM hardware installation figure on page 12.
2011/03/23	1.2	v1.0b013	1. Change water mark to Preliminary. 2. Change NuApps-254-RM Main Window picture on page 18. 3. Add System Requirement on page 22. 4. Change Test Config picture on page 24 and 26. 5. Change Control Buttons/Test Running Status Icon pictures on page 27. 6. Change Test Configuration main window picture on page 31. 7. Add Pairing/Assigning Test Ports chapter on page 32. 8. Add Software Version on Revision History
2011/05/16	1.3	v1.1b001	1. Page 5, adding XM-RM Module card requirement table, and updating NuApps-2544-RM installing requirements. 2. Page 6, add note messages regarding to install NuApps-2544-RM. 3. Page 15, adding “Available Ports are not enough” info. 4. Page 21, correcting descriptions about “Save/Save as”. 5. Page 23, removing “USB” from Reconnect section. 6. Page 25, changing figure for System Info. 7. Page 26, changing figure for Test Config. 8. Page 31, changing figure for Test Config. 9. Page 32, changing figure. 10. Page 39, changing figure for Throughput, and adding descriptions about “Delay Time after Learning.” 11. Page 41, changing figure for Latency, and adding descriptions about “Delay Time after Learning.” 12. Page 43, changing figure for Packet Loss, and adding descriptions about “Delay Time after Learning.” 13. Page 45, changing figure for Back to Back, and adding descriptions about “Delay Time after Learning.” 14. Page 49, adding more figures showing test result charts for different pairs of ports. Also, changing the test report file format to “xls”.
2011/06/23	1.3	v1.1b003	1. Apply new user manual template. 2. Remove Preliminary watermark. 3. Page 5 and Page 12, changing NuApps-2544-RM logo.

Table of Contents

1. NuApps-2544-RM Overview

NuApps-2544-RM is an application that's designed base on RFC-2544 for analyzing Ethernet switches, bridges, and routers. NuApps-2544-RM's multiple topologies and the load-generating capabilities provide an effective way to evaluate DUT **Throughput**, **Latency**, **Packet Loss**, and **Back to Back** under different modes such as **One-to-One**, **One-to-Many**, and **Many-to-One**. NuApps-2544-RM's real-time display of test results and various customizable report formats make it easy to view the test data and organize them into an appropriate form for debug, report, and record.

NuApps-2544-RM is designed for Xtramus Technologies XM-RM series module cards listed in the table down below:

Module Cards Support NuApps-2544-RM			
XM-RM661	**XM-RM671**	**XM-RM681**	**XM-RM731**
XM-RM751	**XM-RM761**	**XM-RM781**	**XM-RM891**

*** Note: NuStreams-2000i and NuStreams-600i are required as well.**

Also, the firmware/FPGA/PROM version of your XM-RM module cards shall meet the requirements listed down below:

Module Cards Requirements for NuApps-2544-RM			
Module	**Firmware**	**FPGA**	**PROM**
XM-RM661	v1.1b004	v1.2b009	v1.5b044
XM-RM671	v1.1b004	v1.2b009	v1.5b044
XM-RM681	v1.1b004	v1.2b009	v1.5b044
XM-RM731	v1.4b022	v1.2b079	v1.5b044
XM-RM751	v1.1b004	v1.2b009	v1.5b044
XM-RM761	v1.1b004	v1.2b009	v1.5b044
XM-RM781	v1.1b004	v1.2b009	v1.5b044
XM-RM891	v1.1b014	v1.2b005	v1.5b044

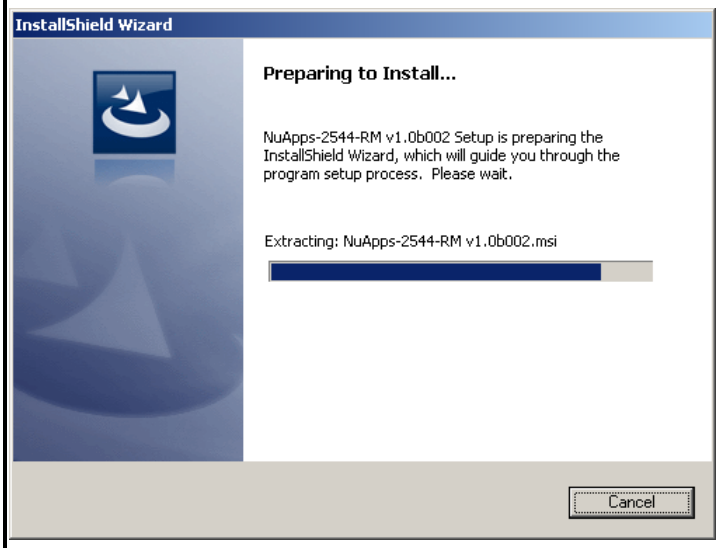
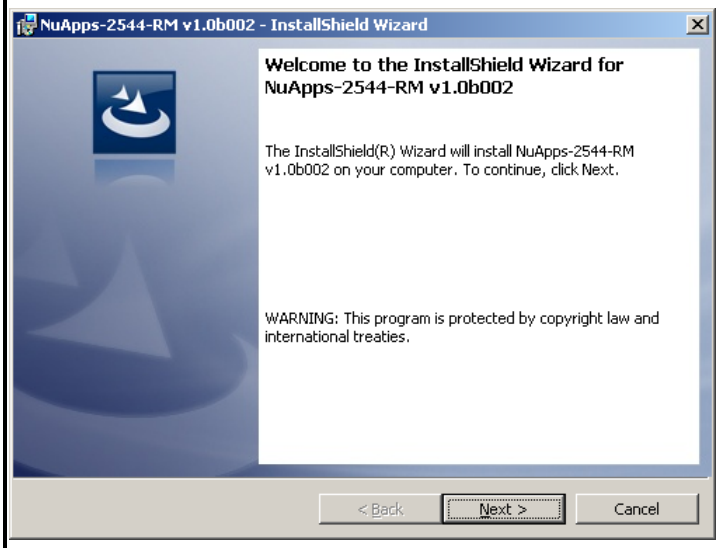
Please make sure that your PC meets the requirements listed in the table down below before installing NuApps-2544-RM.

OS	**Windows 2000/Windows XP**	**Windows Vista/Windows 7**
CPU	Pentium 1.3GHz or Higher	
RAM	512MB RAM	1GB RAM
HDD	10 GB Available Space	

***Note: Large amount of data will be generated while running NuApps-2544-RM. It is recommended to preserve enough available Hard-Disk space to store these data.**

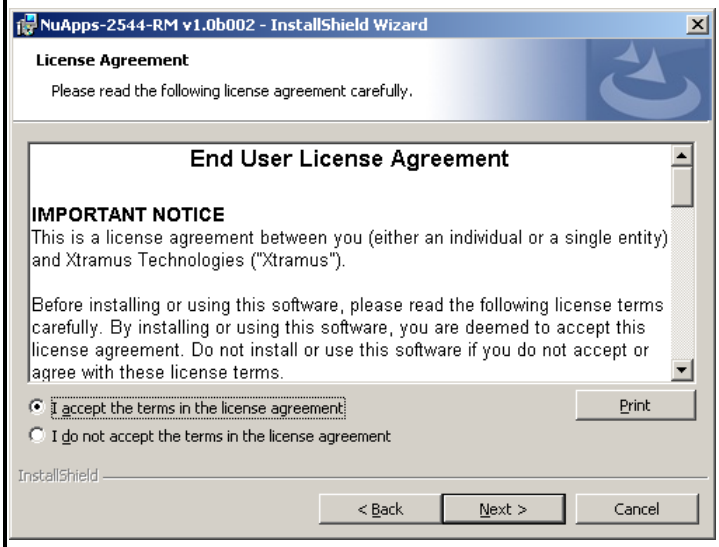
2. Installing/Uninstalling NuApps-2544-RM

Please follow the steps down below to install NuApps-2544-RM.

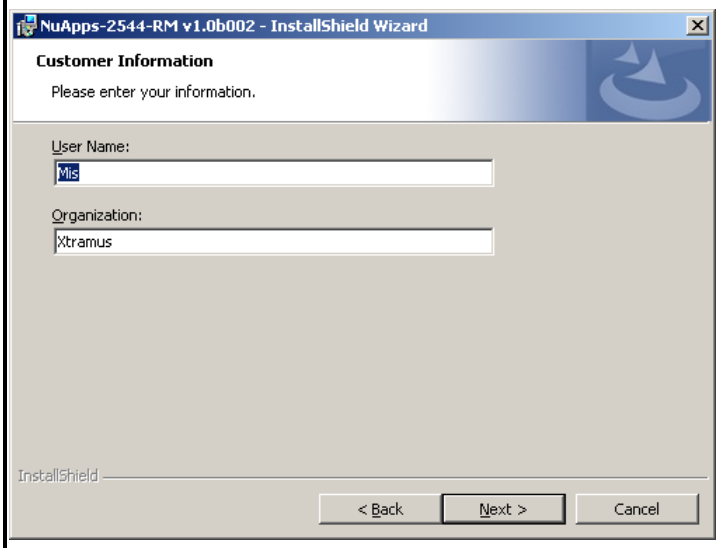
Installing NuApps-2544-RM	
	1. Double-click NuApps-2544-RM installation program and start the installation process*.
	2. InstallShield Wizard is starting to install NuApps-2544-RM. If you would like to cancel installation, click "**Cancel**".
	3. Click "**Next**" to continue installation.

***Note:** Due to different Operating Systems or system settings, warning messages might pop up when installing NuApps-2544-RM or driver for your device. When this occurs, please choose the options on these pop-up warning messages that allow you to continue installing NuApps-2544-RM or device driver.

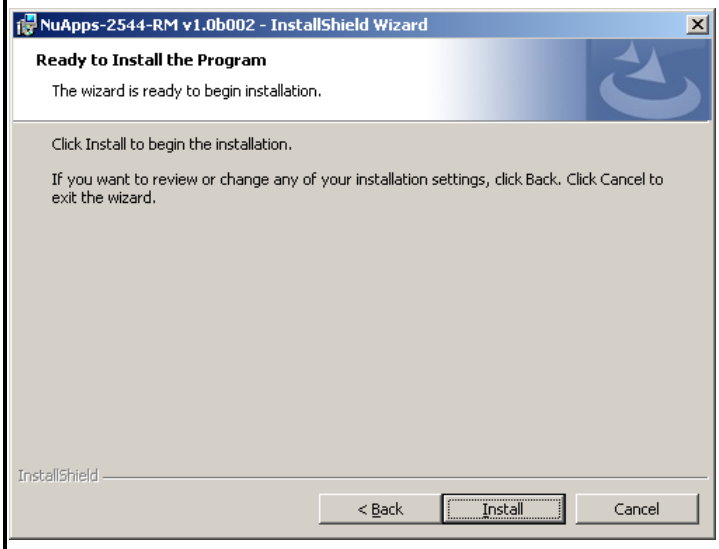
Installing NuApps-2544-RM



4. Click "**I accept the terms in the license agreement**", and click "**Next**" to continue.

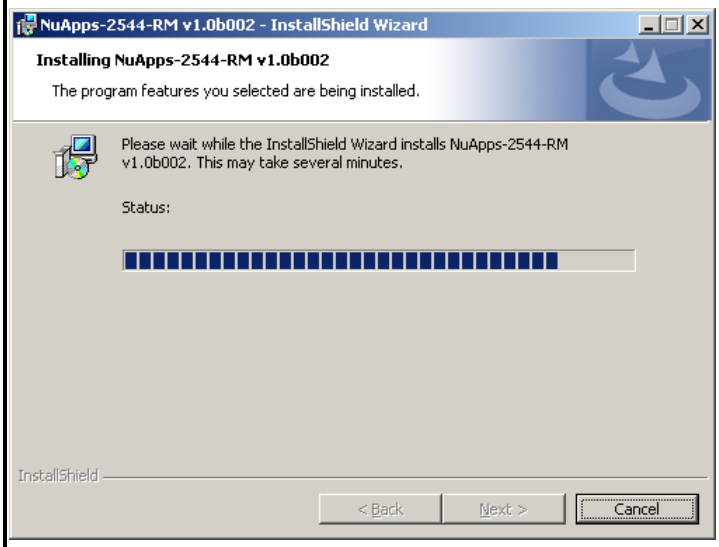


5. You can input **Username** and **Organization** in the related fields. Click "**Next**" to continue.

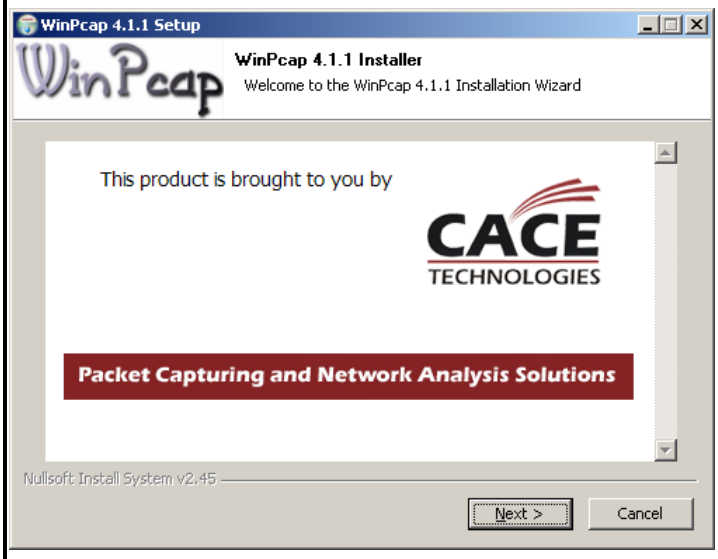


6. NuApps-2544-RM InstallShield Wizard will start installing momentarily. Click "**Install**" button to continue.

Installing NuApps-2544-RM



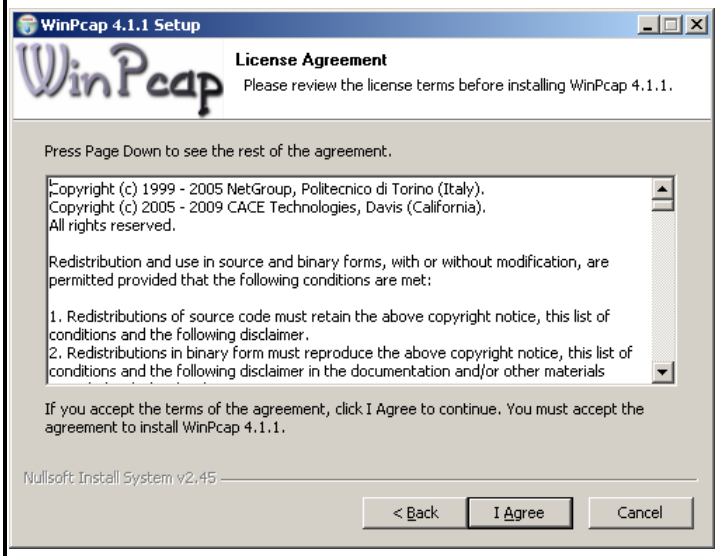
7. InstallShield Wizard is installing NuApps-2544-RM.



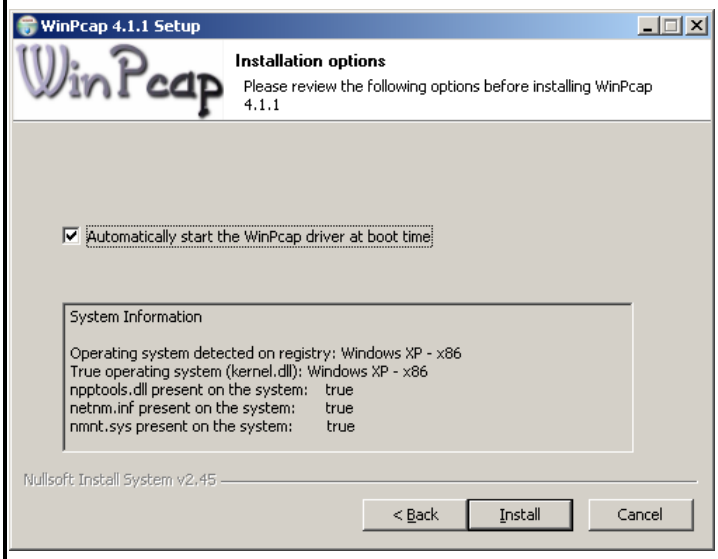
8. If your PC does not have **WinPcap** installed, a **WinPcap Installer** window will popup. Click **Next** button to get ready to install, or click **Cancel** button to stop. For more detail information regarding to WinPcap, please visit their webpage at: www.winpcap.org.

9. WinPcap is preparing to install, or click **Cancel** button to stop at any time.

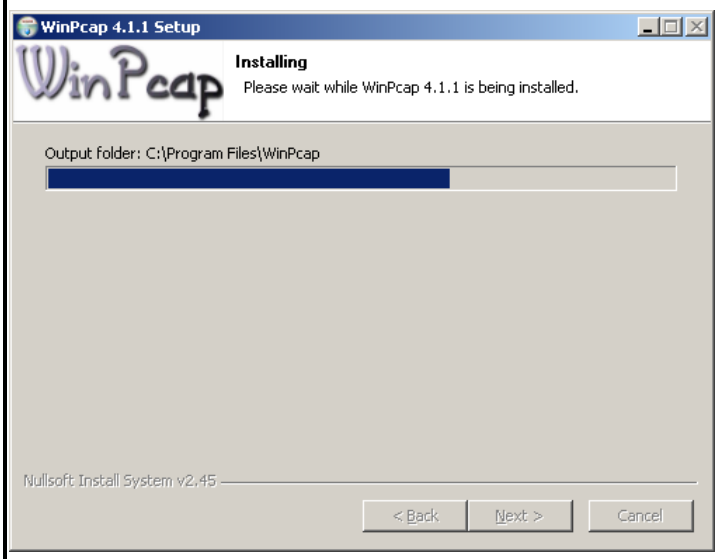
Installing NuApps-2544-RM



10. Review the license agreement before installing. Click **I Agree** button to continue. It is necessary to accept the agreement to install WinPcap.

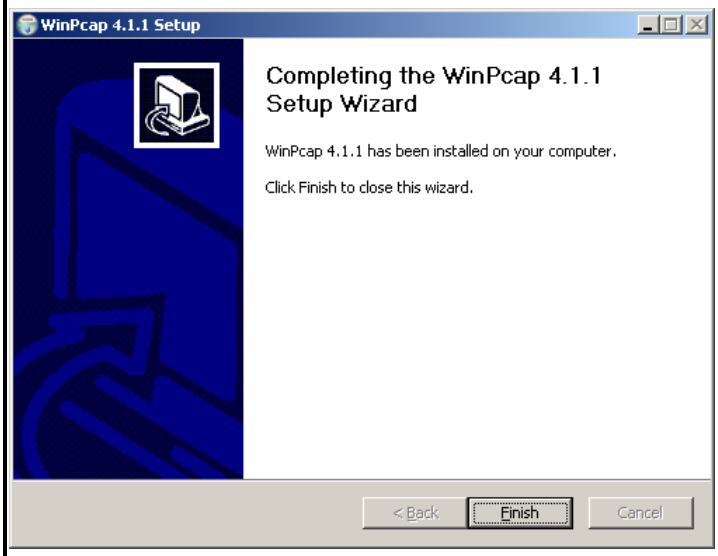


11. You can set if you would like to start WinPcap driver when booting PC by clicking the check-box. Click "**Install**" to continue.

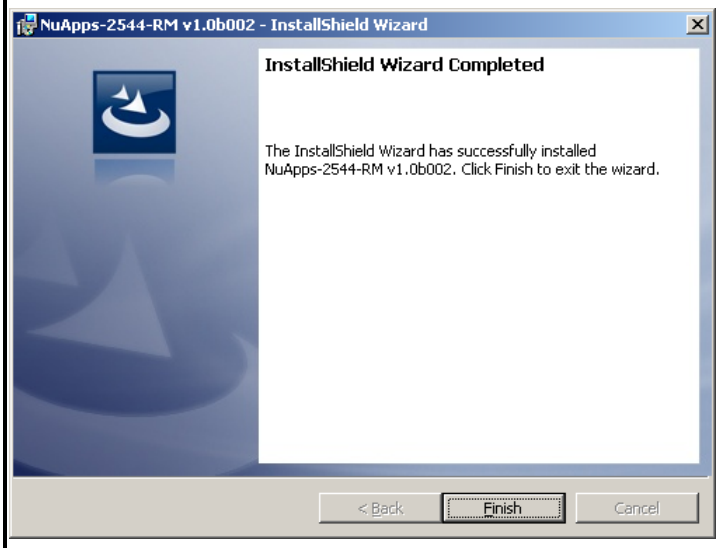


12. WinPcap is installing.

Installing NuApps-2544-RM



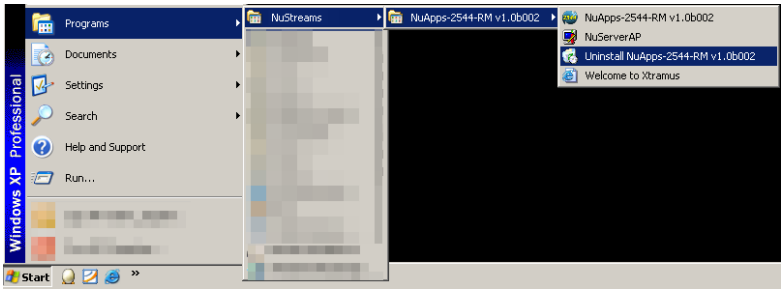
13. WinPcap installation completes. Click **Finish** button to close the wizard.



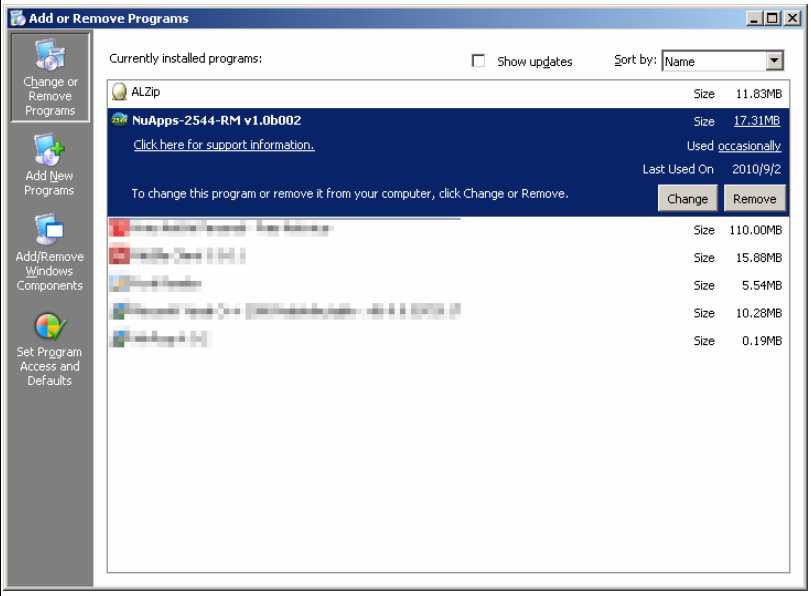
14. NuApps-2544-RM installation completes. Click **Finish** button to exit.

You can uninstall NuApps-2544-RM by:

Uninstalling NuApps-2544-RM



- Click **Start** → **Programs** → **NuStreams** → **NuApps-2544-RM** → **Uninstall NuApps-2544-RM**.

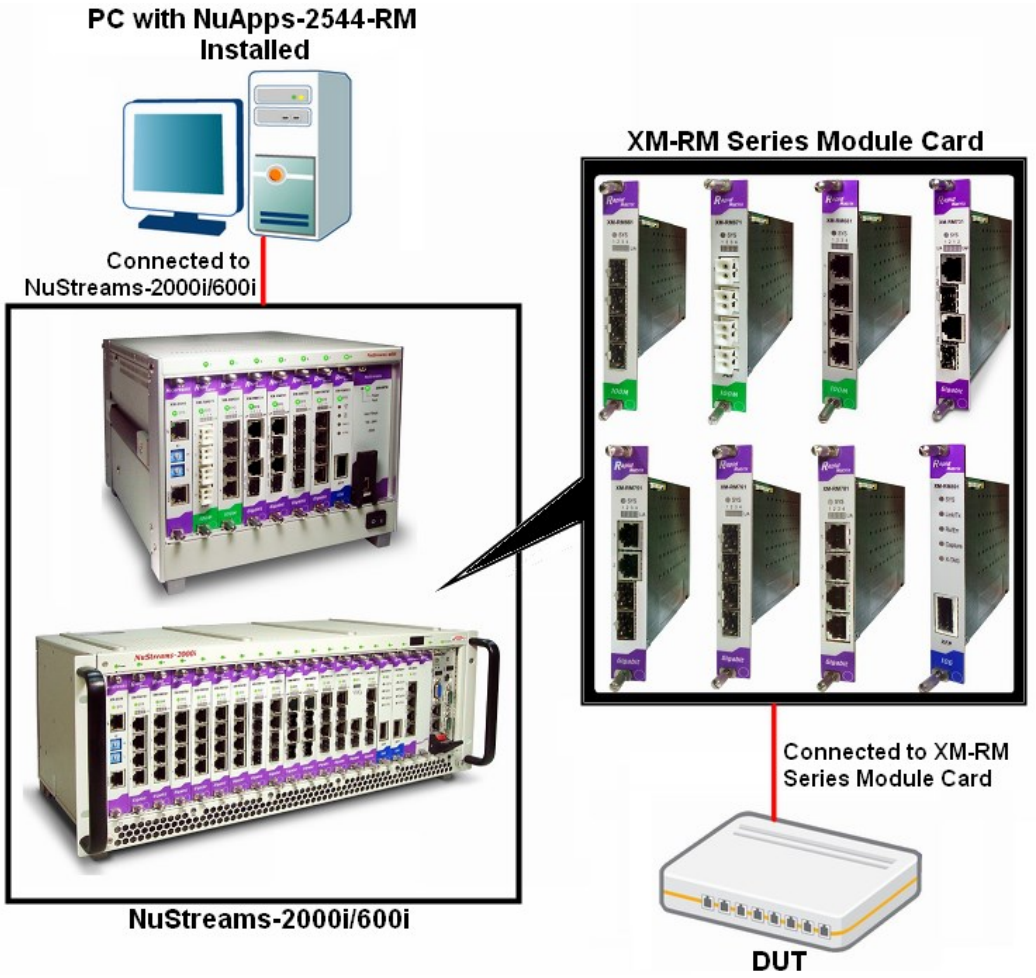


- Go to the **Control Panel**, choose **NuApps-2544-RM** from installed program list, and click "**Remove**" to uninstall.

3. NuApps-2544-RM Function Overview

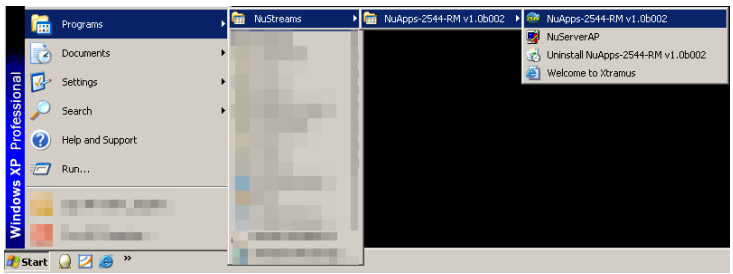
3.1. Starting NuApps-2544-RM

Before starting NuApps-2544-RM, the DUT, your PC, and NuStreams-2000i/600i shall be connected properly as show in the figure down below:



There are two ways to start NuApps-2544-RM:

Starting NuApps-2544-RM

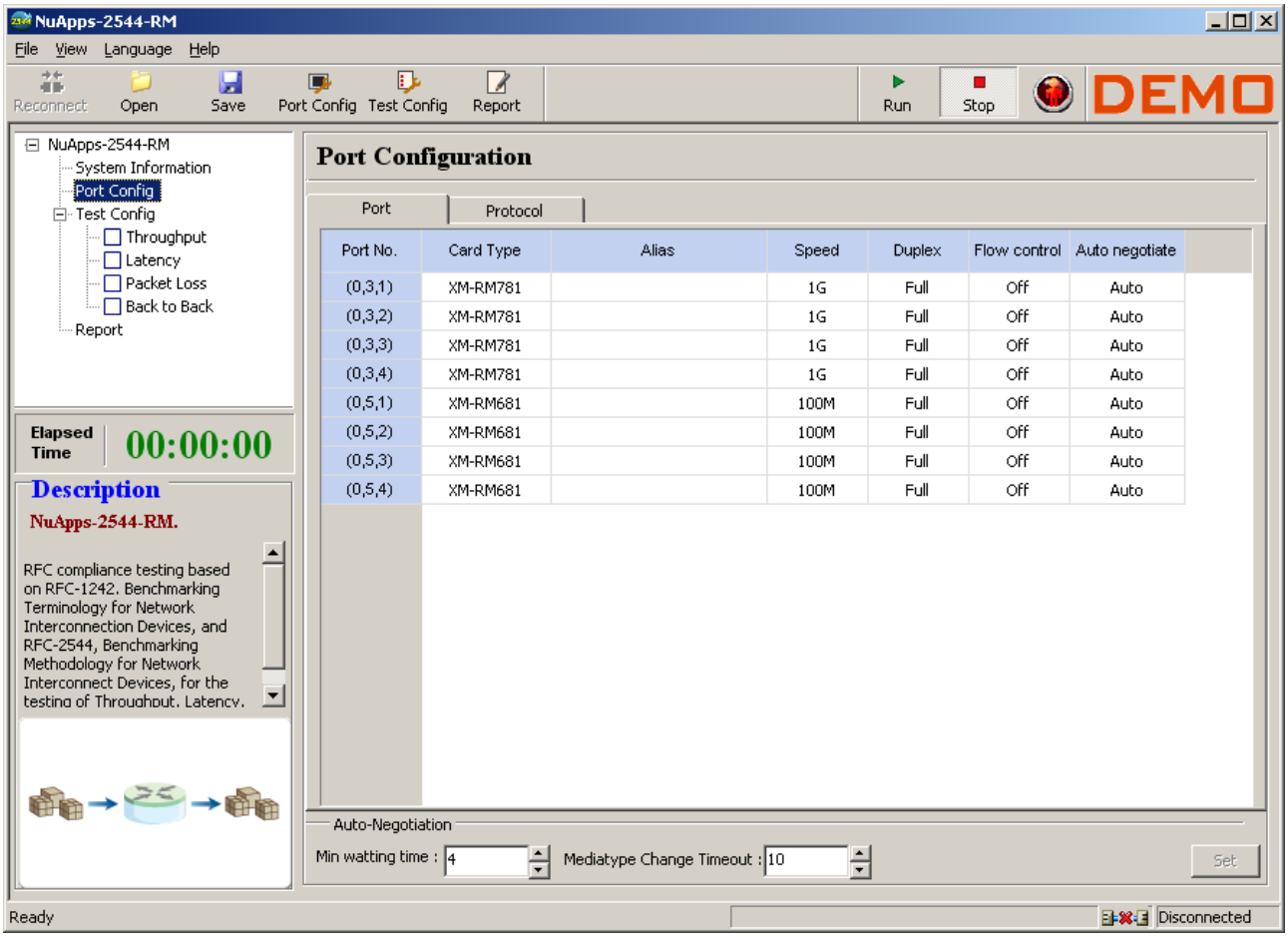


- Click **Start** → **Programs** → **NuStreams** → **NuApps-2544-RM**.

- Double-click NuApps-2544-RM icon located on your PC's desktop.

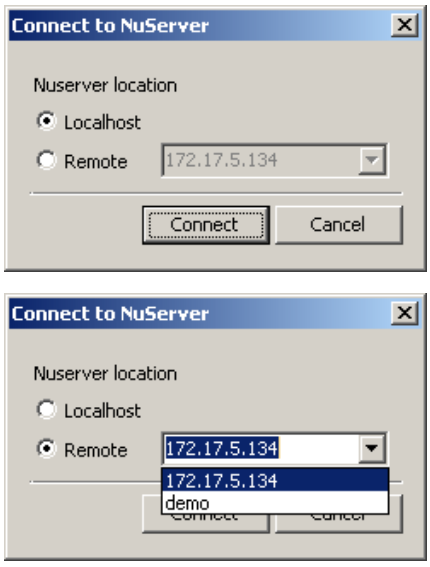
NuApps-2544-RM Demo Mode

If your PC is not connected with NuStreams-2000i/600i, you can still run NuApps-2544-RM under Demo Mode. Almost all NuApps-2544-RM's functions are available under Demo Mode. However, please note that **Demo Mode is for system demo purposes only**, and does not serve any testing purposes at all.



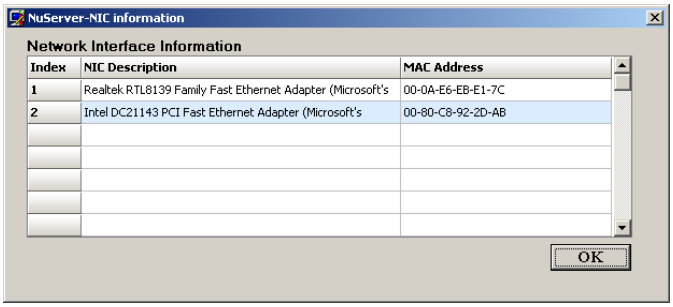
Please follow the steps down below to start NuApps-2544-RM and NuServer properly.

Starting NuServer



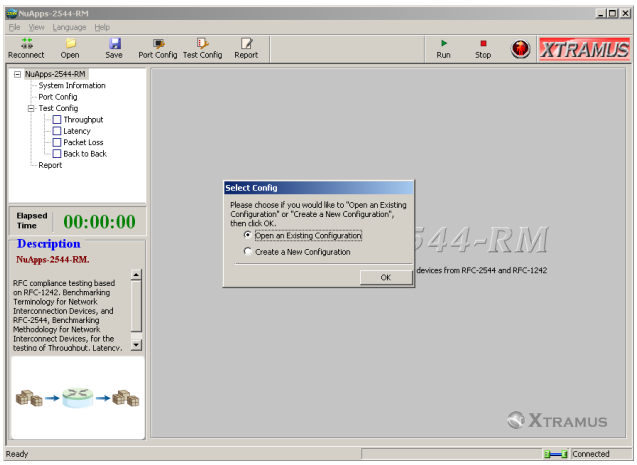
When starting NuApps-2544-RM, a "**Connect to NuServer**" window will pop up and asked how you are going to connect to NuServer.

- **Local Host:** Choose this option when you're running NuApps-2544-RM from NuStreams-2000i IPC module or a PC that's connected to NuStreams-2000i/600i via an RJ45 cable.
- **Remote:** Choose this option when you're running NuApps-2544-RM from other PC located on the network. Choose the IP address which is assigned from NuStreams-2000i/600i from the scroll-down menu, or choose **demo** to enter NuApps-2544-RM's Demo Mode.
- **Connect/Cancel:** Click the Connect/Cancel button to connect to NuStreams-2000i/600i or cancel starting NuApps-2544-RM.



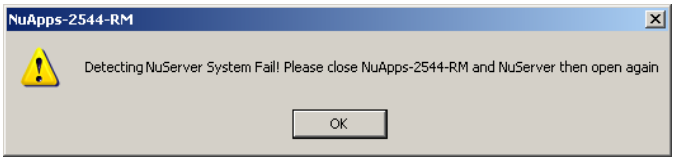
A "**NuServer-NIC Information**" window will pop up. Please select the NIC (Network Interface Card) which is connected to NuStreams -2000i/ 600i's from the **Network Interface Information** table, and click **OK**. If you're using NuStreams-2000i's IPC module, please choose "**Realtek RTL8139 Family Fast Ethernet**".

NuServer will connect to the daughter boards, and NuApps-2544-RM will start as well.



You now have access to NuApps-2544-RM's main display window.

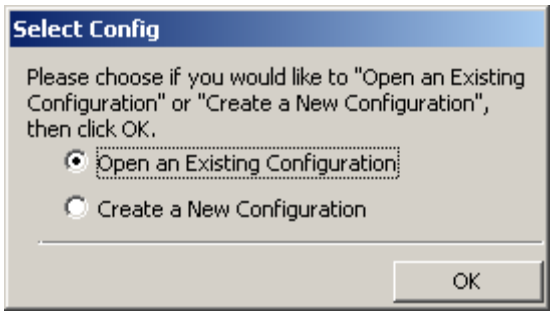
Starting NuServer



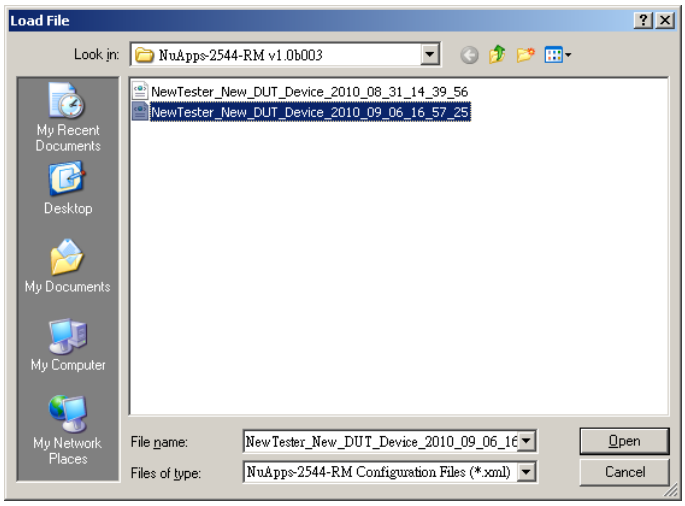
If an error message window pops up and says "**Detecting NuServer System Fail**", please close NuApps-2544-RM and NuServer, and start again.

After starting NuApps-2544-RM, a **Select Config** window will pop up. You have to reserve ports on module cards before performing tests with NuApps-2544-RM. Please follow the steps down below and make the proper configurations for NuApps-2544-RM.

Port Reserving



As mentioned above, you have to reserve ports on module cards before performing tests with NuApps-2544-RM. You can do so by either **Open an Existing Configuration** or by **Create a New Configuration**.



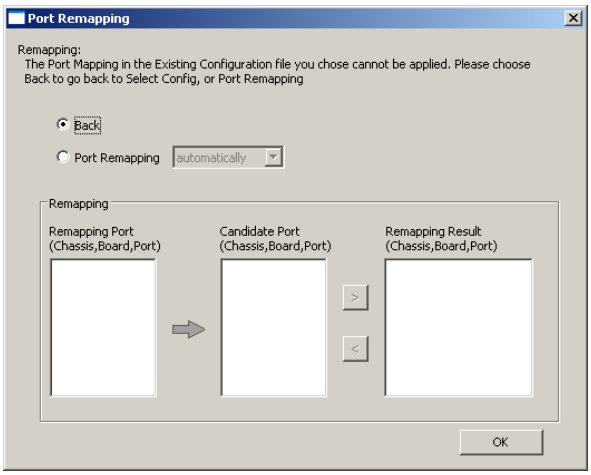
If you have a previously saved configuration file stored in your PC, you can load it and apply all the setting you've made by choosing "**Open an Existing Configuration**" from the **Select Config** pop-up window.

Configuration files are saved in the format of "*** .xml**", and are named with **Tester Name**, **DUT Name**, and the date/time when the files are created.

If the module card information contained in the configuration file you've loaded from your PC has more module cards than your current amount of module cards, a warning message will pop up, showing that "**Available ports are not enough**".

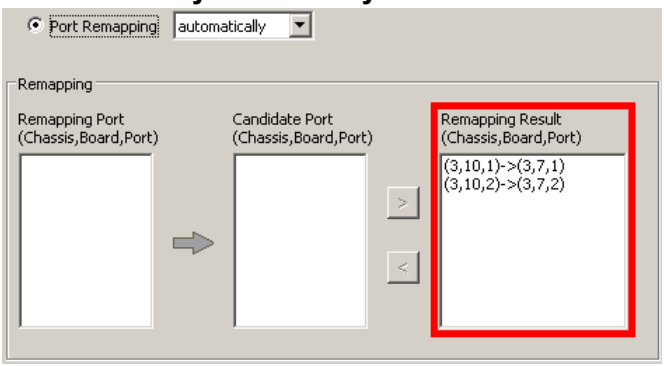
If this happens, please click the **OK** button, and choose **Create a New Configuration** from the **Select Config** window instead.

Port Reserving



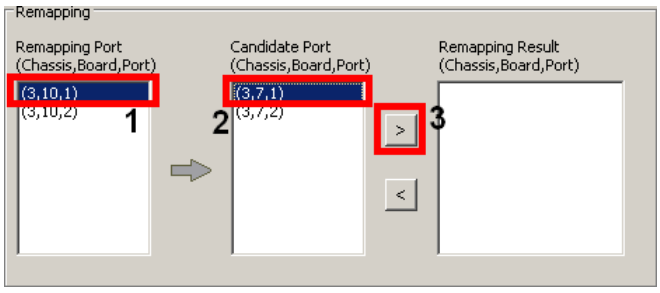
If the port mapping contained in the configuration file you've loaded from your PC does not match NuStreams-2000i/600i's current port mapping, a **Port Remapping** window will pop up and guides you through port remapping process.

- **Back:** Go back to **Select Config** window.
- **Port Remapping:** Click the scroll-down menu to choose whether if you would like to remap ports **automatically** or **manually**.



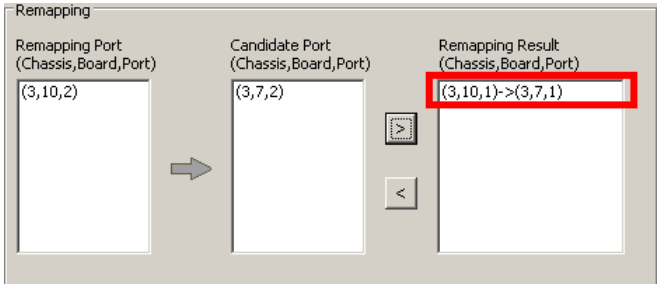
If you choose **automatically** from the **Port Remapping** scroll-down menu, NuApps-2544-RM will make the proper port remapping automatically.

The final result of the port remapping will be shown on the **Remapping Result** field. Press **OK** to continue.



If you choose **manually** from **Port Remapping** scroll-down menu, you will have to make the proper port remapping by yourself.

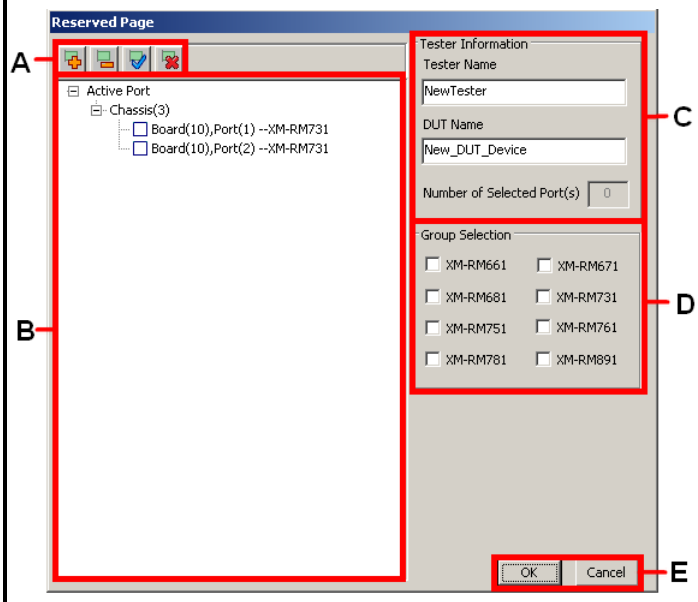
- **Remapping Port:** This field shows the port mapping you've loaded from file.
- **Candidate Port:** This field shows the current port mapping.



To make port remapping manually, please choose a port from **Remapping Port** (**1**), assign a new port ID from **Candidate Port** (**2**), and click > button to add it to the **Remapping Result** (**3**).

The final result of the port remapping will be shown on the **Remapping Result** field. Press **OK** to continue.

Port Reserving



If you would like to make a new configuration, please choose "**Create a New Configuration**" from the **Select Config** pop-up window. A **Reserved Page** window will pop up when you choose to create a new configuration.

The **Reserved Page** pop-up window can be divided as:

- **A. Tree Style Tab Buttons**
- **B. Active Port Tree Style Tab**
- **C. Tester Information**
- **D. Group Selection**
- **E. OK/Cancel Buttons**

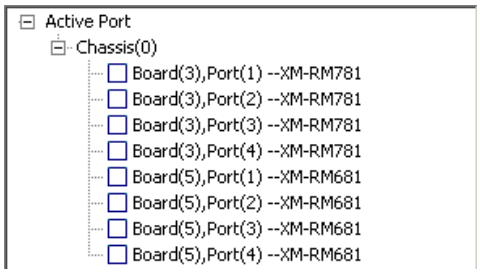
After selecting the port for test performing, please click **OK** button to continue.

A. Tree Style Tab Buttons

These two buttons allow you to unfold/fold all the Active Port tree style tab displayed in **B**.

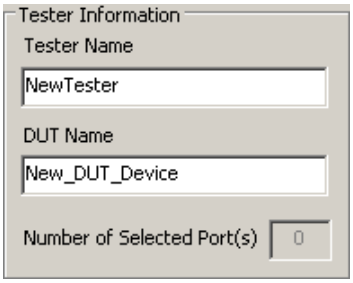
These two buttons allow you to check/uncheck all the Active Port displayed in **B**.

B. Active Port Tree Style Tab



All the module cards, along with their Active Ports are listed here in this field. You can fold/unfold the tree style tab by clicking ⊟/⊞ icons. Also, you can check/uncheck the port by clicking ☑ icon.

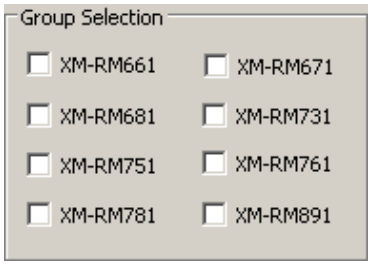
C. Tester Information



You can set the **Tester Name** and **DUT Name** here in the **Tester Information** field. The **Tester Name** and **DUT Name** you've set here will be applied when naming the configuration files.

Also, the number of ports you've selected will be displayed in **Number of Selected Port(s)** field.

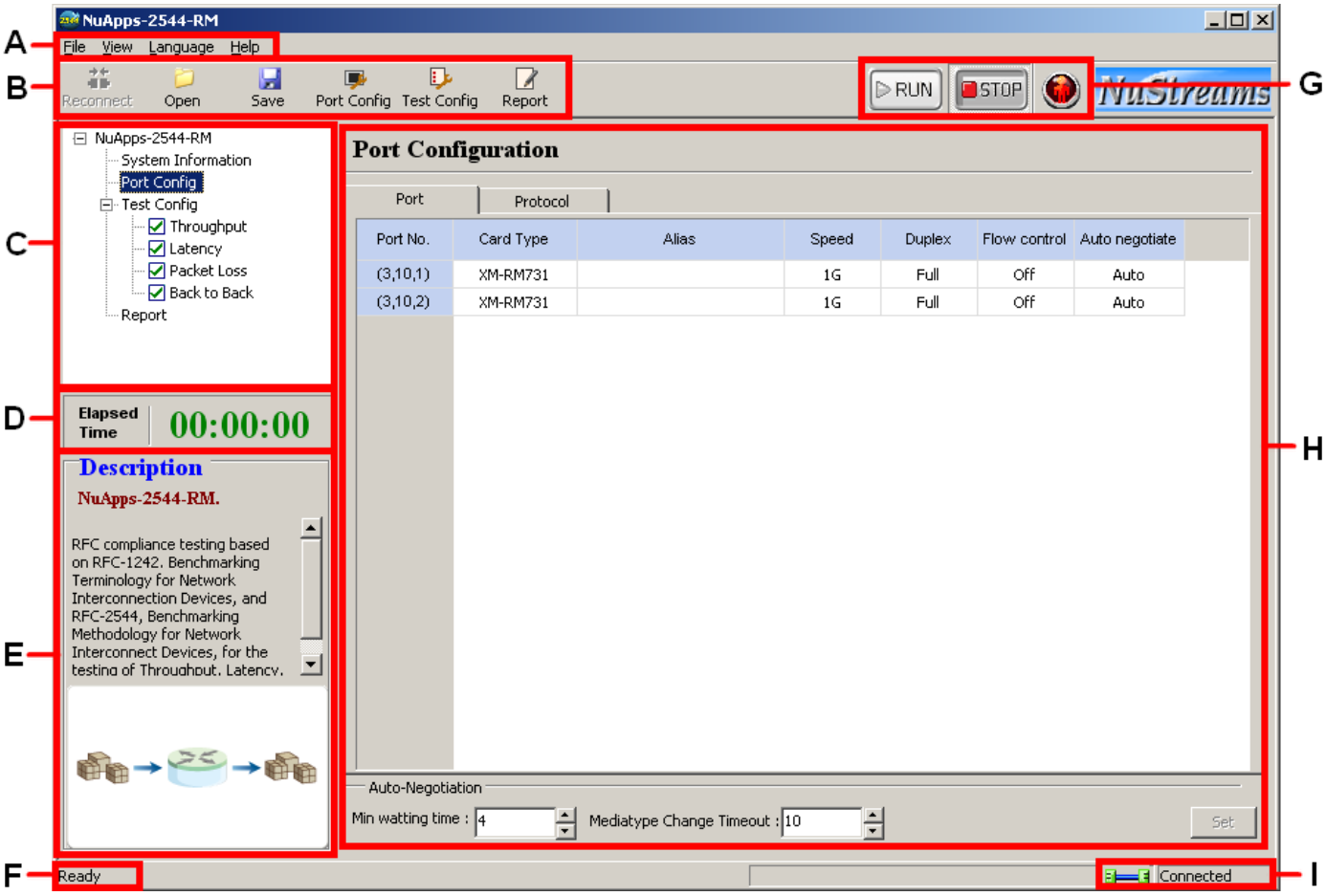
D. Group Selection



Clicking the check box in front of each module card allows you to active all the ports of the module cards.

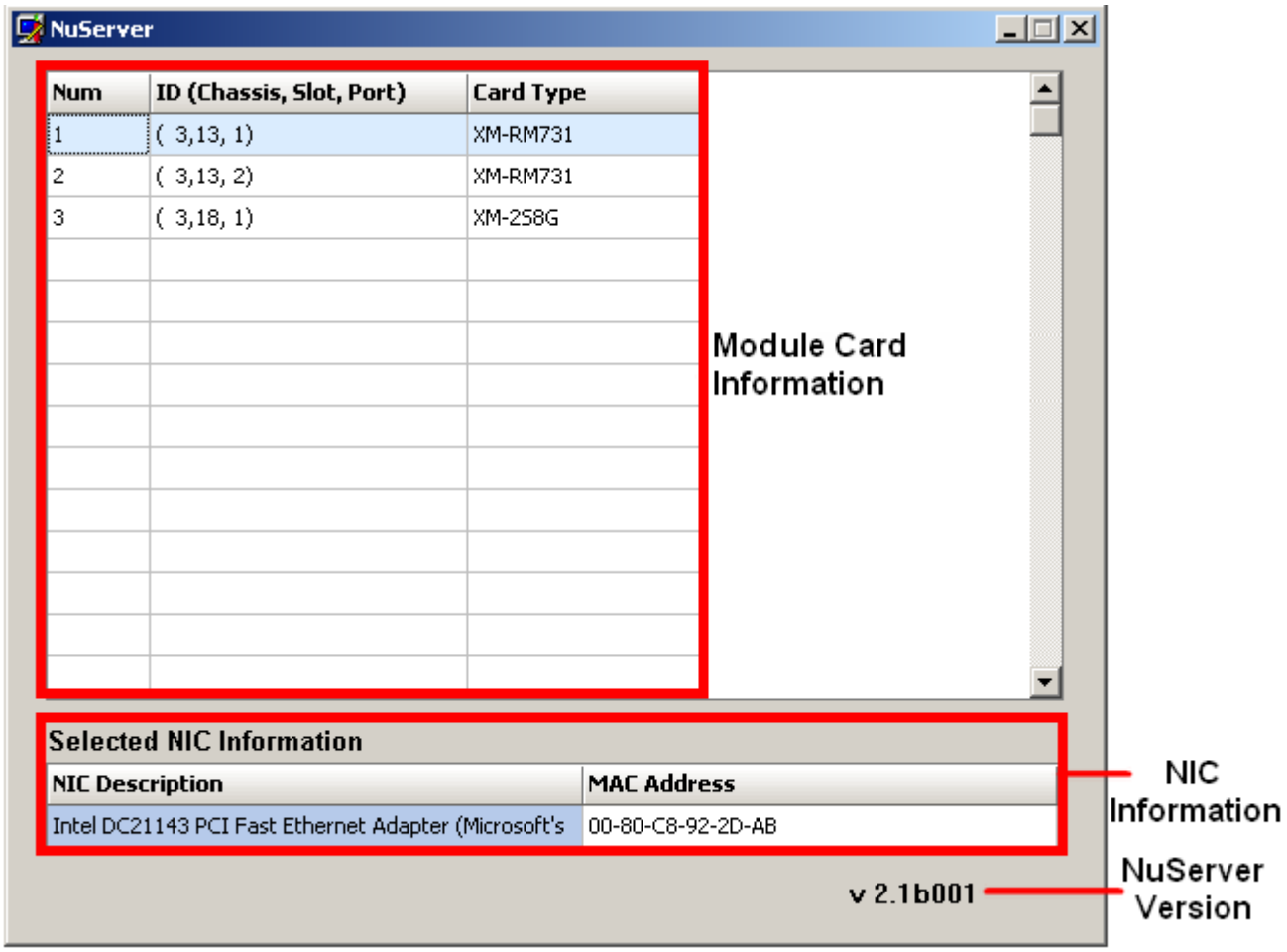
3.2. NuApps-2544-RM/NuServer Overview

NuApps-2544-RM Main Window



NuApps-2544-RM Functions Overview		
A	**Menu Bar**	The **Menu Bar** allows you to make settings about test criteria, load/save settings you've made, and change language displayed.
B	**Quick Launch Buttons**	The **Quick Launch Buttons** allow you to reconnect your PC to NuStream-200i/600i, open/save test settings, make test configurations, and view test reports.
C	**System Info/Configuration List**	By clicking the **System Info/Configuration List**, you can view system information, making test configurations, or view test reports on **H. Main Display Screen**.
D	**Elapsed Time**	The **Elapsed Time** field displays the elapsed time during test.
E	**Description**	The **Description** field display brief descriptions regarding to tests.
F	**Status Bar**	The **Status Bar** shows the running status of NuApps-2544-RM.
G	**Control Buttons/Test Running Status Icon**	The **Control Buttons** allow you to start/stop tests, and the **Test Running Status Icon** indicates if there's a test running.
H	**Main Display Screen**	You can make detail configurations and view real-time testing diagrams on the **Main Display Screen**.
I	**System Connection Status**	This icon shows the connection status between your PC and NuStreams-2000i/600i.

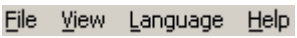
NuServer



Description	
Module Card Information	This section displays the information regarding to the model cards that are installed on NuStreams-2000i/600i. Model Card IDs are showed as the format of **(X, Y, Z)** while X is the number of the chassis (which is displayed on NuStreams-2000i/600i), Y is the slot number where this model card is installed, and Z is the available port number located on the model card.
NIC Information	This section displays the detail information (including NIC Model name, NIC's MAC address) regarding to the selected NIC.
NuServer Version	This section displays the version of your NuServer.

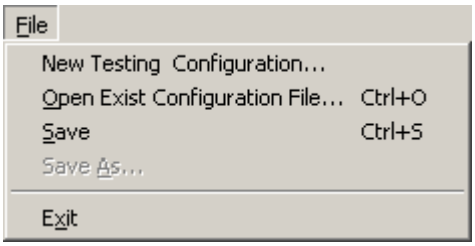
4. NuApps-2544-RM Functions

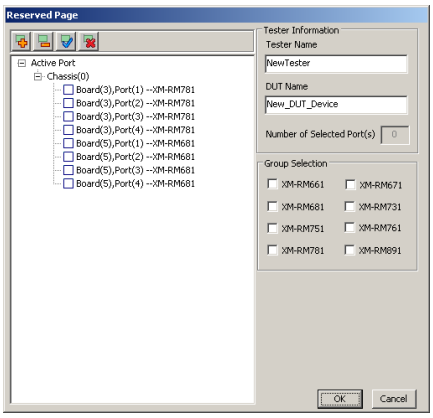
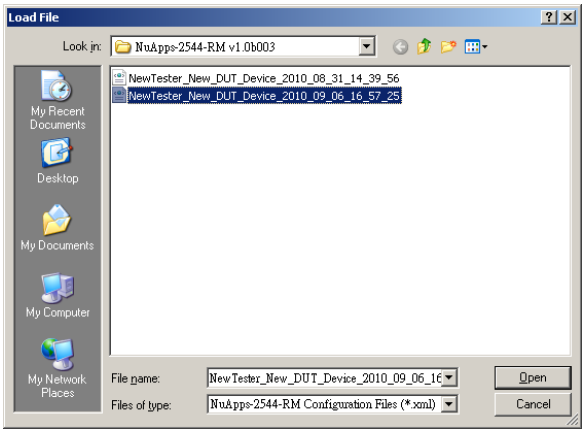
4.1. Menu Bar

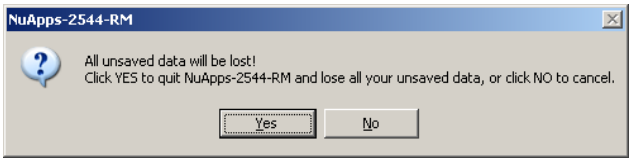


NuApps-2544-RM **Menu Bar** includes configuration options such as **File**, **View**, **Language**, and **Help**. Please refer to the sections down below for detail information regarding to each configuration option.

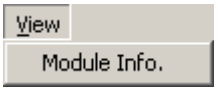
4.1.1. File

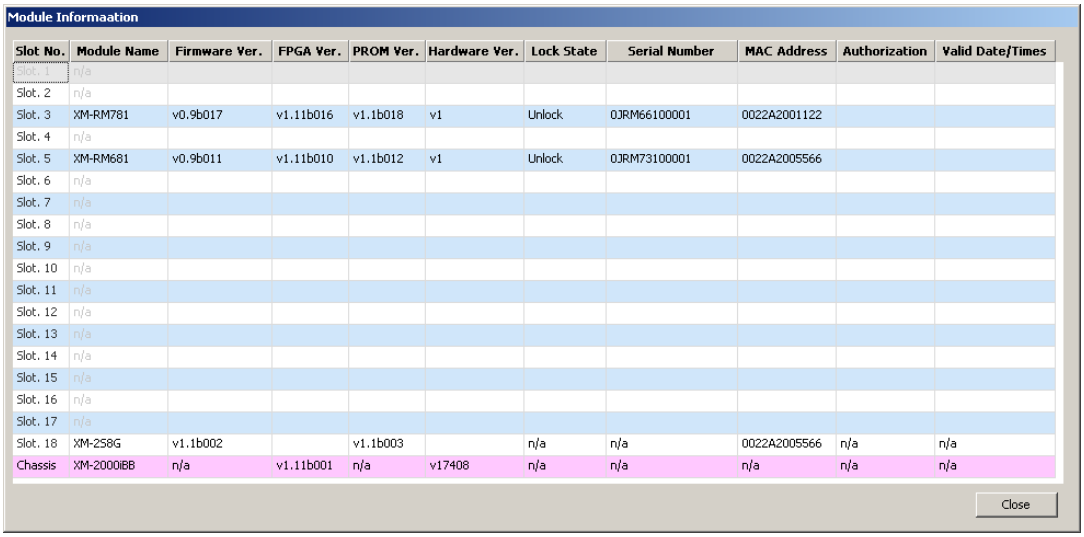


File		
New Testing Configuration		If you would like to make a new configuration, please choose "**Create a New Configuration**" from the **Menu Bar**. A **Reserved Page** window will pop up when you choose to create a new configuration. For detail information about how to reserve ports for your tests, please refer to **Page 15**.
Open Exist Configuration File		If you have a previously saved configuration file stored in your PC, you can load it and apply all the setting you've made by choosing "**Open Existing Configuration**" from the **Menu Bar**. Configuration files are saved in the format of " *** .xml**", and are named with **Tester Name**, **DUT Name**, and the date/time when the files are created.

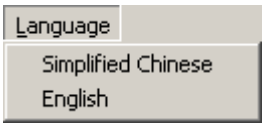
File	
Save/Save As…	The **Save/Save As…** function on the **Menu Bar** allow you to save the settings you've made or the test results. To save the settings you've made, **choose "Save/Save As…" from the Menu Bar before performing any tests**, and choose the file path where you would like to save the configuration file. Configuration files are saved in the format of " *** .xml**". To save the test results, **choose "Save/Save As…" from the Menu Bar after performing test**, and choose the file path where you would like to save your test results. Test results and related statistic are available and can be viewed with the " *** .xls**" file you saved this way. Please note that you need Microsoft Excel® to view " *** .xls**" file.
Exit	 A prompt pop-up window will ask if you are sure to exit NuApps-2544-RM. Click **YES** to exit NuApps-2544-RM, or click **NO** to cancel.

4.1.2. View



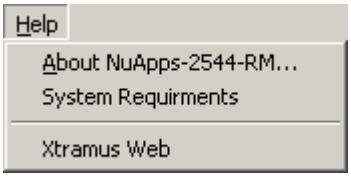
View	
Module Info.	 You can view all information regarding to the module cards you've installed on your NuStreams-2000i/600i by **View** function on the **Menu Bar**. ➢ **Close:** Close **Module Information** window.

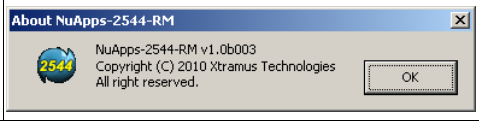
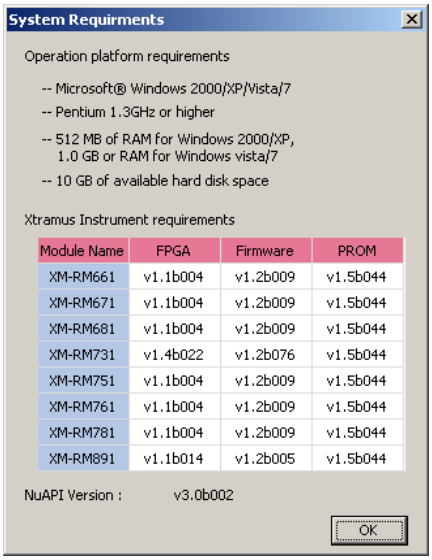
4.1.3. Language



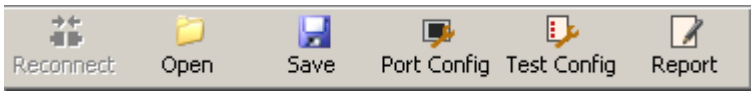
Language	
English/Simplified Chinese	NuApps-2544-RM has **2** different languages for its UI available. You can set the UI language to either **English** or **Simplified Chinese**.

4.1.4. Help



Help		
About NuApps-2544-RM		An "**About**" window will pop up and show detailed system information.
System Requirements		A "**System Requirements**" window will pop up and show the requirements for your PC and the FPGA/Firmware/PROM of the module cards. ➢ **OK:** Click this button to exit the "**System Requirements**" pop-up window.
Xtramus Web	Open your default web browser and access Xtramus Website (www.xtramus.com).	

4.2. Quick Launch Buttons



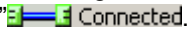
These **Quick Launch Buttons** allow you to reconnect NuStreams-2000i/600i, open/save configuration files, module port configuration, test configuration, and view test reports. Please refer to the section down below for more detail descriptions regarding to **Quick Launch Buttons**.

Reconnect

If the connection between your PC and NuStreams-2000i/600i is down, a "**Disconnected**" icon 

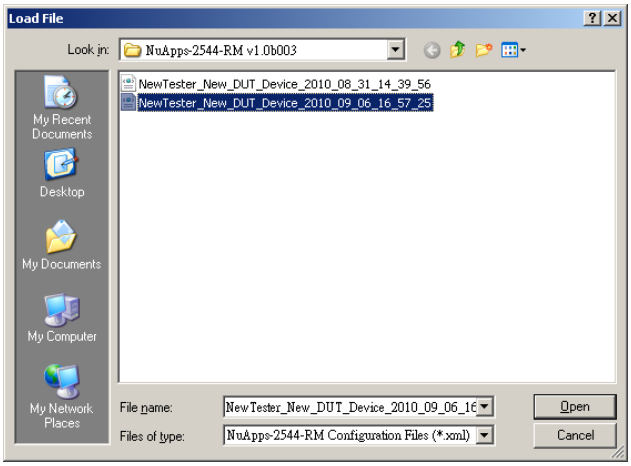
will be shown in "**System Connection Status**".

Press **Reconnect** button 

to re-establish the connection between your PC and NuStreams-2000i/600i. If the connection has been established successfully, a message window will pop up, and the "**System Connection Status**" will be shown as "**Connected**" 

.

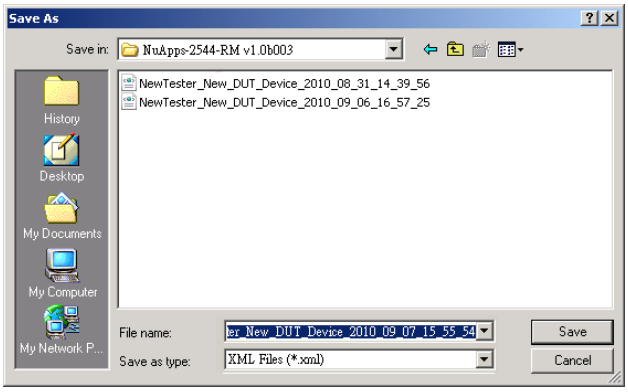
Open



If you have a previously saved configuration file stored in your PC, you can load it and apply all the setting you've made by clicking **Open** button on the **Quick Launch Buttons**.

Configuration files are saved in the format of " *** .xml**", and are named with **Tester Name**, **DUT Name**, and the date/time when the files are created.

Save

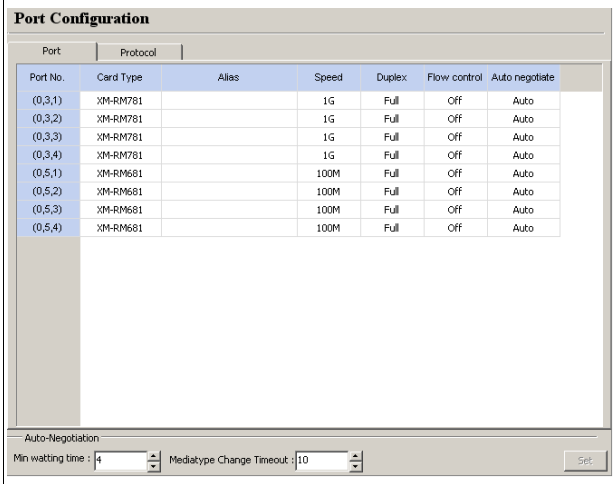


You can save the current test settings with the **Save** button on the **Quick Launch Buttons**.

Configuration files are saved in the format of " *** .xml**", and are named with **Tester Name**, **DUT Name**, and the date/time when the files are created.

Test results and related statistic are available and can be viewed with the " *** .xls**" file you saved this way. You need Microsoft Excel® to view " *** .xls**" file.

Port Config

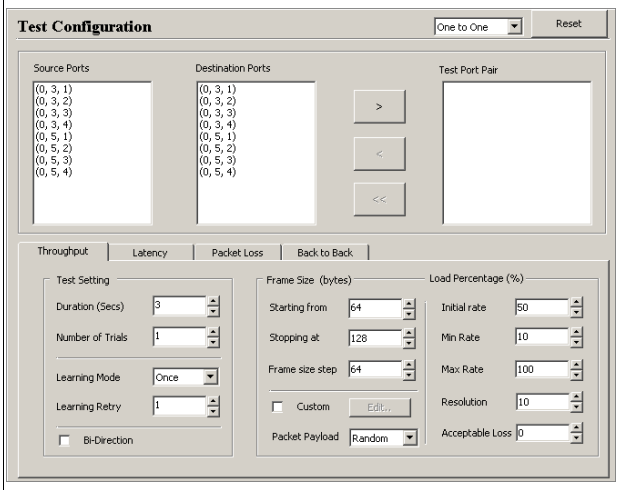


By clicking the **Port Config** button, the **Port Configuration** screen will be shown on the **Main Display Screen** located on the right side of NuApps-2544-RM's main window, allowing you to make settings for the module ports.

Settings such as port transmitting rate, auto-negotiation, and protocol are available and can be set here.

For more detail description about **Port Configuration**, please refer to **4.8. Port Configuration**.

Test Config

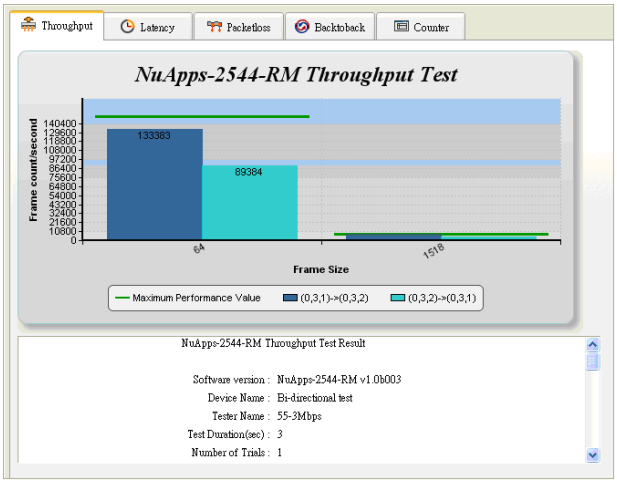


By clicking the **Test Config** button, the **Test Configuration** screen will be shown on the **Main Display Screen** located on the right side of NuApps-2544-RM's main window, allowing you to make test settings.

You can set 4 different test modes here, including **Throughput**, **Latency**, **Packet Loss**, and **Back to Back**.

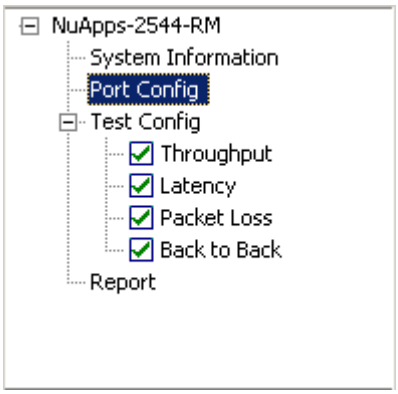
For more detail description about **Port Configuration**, please refer to **4.9. Test Configuration**.

Report



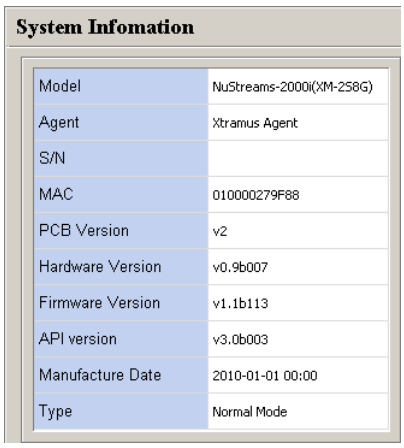
The **Report** button allows you to view test results, charts, and statistics on the **Main Display Screen** located on the right side of NuApps-2544-RM's main window.

4.3. System Info/Configuration List



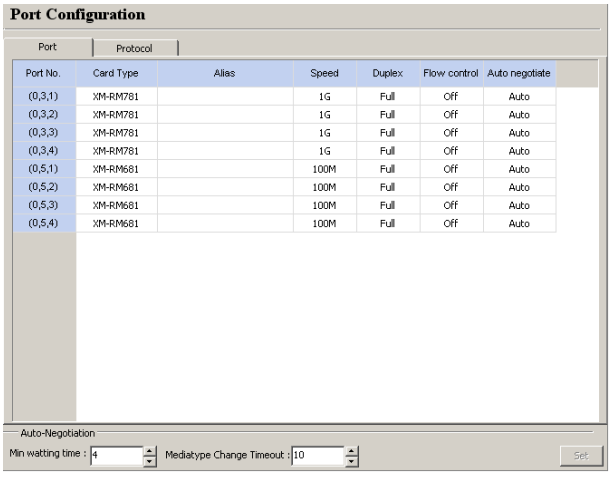
The **System Info/Configuration List** allows you to view system information, making port/test configurations, and check test reports on the **Main Display Screen**.

System Information



By clicking the **System Information** on the **System Info/Configuration List**, the **System Information** screen will be shown on the **Main Display Screen** located on the right side of NuApps-2544-RM's main window.

Port Config

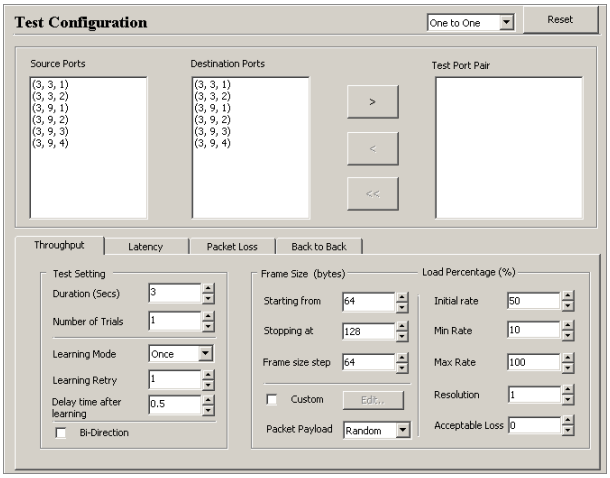


By clicking the **Port Config** on the **System Info/Configuration List**, the **Port Configuration** screen will be shown on the **Main Display Screen** located on the right side of NuApps-2544-RM's main window, allowing you to make settings for the module ports.

Settings such as port transmitting rate, auto-negotiation, and protocol are available and can be set here.

For more detail description about **Port Configuration**, please refer to **4.8. Port Configuration**.

Test Config (Throughput, Latency, Packet Loss, Back to Back)

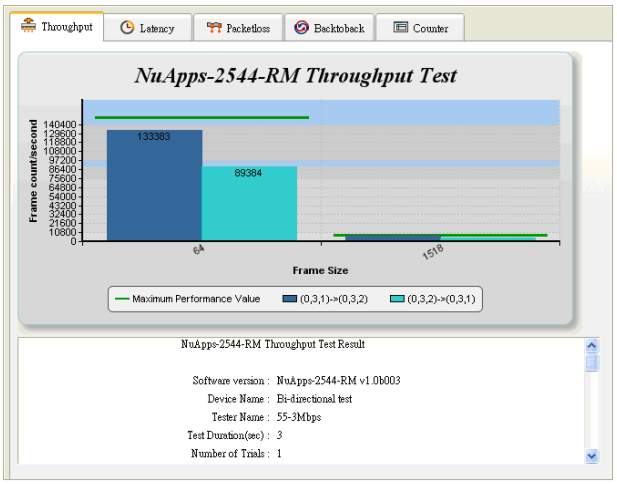


By clicking the **Test Config** from the **System Info/Configuration List**, the **Test Configuration** screen will be shown on the **Main Display Screen** located on the right side of NuApps-2544-RM's main window, allowing you to make test settings.

You can set 4 different test modes here, including **Throughput**, **Latency**, **Packet Loss**, and **Back to Back**.

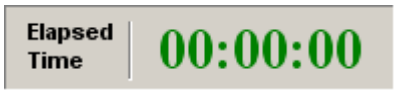
For more detail description about **Test Configuration**, please refer to **4.9. Test Configuration**.

Report



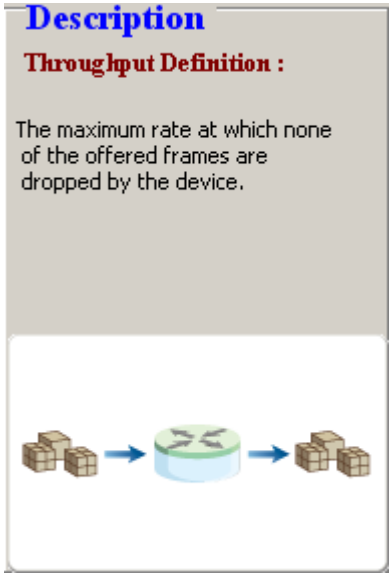
The **Report** on the **System Info/Configuration List** allows you to view test results, charts, and statistics on the **Main Display Screen** located on the right side of NuApps-2544-RM's main window.

4.4. Elapsed Time



The **Elapsed Time** allows you to know the time spent during tests.

4.5. Description



The **Description** displays brief descriptions and figures regarding to **Throughput**, **Latency**, **Packet Loss**, and **Back to Back** tests.

4.6. Status Bar

The **Status Bar** shows the running status of NuApps-2544-RM.

4.7. Control Buttons/Test Running Status Icon

The **Control Buttons** allow you to start/stop tests, and the **Test Running Status Icon** indicates if there's a test running.

Control Buttons	
	Start test
	Stop test

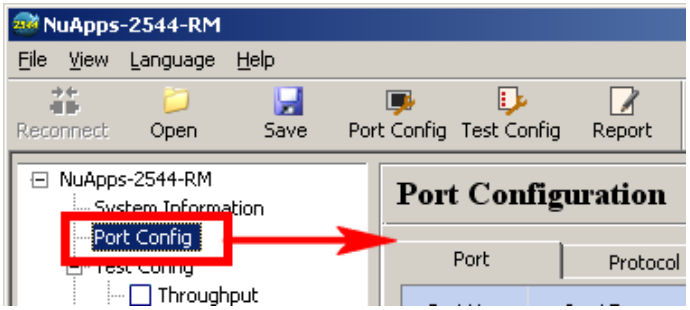
Test Running Status Icon	
	No test is underway
	Test is running

4.8. Port Configuration

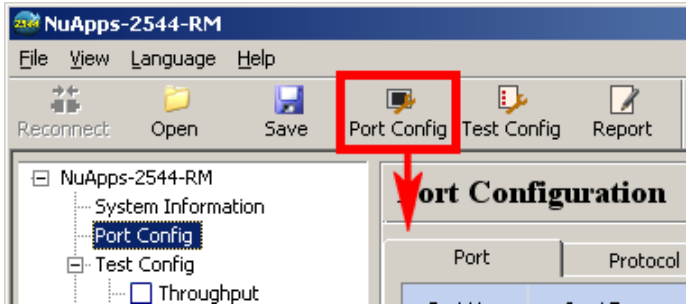
Settings such as port transmitting rate, auto-negotiation, and protocol are available and can be configured on the **Port Configuration** displayed on the **Main Display Screen**.

There are two ways to access **Port Config**:

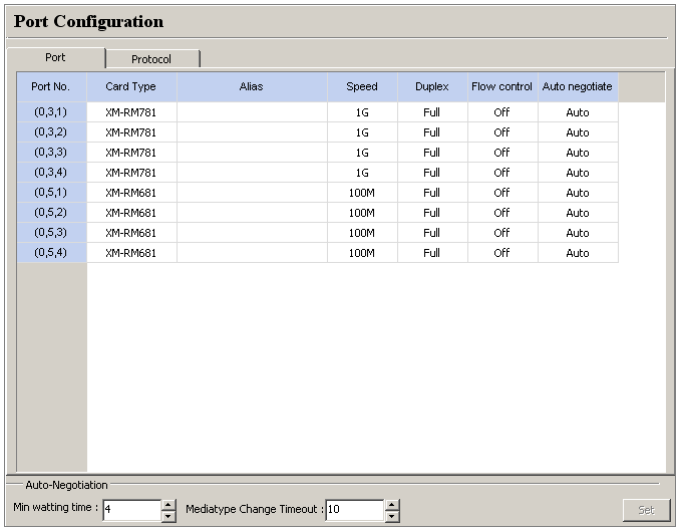
Accessing Port Config

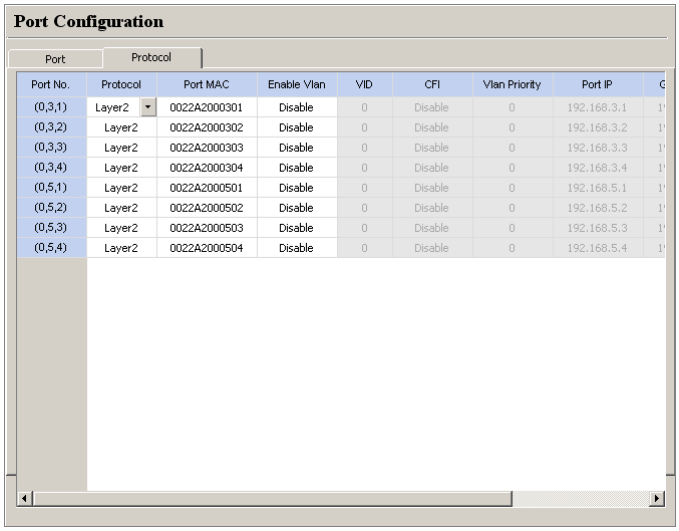


- Click **Port Config** located on **System Info/ Configuration List**



- Click the **Port Config** button located on **Quick Launch Buttons**.

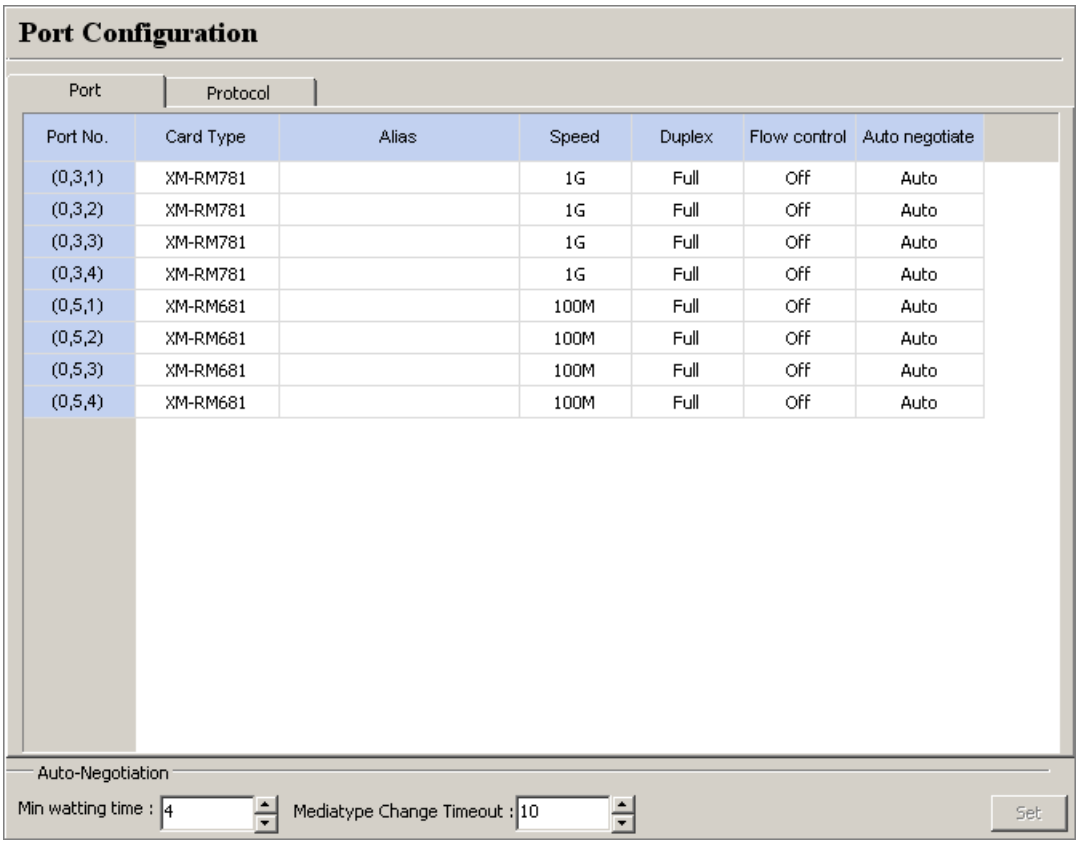




The **Port Configuration** contains two different sets of settings: **Port** and **Protocol**, which can be accessed by clicking the **Port** or **Protocol** menu tab.

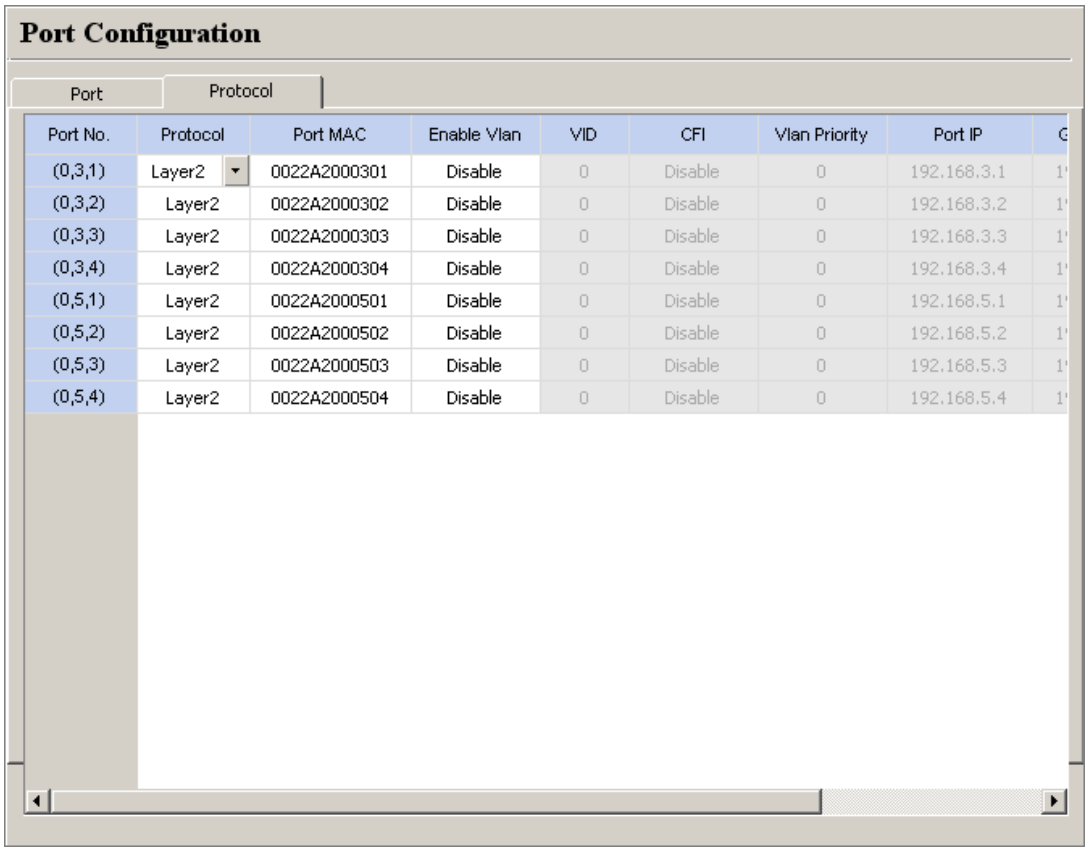
- **Port:** Allows you to set each port's transmitting rate, flow control, and auto-negotiation.
- **Protocol:** Allows you to set each port's protocol (Layer 2 or Layer 3-IP), VLAN, and IP addresses.

Port



- **Port No./Card Type:** These two fields display each port's Port ID and the model name of its module card.
- **Alias:** You can input alias for identifying active ports here in these fields.
- **Speed:** The **Speed** scroll-down menu allows you to set each port's transmitting/receiving rate.
- **Duplex:** You can set the port as Full-Duplex or Half-Duplex with the scroll-down menu.
- **Flow Control:** When enabling this function, the transmitting rate will drop if traffic overflow occurs.
- **Auto Negotiate:** By clicking the scroll-down menu, you can set the transmitting mode to **Auto** (with auto-negotiation) or **Force** (without auto-negotiation).
  - **Min Waiting Time:** The minimum waiting time (**in seconds**) for auto-negotiation.
  - **Media Type Change Timeout:** If the time (**in seconds**) NuApps-2544-RM spent for auto-negotiation exceeds the time you set here, the test will stop.
  - **Set:** Click this button when you've finished setting **Min Waiting Time** and **Media Type Change Timeout**.

Protocol



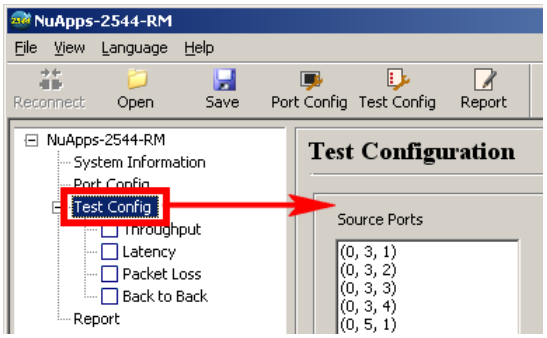
- **Port No.:** This field displays each port's Port ID.
- **Protocol:** The **Protocol** scroll-down menu allows you to set each port's protocol to either **Layer 2** or **Layer 3-IP**.
  - **Layer 2:** Packets will be transmitted and received via layer 2 MAC addresses.
  - **Layer 3-IP:** Packets will be transmitted and received via layer 3 IP addresses.
- **Port MAC:** These fields display the MAC addresses of all ports.
- **Enable VLAN:** VLAN (**Virtual LAN**) is a group of hosts with common requirements that communicate within the same Broadcast domain regardless of the physical location. Setting the **Protocol** to **Layer 2** and enabling VLAN allows you to make settings for the following options:
  - **VID:** VID stands for **Virtual ID**, an ID number for identifying different virtual LANs on the network. You can set the VID for each port.
  - **CFI:** CFI stands for **Canonical Format Indicator**, a 1-bit field in frames for compatibilities of Ethernet and Token Ring networks.
  - **VLAN Priority:** VLAN Priority (IEEE P802.1p) indicates the priority level of frames transmitted from each port. The value can be set from 0 to 7.
- **Port IP/Gateway IP/IP Mask:** These three fields can only be set when you set the **Protocol** to **Layer 3-IP**. You can input each port's **IP Address**, **Gateway IP Address**, and **Default Mask** in these fields.

4.9. Test Configuration

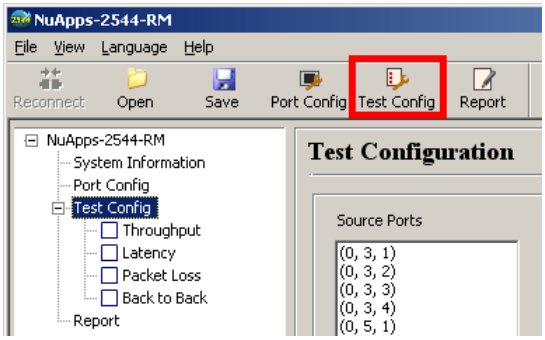
4 different test modes, including **Throughput**, **Latency**, **Packet Loss**, and **Back to Back**, can be configured on the **Test Configuration** displayed on the **Main Display Screen.**

There are two ways to access **Test Config**:

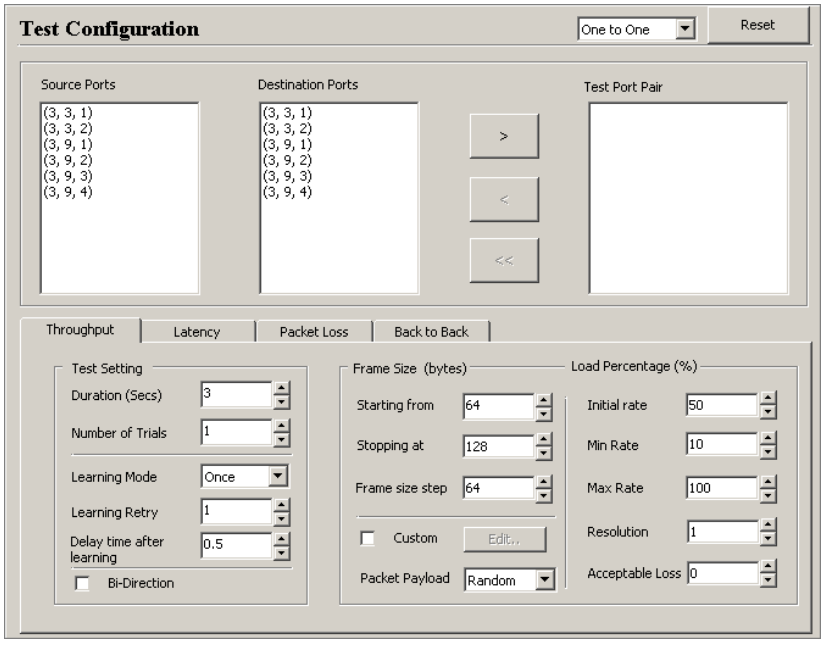
Accessing Test Config



- Click **Test Config** located on **System Info/ Configuration List**



- Click the **Test Config** button located on **Quick Launch Buttons**.

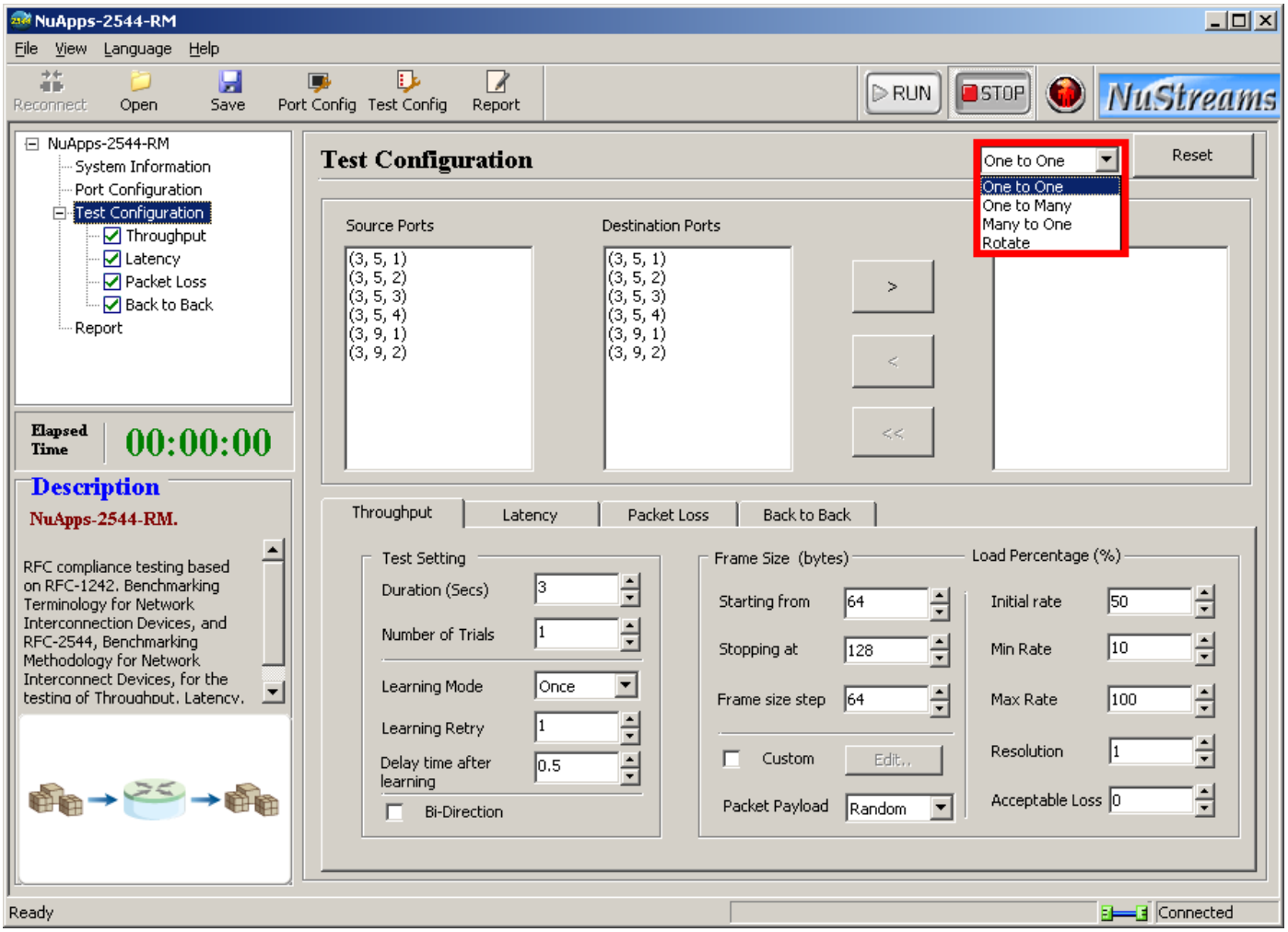


The **Test Configuration** contains four different sets of settings: **Throughput**, **Latency**, **Packet Loss** and **Back to Back**, which can be accessed by clicking the test you would like to perform on **System Info/Configuration List** or the tab menu located on **Test Configuration** screen.

4.9.1. Pairing/Assigning Test Ports

Before making any test configurations on the **Test Configuration** screen, you have to make the proper port pairing/assigning first. NuApps-2544-RM has 4 different test modes available: **One to One**, **One to Many**, **Many to One**, and **Rotate**.

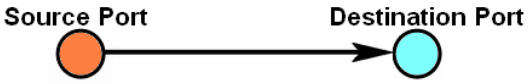
To access these 4 test modes, please click the scroll-down menu located on the upper-right part of NuApps-2544-RM's window as shown in the figure down below.



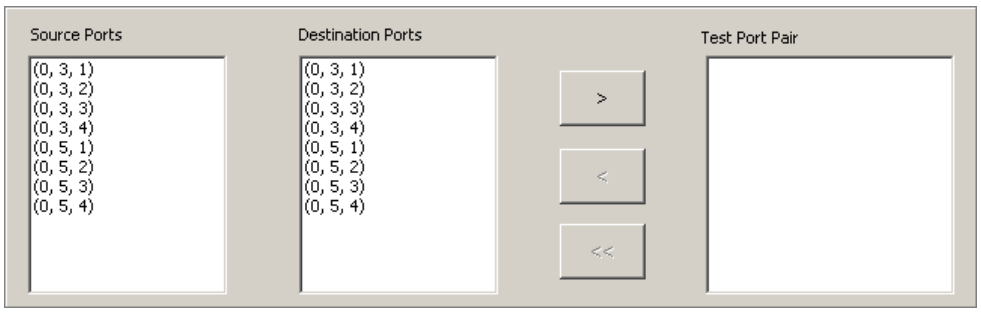
If you want to reset all settings you've done for NuApps-2544-RM's test mode back to the default value, please press the **Reset** button located next to the scroll-down menu.

Please see the sections down below for more information regarding to pair/assign ports in different test modes.

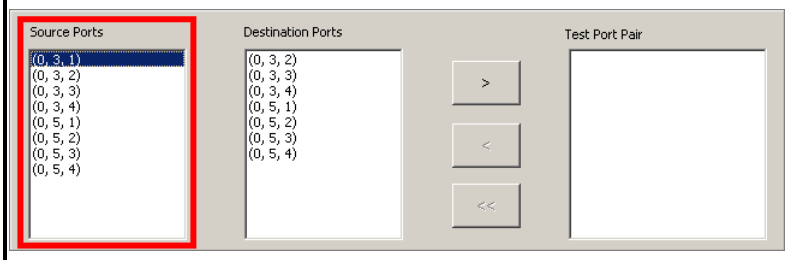
One to One



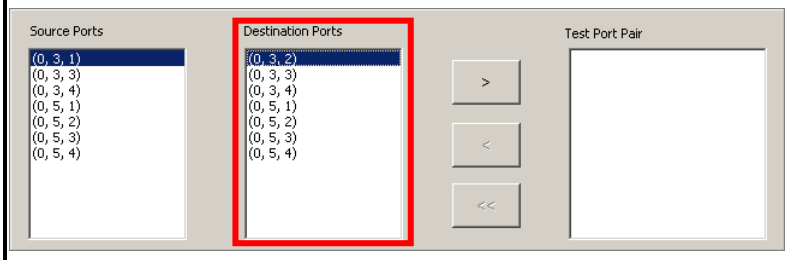
In **One to One** test mode, packets will be sent from one source port to one destination port as shown in the figure above.



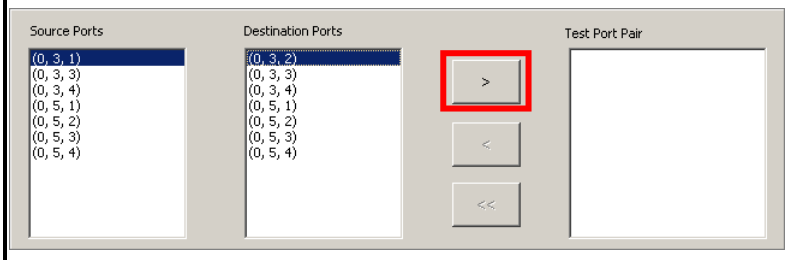
Port Pairing/Assigning for One to One Mode



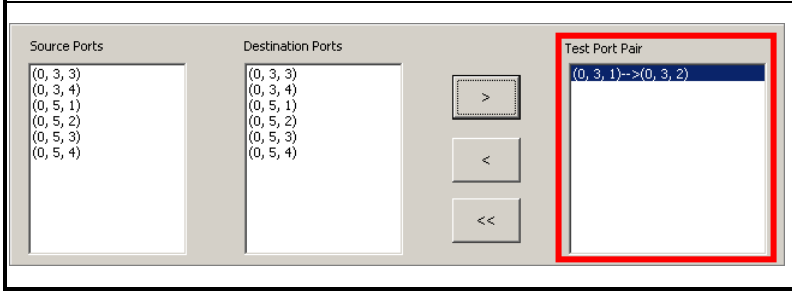
1. Choose a port that will serve as the source port from the **Source Ports** field.



2. Choose a port that will serve as the destination port from the **Destination Ports** field.

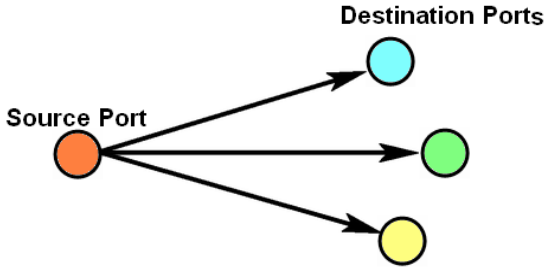


3. Click the 〉 button to add the port pair you set in step 1~2.

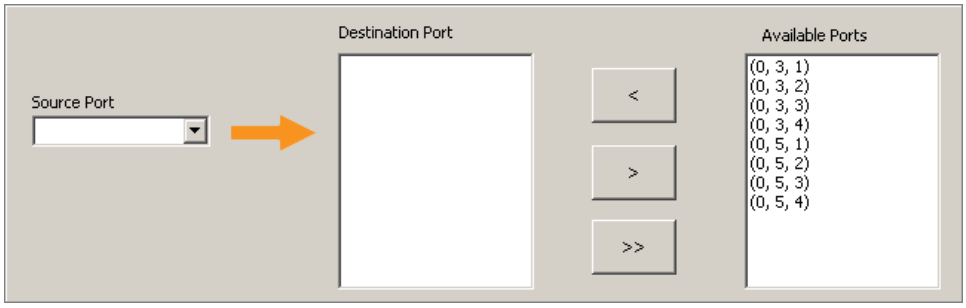


4. The port pair will be added to the **Test Port Pair** field. You can remove the selected port pair by clicking the 〈 button, or remove all port pairs by clicking the 〈〈 button.

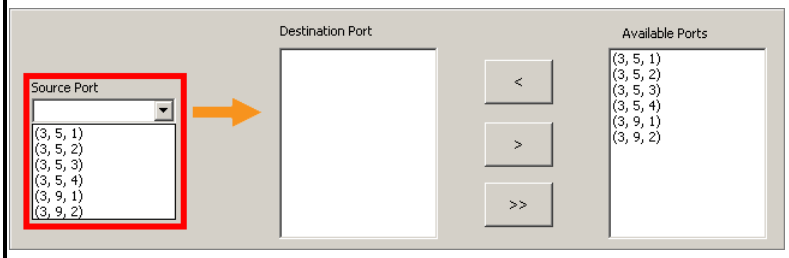
One to Many



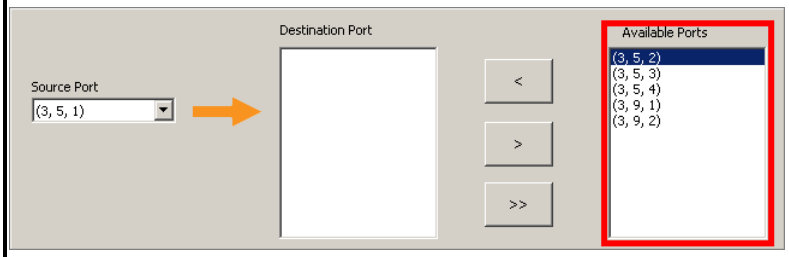
In **One to Many** test mode, packets will be sent from one source port to multiple destination ports as shown in the figure above.



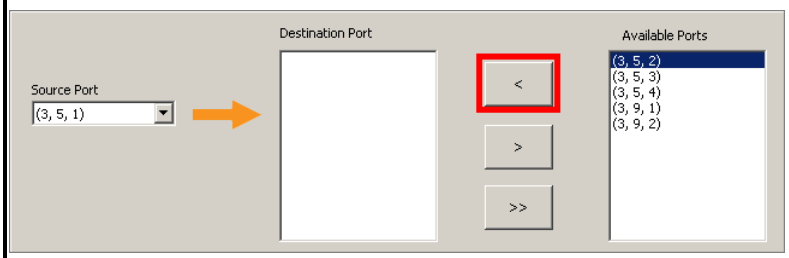
Port Pairing/Assigning for One to Many Mode



1. Choose a port that will serve as the source port from the **Source Port** field.

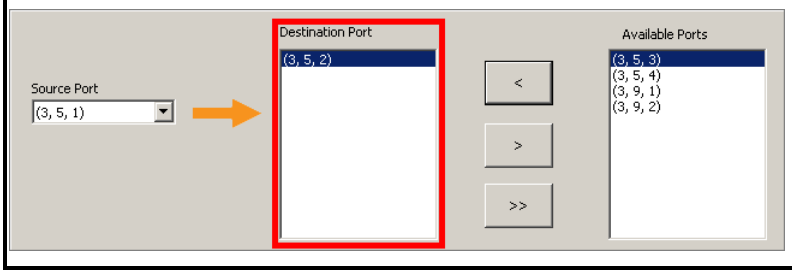


2. Choose ports that will serve as the destination ports from the **Available Ports** field.



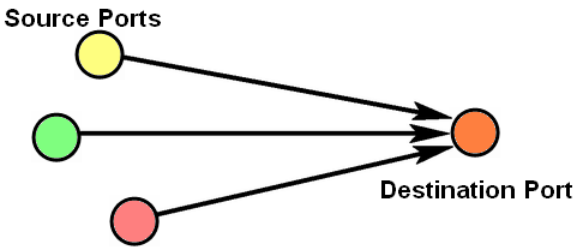
3. Click the 〈 button to add the destination port you've selected in step 2.

Port Pairing/Assigning for One to Many Mode

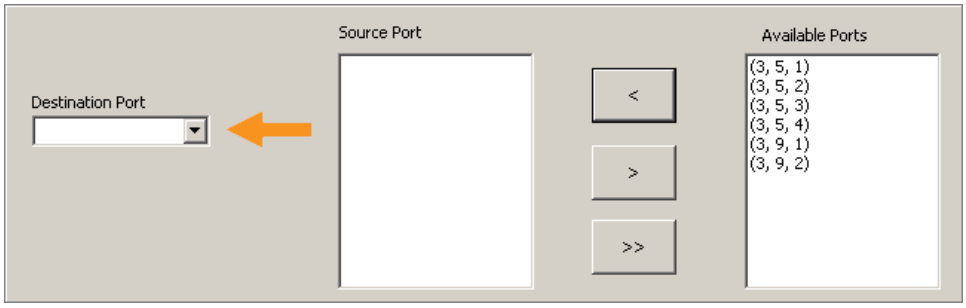


4. The port you've selected will be added to the **Destination Port** field. You can remove one destination port by clicking the 〉 button, or remove all destination ports by clicking the 〉〉 button.

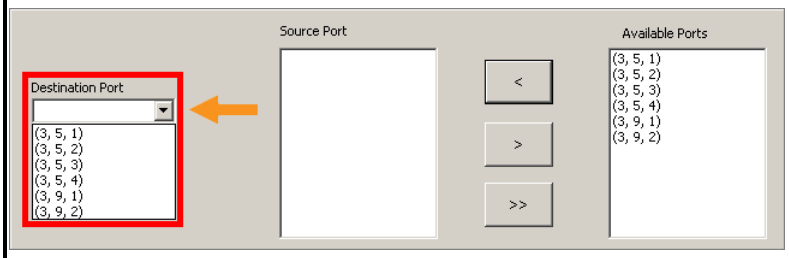
Many to One



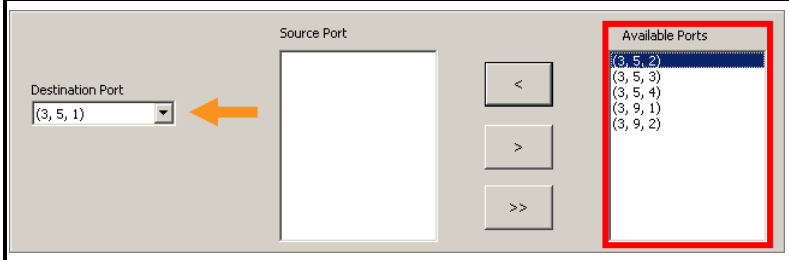
In **Many to One** test mode, packets will be sent from one destination port to multiple source ports as shown in the figure above.



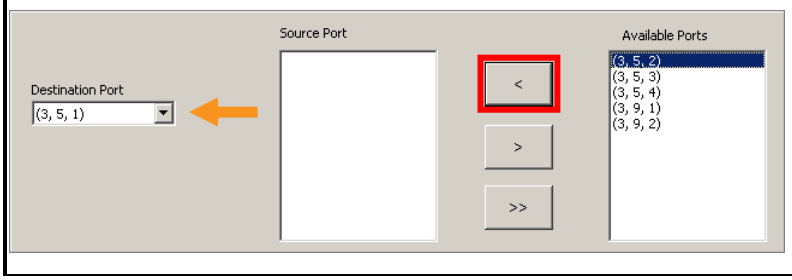
Port Pairing/Assigning for Many to One Mode



1. Choose a port that will serve as the destination port from the **Destination Port** field.

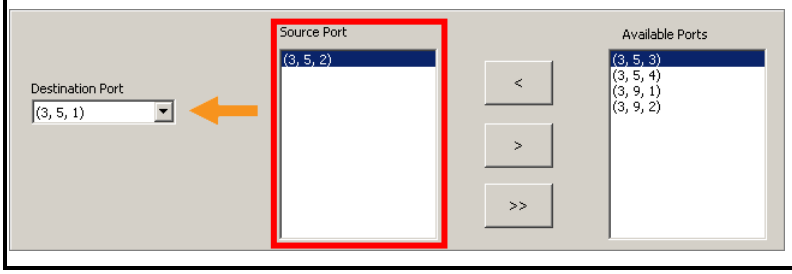


2. Choose ports that will serve as the source port from the **Available Ports** field.



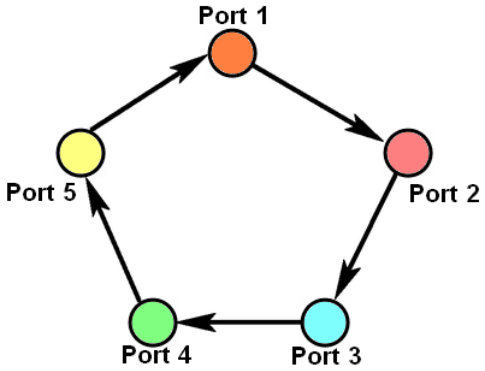
3. Click the 〈 button to add the source port you've selected in step 2.

Port Pairing/Assigning for Many to One Mode

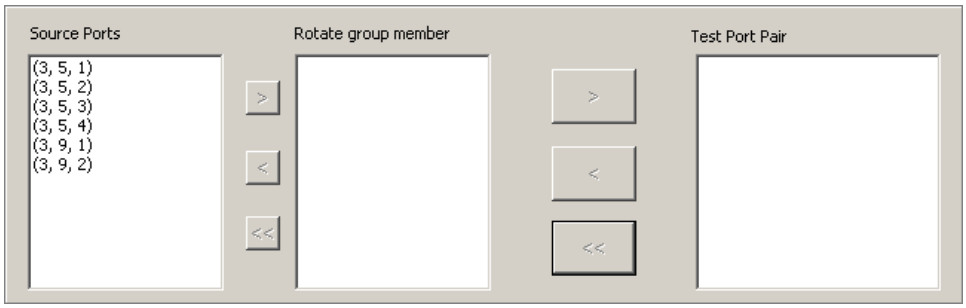


4. The port you've selected will be added to the **Source Port** field. You can remove one source port by clicking the 〉 button, or remove all source ports by clicking the 〉〉 button.

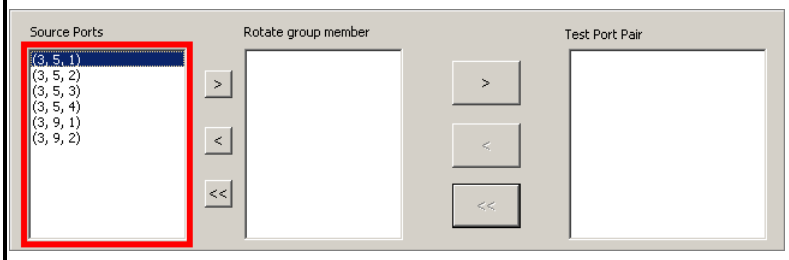
Rotate



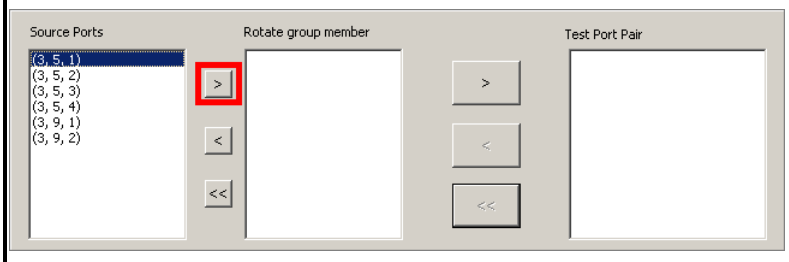
In **Rotate** test mode, packets will be sent from port to port in a loop while the last port will be connected to the first port, as shown in the figure above.

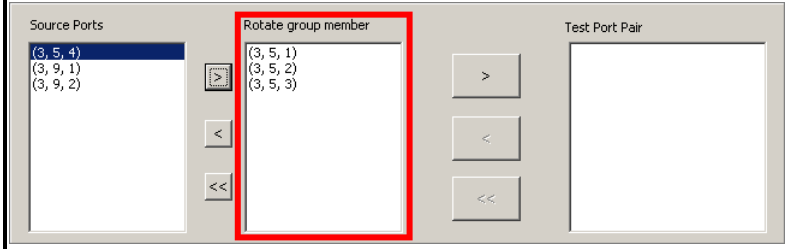


Port Pairing/Assigning for Rotate Mode



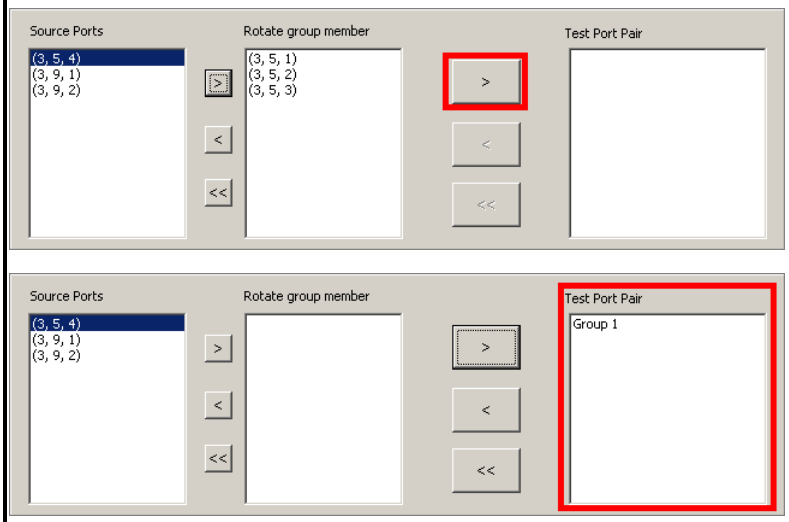
1. Choose the ports that will be used in the Rotate test mode from the **Source Ports** field,





2. Click the 〉 button to add the port you've selected in step 1. The ports you've added will be shown in the **Rotate Group Member** field. You can remove one port by clicking the 〈 button, or remove all ports by clicking the 〈〈 button.

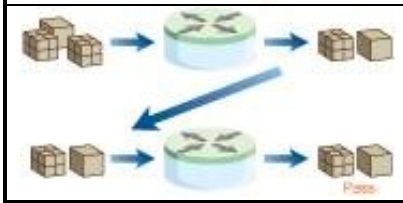
Port Pairing/Assigning for Rotate Mode



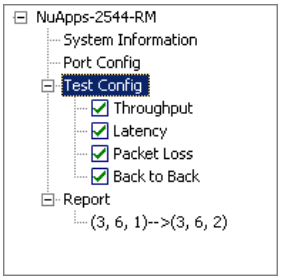
3. Click the 〉 button to add all the ports listed in **Rotate Group Member** field as a group of ports. The port group will be listed in the **Test Port Pair** field. You can remove one group by clicking the 〉 button, or remove all groups by clicking the 〉〉 button.

4.9.2. Test Configuration Overview

NuApps-2544-RM supports four different tests including:

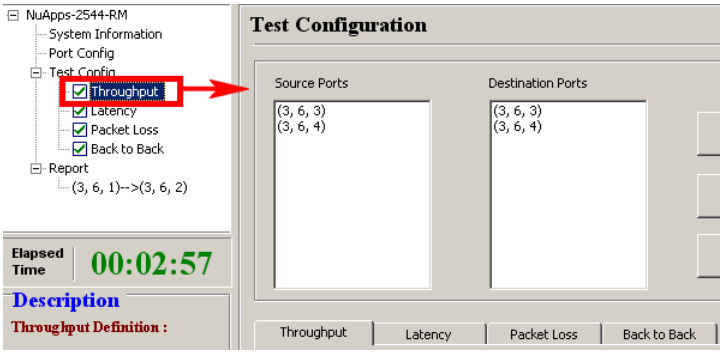
Diagram	Description
	**Throughput** test determines the DUT's maximum capable throughput rate without dropping any packets.
	**Latency** test measures the time it takes for the DUT to forward a packet.
	**Packet Loss** test measures the percentage of packets that are not forwarded due to the lack of resource.
	**Back to Back** test measures DUT's buffer capacity by sending bursts of traffic at the maximum frame rate and measuring the longest burst size without dropping any packets.

To start performing tests with NuApps-2544.RM, please check the check box ☑ in front of the test you would like to perform first. Unchecked tests will not be performed, and you cannot access their reports as well during or after the tests.

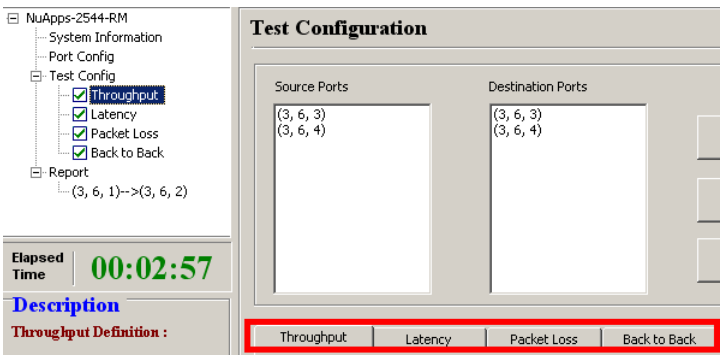


You can access setting options for the tests you would like to perform by:

Accessing Test Setting Pages



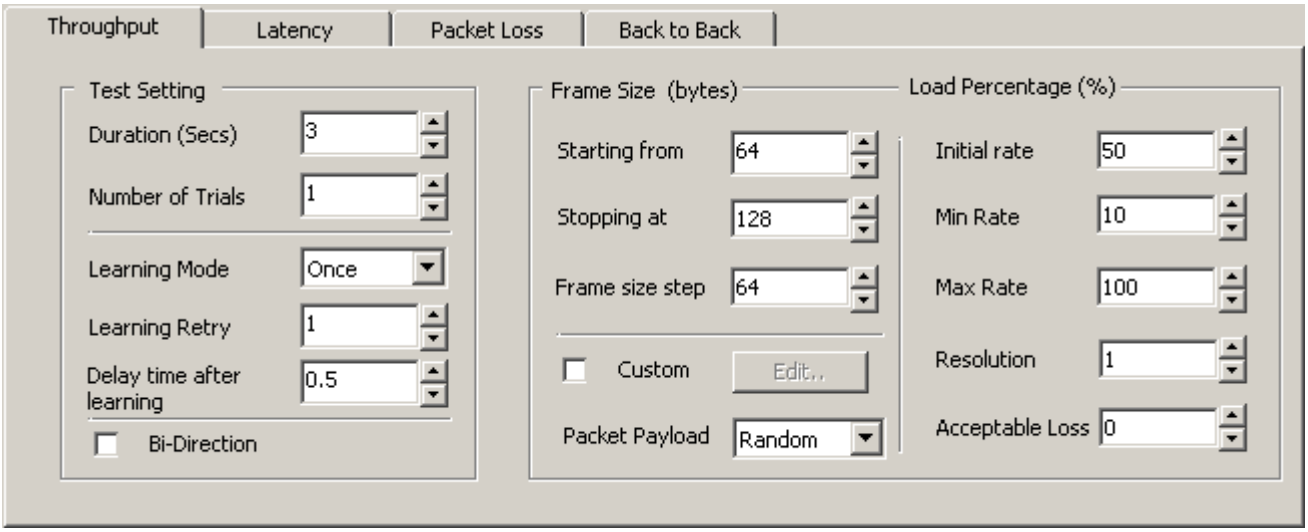
- Click the test you would like to configure located on **System Info/ Configuration List**



- Click the test you would like to configure located on the test tab menu.

For more detailed setting options regarding to **Throughput**, **Latency**, **Packet Loss** and **Back to Back**, please refer to the sections down below.

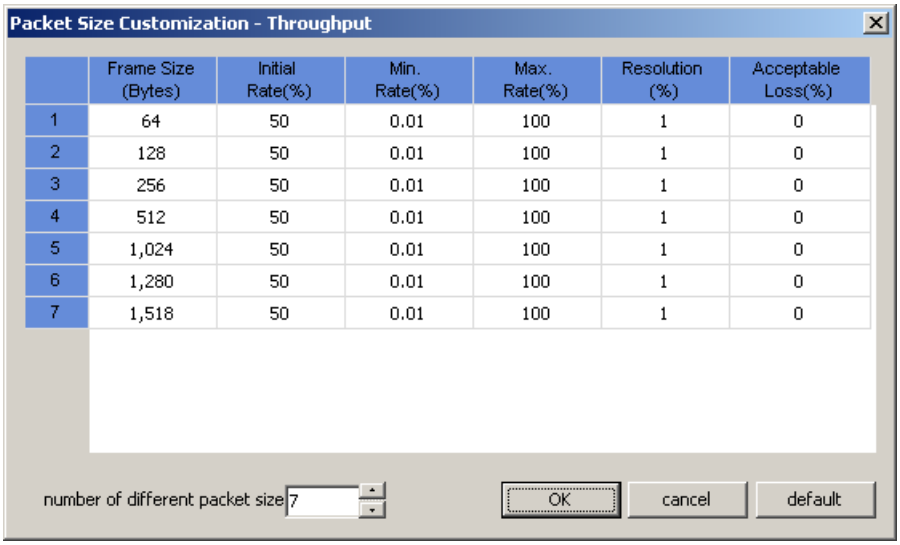
4.9.3. Throughput Test



Throughput test determines the DUT's maximum capable throughput rate without dropping any packets. The **Throughput** configuration page allows you to customize the test duration, packet length, packet transmission rate (%) for the desired testing environment.

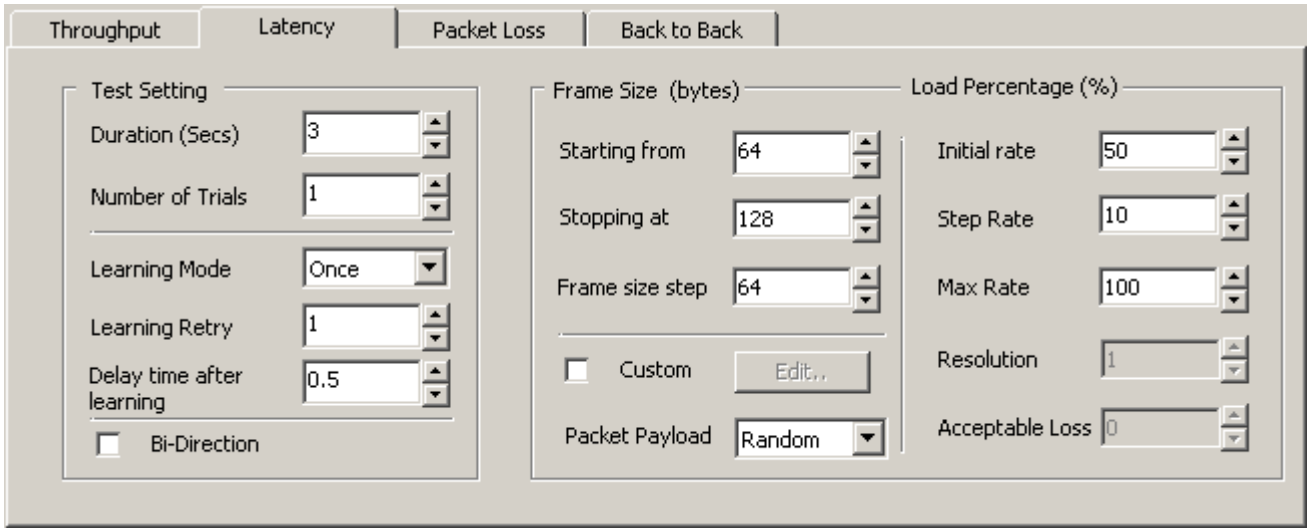
Test Setting	
Duration (Secs)	The duration of time (in seconds) for the test. The range for the testing time is **1~5000**.
Number of Trials	The number of times of the test. The range for the number of times of the test is **1~100**.
Learning Mode	This function allows the DUT to create an address table according to the source address in the received frame. • **Never:** DUT will **never** create an address table, and **Learning Mode** is disabled. • **Once:** DUT will create an address table only **once**. • **Every Trial:** DUT will create an address table **in every trial**.
Learning Retry	The value set here will be the number of learning packets that will be sent through the ports chosen to be learned for building address table.
Delay Time After Leaning	You can set the delay time after NuApps-2544-RM created an address table according to the source address in the received frame
Bi-Direction	Enabling this function allows two-way direction transmitting during the test.

Frame Size (bytes)	
Starting from/at	The starting/ending size of the transmitted packet. The range of the **Starting from/at** field is **60~2032**.
Frame Size Step	The frame size will increase in arithmetic progression fashion, while the value you set here will serve as its difference. The range of the **Frame Size Step** is **60~2032**.
Custom	You can customize the size of each transmitted packet manually by enabling **Custom** function and clicking the **Edit** button. A **Packet Size Customization -Throughput** window will pop up. You can customize the **Initial Rate**, **Min/Max Rate**, **Resolution**, and **Acceptable Loss** here as well.

Frame Size (bytes)	
Custom (Contd.)	 You can double-click the field you would like to customize and input the value manually. • **Number of Different Packet Size:** You can set how many different frame sizes you would like to apply to the test here in this field. • **OK/Cancel:** Apply/cancel the changes you've made. • **Default:** Set all the values to default value.
Packet Payload	This scroll-down menu allows you to set packet contents to **Random**, **Increase**, **0×55AA**, **0×00FF**, **All 1** or **All 0**.

Load Percentage (%)	
Initial Rate	The starting network traffic rate (%) of the test.
Min. Rate	The minimum acceptable network traffic rate (%) of the test.
Max. Rate	The maximum acceptable network traffic rate (%) of the test.
Resolution	The test will stop when the difference between the current network traffic rate and the last network traffic rate is smaller than the value you set here.
Acceptable Loss	The acceptable rate of packet loss during the test.

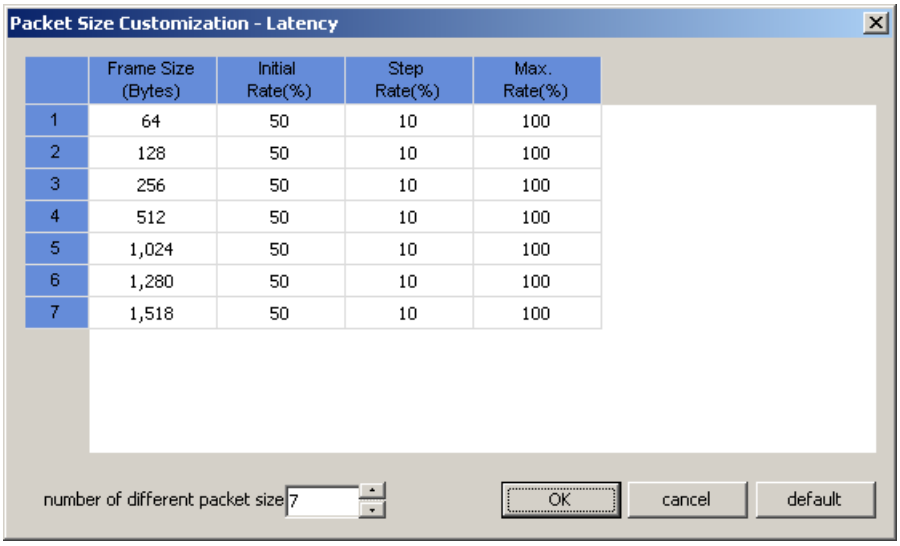
4.9.4. Latency Test



Latency test measures the time it takes for the DUT to forward a packet. The load generated by NuStreams-2000i/600i can be customized with different packet lengths and for specified period of times.

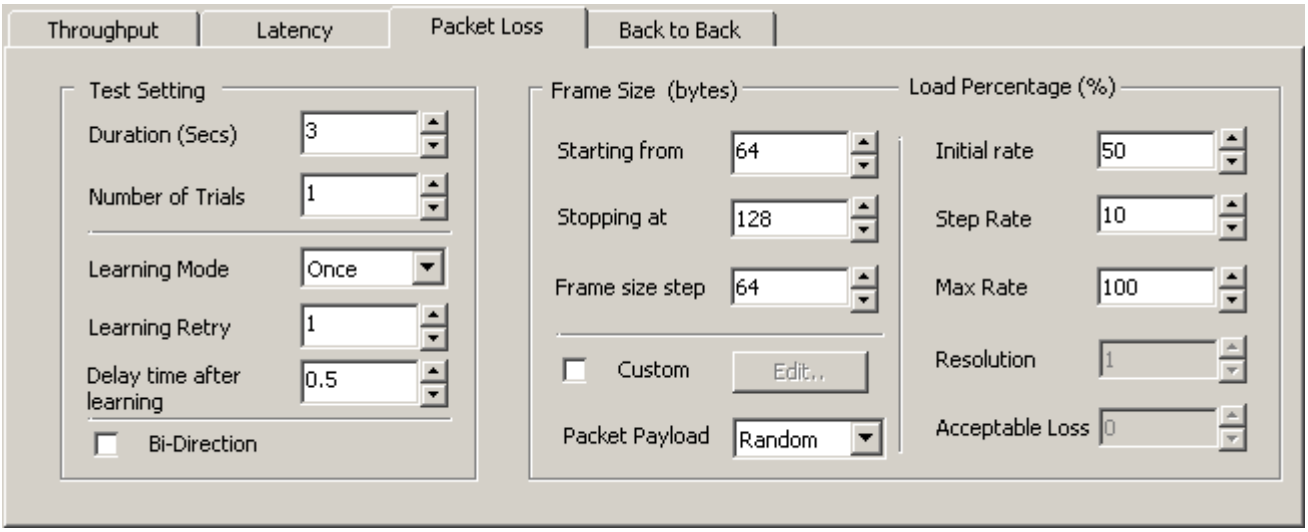
Test Setting	
Duration (Secs)	The duration of time (in seconds) for the test. The range for the testing time is **1~5000**.
Number of Trials	The number of times of the test. The range for the number of times of the test is **1~100**.
Learning Mode	This function allows the DUT to create an address table according to the source address in the received frame. • **Never:** DUT will **never** create an address table, and **Learning Mode** is disabled. • **Once:** DUT will create an address table only **once**. • **Every Trial:** DUT will create an address table **in every trial**.
Learning Retry	The value set here will be the number of learning packets that will be sent through the ports chosen to be learned for building address table.
Delay Time After Leaning	You can set the delay time after NuApps-2544-RM created an address table according to the source address in the received frame
Bi-Direction	Enabling this function allows two-way direction transmitting during the test.

Frame Size (bytes)	
Starting from/at	The starting/ending size of the transmitted packet. The range of the **Starting from/at** field is **60~2032**.
Frame Size Step	The frame size will increase in arithmetic progression fashion, while the value you set here will serve as its difference. The range of the **Frame Size Step** is **60~2032**.
Custom	You can customize the size of each transmitted packet manually by enabling **Custom** function and clicking the **Edit** button. A **Packet Size Customization -Latency** window will pop up. You can customize the **Initial Rate**, **Step Rate**, and **Max. Rate** here as well.

Frame Size (bytes)	
Custom (Contd.)	 You can double-click the field you would like to customize and input the value manually. • **Number of Different Packet Size:** You can set how many different frame sizes you would like to apply to the test here in this field. • **OK/Cancel:** Apply/cancel the changes you've made. • **Default:** Set all the values to default value.
Packet Payload	This scroll-down menu allows you to set packet contents to **Random**, **Increase**, **0×55AA**, **0×00FF**, **All 1** or **All 0**.

Load Percentage (%)	
Initial Rate	The starting network traffic rate (%) of the test.
Min. Rate	The minimum acceptable network traffic rate (%) of the test.
Max. Rate	The maximum acceptable network traffic rate (%) of the test.

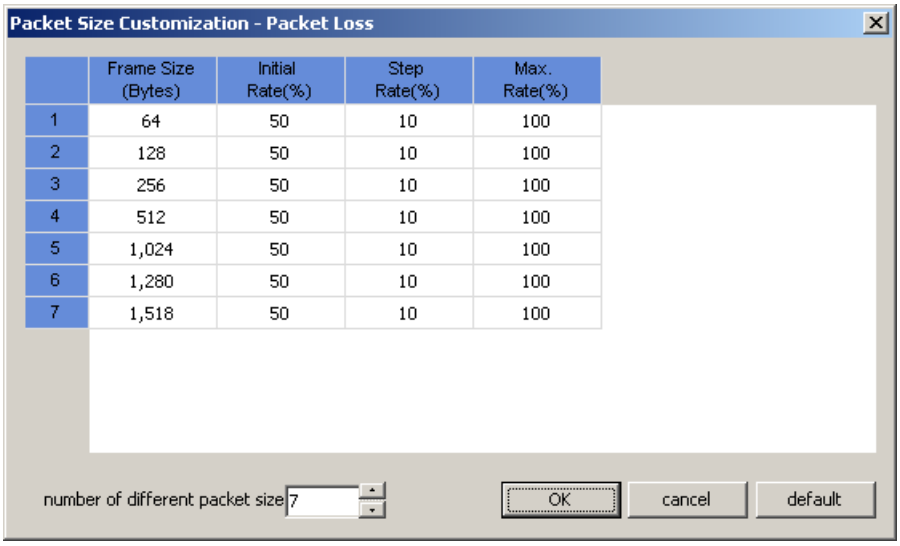
4.9.5. Packet Loss Test



Packet Loss test measures the percentage of packets that are not forwarded (therefore, lost) due to the lack of resource. The loading and the testing time can be customized to simulate real-world scenario; thus, giving the user a clear view of DUT's performance limits under different loading environments.

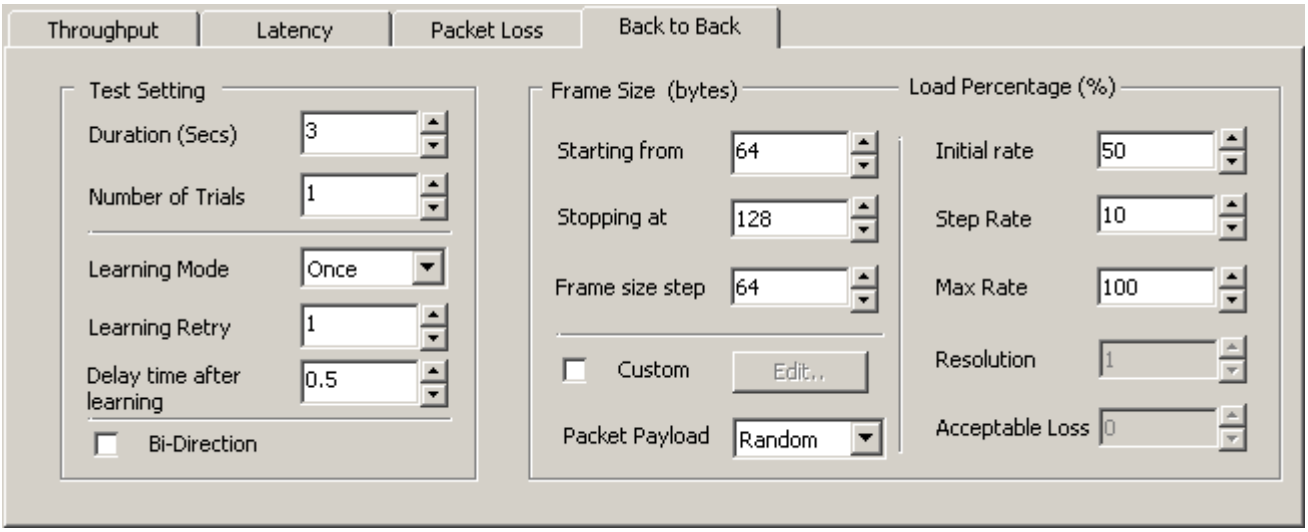
Test Setting	
Duration (Secs)	The duration of time (in seconds) for the test. The range for the testing time is **1~5000**.
Number of Trials	The number of times of the test. The range for the number of times of the test is **1~100**.
Learning Mode	This function allows the DUT to create an address table according to the source address in the received frame. • **Never:** DUT will **never** create an address table, and **Learning Mode** is disabled. • **Once:** DUT will create an address table only **once**. • **Every Trial:** DUT will create an address table **in every trial**.
Learning Retry	The value set here will be the number of learning packets that will be sent through the ports chosen to be learned for building address table.
Delay Time After Leaning	You can set the delay time after NuApps-2544-RM created an address table according to the source address in the received frame
Bi-Direction	Enabling this function allows two-way direction transmitting during the test.

Frame Size (bytes)	
Starting from/at	The starting/ending size of the transmitted packet. The range of the **Starting from/at** field is **60~2032**.
Frame Size Step	The frame size will increase in arithmetic progression fashion, while the value you set here will serve as its difference. The range of the **Frame Size Step** is **60~2032**.
Custom	You can customize the size of each transmitted packet manually by enabling **Custom** function and clicking the **Edit** button. A **Packet Size Customization -Packet Loss** window will pop up. You can customize the **Initial Rate**, **Step Rate**, and **Max. Rate** here as well.

Frame Size (bytes)	
Custom (Contd.)	 You can double-click the field you would like to customize and input the value manually. • **Number of Different Packet Size:** You can set how many different frame sizes you would like to apply to the test here in this field. • **OK/Cancel:** Apply/cancel the changes you've made. • **Default:** Set all the values to default value.
Packet Payload	This scroll-down menu allows you to set packet contents to **Random**, **Increase**, **0×55AA**, **0×00FF**, **All 1** or **All 0**.

Load Percentage (%)	
Initial Rate	The starting network traffic rate (%) of the test.
Min. Rate	The minimum acceptable network traffic rate (%) of the test.
Max. Rate	The maximum acceptable network traffic rate (%) of the test.

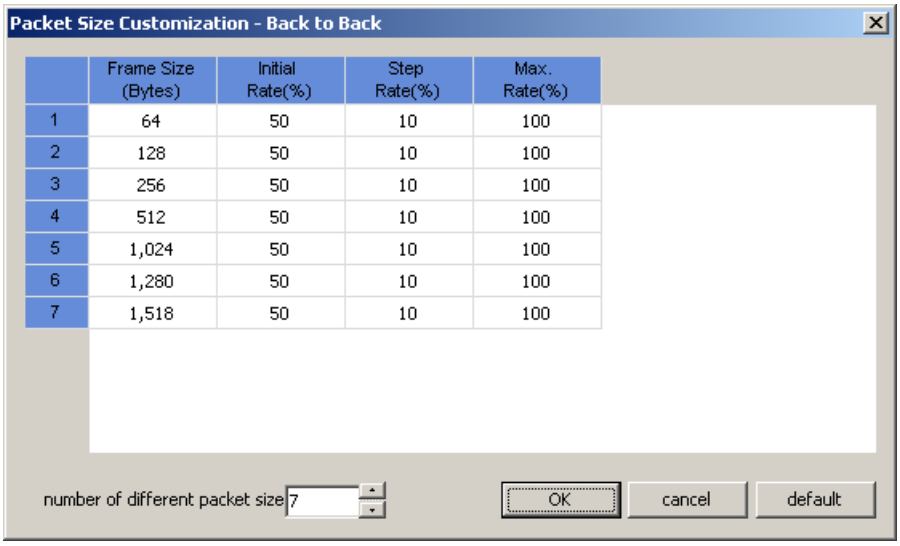
4.9.6. Back to Back Test



Back to Back test measures DUT's buffer capacity by sending bursts of traffic at the maximum frame rate and measuring the longest burst size without dropping any packets.

Test Setting	
Duration (Secs)	The duration of time (in seconds) for the test. The range for the testing time is **1~5000**.
Number of Trials	The number of times of the test. The range for the number of times of the test is **1~100**.
Learning Mode	This function allows the DUT to create an address table according to the source address in the received frame. • **Never:** DUT will **never** create an address table, and **Learning Mode** is disabled. • **Once:** DUT will create an address table only **once**. • **Every Trial:** DUT will create an address table **in every trial**.
Learning Retry	The value set here will be the number of learning packets that will be sent through the ports chosen to be learned for building address table.
Delay Time After Leaning	You can set the delay time after NuApps-2544-RM created an address table according to the source address in the received frame
Bi-Direction	Enabling this function allows two-way direction transmitting during the test.

Frame Size (bytes)	
Starting from/at	The starting/ending size of the transmitted packet. The range of the **Starting from/at** field is **60~2032**.
Frame Size Step	The frame size will increase in arithmetic progression fashion, while the value you set here will serve as its difference. The range of the **Frame Size Step** is **60~2032**.
Custom	You can customize the size of each transmitted packet manually by enabling **Custom** function and clicking the **Edit** button. A **Packet Size Customization -Back to Back** window will pop up. You can customize the **Initial Rate**, **Step Rate**, and **Max. Rate** here as well.

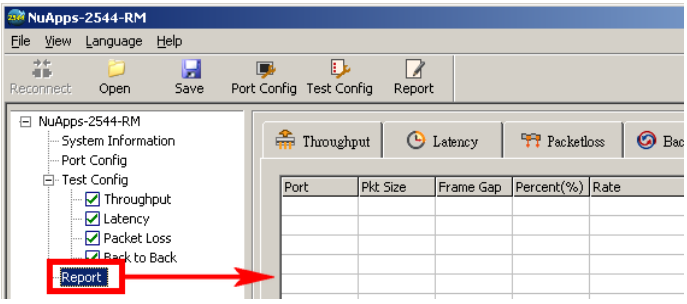
Frame Size (bytes)	
Custom (Contd.)	 You can double-click the field you would like to customize and input the value manually. • **Number of Different Packet Size:** You can set how many different frame sizes you would like to apply to the test here in this field. • **OK/Cancel:** Apply/cancel the changes you've made. • **Default:** Set all the values to default value.
Packet Payload	This scroll-down menu allows you to set packet contents to **Random**, **Increase**, **0×55AA**, **0×00FF**, **All 1** or **All 0**.

Load Percentage (%)	
Initial Rate	The starting network traffic rate (%) of the test.
Min. Rate	The minimum acceptable network traffic rate (%) of the test.
Max. Rate	The maximum acceptable network traffic rate (%) of the test.

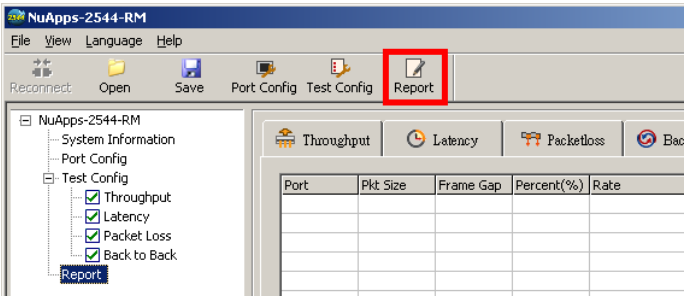
4.10. Report

Test results, statistics and charts are displayed and can be checked on the **Main Display Screen.** There are two ways to view **Report**:

Accessing Report

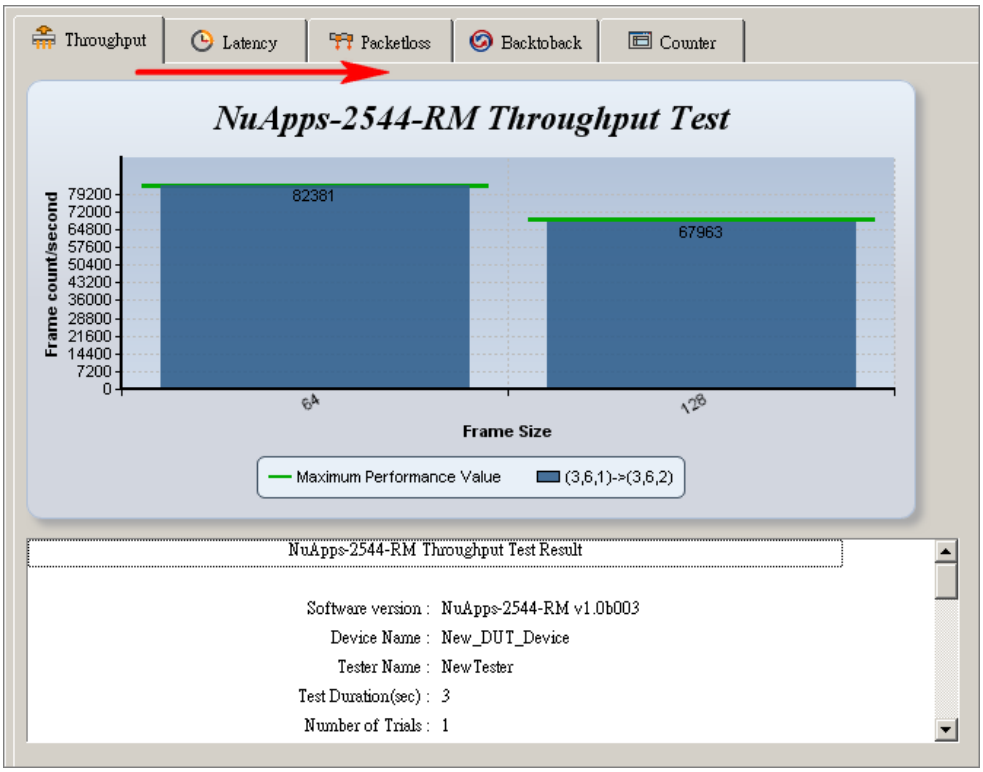


- Click **Report** located on **System Info/ Configuration List**.

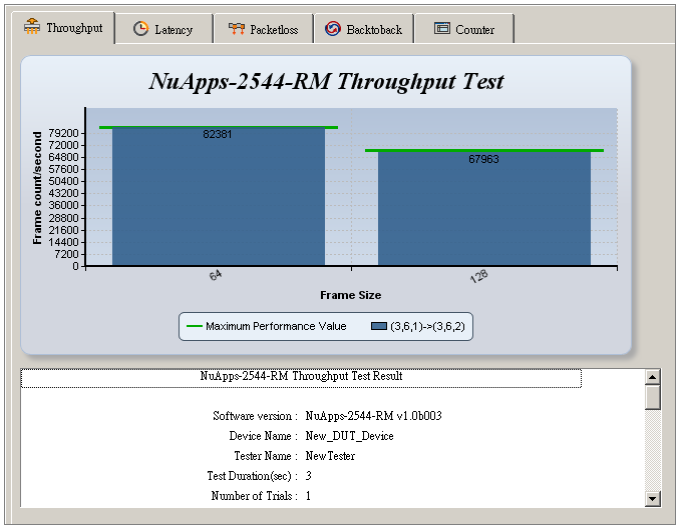


- Click the **Report** button located on **Quick Launch Buttons**.

During the tests, charts for the results of each test (**Throughput**, **Latency**, **Packet Loss** or **Back to Back**) will be displayed on the **Main Display Screen**. NuApps-2544-RM will switch charts of each test automatically when finishing the current test and starting the next test as shown in the figures. Please note that you can only access charts of the tests you've performed.

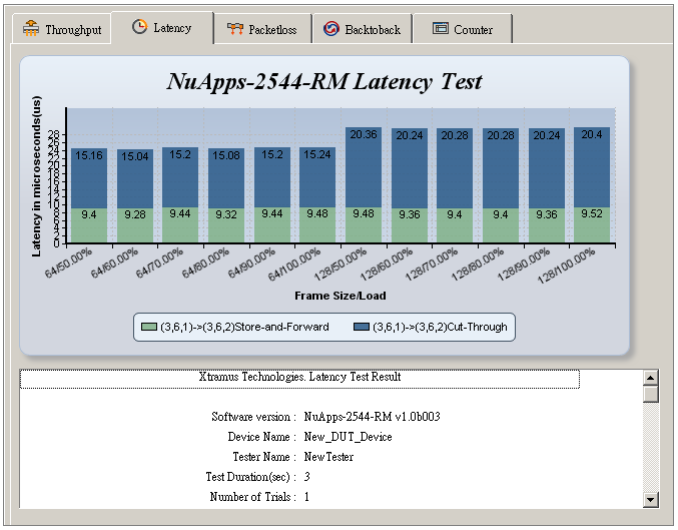


Throughput Test Result Chart



This chart uses **Frame Count per Second** as X-Axis, and **Frame Size** as Y-Axis to show DUT's throughput performance.

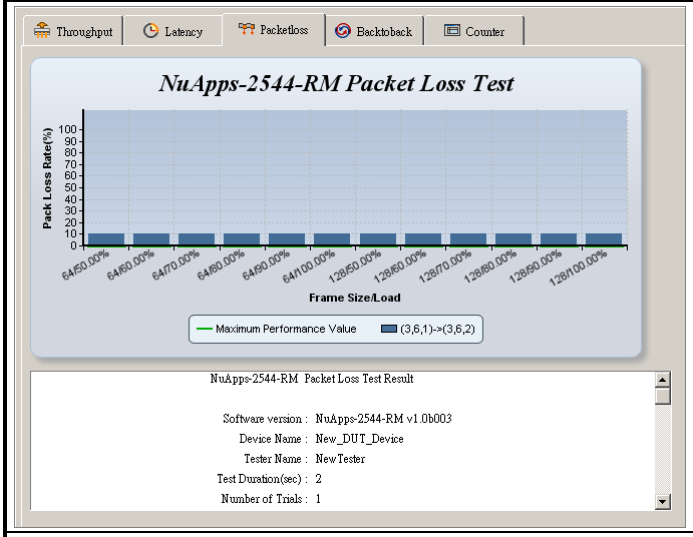
Latency Test Result Chart



This chart uses **Latency in Microseconds (µs)** as X-Axis, and **Frame Size/Load** as Y-Axis.

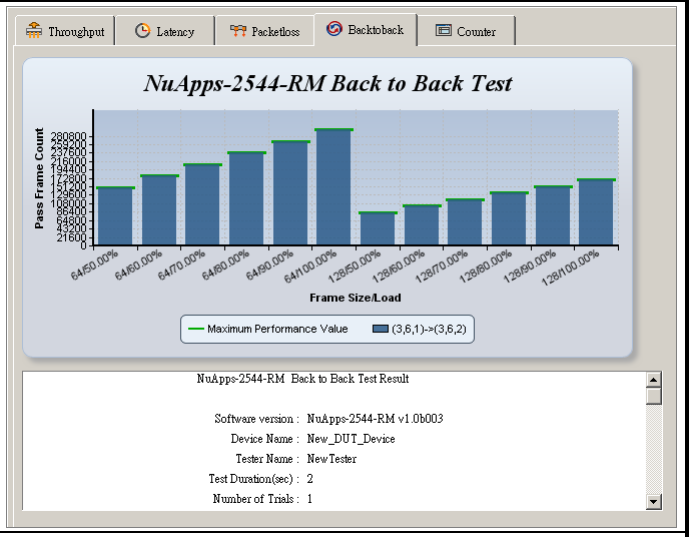
- **Store and Forward:** Represents packets that were stored inside DUT's buffer before transmitted.
- **Cut Through:** Represents packets that were transmitted right away.

Packet Loss Test Result Chart



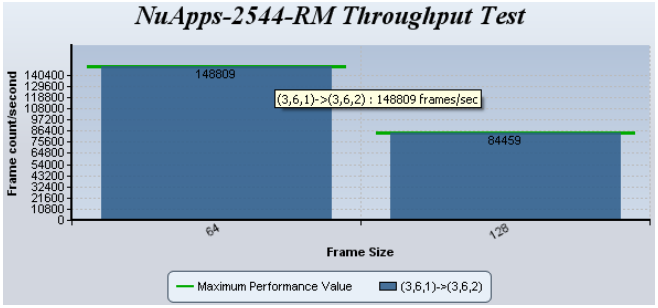
This chart uses **Packet Loss Rate (%)** as X-Axis, and **Frame Size/Load** as Y-Axis to show DUT's packet loss ratio.

Back to Back Test Result Chart



This chart uses **Pass Frame Count** as X-Axis, and **Frame Size/Load** as Y-Axis to show DUT's back to back test result.

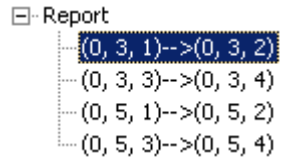
Viewing Test Result Chart



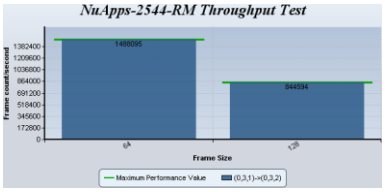
To view detail statistics on the chart, please move the mouse cursor to the part you would like to know more, as shown in the figure on the left.

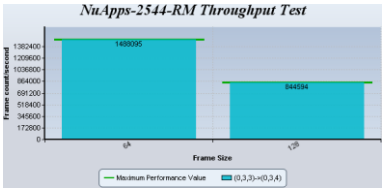
Viewing Test Result Chart (Continued)

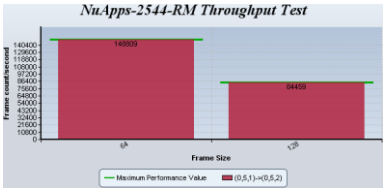
If you would like to view test result charts for other pairs of ports, please click the port pair you would like to view from **Report** on the **System Info/Configuration List**.



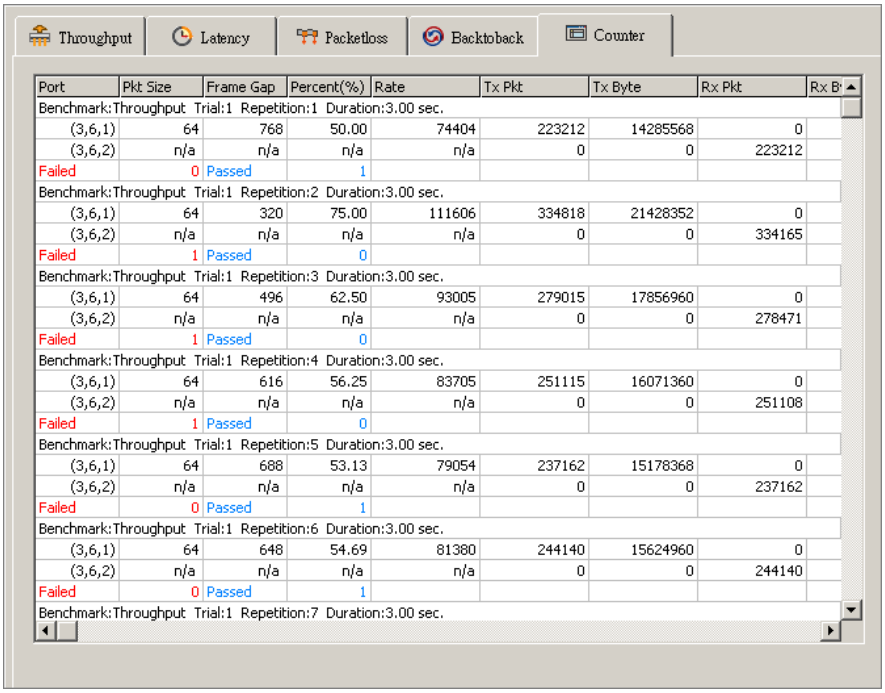
As shown in the figures down below, test result charts of different pairs of ports will be represented in different colors.







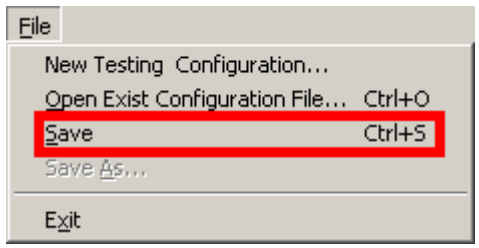
Also, you can view test results counter by clicking the **Counter** tab menu. All statistics will be displayed in this table in great detail for test result analysis.



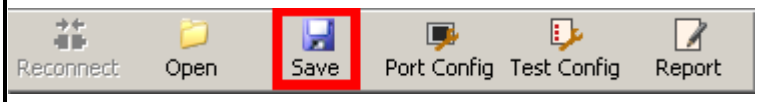
Port	Pkt Size	Frame Gap	Percent(%)	Rate	Tx Pkt	Tx Byte	Rx Pkt	Rx B
Benchmark:Throughput Trial:1 Repetition:1 Duration:3.00 sec.								
(3,6,1)	64	768	50.00	74404	223212	14285568	0	
(3,6,2)	n/a	n/a	n/a	n/a	0	0	223212	
Failed	0	Passed	1					
Benchmark:Throughput Trial:1 Repetition:2 Duration:3.00 sec.								
(3,6,1)	64	320	75.00	111606	334818	21428352	0	
(3,6,2)	n/a	n/a	n/a	n/a	0	0	334165	
Failed	1	Passed	0					
Benchmark:Throughput Trial:1 Repetition:3 Duration:3.00 sec.								
(3,6,1)	64	496	62.50	93005	279015	17856960	0	
(3,6,2)	n/a	n/a	n/a	n/a	0	0	278471	
Failed	1	Passed	0					
Benchmark:Throughput Trial:1 Repetition:4 Duration:3.00 sec.								
(3,6,1)	64	616	56.25	83705	251115	16071360	0	
(3,6,2)	n/a	n/a	n/a	n/a	0	0	251108	
Failed	1	Passed	0					
Benchmark:Throughput Trial:1 Repetition:5 Duration:3.00 sec.								
(3,6,1)	64	688	53.13	79054	237162	15178368	0	
(3,6,2)	n/a	n/a	n/a	n/a	0	0	237162	
Failed	0	Passed	1					
Benchmark:Throughput Trial:1 Repetition:6 Duration:3.00 sec.								
(3,6,1)	64	648	54.69	81380	244140	15624960	0	
(3,6,2)	n/a	n/a	n/a	n/a	0	0	244140	
Failed	0	Passed	1					
Benchmark:Throughput Trial:1 Repetition:7 Duration:3.00 sec.								

You can save the test results by:

Saving Test Results



- Click **Save** located on **Menu Bar**.



- Click the **Save** button located on **Quick Launch Buttons**.

Test results and related statistic are available and can be viewed with the " *** .xls**" file you saved this way.

You need Microsoft Excel® to view " *** .xls**" file.

Doc #USM_NuApps-2544-RM_V1.3_ENG_20180815