NuWIN-RM
User's Manual

USM Ver1.0

Foreword

Copyright

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Revision History

Date	Doc Ver.	Software Ver.	History
2017/05/08	1.0	V2.0b006	First draft version

Table of Contents

1. NuWIN-RM Overview

NuWIN-RM provides a powerful and sophisticated virtual front panel to manage the NuStreams chassis. Each test port can be independently configured with parameters to define streams, filters, and capture capabilities. Traffic for various network protocols can be customized, transmitted, and received on each port. Comprehensive statistics provide users an in-depth analysis of the performance of the DUT (Device under Test).

NuWIN-RM has a flexible and intuitive interface to control test modules in a single or multiple chassis through a click of the mouse. Any combination of test modules can be inserted into NuStreams chassis and be instantly identified.

Each port can be configured to analyze and count packets to match user-defined criteria, such as source and destination MAC addresses, custom patterns, errors, and frame size ranges. Each port is equipped with capture memory, which can store packets in real time. A comprehensive set of user-defined triggers and filters are available based on source and/or destination MAC and/or IP addresses, data patterns, and error conditions.

NuWIN-RM is designed to allow multiple users to access individual ports of every test module installed. This feature enables users to execute their own tests on the ports assigned to them without disrupting other users on the system.

NuWIN-RM is designed for Xtramus XM-RM series module cards. The table down below lists the XM-RM module cards that are supported by NuWIN-RM.

Module Cards Support NuWIN-RM	
Module Card	**Max Rate**
XM-RM661/671/681	100M
XM-RM731/751/761/781	1000M
XM-RM881/881-2/891	10G

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

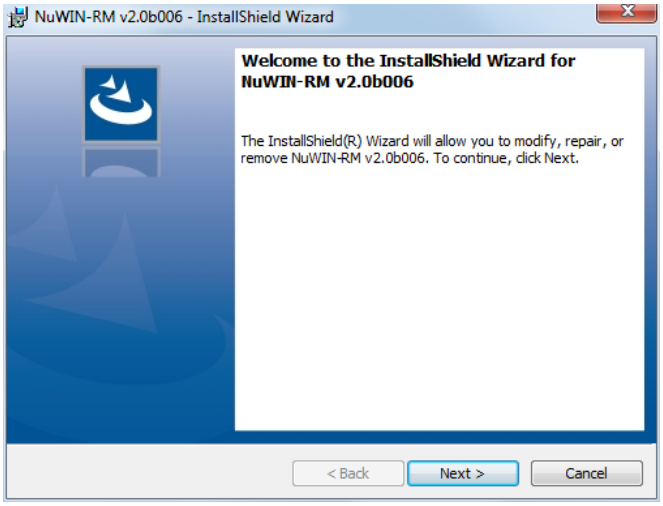
Also, please make sure that your PC meets the requirements listed in the table down below before installing NuWIN-RM.

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

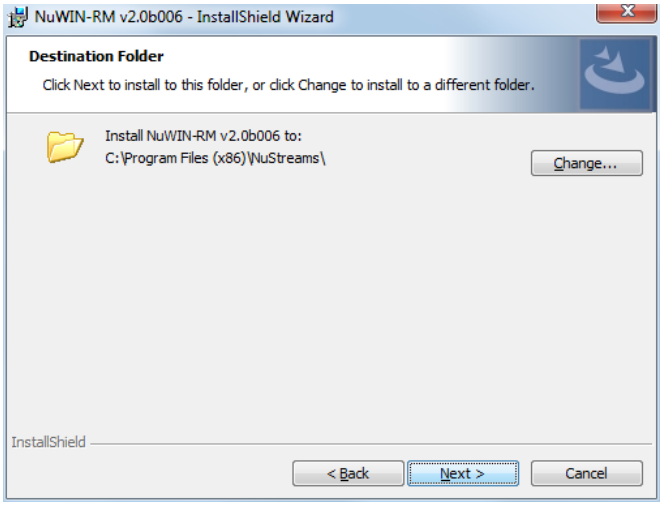
∗ Note: Large amount of data will be generated while running NuWIN-RM. It is recommended to reserve enough available Hard-Disk space to store these data.

2. Installing/Uninstalling NuWIN-RM

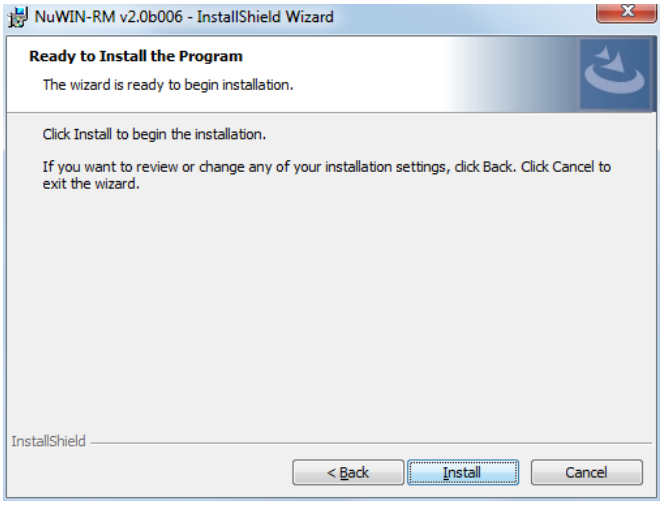
Please follow the steps down below to install NuWIN-RM.

Installing NuWIN-RM	
	1. Double-click NuWIN-RM installation program and start the installation process.
	2. Install Wizard is starting to install NuWIN-RM. If you would like to cancel installation, click **Cancel**, or Click **Next** to continue installation.
	3. Choose "**I accept the terms in the license agreement**" and click **Next** to continue the installation. Click **Back** to return to the previous step. Or if you do not agree with the end user license agreement, please click **Cancel** to exit the Install Wizard.

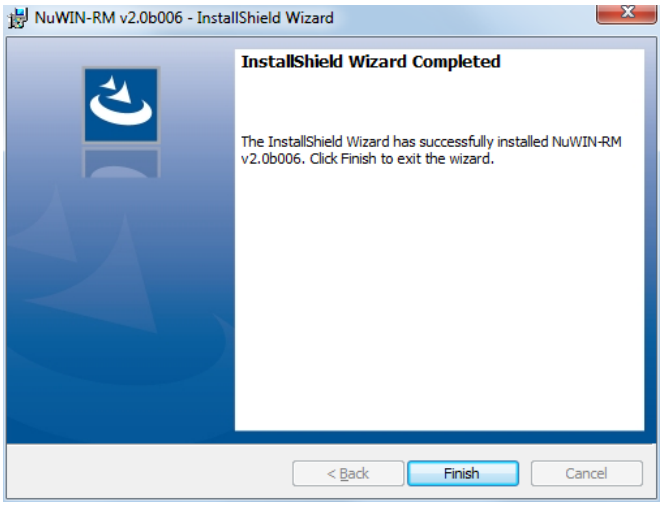
Installing NuWIN-RM



4. Set the file path where you want to install NuWIN-RM.



5. Click **Install** to continue the installation. If you want to review or change any of your installations settings, click **Back**. Or Click **Cancel** to exit the wizard.

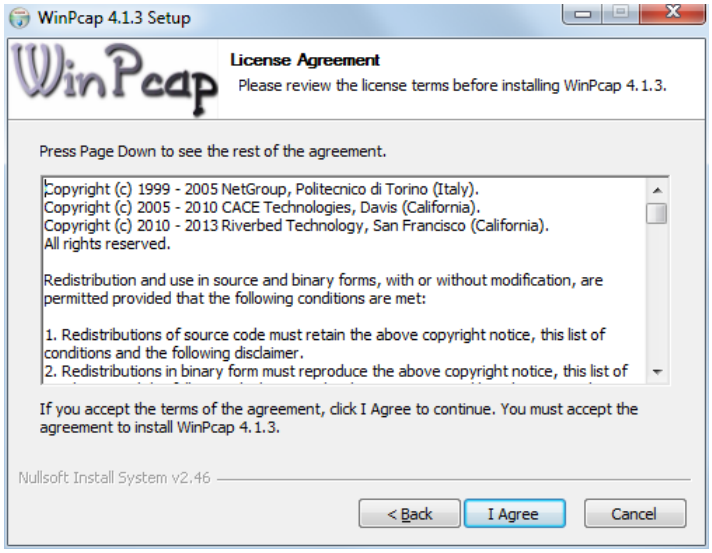


6. Click **Finish**, then the installation of NuWIN-RM is completed.

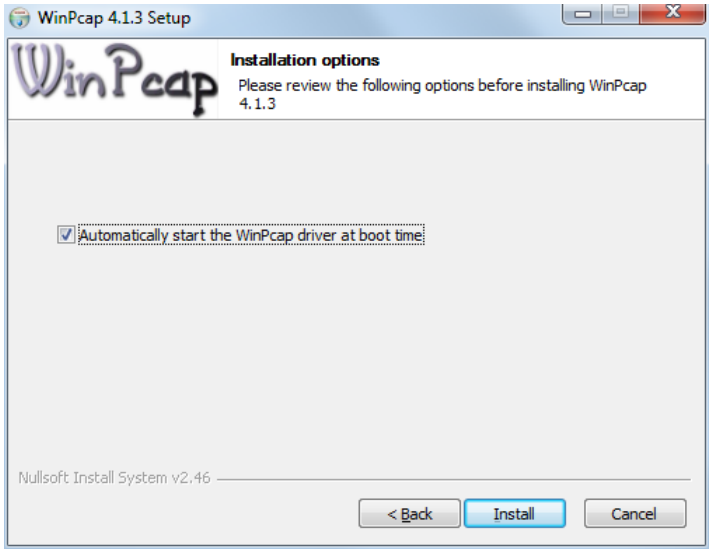
***Note:** Due to different Operating Systems or system settings, warning messages might pop up when installing NuWIN-RM. When this occurs, please choose the options on these pop-up warning messages that allow you to continue installing NuWIN-RM.

Installing NuWIN-RM

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

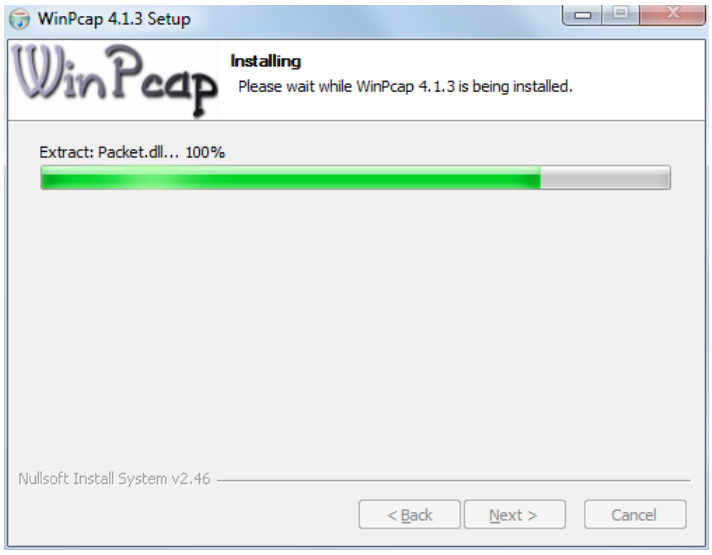


8. Review the license agreement before installing. Click **I Agree** to continue. It is necessary to accept the agreement to install WinPcap.

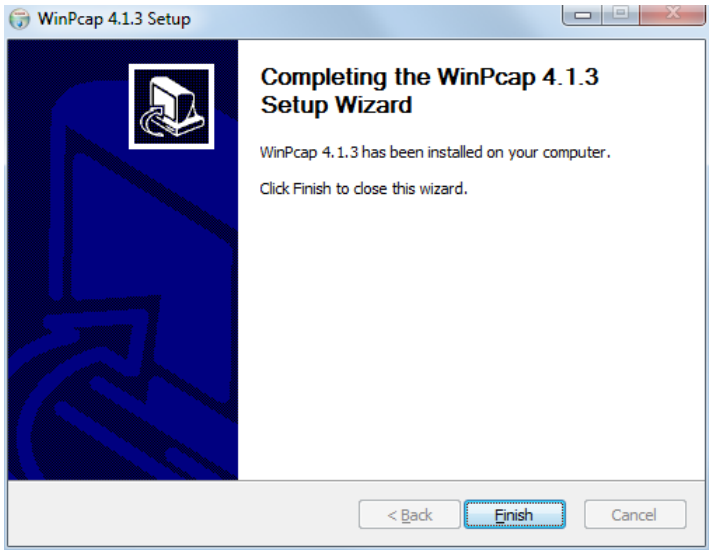


9. You can set if you would like to start WinPcap driver when booting PC by clicking the check-box. Click **Install** to continue.

Installing NuWIN-RM



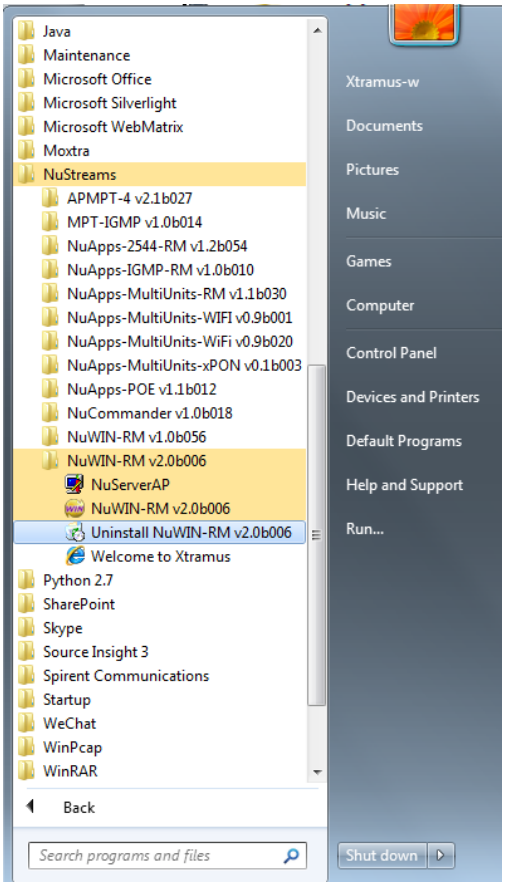
10. WinPcap is installing.



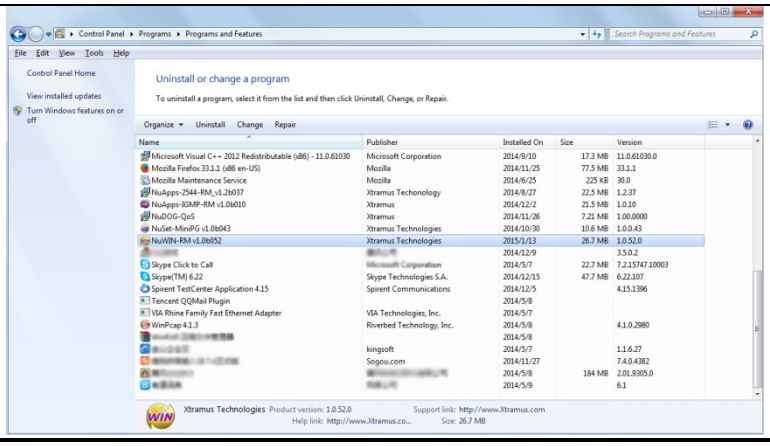
11. WinPcap installation completes. Click **Finish** to close the wizard.

You can uninstall NuWIN-RM by:

Uninstalling NuWIN-RM



- Click **Start→All Programs→NuStreams→NuWIN-RM →Uninstall NuWIN-RM**.

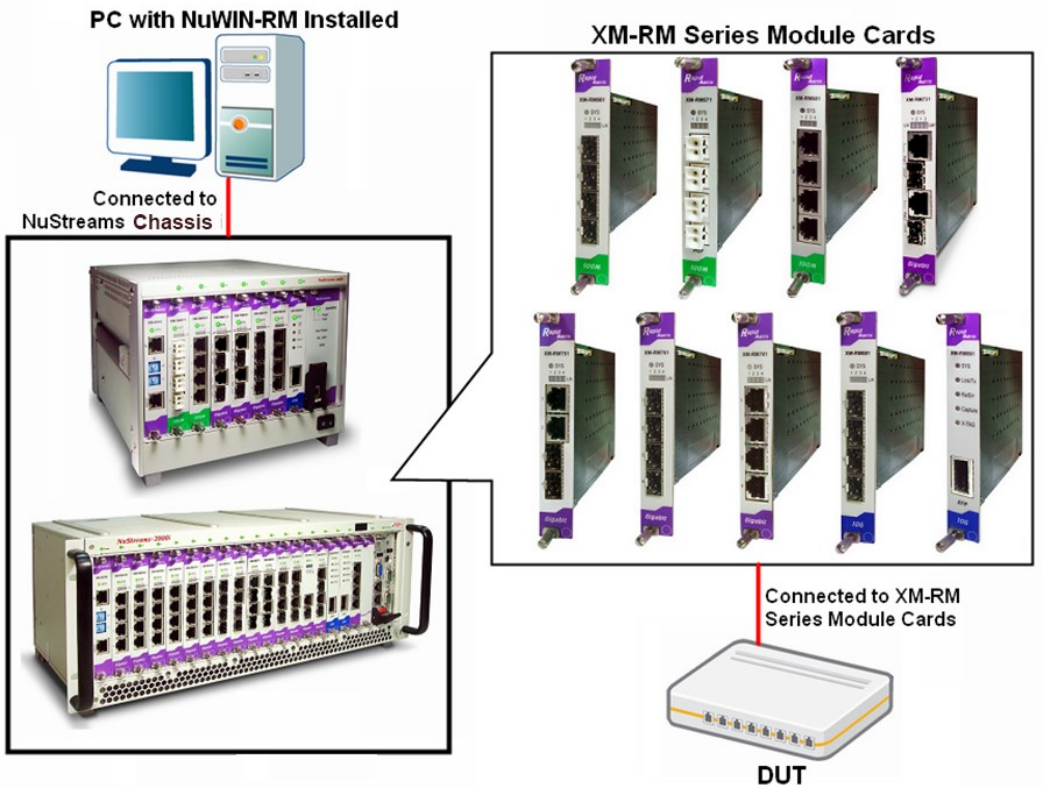


- Go to the **Control Panel** and uninstall the program.

3. NuWIN-RM Function Overview

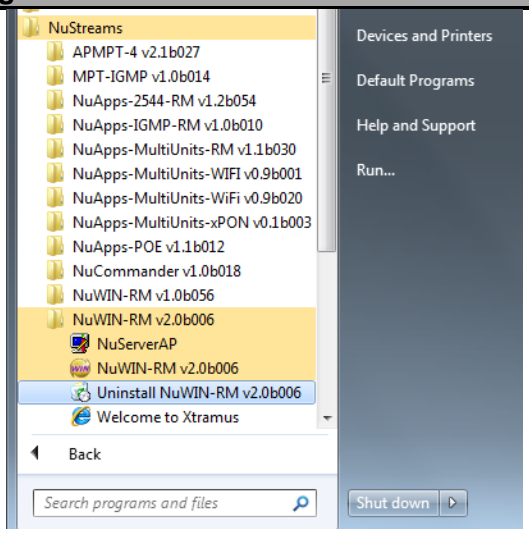
3.1. Starting NuWIN-RM

Before starting NuWIN-RM, the DUT, your PC, and NuSteams chassis shall be connected properly as shown in the picture down below:



There are two ways to start NuWIN-RM:

Starting NuWIN-RM



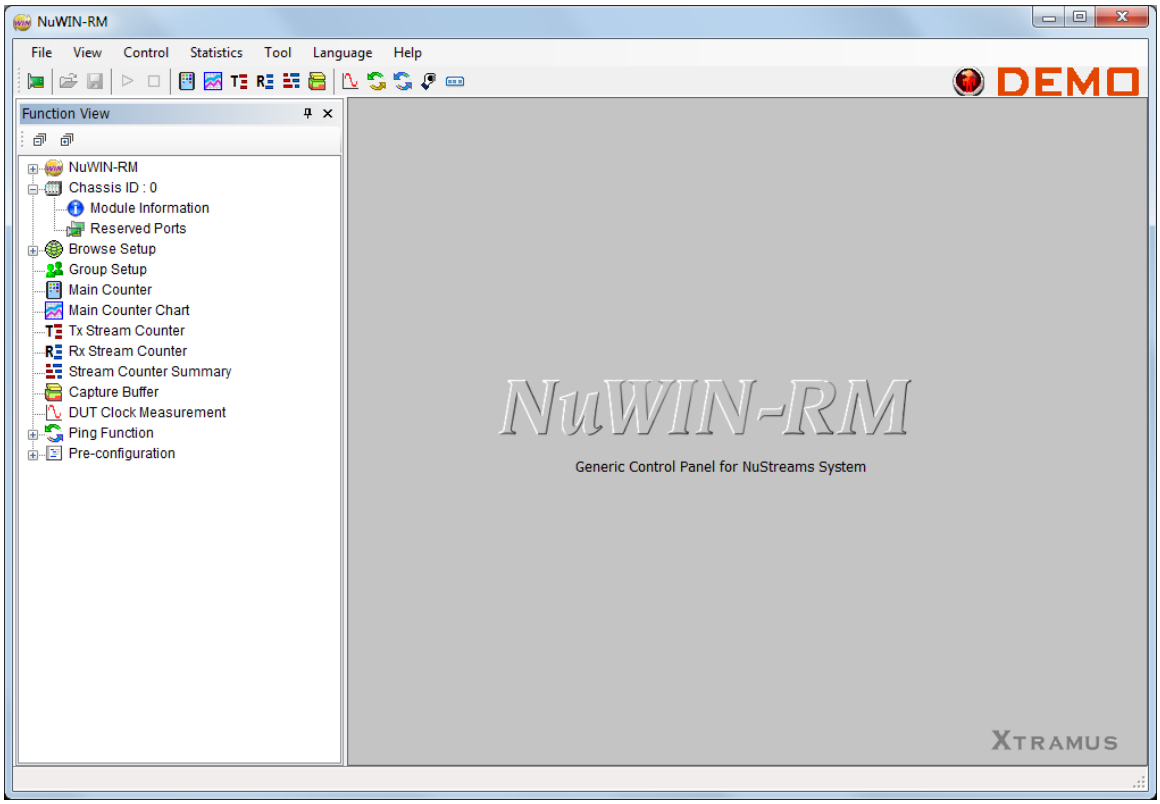
- Click **Start→AllPrograms→NuStreams→NuWIN-RM vxxxx→NuWIN-RMvxxxx**.

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

NuWIN-RM Demo Mode

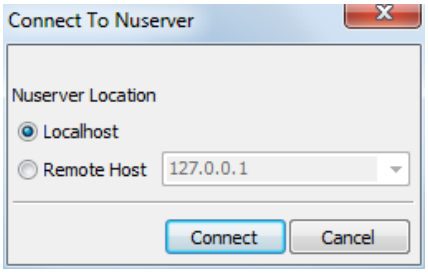
If your PC is not connected with NuSteams chassis, you can still run NuWIN-RM under **Demo Mode**. Almost all NuWIN-RM's functions are available under **Demo Mode**.

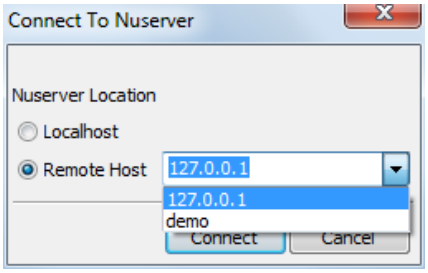
Note：Demo Mode is for system demo purposes only, and does not serve any testing purposes at all.



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

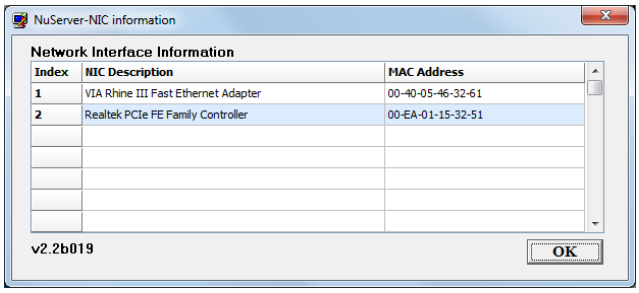
Starting NuServer





When starting NuWIN-RM, a "**Connect To NuServer**" window will pop up and ask how you are going to connect to NuServer.

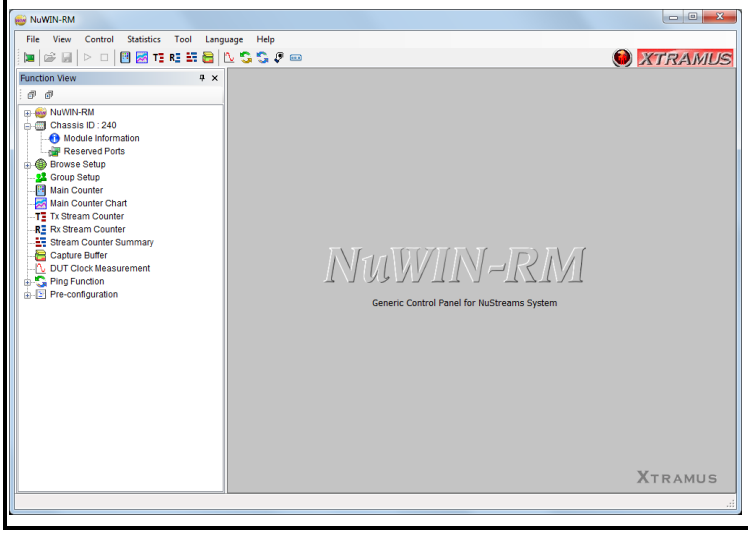
- **Local Host:** Choose this option when you're running NuWIN-RM from NuStreams-2000i IPC module or a PC that's connected to NuSteams chassis via an RJ45 cable.
- **Remote Host:** Choose this option when you're running NuWIN-RM from other PC located on the network. Choose the IP address which is assigned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

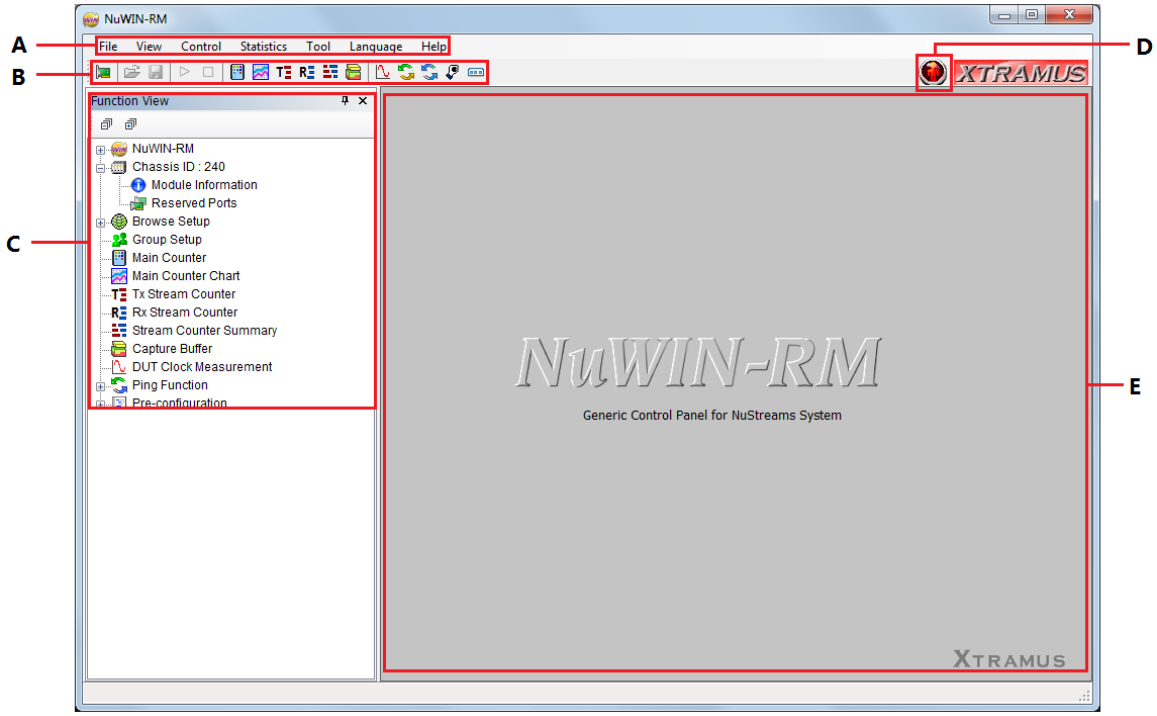
Starting NuServer



You now have accessed to NuWIN-RM's main display window.

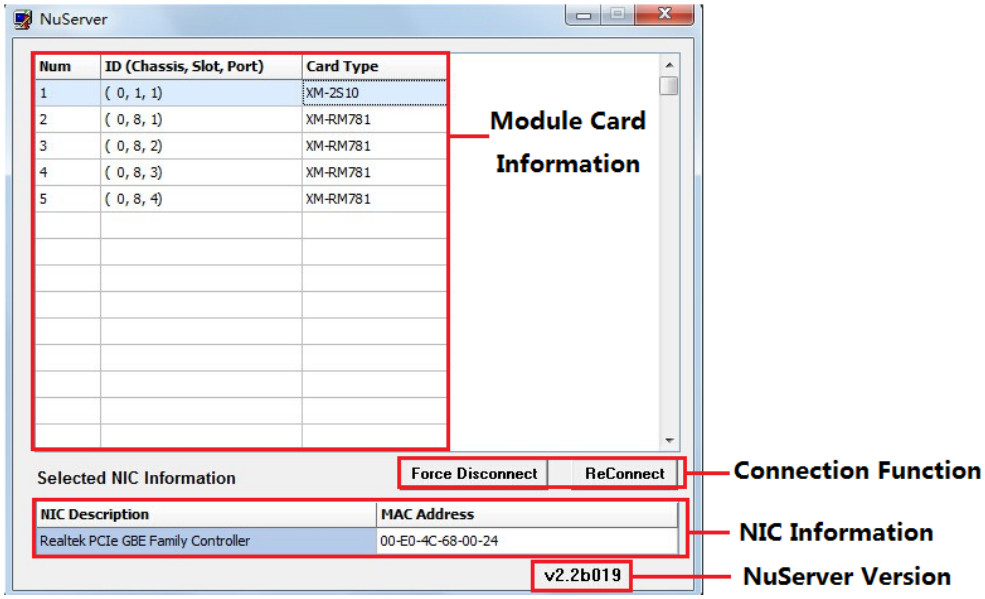
3.2. NuWIN-RM/NuServer Overview

NuWIN-RM Main Window



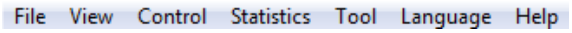
NuWIN-RM Main Screen		
A	**Menu Bar**	The **Menu Bar** allows you to make settings about test criteria, load/save settings you've made, and change language displayed.
B	**Quick Launch Buttons**	The **Quick Launch Buttons** allow you to reconnect your PC to NuStream-2000i/600i, open/save test settings, make test configurations, and view test reports.
C	**Function View**	By clicking the **Function View**, you can view system information, making test configurations, or view test reports on the **Main Display Pane**.
D	**Status Icon**	The **Status Icon** shows the running status of NuWIN-RM.  No test is underway.  Test is running.
E	**Main Display Pane**	You can make detail configurations and view real-time testing diagrams on the **Main Display Pane**.

NuServer



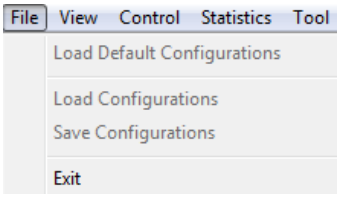
Description	
Module Card Information	This section displays the information regarding to the module cards that are installed on NuSteams chassis. Module Card IDs are showed as the format of **(X, Y, Z)** while X is the chassis ID (which is displayed on NuSteams chassis), Y is the slot number where this module card is installed, and Z is the available port number located on the module card.
Connection Function	You can reconnect a link down status or force to disconnect your NuStreams-600i/2000i to your PC.
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.

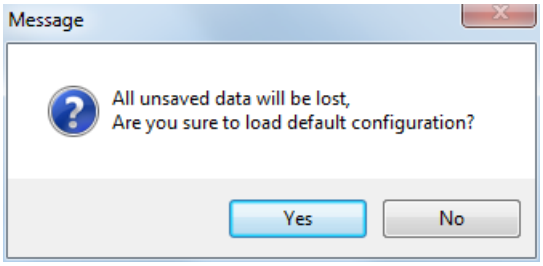
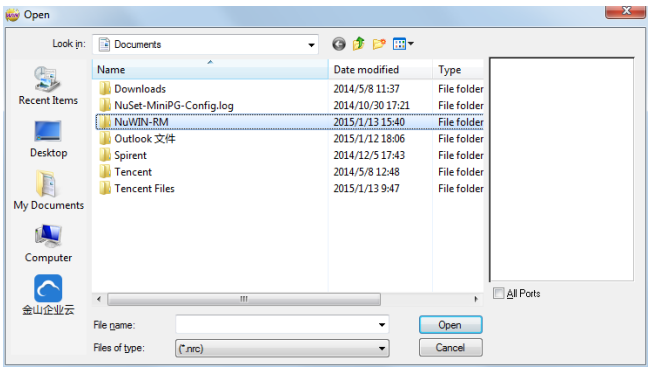
4. Menu Bar

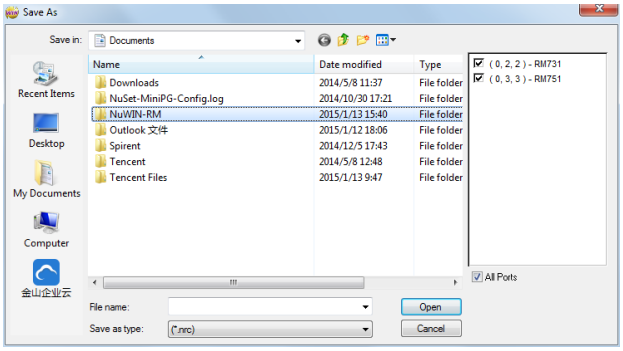
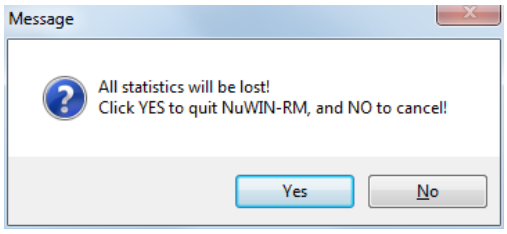


NuWIN-RM's **Menu Bar** includes configuration options such as **File**, **View**, **Control**, **Statistics**, **Language**, and **Help**. Please refer to the sections down below for detail information regarding to each configuration option.

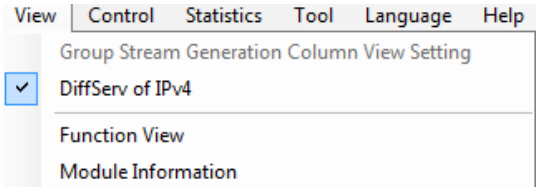
4.1. File

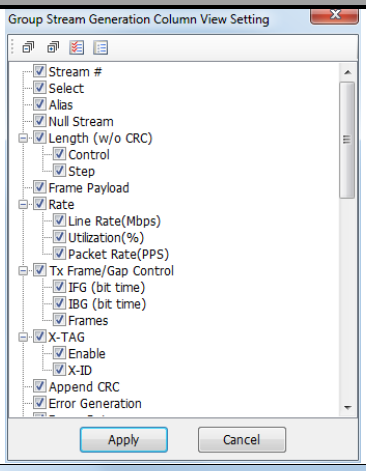
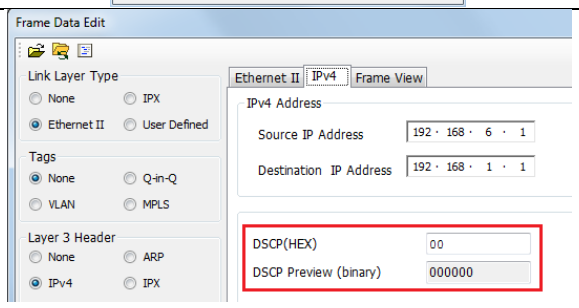
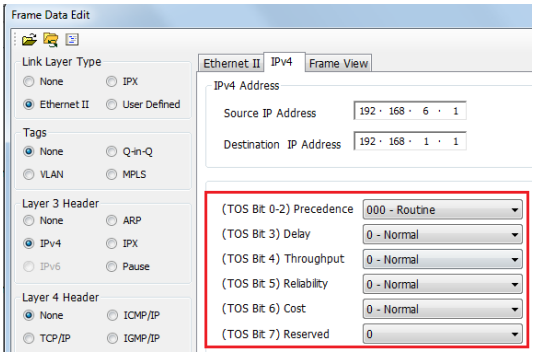
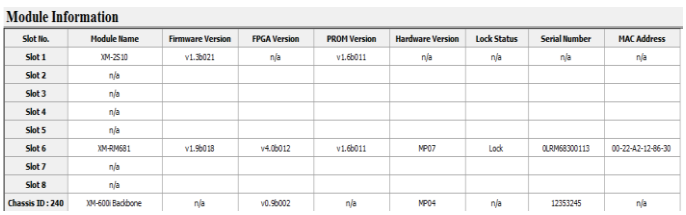


File		
Load Default Configurations		A window will pop up to remind you the all the unsaved data will be lost if you use this function. Click **Yes** to reset all the settings to default. Or Click **No** to cancel.
Load Configurations		If you have a previously saved configuration setting file in your PC, you can load it and apply all the setting you've made by choosing "**Load Configurations**" from the **Menu Bar**. All configuration files are saved in the format of "**∗.nrc**".

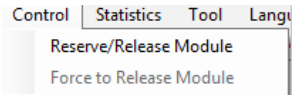
File		
Save Configurations		You can save the current configuration settings to your PC by choosing "**Save Configurations**" from the **Menu Bar**. All configuration files are saved in the format of "**∗.nrc**".
Exit		Click **Yes** to exit NuWIN-RM, or click **No** to cancel. A prompt pop-up window will ask if you would like to close NuServer as well.

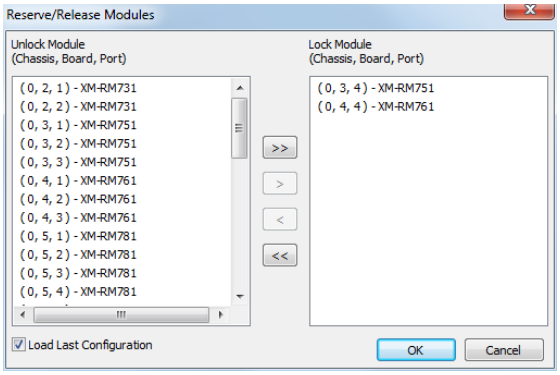
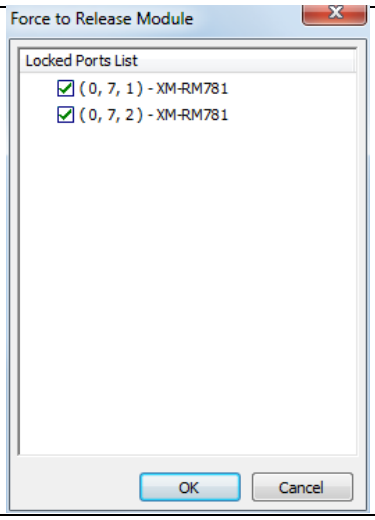
4.2. View



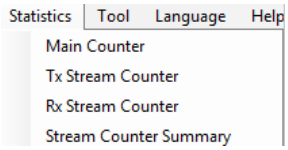
View		
Group Stream Generation Column View Setting		Click **Group Stream Generation Column View Setting** to select the items you want to configure for each stream. The selected items here will be configurable in the **Stream Generation** page.
DiffServ of IPv4	 	Check **Diffserv of IPv4** here, the QoS priority settings in the **Frame Data Edit** window will be DSCP, shown as the upper picture on the left. Uncheck **Diffserv of IPv4** here, the QoS priority settings will be ToS, shown as the lower picture on the left.
Module Information		Check **Module Information** here, the detailed module information will be displayed in the Main Display Pane.

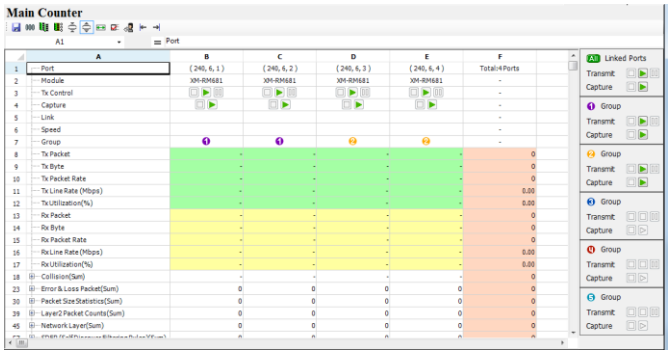
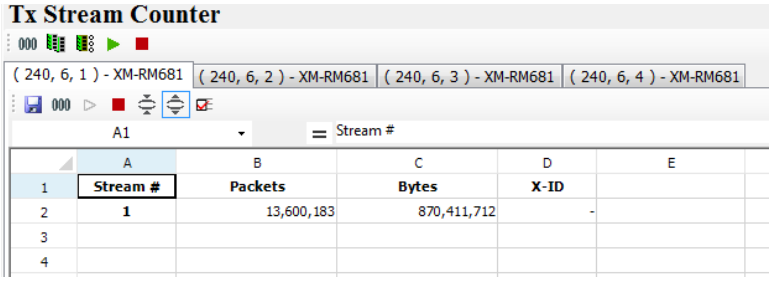
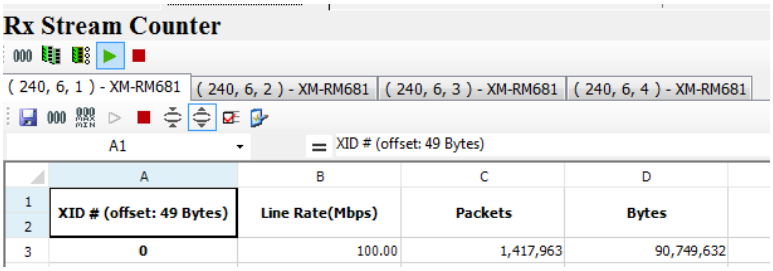
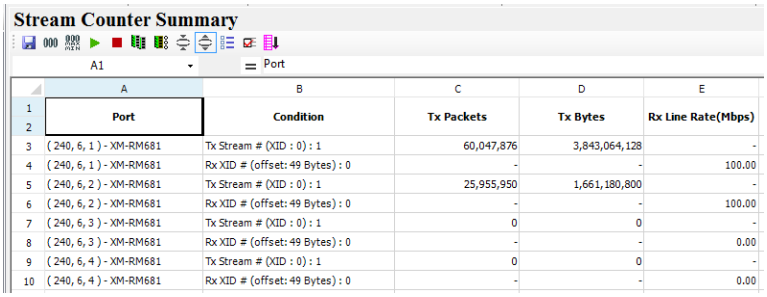
4.3. Control



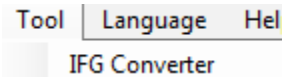
Control		
Reserve/Release Module		A **Reserve/Release Modules** window will pop up if you choose **Reserve /Release Module** from the **Menu Bar**. You can choose the module cards you would like to reserve or release on the **Reserve/Release Modules** window. For detailed information, please refer to **7. Reserve/Release Module**.
Force to Release Module		Generally, the **Force to Release Module** function is gray. But if the function turns black, it means some active ports are locked so as to not available to use. In this case, please click this function to pop up the window on the left to force release the locked ports.

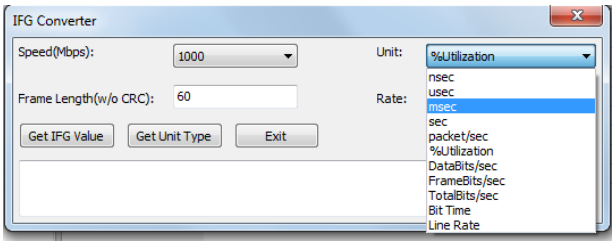
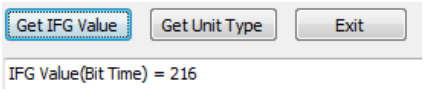
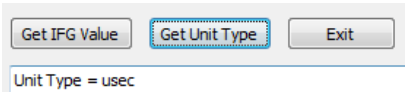
4.4. Statistics



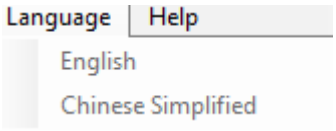
Statistics		
Main Counter		You can view counter reports, start/stop packet counts on the **Main Counter** page. For detailed information, please refer to **6.3. Main Counter**.
Tx Stream Counter		**Tx Stream Counter** allows the user to view the Tx test data of his interest. For detailed information, please refer to **6.7.1. Tx Stream Counter**.
Rx Stream Counter		**Rx Stream Counter** allows the user to view the Rx test data of his interest. For detailed information, please refer to **6.7.2. Rx Stream Counter**.
Stream Counter Summary		**Stream Counter Summary** allows the user to view the test data of his interest. For detailed information, please refer to **6.7.3. Stream Counter Summary**.

4.5.Tool



Tool	
IFG Converter	 IFG Converter allows the user to converter the frame gap among different units. ➢ **Speed:** set the network speed from the scroll down menu. ➢ **Frame Length (w/o CRC):** Set the length of the packet by inputting the desired value. ➢ **Unit:** Select the unit from the scroll down menu. ➢ **Rate:** transmission rate. Click the  button on the right, you can view the frame gap in other units automatically converted by this tool and displayed in the pop-up window. ➢ **Get IFG value:** Click this button, the frame gap in unit of Bit Time will be displayed in the down area.  ➢ **Get Unit Type:** Click this button, the unit type will be displayed in the down area.  ➢ **Exit:** Exit this function and close **IFG Converter** window.

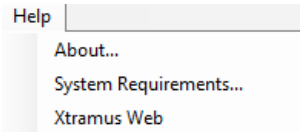
4.6. Language

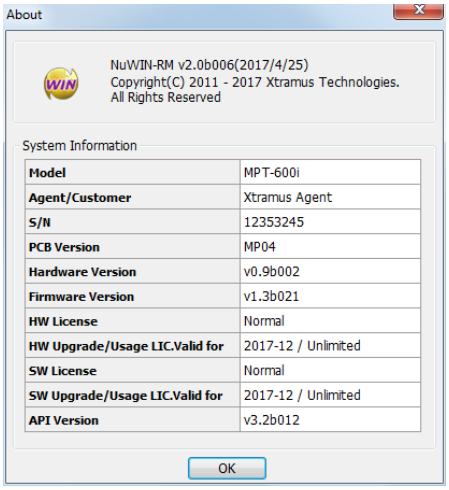
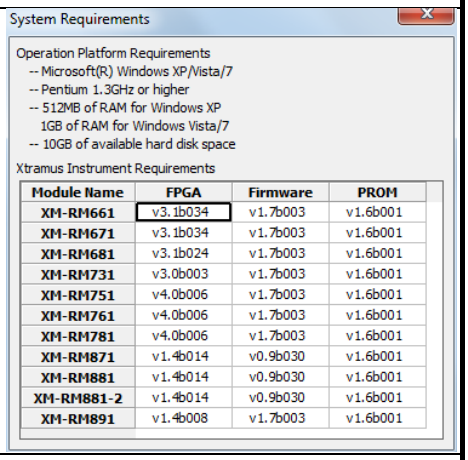


Language	
English	NuWIN-RM supports 2 different languages for its UI.

Note: As to the current version of NuWIN-RM, only English UI is supported.

4.7. Help

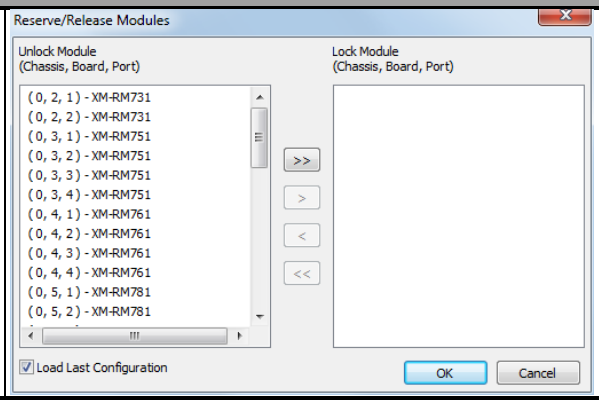


<table>
<tr><th colspan="3">Help</th></tr>
<tr><td>About</td><td>An “About” window will pop up and show detailed system information.
OK: Click this button to exit the window.</td><td> 
</td></tr>
<tr><td>System Requirements</td><td>A “System Requirements” window will pop up and show the requirements for your PC and the FPGA/Firmware/PROM of the module cards.</td><td> 
</td></tr>
<tr><td>Xtramus Web</td><td colspan="2">Access Xtramus website (www.xtramus.com).</td></tr>
</table>

5. Quick Launch Buttons

These **Quick Launch Buttons** allow you to reserve/release module cards, view counter statistics, browse/configure system settings, and perform Ping commands. Please refer to the section down below for more detail descriptions regarding to **Quick Launch Buttons**.

Reserve/Release Module

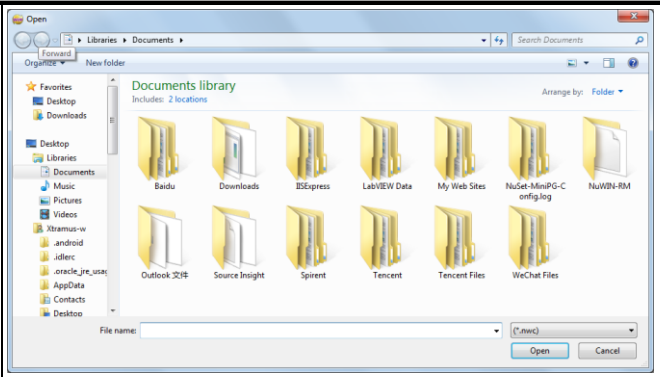


A **Reserve/Release Modules** window will pop up if you choose **Reserve /Release Module** from the **Quick Launch Buttons**.

You can choose the module cards you would like to reserve or release on the **Reserve/Release Modules** window.

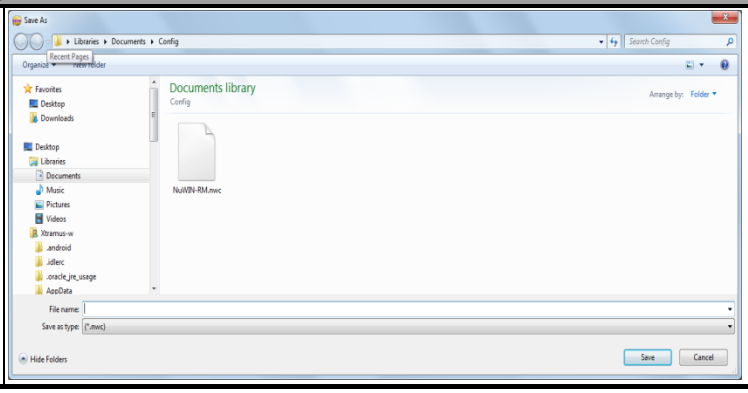
For detailed information, please refer to **7. Reserve/Release Module**.

Load Configurations



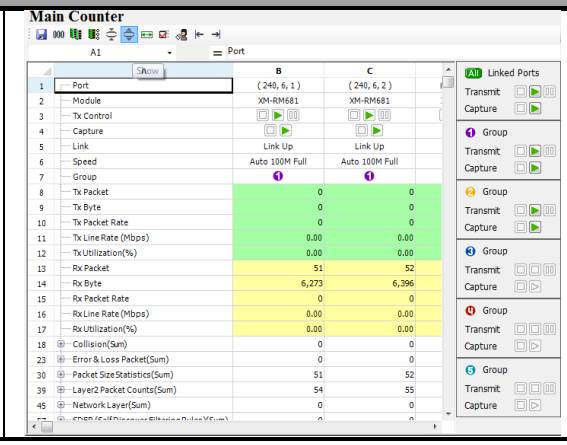
Select the ".nwc" file you saved before, the system will load the configurations.

Save Configurations



Save the current configuration as the".nwc" file.

Main Counter

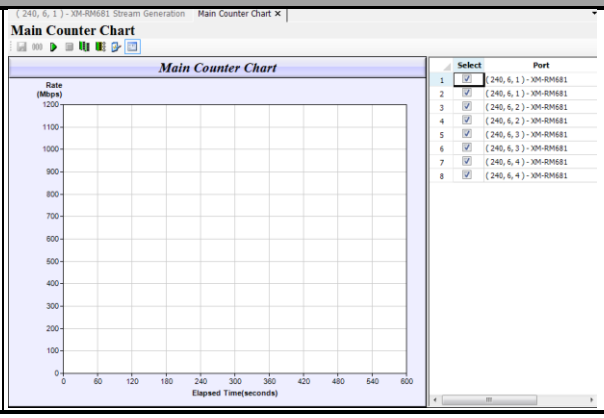


A **Main Counter** window will pop up if you press the **Main Counter** button on the **Quick Launch Buttons**.

You can view counter reports, start/stop transmitting on the **Main Counter** window.

For detailed information, please refer to **6.5. Main Counter**.

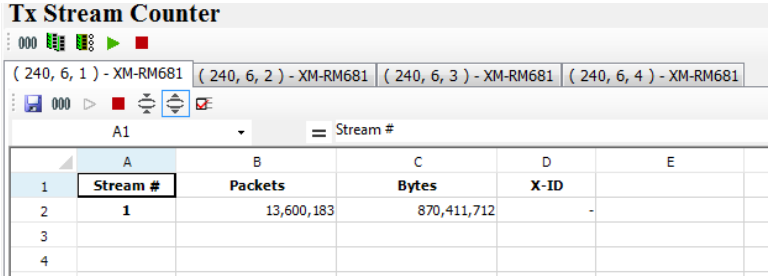
Main Counter Chart



Click this button to show the rate curve of the ports.

Tx Stream Counter

Tx Stream Counter

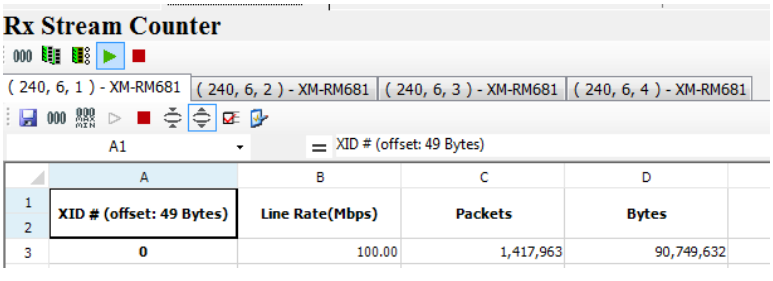


Tx Stream Counter allows the user to view the Tx test data of his interest.

For detailed information, please refer to **6.7.1.Tx Stream Counter**.

Rx Stream Counter

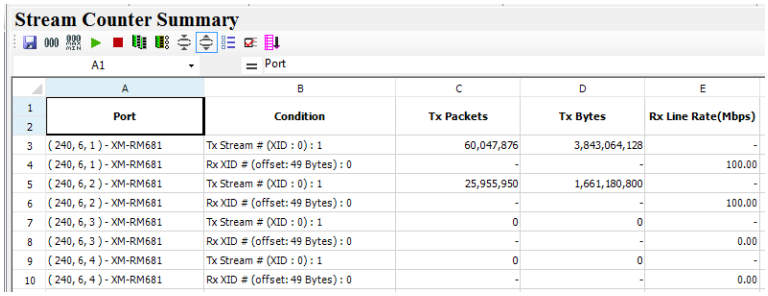
Rx Stream Counter



Rx Stream Counter allows the user to view the Rx test data of his interest.
For detailed information, please refer to **6.7.2. Rx Stream Counter**.

Stream Counter Summary

Stream Counter Summary

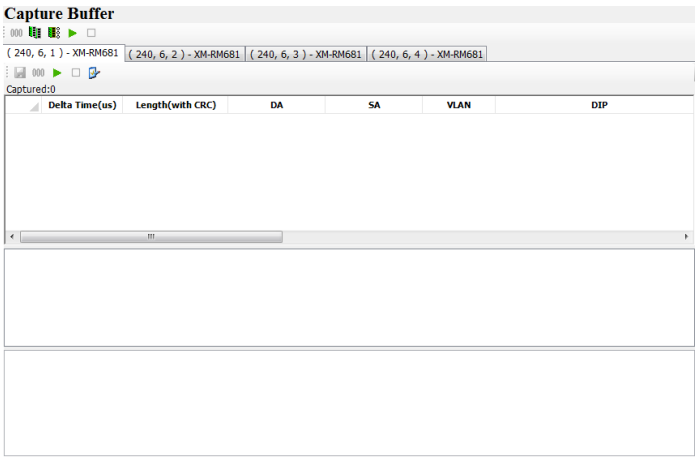


	Port	Condition	Tx Packets	Tx Bytes	Rx Line Rate(Mbps)
3	(240, 6, 1) - XM-RM681	Tx Stream # (XID : 0) : 1	60,047,876	3,843,064,128	-
4	(240, 6, 1) - XM-RM681	Rx XID # (offset: 49 Bytes) : 0	-	-	100.00
5	(240, 6, 2) - XM-RM681	Tx Stream # (XID : 0) : 1	25,955,950	1,661,180,800	-
6	(240, 6, 2) - XM-RM681	Rx XID # (offset: 49 Bytes) : 0	-	-	100.00
7	(240, 6, 3) - XM-RM681	Tx Stream # (XID : 0) : 1	0	0	-
8	(240, 6, 3) - XM-RM681	Rx XID # (offset: 49 Bytes) : 0	-	-	0.00
9	(240, 6, 4) - XM-RM681	Tx Stream # (XID : 0) : 1	0	0	-
10	(240, 6, 4) - XM-RM681	Rx XID # (offset: 49 Bytes) : 0	-	-	0.00

Stream Counter Summary allows the user to view the test data of his interest.

For detailed information, please refer to **6.7.3. Stream Counter Summary**.

Capture Buffer

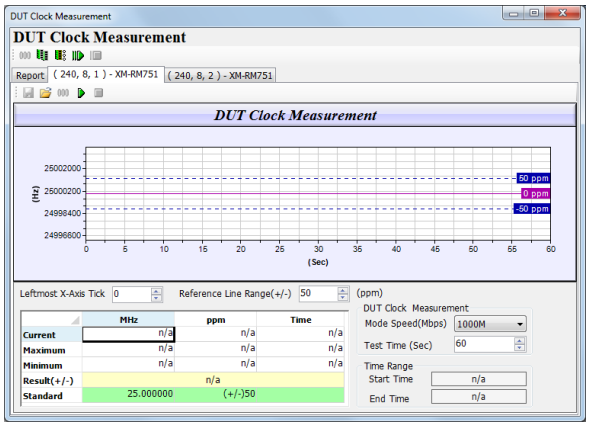


A **Capture Buffer** window will pop up if you press the **Capture Buffer** on the **Quick Launch Buttons**.

You can set capture buffer criteria or start/stop capturing packets here.

For detailed information, please refer to **6.8. Capture Buffer**.

DUT Clock Measurement

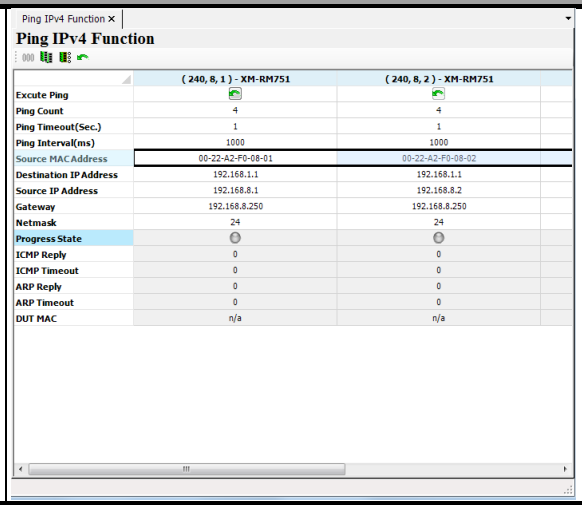


A **DUT Clock Measurement** window will pop up if you press the **DUT Clock** on the **Quick Launch Buttons**.

You can test the Crystal Oscillator's frequency of the DUT and see if it's either faster or slower than standard speed in ppm scale.

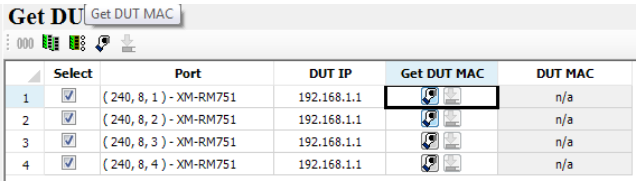
For detailed information, please refer to **6.9. DUT Clock Measurement**.

Ping IPv4/IPv6 Function



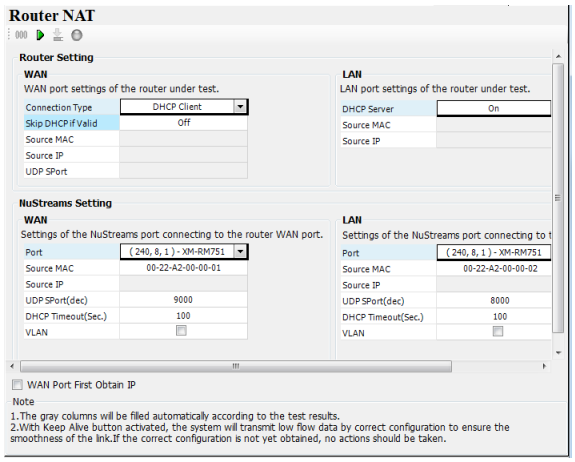
Layer 3 Ping, IPv4 or IPv6.

Get DUT MAC



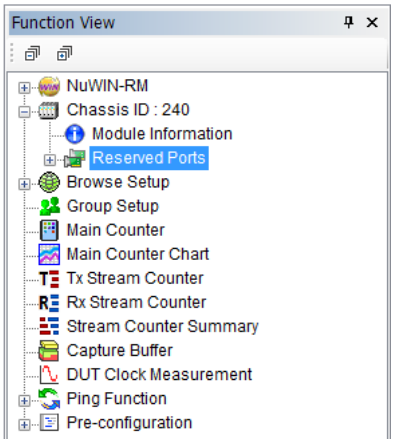
Get the MAC address of the DUT port connecting to the corresponding testing port.

Get DUT MAC



Test the NAT function of the DUT.

6. Function View

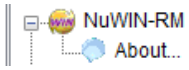


The **Function View** allows you to view system information, making configurations, and check test reports. You can fold/unfold the tree style tab by clicking ⊟/⊞ icons on the System Info /Configuration List.

As shown in the picture above, Module Info/Configuration's tree style tab menu are divided into two categories: **NuWIN-RM** and **Chassis ID**.

- **NuWIN-RM**

Unfold **NuWIN-RM**, You can see the figure down below.



About

An "**About**" window will pop up and show detailed system information.

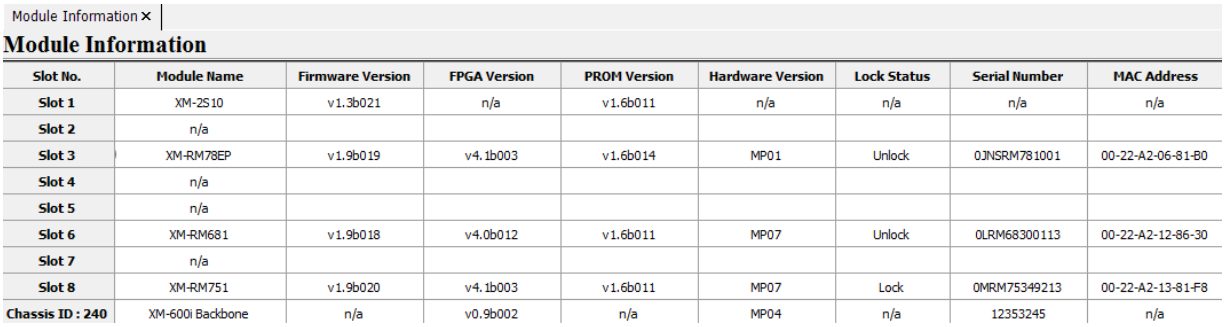
- **Chassis ID**

Chassis ID means the ID number of the chassis, which will exactly be displayed behind the colon.

The **Chassis ID list** contains the main functions of NuWIN-RM, including **Module Information**, **Reserved Ports**, **Main Counter**, **Browse Setup**, **Stream Counter**, **Capture Buffer**, **Group Setup**, **Ping Function**, **DUT Clock Measurement** and **Pre-configuration**. For detailed information about these functions, please see the sections down below.

6.1. Module Information

Module Information


Module Information ×

Module Information

Slot No.	Module Name	Firmware Version	FPGA Version	PROM Version	Hardware Version	Lock Status	Serial Number	MAC Address
Slot 1	XM-2S10	v1.3b021	n/a	v1.6b011	n/a	n/a	n/a	n/a
Slot 2	n/a							
Slot 3	XM-RM78EP	v1.9b019	v4.1b003	v1.6b014	MP01	Unlock	0JNSRM781001	00-22-A2-06-81-B0
Slot 4	n/a							
Slot 5	n/a							
Slot 6	XM-RM681	v1.9b018	v4.0b012	v1.6b011	MP07	Unlock	0LRM68300113	00-22-A2-12-86-30
Slot 7	n/a							
Slot 8	XM-RM751	v1.9b020	v4.1b003	v1.6b011	MP07	Lock	0MRM75349213	00-22-A2-13-81-F8
Chassis ID : 240	XM-600i Backbone	n/a	v0.9b002	n/a	MP04	n/a	12353245	n/a

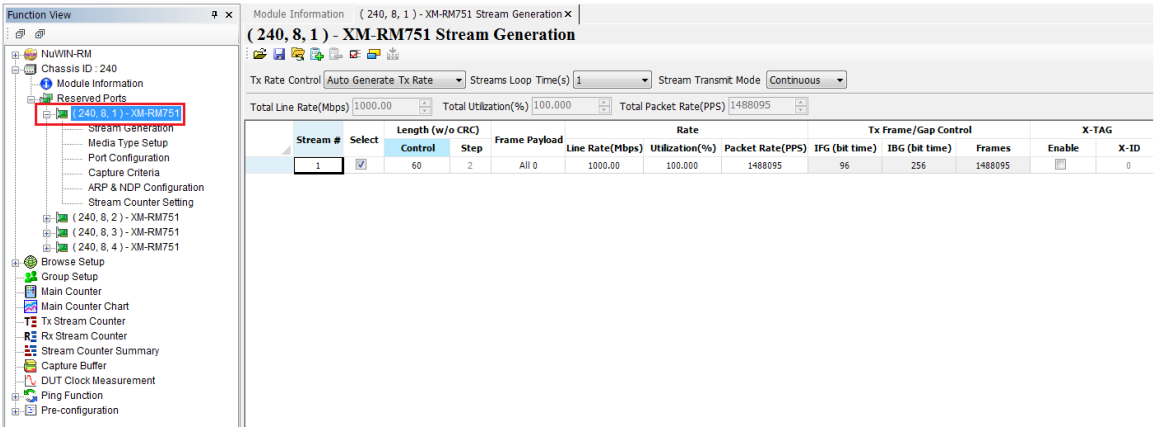
If you click **Module Information** from the **Function View**, the **Main Display Pane** will display **Module Information** as shown in the picture above.

The following information can be viewed on **Module Information**:

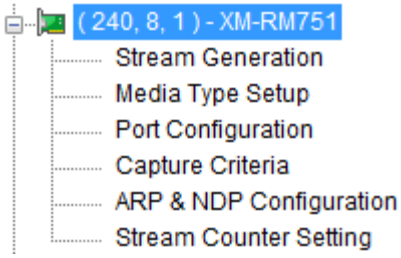
- **Slot No.**: This field displays the slot number of the module card.
- **Module Name:** This field displays the module name of the module card.
- **Firmware Version:** This field displays module card's firmware version.
- **FPGA Version:** This field displays module card's FPGA version.
- **PROM Version:** This field displays module card's PROM version
- **Hardware Version:** This field displays module card's hardware version.
- **Lock Status:** This field display module card's current status. If a port has been reserved for tests, the **Lock Status** field will show **Lock**. If a port is not selected and reserved for tests, the **Lock Status** field will show **Unlock**.
- **Serial Number:** This field displays the serial number of the device.
- **MAC Address:** This field displays the mac address of the module card.

6.2. Reserved Ports

All reserved ports that you've reserved for tests will be listed here as shown in the picture right.
For detailed information about how to reserve/release ports, please refer to **7. Reserve/Release Module**.

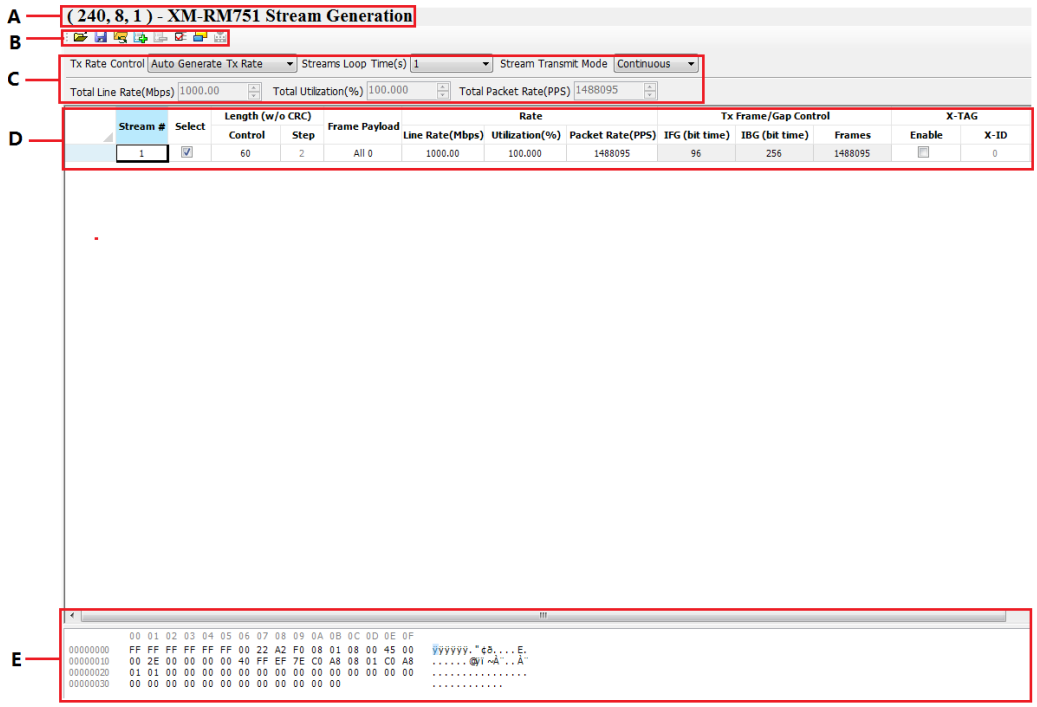


The reserved ports will be listed here in a format of **(X, Y, Z): XM-RMxxx**. Click the button before each port to expand the sub-menu.



6.2.1. Stream Generation

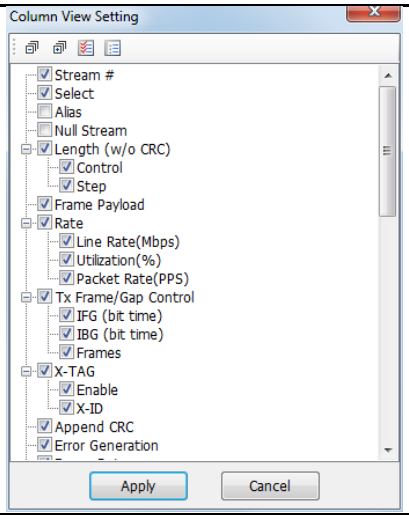
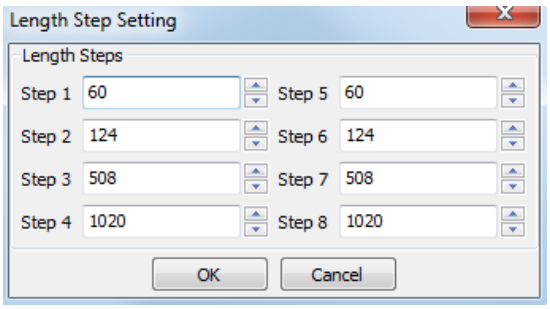
The **Stream Generation** allows you to add multiple streams for the specific reserved port and editing contents of these streams.



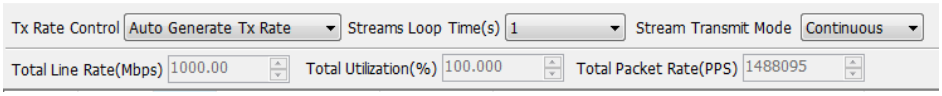
Stream Generation Descriptions		
A	**Port Number**	This field displays the ID of the reserved port you're setting.
B	**Control Buttons**	These buttons allow you to save the current settings, load previously saved settings and apply the settings.
C	**Tx Control Settings**	This scroll-down menu allows you to set the stream transmitting rate.
D	**Stream Settings**	You can set the stream transmitting mode here.
E	**Packet Content**	This field displays the contents of the stream you've selected.

Please see the sections down below for detail information regarding to **Stream Generation**.

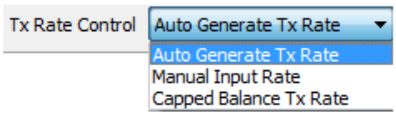
6.2.1.1. Control Buttons

Control Buttons Descriptions	
	Load previously saved settings. Please note that the settings you load should be in "***.sgx**" format.
	Save the current settings to "***.sgx**" format files.
	Load the default stream generation settings.
	Add Stream.
	Delete Steam.
	 Set the items you want to configure for each stream. The selected items here will be listed as a configurable column in **Section B**.
	 After pressing the **Length Step** button, a **Length Step Setting** window will pop up, showing the frame lengths of different steps. You can set the frame length for each step here. Press **OK** to save all the changes you've made and exit or press **Cancel** to directly exit.
	Apply the current settings.

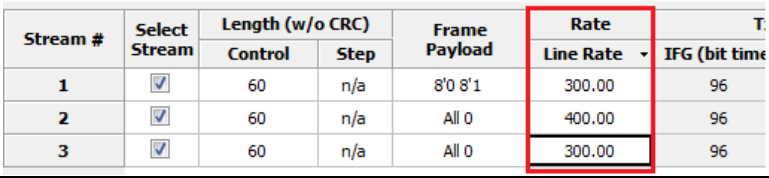
6.2.1.2. Tx Rate Settings



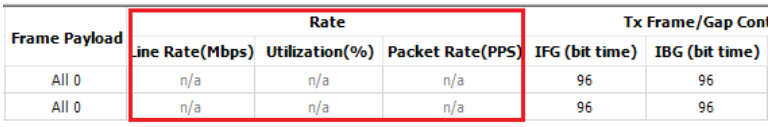
➢ **Tx Rate Control**: set the Tx rate control mode of each stream.



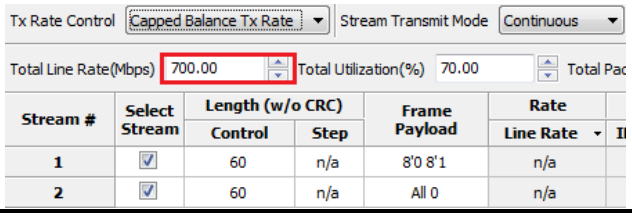
Tx Rate Control	
Auto Generated Tx Rate	When the **Tx Rate Control** is set to **Auto Generated Tx Rate**, you can input **Line Rate** of every stream manually. The system will automatically calculate **IFG** and **IBG**.
Manual Input Rate	When the **Tx Rate Control** is set to **Manual Input Rate**, you can input the **IFG**, **IBG** and other items manually. The system will automatically calculate the **Rate**.
Capped Balance Tx Rate	When the **Tx Rate Control** is set to **Capped Balance Tx Rate**. You only need to set the **Total Line Rate (Mbps)** of all streams, and then the system will automatically assign the line rate for each port.



Stream #	Select Stream	Length (w/o CRC)		Frame Payload	Rate	T
		Control	Step		Line Rate	IFG (bit time
1	☑	60	n/a	8'0 8'1	300.00	96
2	☑	60	n/a	All 0	400.00	96
3	☑	60	n/a	All 0	300.00	96

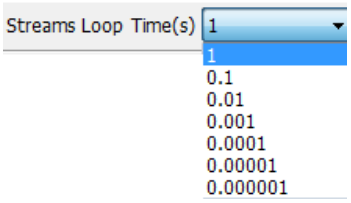


Frame Payload	Rate			Tx Frame/Gap Cont	
	Line Rate(Mbps)	Utilization(%)	Packet Rate(PPS)	IFG (bit time)	IBG (bit time)
All 0	n/a	n/a	n/a	96	96
All 0	n/a	n/a	n/a	96	96

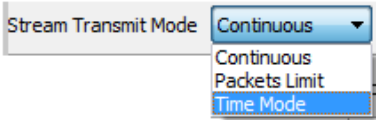


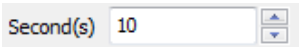
Stream #	Select Stream	Length (w/o CRC)		Frame Payload	Rate	
		Control	Step		Line Rate	I
1	☑	60	n/a	8'0 8'1	n/a	
2	☑	60	n/a	All 0	n/a	

- **Stream Loop Time**: set the time for all the streams of the port run a loop. The streams will be transmitted circularly.



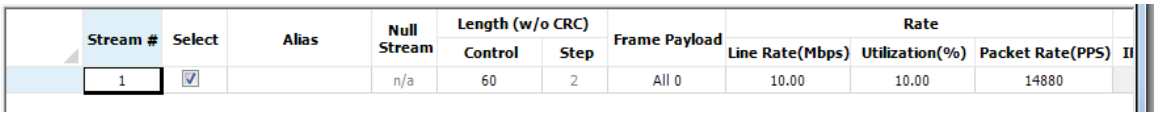
- **Stream Transmit Mode**: Set the packet transmitting mode of each stream.



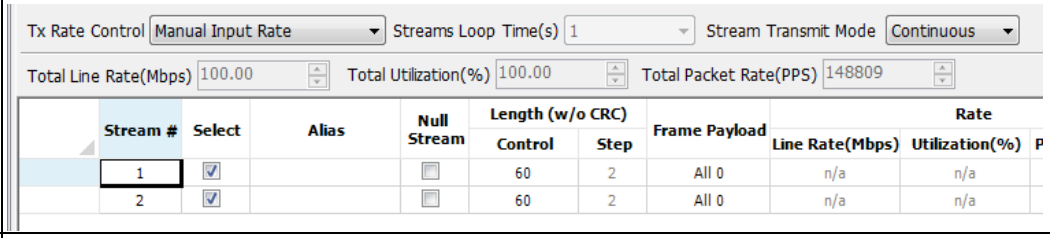
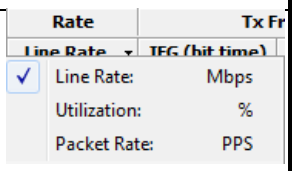
Stream Transmit Mode	
Continuous	NuWIN-RM will transmit streams continuously.
Packets Limit	When the **Stream Transmit Mode** is set to **Packet Limit**, a **Packets** field will be displayed right next to the **Stream Transmit Mode** scroll-down menu. NuWIN-RM will stop transmitting packets when the set amounts of packets are transmitted. 
Time Mode	When the **Stream Transmit Mode** is set to **Time Mode**, a **Second** field will be displayed right next to the **Stream Transmit Mode** scroll-down menu. NuWIN-RM will stop transmitting packets when the set amount of time is passed. 

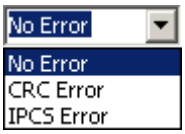
- **Total Line Rate**: The total Tx rate sum of all streams of the port.
- **Stream Utilization**: The ratio of the **Total Line Rate** to the wire rate.
- **Total Packet Rate**: The packets number transmitted of all the streams of the port.

6.1.2.3. Stream Settings



The section lists the detailed settings of each stream. Also, you can add more streams and editing their contents here as well. About how to add a new stream, please see **6.1.2.4. Add Streams** for detailed information.

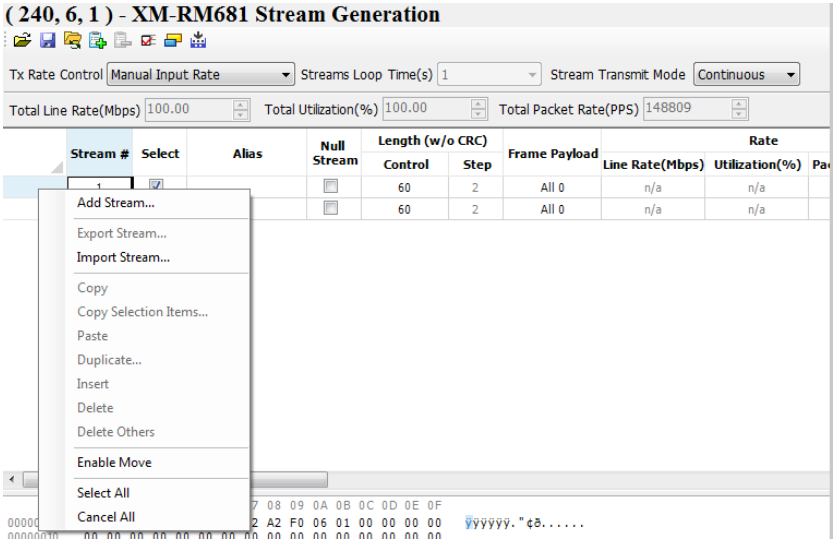
Stream Settings	
Select	Click the check box here to select the stream.
Alias	You can name an alias for each stream by double click the alias column and input the alias.
Null Stream	The null stream is a fake stream. This kind of stream will occupy the transmitting time but not really transmit any packet actually. You can only set the stream as a null Stream when the **Tx Rate Control** is set to **Manual Input Rate**. 
Length (w/o CRC)	You can set how the values of packet lengths (without CRC) are changing here in this field. To set the changing mode of packet length, please double click on the column to access the scroll-down menu. The scroll-down menu contains the following modes: ➢ **60:** set a fixed frame length of 60, or you can manually input a value in the above box. The range of the frame length is from 48 to 16300. ➢ **Random:** set the frame length to be random. ➢ **Increase:** the frame length will be in an increased mode. ➢ **Decrease:** the frame length will be in a decreased mode. ➢ **Step:** the frame length will be in a step mode. And you can select the step value from the scroll down menu by double clicking the **step** column. ➢ **IMIX:** a specific frame length mode, which is "7*64+4*570+1518 bytes". The packets will be transmitted by this mode cyclically.
Frame Payload	Click the **Frame Payload** scroll-down menu to set packet contents as **All 0**, **Increase**, **Random**, **Decrease**, **Word Increase**, **Word Decrease**, **55AA**, **5555AAAA**, **8'0 8'1**, **16'0 16'1**, **32'0 32'1**, **64'0 64'1**, **Random**, and **All 1**.
Rate	You can set the transmitting rate here in this field. There are three different modes available for setting transmitting rate: ➢ **Packet Rate:** This option will set the rate as PPS, amount of packets sent per second. ➢ **Line Rate:** This option will set the rate as the line rate (in Mbps). ➢ **Utilization:** This option will set the rate as utilization percentage (%). To access the transmitting rate setting mode menu, please click the ▼ icon as shown in the picture above. Also, please note that if you would like to set transmitting rate here manually, you have to set **Tx Rate Control** to **Auto Generated Tx Rate**. 
Tx Frame/Gap Control	The **Tx Frame/Gap Control** allows you to set the **IFG (bit time)**, **IBG (bit time)**, and **Frames**. Please note that if you would like to set **Tx Frame/Gap Control** here manually,

Stream Settings	
	you have to set **Tx Rate Control** to **Manual Input Rate**.
X-TAG	The **X-TAG** field allows you to enable/disable the X-TAG that will be added into the frames. Click and check the "**Add**" check box to enable the X-TAG function, or uncheck the "**Add**" check box to disable this function. Also, to set the **X-ID** (X-TAG ID), please check the "**Add**" check box, and input the XID manually in the **X-ID** field. The range of the XID is from **0** to **511**.
Append CRC	You can set if you would like to add CRC headers in your stream by check the check box.
Error Generation	The **Error Generation** allows you to insert frame errors to the stream. ➢ **No Error:** No error frames will be generated. ➢ **CRC Error:** Streams with CRC Error will be generated. ➢ **IPCS Error:** Streams with IPCS Error will be generated. To access the scroll-down menu, please click the **Error Generation** field. 
Frame Data	If you press the **Frame Edit** button, a **Frame Data Edit** window will pop up, allowing you to edit frames. For more detailed information, please refer to **9. Editing Protocol with Frame Data Edit** window.
Protocol Type	This field displays the protocol you've set with **Frame Data Edit** window.
MAC	The **MAC** field displays the **DA (Destination MAC Address)** and **SA (Source MAC Address)** of the reserved ports. If you would like to edit the destination/source MAC addresses listed here, please double-click the **DA** and **SA (Source MAC Address)** of each stream.
VLAN	The **VLAN** field allows you to enable/disable the VLAN that will be added into the frames. Click and check the "**Enable**" check box to enable the VLAN function, or uncheck the "**Enable**" check box to disable this function. Also, to set the **VID** (VLAN ID), please input the VID manually in the **VID** field.
IPv4/IPv6	The **IP** field displays the **DIP (Destination IP Address)** and **SIP (Source IP Address)** of the reserved ports. If you would like to add DIP and SIP to the frames, click and check the "**Enable**" check box. Please note **IPv6** is available for part of the XM-RM modules, not all of them.

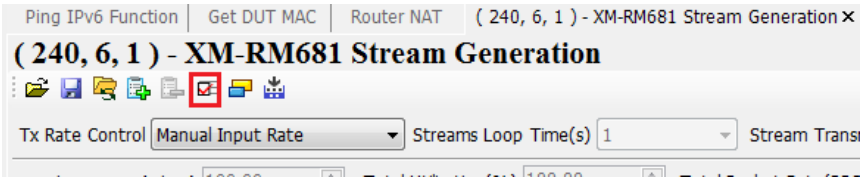
6.1.2.4. Adding New Streams

NuWIN-RM provides two ways for the user to add new streams:

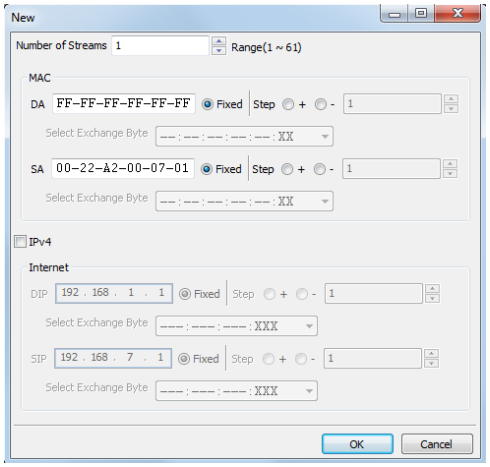
1. Right-click on the far left blank column ahead of each steam and then select Add **Steam**.



2. Click the Add Stream button.

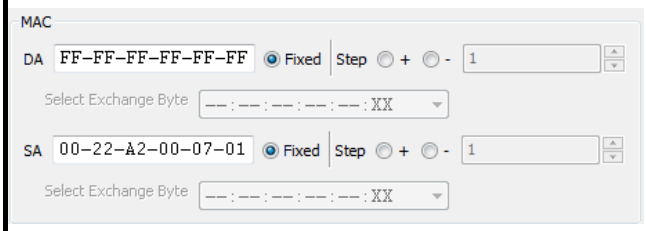


Then the following window will pop up to allow you configure the detailed settings of the added streams.

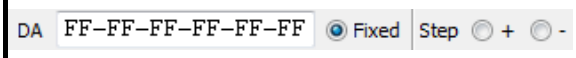


Adding Streams Settings

Please set the number of streams you would like add. You can add 61 more ports here.

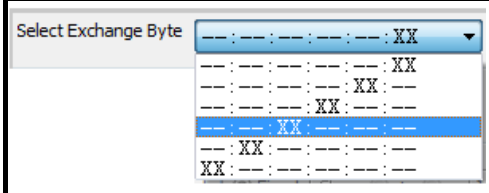


You can input the DA (Destination MAC Address) and SA (Source MAC Address) here in the MAC field.

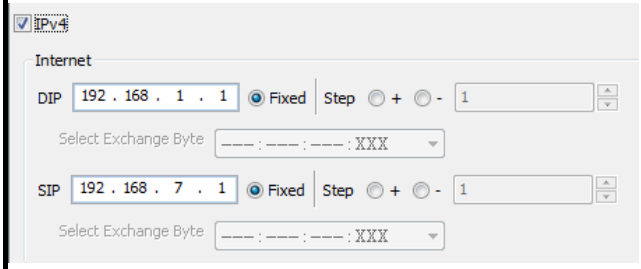


If you need your new streams have the same MAC address, please choose Fixed as shown in the picture on the left.

NuWIN-RM allows you to set new streams' MAC addresses in an increasing or decreasing manner.
+: Set the MAC address values in an increasing manner.
-: Set the MAC address values in a decreasing manner.
Please set the value of the steps in the field on the right hand.



Also, you can set which section you would like to change with the Select Exchange Byte scroll-down menu.



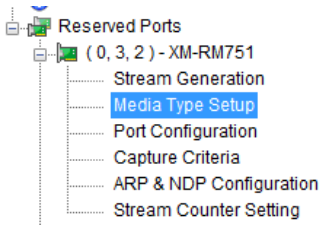
If you would like to set the IPv4 addresses for your streams, please check the IPv4 check box.
Setting DIP (Destination IP Address) and SIP (Source IP Address) for new streams are quite like setting MAC address and can be related. Please refer to step 4~7.

Click OK to save all the settings you've made and exit, or Cancel to exit without saving.

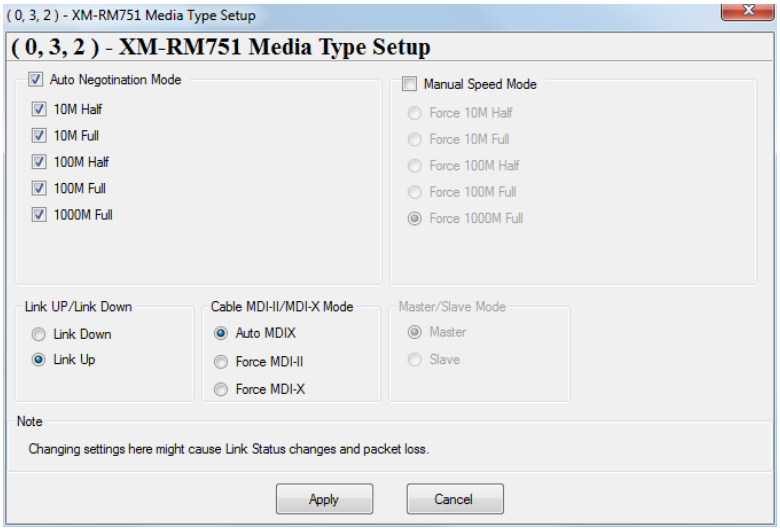
Stream #	Select Stream	Length (w/o CRC)		Frame Payload	Rate	Tx Frame/Gap Control		
		Control	Step		Line Rate	IFG (bit time)	IBG (bit time)	Frames
1	☑	60	n/a	8'0 8'1	n/a	96	368	1
2	☑	60	n/a	All 0	n/a	96	368	1
3	☐	60	n/a	All 0	n/a	96	736	1
4	☑	60	n/a	All 0	n/a	96	384	1

The newly added streams will be displayed on the Main Display.

6.2.2. Media Type Setup

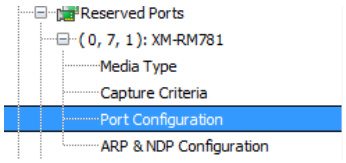


When clicking **Media Type Setup**, the following window will pop up. The **Media Type Setup** window varies from different module cards you've reserved for the tests. Please refer to the sections down below for media type settings.



- **Auto Negotiation Mode:** This function allows automatically negotiate the transmitting rate between the two communication ports. You can select the transmitting rate in the **Auto Negotiation Mode** area.
- **Manual Speed Mode:** This function allows you to manually set the transmitting rate. **Force** here means the transmitting rate of the port will switched to the selected mode even if the connection fails.
- **Link Down:** If this function is selected, this port will be closed and unable to use. All connections to this port will be cut off.
- **Link Up:** Select this function to enable this port. The connections to this port are available to be established.
- **Auto-MDIX:** MDIX is a technology that automatically detects the required cable connection type (straight-through or crossover) and configures the connection appropriately. Click the **Auto-MDIX** scroll-down menu to enable or disable this function.
- **Force MDI-II**: force the port to be **Force MDI-II** type.
- **Force MDI-X**: force the port to be **Force MDI-X** type.
- **Copper/Fiber Mode:** Only when the Manual Speed Mode is set to be **Manual Speed Mode**, this function is available. Please set the media type according to the practical type of the port. If the port is electrical, please select **Copper Mode,** and if the port is optical, please select **Fiber Mode**.
- **Master/Slave Mode:** Only when the Manual Speed Mode is set to be **Manual Speed Mode**, this function is available. The two ends of the connection will be set as **Master** or **Slave**. If both ends of the connection are set to the same, the link of that connection will be down. Please set the module card's port accordingly here, or choose **Auto Detect** so NuWIN-RM will detect and set the transmitting mode automatically.
- **Apply:** Press this button to apply all the changes you've made and exit.
- **Cancel:** Press this button to cancel all the changes you've made and exit.

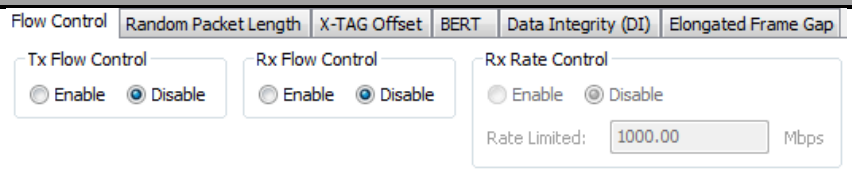
6.2.3. Port Configuration



When clicking **Port Configuration**, a **Port (X, Y, Z): Port Configuration** window will pop up, where **(X, Y, Z)** is module card's port ID. You can make port configurations for the designated port here on the Port Configuration pop-up window.

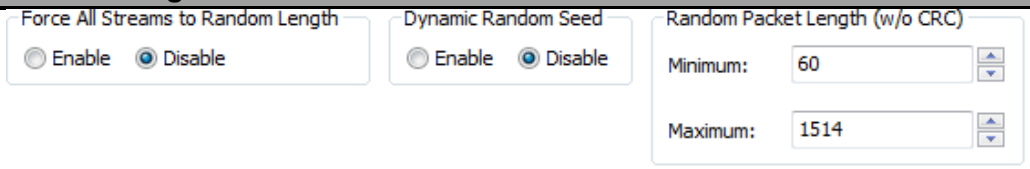
The **Port Configuration** window contains 6 menu tabs: **A. Flow Control**, **B. Random Packet Length**, **C. X-TAG Offset**, **D. BERT**, **E. Data Integrity (DI)**, and **F. Elongated Frame Gap**. Please see the sections down below for more detailed descriptions.

A. Flow Control



- **Flow Control:** This function is used to release the network congestion situations. Including **Tx Flow Control** and **Rx Flow Control**.
- **Rx Rate Control**: Enable this function to control the rate of receiving data. You can input the maximum receiving speed of the port in **Rate Limited**.

B. Random Packet Length

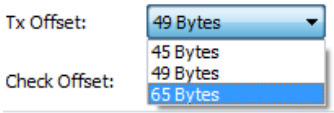


- **Force All Streams to Random Length:** when this function is enabled, all streams of the port will be in a random length between the **Minimum** value and the **Maximum** value set in **Random Packet Length (w/o CRC)**.
- **Dynamic Random Seed:** Enable this function, then the random packet of different streams will be different, or packet lengths of all streams may be the same.
- **Random Packet Length (w/o CRC)**: Set the range of the random packet length.

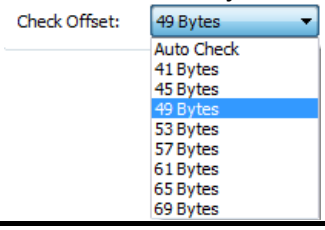
C. X-TAG Offset

X-TAG is a 12-byte tag developed by Xtramus, embedded in the transmitted packets, which is an enhance measure to check the validation of data transmission on the network. When the starting position of the X-TAG in the received packet by the other port of the two communication ends coincides with the **Byte** set in **Check Offset**, then the data transmission between the two communication ends is supposed to be validate. The **Byte** in **Check Offset** should be set based on the **Byte** in **Tx Offset**.

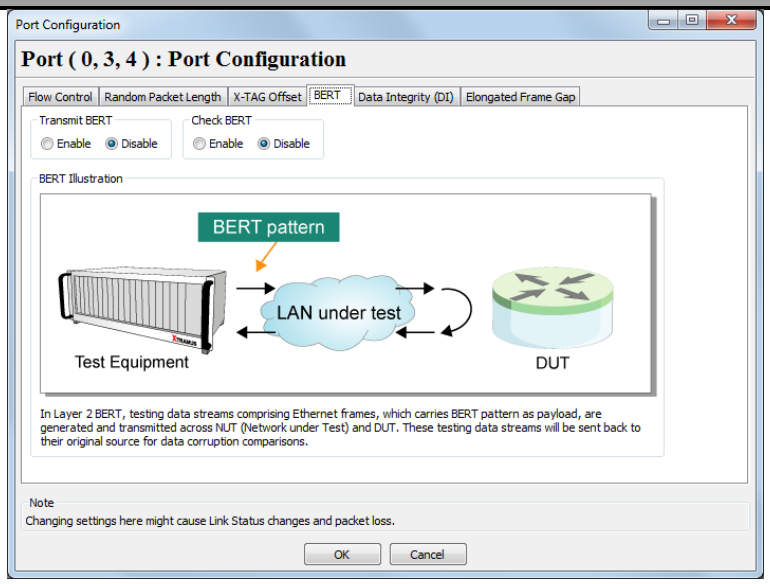
- **Tx Offset:** Set the starting position of the X-TAG in the transmitted packet from the scroll down menu.



- **Check Offset:** Set the starting position of the X-TAG in the received packet from the scroll down menu. **Auto Check** means the system will automatically select the right **Byte** for this function.



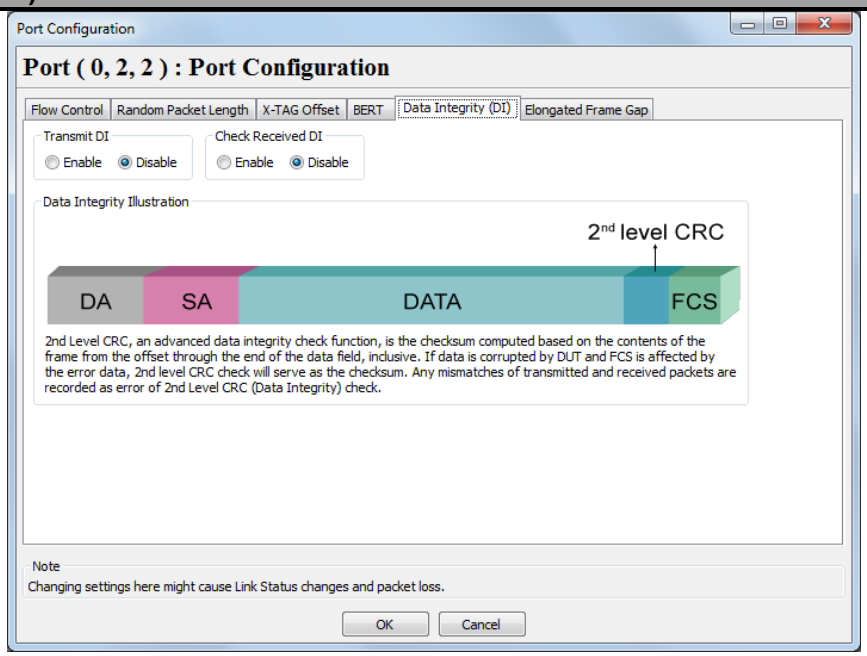
D. BERT



BERT stands for **Bit Error Rate Test**.

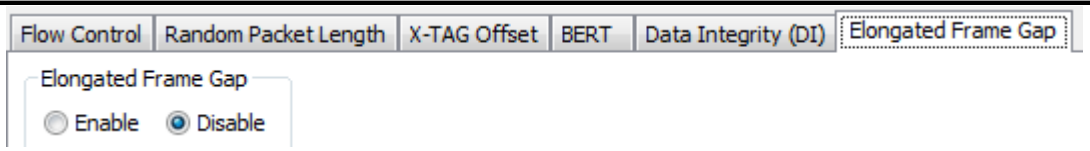
- **Transmit BERT:** Adding BERT patterns to transmitted packets if this is enabled.
- **Check BERT:** NuWIN-RM will check if BERT patterns are in received packets.

E. Data Integrity (DI)



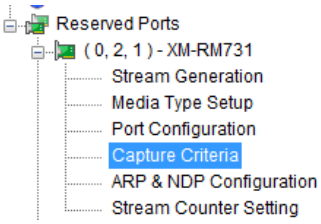
- **Transmit DI:** When enabled, NuWIN-RM will check data integrity of transmitted packets.
- **Check Received DI:** When enabled, NuWIN-RM will check data integrity of received packets.

F. Elongated Frame Gap



When this function is enabled and the transmitting packet flow reaches wirespeed, a 1 byte-time of frame gap will be inserted after a certain amount of packets are transmitted. This can reduce packet loss caused by crystal frequency differentials between DUT and test instrument. Enabling Elongated Frame Gap can compensate crystal frequency differentials by around 30 ppm as simulation.

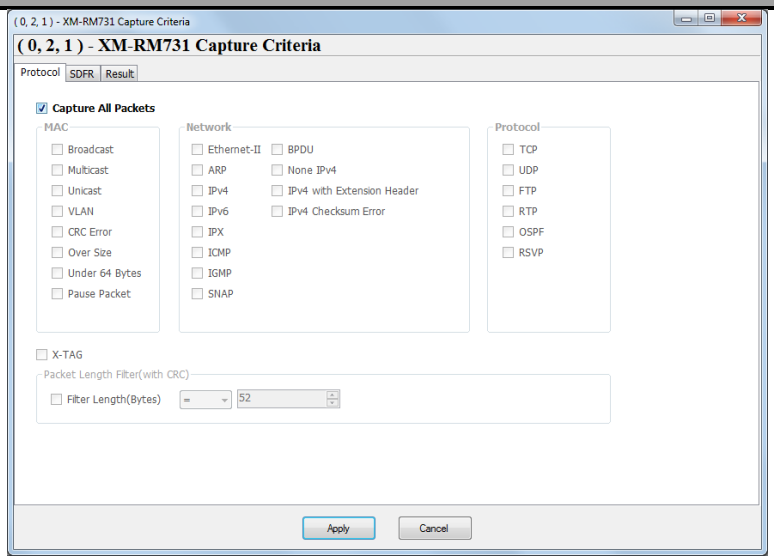
6.2.4. Capture Criteria



When clicking **Capture Criteria**, the following window will pop up, where **(X, Y, Z)** is the module card's port ID. You can set packet capturing criteria for the designated port here.

The **Capture Criteria** contains 3 menu tabs: **A. Protocol**, **B. SDFR**, and **C. Result**. Please see the sections down below for details.

A. Protocol

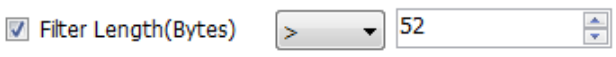


Protocol allows you to set the criteria for packet capturing.

- **Capture All Packets:** Click this check box to capture all packets.

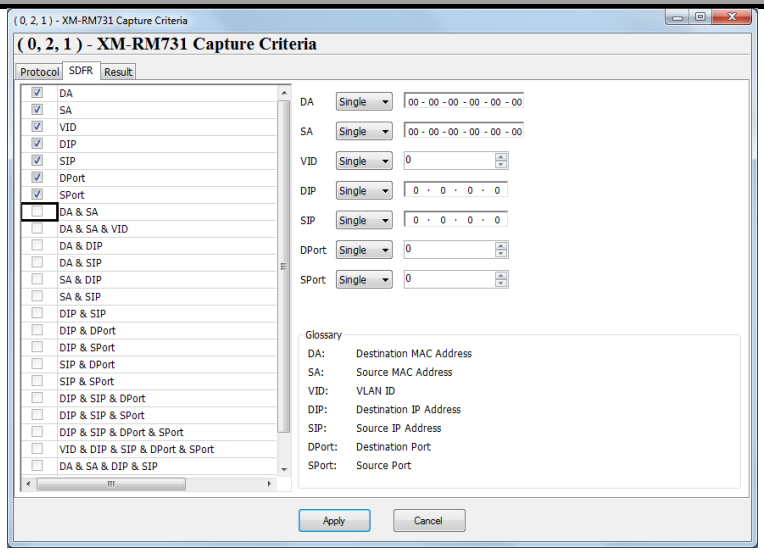
If you uncheck the **Capture All Packets** option, you can set the specific protocols or rules.

- **X-TAG:** check this option to capture packets with X-TAG.
- **Packet Length Filter:** Capture the packets with the specified length. The calculation of the length involves the CRC field. For example, if you want the system captures the packets with a length greater than 52 bytes, you should make the following setting



You can make multiple capture rules at the same time. Then the system will capture the packets satisfying all the rules.

B. SDFR

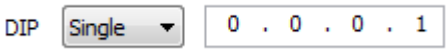


SDFR (Self-Discover Filtering Rules) is a technology that makes packet capturing/filtering over Ethernet easy and convenient. SDFR parameters include filter of Layer 3 Destination IP Address (**DIP**) and Source IP Address (**SIP**)

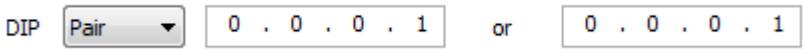
Each filter is independent and can be activated in any combinations. You can choose the rules by clicking the check boxes on the left side.

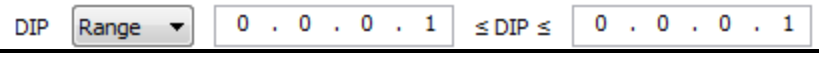
You can set and input the value of the rules on the right side. The value of the rules can be set as **Single**, **Pair**, and **Range**. The following descriptions will use **DA** as example.

- **Single:** A single value will be used as SDFR parameter.

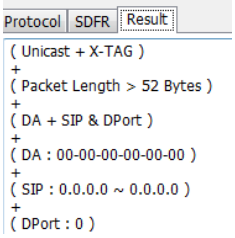


- **Pair:** Two values will be used as SDFR parameters.



- **Range:** Values within the range of the two values set here will be used as SDFR parameters.
- 

C. Result



The **Result** page will display the settings you've made in **Protocol** and **SDFR** pages.

6.2.5. ARP&NDP Configuration

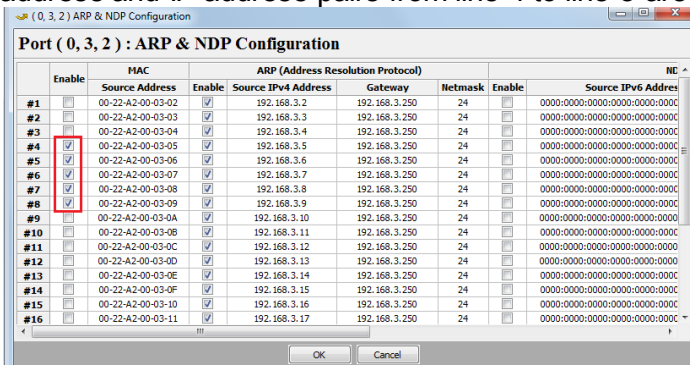
ARP&NDP Configuration

ARP&NDP Configuration – Assign MAC address and IP address pairs to one port

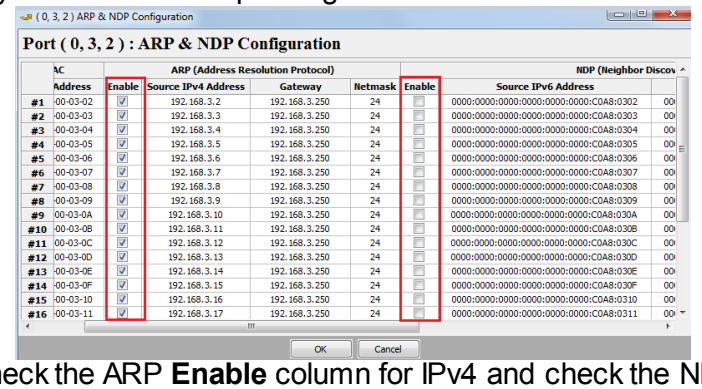
ARP, namely address resolution protocol, is a TCP/IP protocol to obtain the MAC address based on the IP address. NDP, namely neighbor discovery protocol, is a replacement of ARP in IPv6.

You can assign multiple MAC address and IP address pairs to one port. As long as the IP address in the ARP request fits one of the assigned pairs, the port will response the ARP request.

To assign a specific MAC address and IP address pair to the port, check the corresponding line in the most left **Enable** column. For example, in the picture down below, the MAC address and IP address pairs from line 4 to line 8 are selected.

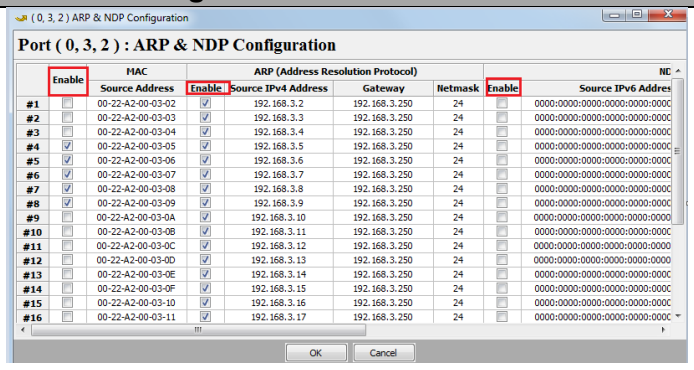


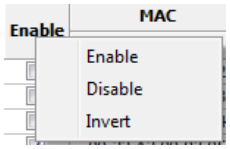
Meanwhile, you must enable the ARP or NDP according the type of the IP address (IPv4 or IPv6) by check the corresponding line in the ARP or NDP **Enable** column.



Note: please check the ARP **Enable** column for IPv4 and check the NDP **Enable** column for IPv6. Or, the MAC address and IP address pair is not successfully assigned to the port.

ARP&NDP Configuration – Buttons





- **Enable:** right-click the **Enable** area shown in the above leftpicture, a menu will pop up to facilitate the enabling operations, shown as the above right picture.
  - **Enable:** check all the lines of the column.
  - **Disable:** uncheck all the lines of the column.

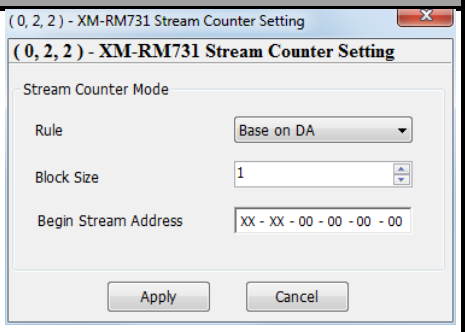
	• **Invert:** If the line is checked, then uncheck it or reverse. ➢ **OK:** Press this button to apply all the changes you've made and exit. ➢ **Cancel:** Press this button to cancel all the changes you've made and exit.

6.2.6. Stream Counter Setting

This function allows the user to set the statistical rules for the stream counters.

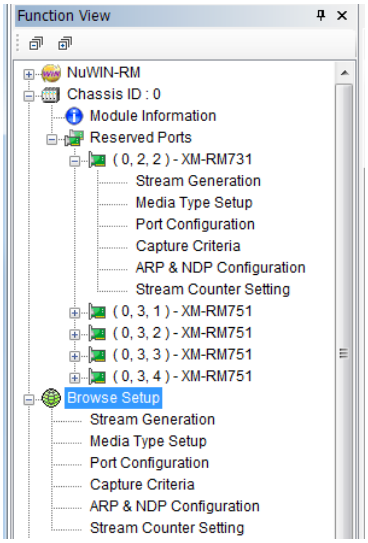
<table>
<tr><th colspan="2">Stream Counter Setting</th></tr>
<tr><td>Edit Rule</td><td>

Rule: to set the rule from the scroll down menu.
Block Size: to set the range based on the rule.
Begin Stream Address: to set the beginning address based on the rule.



Example:
Select the Rule as Base on DA, the Block Size as 5, the Begin Stream Address as XX-XX-00-00-00-00, then the packets satisfying to be received by the port will the packets with DA from XX-XX-00-00-00-00 to XX-XX-00-00-00-04.
</td></tr>
</table>

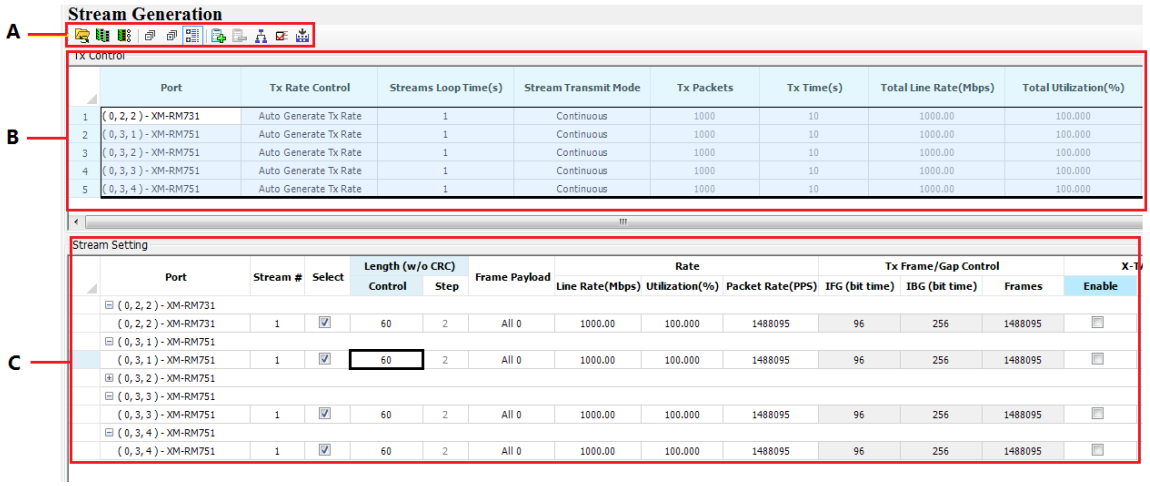
6.3. Browse Setup



This function allows the user to view and set the configurations of every stream and all ports.

6.3.1. Stream Generation

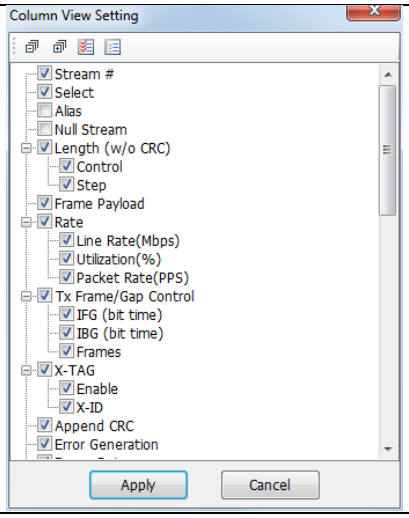
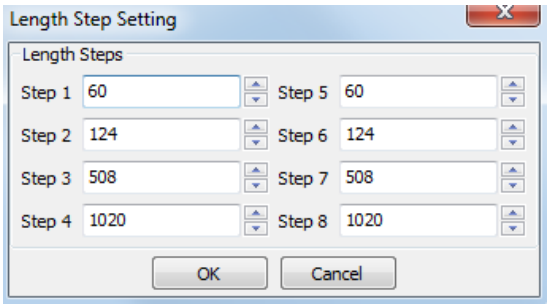
The **Stream Generation** allows you to view and set the settings for all ports and all streams at one page.



Stream Generation Descriptions		
A	**Control Buttons**	These buttons allow you to save the current settings, load previously saved settings and apply the settings.
B	**Tx Control**	This section allows you to view and set the Transmitting settings for all the ports.
C	**Stream Setting**	This section allows you to view and set the Transmitting settings for all the streams.

Please see the sections down below for detail information regarding to **Stream Generation**.

6.3.1.1. Control Buttons

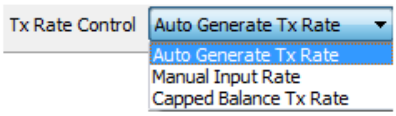
Control Buttons Descriptions	
	Load previously saved settings. Please note that the settings you load should be in "***.sgx**" format.
	Save the current settings to "***.sgx**" format files.
	Load the default stream generation settings.
	Add Stream.
	Delete Steam.
	 Set the items you want to configure for each stream. The selected items here will be listed as a configurable column in **Section B**.
	 After pressing the **Length Step** button, a **Length Step Setting** window will pop up, showing the frame lengths of different steps. You can set the frame length for each step here. Press **OK** to save all the changes you've made and exit or press **Cancel** to directly exit.
	Apply the current settings.

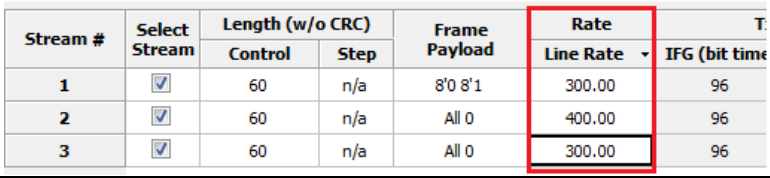
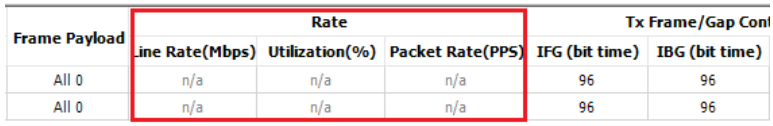
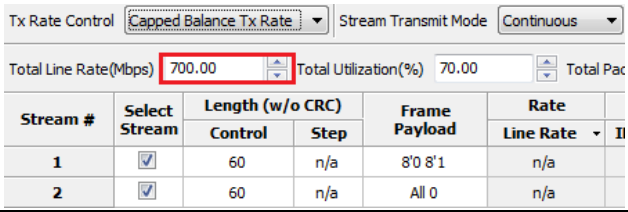
6.3.1.2. Tx Control

	Port	Tx Rate Control	Streams Loop Time(s)	Stream Transmit Mode	T
1	(0, 2, 1) - XM-RM731	Auto Generate Tx Rate	1	Continuous	
2	(0, 2, 2) - XM-RM731	Auto Generate Tx Rate	1	Continuous	
3	(0, 3, 1) - XM-RM751	Auto Generate Tx Rate	1	Continuous	
4	(0, 3, 2) - XM-RM751	Auto Generate Tx Rate	1	Continuous	

Some parameters in this table are configurable. You can double-click the cell where you want to configure and set another value.

- **Tx Rate Control**: set the Tx rate control mode of each stream.



Tx Rate Control	
Auto Generated Tx Rate	When the **Tx Rate Control** is set to **Auto Generated Tx Rate**, you can input**Line Rate**of every stream manually. The system will automatically calculate **IFG** and **IBG**. 
Manual Input Rate	When the **Tx Rate Control** is set to **Manual Input Rate**, you can input the**IFG**, **IBG**and other items manually. The system will automatically calculate the **Rate**. 
Capped BalanceTx Rate	When the **Tx Rate Control** is set to **Capped Balance Tx Rate**. You only need to set the **Total Line Rate (Mbps)** of all streams, and then the system will automatically assign the line rate for each port. 

Stream #	Select Stream	Length (w/o CRC)		Frame Payload	Rate	T
		Control	Step		Line Rate	IFG (bit time
1	☑	60	n/a	8'0 8'1	300.00	96
2	☑	60	n/a	All 0	400.00	96
3	☑	60	n/a	All 0	300.00	96

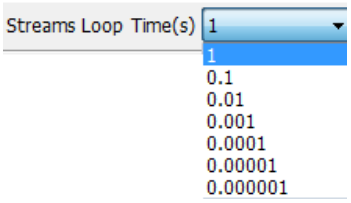
Frame Payload	Rate			Tx Frame/Gap Cont	
	Line Rate(Mbps)	Utilization(%)	Packet Rate(PPS)	IFG (bit time)	IBG (bit time)
All 0	n/a	n/a	n/a	96	96
All 0	n/a	n/a	n/a	96	96

Tx Rate Control: Capped Balance Tx Rate | Stream Transmit Mode: Continuous

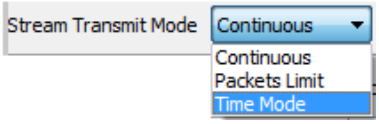
Total Line Rate(Mbps): 700.00 | Total Utilization(%): 70.00 | Total Pac

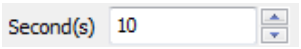
Stream #	Select Stream	Length (w/o CRC)		Frame Payload	Rate	I
		Control	Step		Line Rate	
1	☑	60	n/a	8'0 8'1	n/a	
2	☑	60	n/a	All 0	n/a	

- **Stream Loop Time**: set the time for all the streams of the port run a loop. The streams will be transmitted circularly.



- **Stream Transmit Mode**: Set the packet transmitting mode of each stream.



Stream Transmit Mode	
Continuous	NuWIN-RM will transmit streams continuously.
Packets Limit	When the **Stream Transmit Mode** is set to **Packet Limit**, a **Packets** field will be displayed right next to the **Stream Transmit Mode** scroll-down menu. NuWIN-RM will stop transmitting packets when the set amounts of packets are transmitted. 
Time Mode	When the **Stream Transmit Mode** is set to **Time Mode**, a **Second** field will be displayed right next to the **Stream Transmit Mode** scroll-down menu. NuWIN-RM will stop transmitting packets when the set amount of time is passed. 

- **Total Line Rate**: The total Tx rate sum of all streams of the port.
- **Stream Utilization**: The ratio of the **Total Line Rate** to the wire rate.
- **Total Packet Rate**: The packets number transmitted of all the streams of the port.
- **Length Step**: The port will transmit the packets in a step mode according to the steps you set up here.

Example:

Length Step(w/o CRC)							
Step 1	**Step 2**	**Step 3**	**Step 4**	**Step 5**	**Step 6**	**Step 7**	**Step 8**
60	124	252	508	764	1020	1276	1514
60	124	252	508	764	1020	1276	1514
60	124	252	508	764	1020	1276	1514
60	124	252	508	764	1020	1276	1514

The port will send the packets in a sequence of 60, 124, 252, 508, 764, 1020, 1276, 1514 bytes repeatedly.

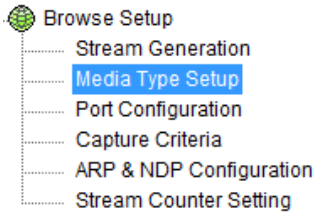
6.3.1.3. Stream Setting

Stream Setting

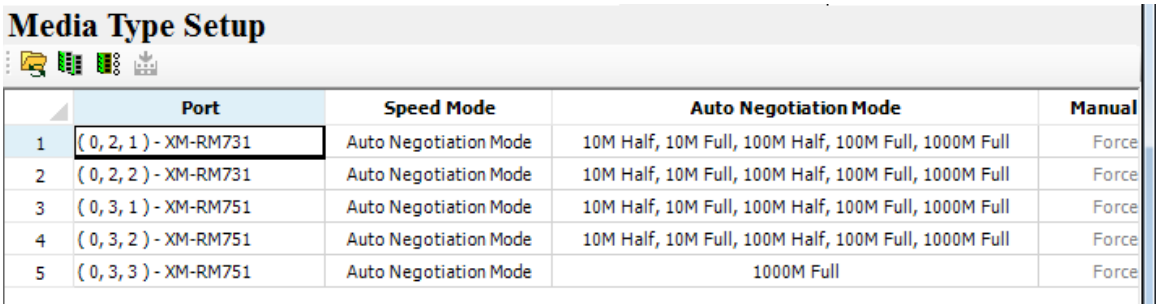
Port	Stream #	Select	Length (w/o CRC)		Frame Payload	Rate	
			Control	Step		Line Rate(Mbps)	Utilization
⊟ (0, 2, 1) - XM-RM731							
(0, 2, 1) - XM-RM731	1	☑	60	2	All 0	1000.00	100.000
⊟ (0, 2, 2) - XM-RM731							
(0, 2, 2) - XM-RM731	1	☑	60	2	All 0	1000.00	100.000
⊟ (0, 3, 1) - XM-RM751							
(0, 3, 1) - XM-RM751	1	☑	60	2	All 0	1000.00	100.000
⊟ (0, 3, 2) - XM-RM751							
(0, 3, 2) - XM-RM751	1	☑	60	2	All 0	1000.00	100.000
⊟ (0, 3, 3) - XM-RM751							
(0, 3, 3) - XM-RM751	1	☑	60	2	All 0	1000.00	100.000

Some parameters in this table are configurable. You can double-click the cell where you want to configure and set another value.

6.3.2. Media Type Setup



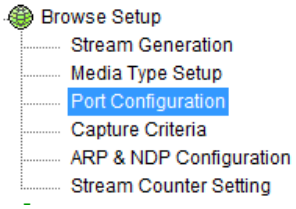
This function allows you to set up the media type settings of all ports at one page.



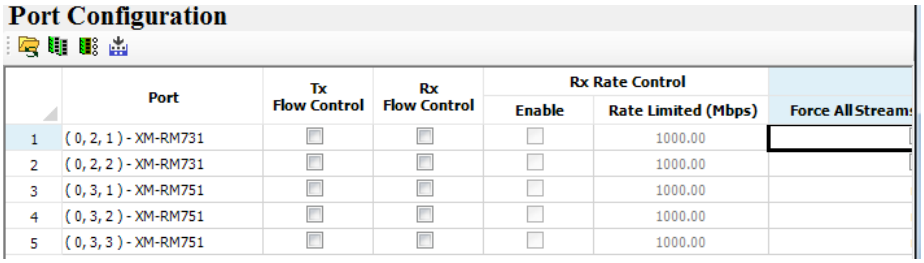
	Port	Speed Mode	Auto Negotiation Mode	Manual
1	(0, 2, 1) - XM-RM731	Auto Negotiation Mode	10M Half, 10M Full, 100M Half, 100M Full, 1000M Full	Force
2	(0, 2, 2) - XM-RM731	Auto Negotiation Mode	10M Half, 10M Full, 100M Half, 100M Full, 1000M Full	Force
3	(0, 3, 1) - XM-RM751	Auto Negotiation Mode	10M Half, 10M Full, 100M Half, 100M Full, 1000M Full	Force
4	(0, 3, 2) - XM-RM751	Auto Negotiation Mode	10M Half, 10M Full, 100M Half, 100M Full, 1000M Full	Force
5	(0, 3, 3) - XM-RM751	Auto Negotiation Mode	1000M Full	Force

- **Auto Negotiation Mode:** This function allows automatically negotiate the transmitting rate between the two communication ports. You can select the transmitting rate in the **Auto Negotiation Mode** area.
- **Manual Speed Mode:** This function allows you to manually set the transmitting rate. **Force** here means the transmitting rate of the port will switched to the selected mode even if the connection fails.
- **Link Down:** If this function is selected, this port will be closed and unable to use. All connections to this port will be cut off.
- **Link Up:** Select this function to enable this port. The connections to this port are available to be established.
- **Auto-MDIX:** MDIX is a technology that automatically detects the required cable connection type (straight-through or crossover) and configures the connection appropriately. Click the **Auto-MDIX** scroll-down menu to enable or disable this function.
- **Force MDI-II**: force the port to be **Force MDI-II** type.
- **Force MDI-X**: force the port to be **Force MDI-X** type.
- **Copper/Fiber Mode:** Only when the Manual Speed Mode is set to be **Manual Speed Mode**, this function is available. Please set the media type according to the practical type of the port. If the port is electrical, please select **Copper Mode,** and if the port is optical, please select **Fiber Mode**.
- **Master/Slave Mode:** Only when the Manual Speed Mode is set to be **Manual Speed Mode**, this function is available. The two ends of the connection will be set as **Master** or **Slave**. If both ends of the connection are set to the same, the link of that connection will be down. Please set the module card's port accordingly here, or choose **Auto Detect** so NuWIN-RM will detect and set the transmitting mode automatically.

6.3.3. Port Configuration



This function allows you to set up the port configuration settings of all ports at one page.



A. Flow Control

- **Flow Control:** This function is used to release the network congestion situations. Including **Tx Flow Control** and **Rx Flow Control**.
- **Rx Rate Control**: Enable this function to control the rate of receiving data. You can input the maximum receiving speed of the port in **Rate Limited**.

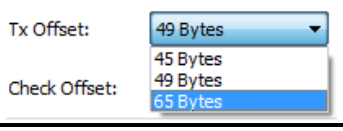
B. Random Packet Length

- **Force All Streams to Random Length:** when this function is enabled, all streams of the port will be in a random length between the **Minimum** value and the **Maximum** value set in **Random Packet Length (w/o CRC)**.
- **Dynamic Random Seed:** Enable this function, then the random packet of different streams will be different, or packet lengths of all streams may be the same.
- **Random Packet Length (w/o CRC)**: Set the range of the random packet length.

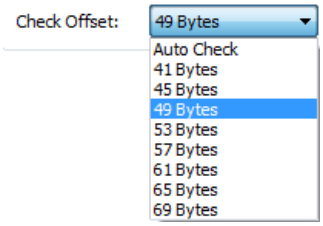
C. X-TAG Offset

X-TAG is a 12-byte tag developed by Xtramus, embedded in the transmitted packets, which is an enhance measure to check the validation of data transmission on the network. When the starting position of the X-TAG in the received packet by the other port of thetwo communication ends coincides with the **Byte** set in **Check Offset**, then the data transmission between the two communication ends is supposed to be validate. The **Byte** in **Check Offset** should be set based on the **Byte** in **Tx Offset**.

- **Tx Offset:** Set the starting position of the X-TAG in the transmitted packet from the scroll down menu.



- **Check Offset:** Set the starting position of the X-TAG in the received packet from the scroll down menu. **Auto Check** means the system will automatically select the right **Byte** for this function.



D. BERT

BERT stands for **Bit Error Rate Test**.

- **Transmit BERT:** Adding BERT patterns to transmitted packets if this is enabled.
- **Check BERT:** NuWIN-RM will check if BERT patterns are in received packets.

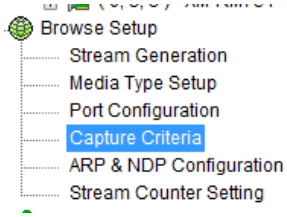
E. Data Integrity (DI)

- **Transmit DI:** When enabled, NuWIN-RM will check data integrity of transmitted packets.
- **Check Received DI:** When enabled, NuWIN-RM will check data integrity of received packets.

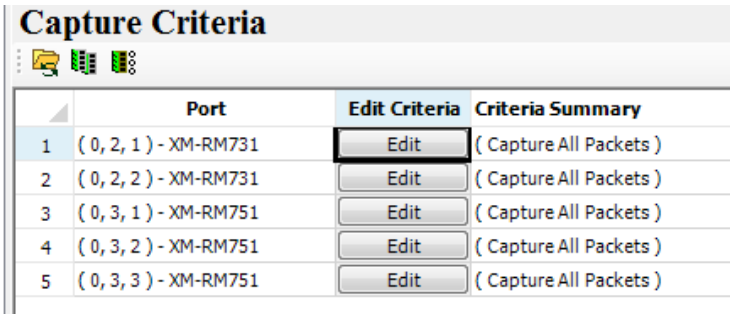
F. Elongated Frame Gap

When this function is enabled and the transmitting packet flow reaches wires peed, a 1 byte-time of frame gap will be inserted after a certain amount of packets are transmitted. This can reduce packet loss caused by crystal frequency differentials between DUT and test instrument. Enabling Elongated Frame Gap can compensate crystal frequency differentials by around 30 ppm as simulation.

6.3.4. Capture Criteria

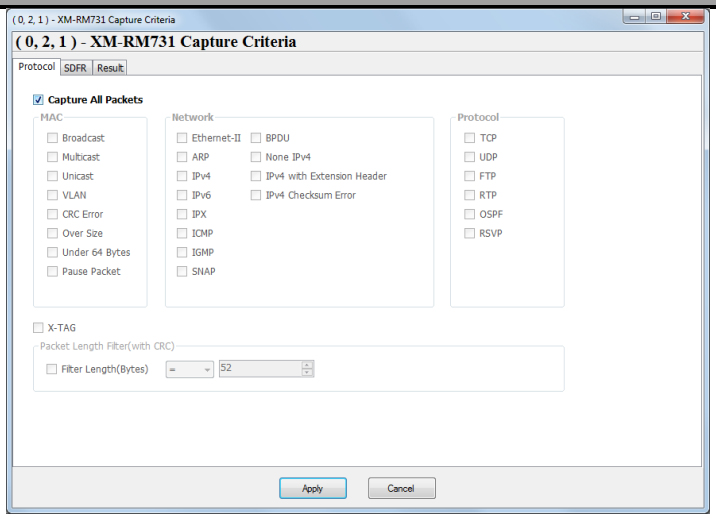


This function allows you to set up the capture criteria of all ports at one page.



Click the **Edit** button, the **Capture Criteria** window will pop up. It contains 3 menu tabs: **A. Protocol**, **B. SDFR**, and **C. Result**. Please see the sections down below for details.

A. Protocol



Protocol allows you to set the criteria for packet capturing.

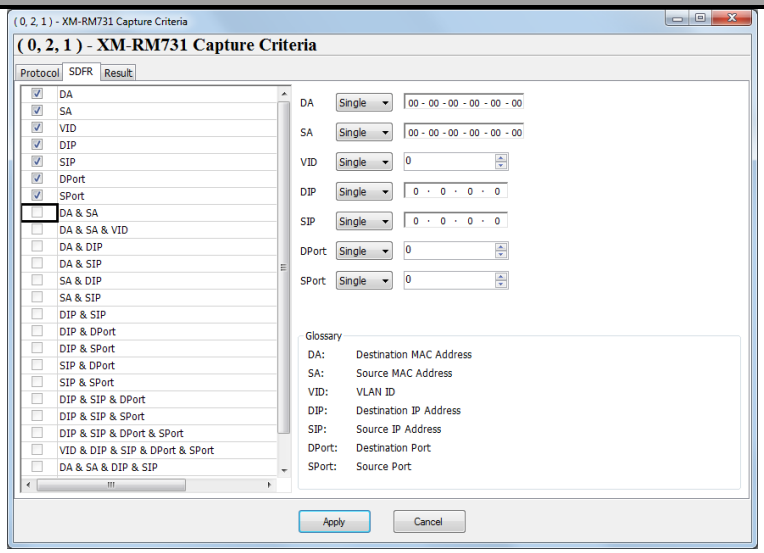
- **Capture All Packets:** Click this check box to capture all packets.

If you uncheck the **Capture All Packets** option, you can set the specific protocols or rules.

- **X-TAG:** check this option to capture packets with X-TAG.
- **Packet Length Filter:** Capture the packets with the specified length. The calculation of the length involves the CRC field. For example, if you want the system captures the packets with a length greater than 52 bytes, you should make the following setting

You can make multiple capture rules at the same time. Then the system will capture the packets satisfying all the rules.

B. SDFR

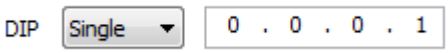


SDFR (Self-Discover Filtering Rules) is a technology that makes packet capturing/filtering over Ethernet easy and convenient. SDFR parameters include filter of Layer 3 Destination IP Address (**DIP**) and Source IP Address (**SIP**)

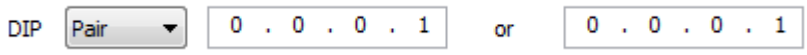
Each filter is independent and can be activated in any combinations. You can choose the rules by clicking the check boxes on the left side.

You can set and input the value of the rules on the right side. The value of the rules can be set as **Single**, **Pair**, and **Range**. The following descriptions will use **DA** as example.

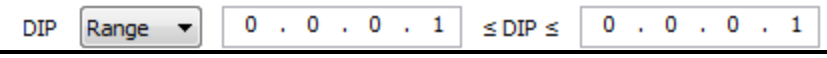
- **Single:** A single value will be used as SDFR parameter.



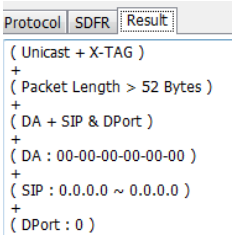
- **Pair:** Two values will be used as SDFR parameters.



- **Range:** Values within the range of the two values set here will be used as SDFR parameters.
-



C. Result



The **Result** page will display the settings you've made in **Protocol** and **SDFR** pages.

6.3.5. ARP&NDP Configuration

This function allows you to set up the ARP&NDP Configuration of all ports at one page.

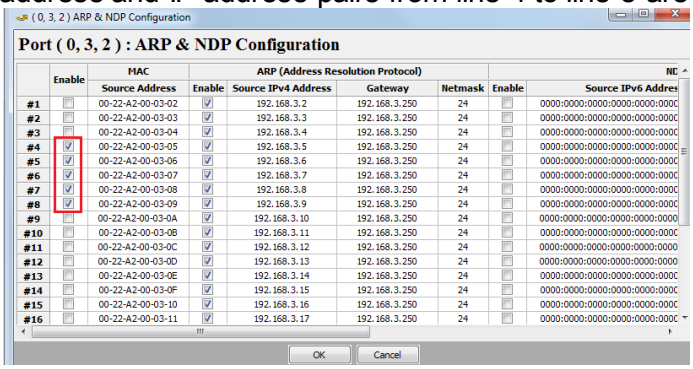
ARP&NDP Configuration

ARP&NDP Configuration – Assign MAC address and IP address pairs to one port

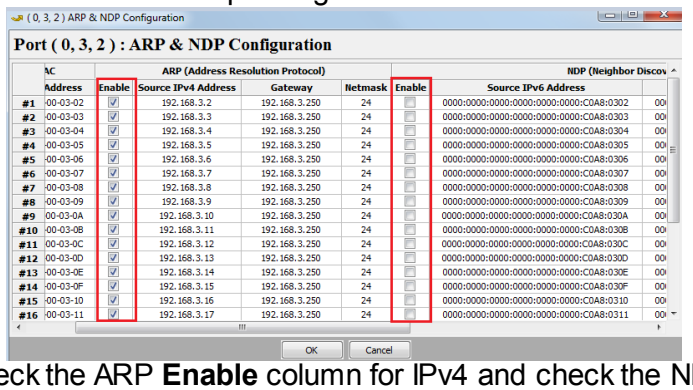
ARP, namely address resolution protocol, is a TCP/IP protocol to obtain the MAC address based on the IP address. NDP, namely neighbor discovery protocol, is a replacement of ARP in IPv6.

You can assign multiple MAC address and IP address pairs to one port. As long as the IP address in the ARP request fits one of the assigned pairs, the port will response the ARP request.

To assign a specific MAC address and IP address pair to the port, check the corresponding line in the most left **Enable** column. For example, in the picture down below, the MAC address and IP address pairs from line 4 to line 8 are selected.

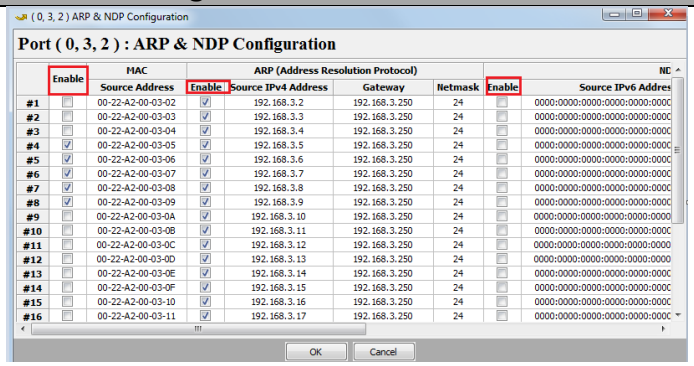


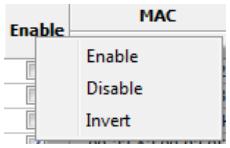
Meanwhile, you must enable the ARP or NDP according the type of the IP address (IPv4 or IPv6) by check the corresponding line in the ARP or NDP **Enable** column.



Note: please check the ARP **Enable** column for IPv4 and check the NDP **Enable** column for IPv6. Or, the MAC address and IP address pair is not successfully assigned to the port.

ARP&NDP Configuration – Buttons

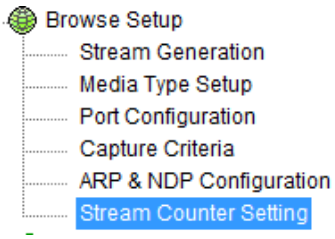




- **Enable:** right-click the **Enable** area shown in the above left picture, a menu will pop up to facilitate the enabling operations, shown as the above right picture.
  - **Enable:** check all the lines of the column.

	• **Disable:** uncheck all the lines of the column. • **Invert:** If the line is checked, then uncheck it or reverse. ➢ **OK:** Press this button to apply all the changes you've made and exit. ➢ **Cancel:** Press this button to cancel all the changes you've made and exit.

6.3.6. Stream Counter Setting



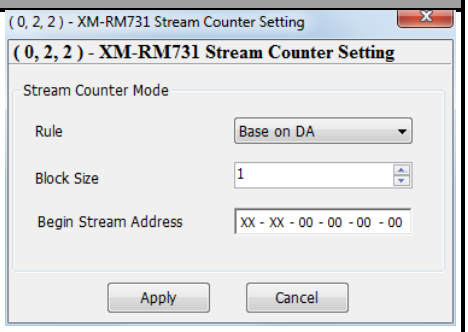
This function allows the user to set the statistical rules for all ports.

	Port	Rx Stream Counter Rule Summary	Edit Rule
1	(0, 2, 1) - XM-RM731	Base on X-TAG, XID #: 0 , offset: 49 Bytes	Edit
2	(0, 2, 2) - XM-RM731	Base on X-TAG, XID #: 0 , offset: 49 Bytes	Edit
3	(0, 3, 1) - XM-RM751	Base on X-TAG, XID #: 0 , offset: 49 Bytes	Edit
4	(0, 3, 2) - XM-RM751	Base on X-TAG, XID #: 0 , offset: 49 Bytes	Edit
5	(0, 3, 3) - XM-RM751	Base on X-TAG, XID #: 0 , offset: 49 Bytes	Edit

Click the **Edit** button, the **Stream Counter Setting** window will pop up. You can edit the statistical rules on this window.

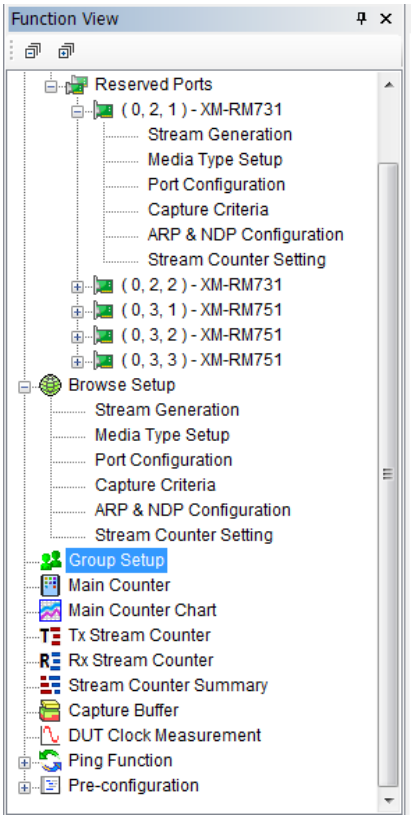
<table>
<tr><th colspan="2">Stream Counter Setting</th></tr>
<tr><td>Edit Rule</td><td>

Rule: to set the rule from the scroll down menu.
Block Size: to set the range based on the rule.
Begin Stream Address: to set the beginning address based on the rule.



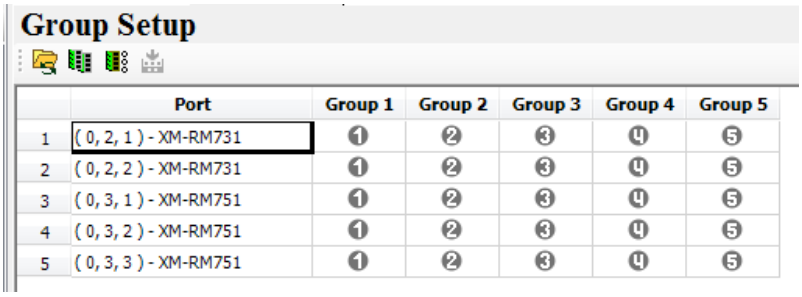
Example:
Select the Rule as Base on DA, the Block Size as 5, the Begin Stream Address as XX-XX-00-00-00-00, then the packets satisfying to be received by the port will the packets with DA from XX-XX-00-00-00-00 to XX-XX-00-00-00-04.
</td></tr>
</table>

6.4. Group Setup



This function allows you to divide the test ports into groups. The ports in the same group can be operated and controlled as a whole during the test, like start, pause or end the test tasks of the ports together.

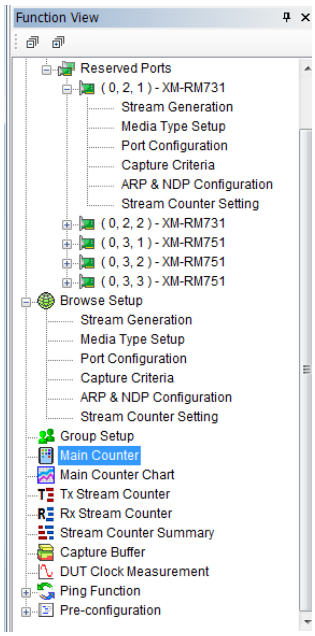
Group Setup



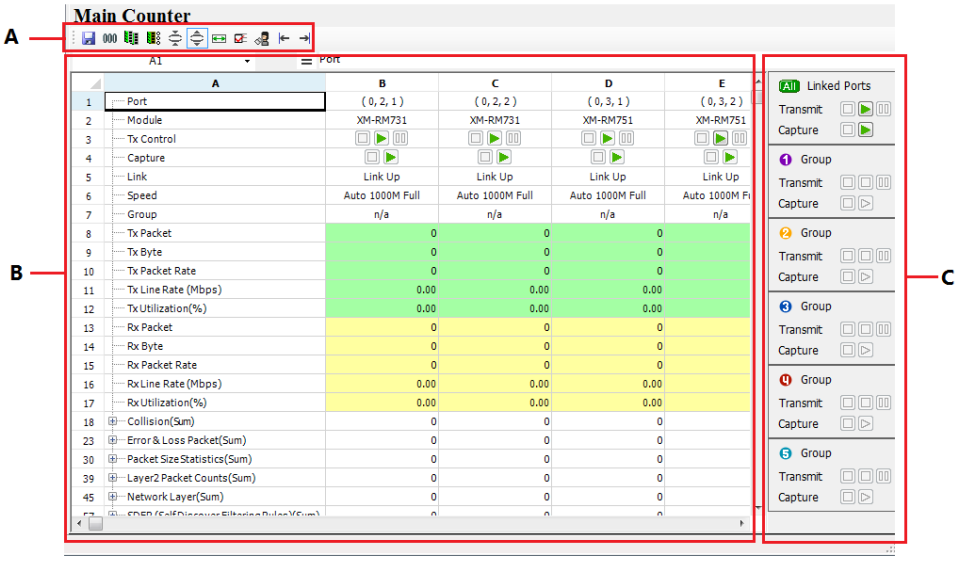
To assign a group to a specified port, please click the group ID you would like to assign.

For example, to assign port (0, 2, 1) to group 1, please click the group number ❶.

6.5. Main Counter



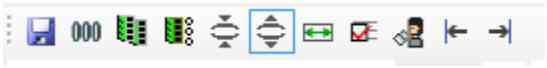
The **Main Counter** window allows you to start/stop transmitting/capturing packets. A **Main Counter** window will pop up as shown in the picture below.



Main Counter Descriptions		
A	**Control Buttons**	These buttons allow you to save the counter report, clear all statistics, hide/show counter information, resize the Main Counter Window, and export the current counter to Microsoft Excel.
B	**Main Display Pane**	You can view counter statistics or start/stop transmitting /capturing packets here in this section.
C	**Group Control Buttons**	These buttons allow you to start/stop transmitting/capturing packets in groups.

Please see the following sections for detail descriptions.

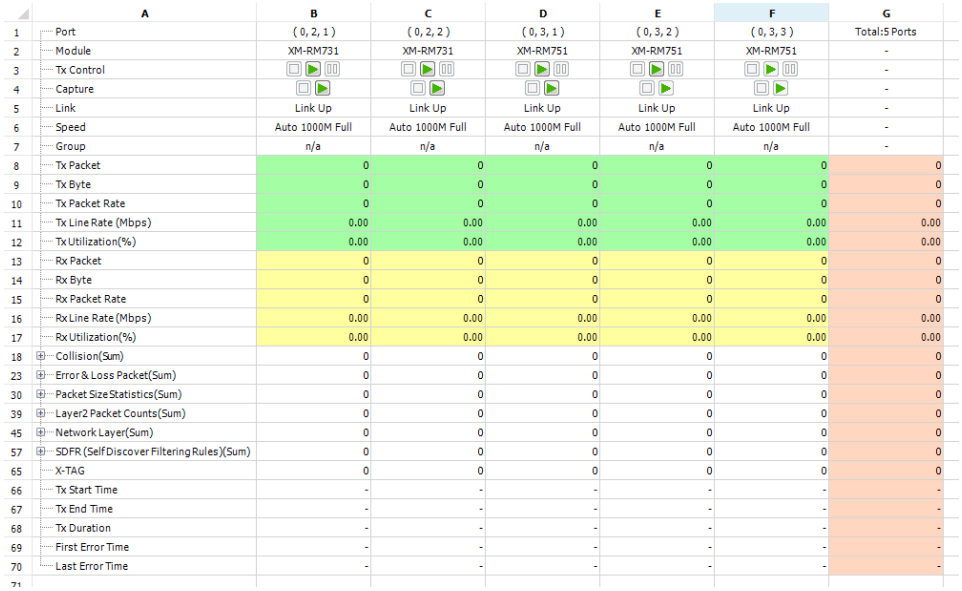
6.5.1. Control Buttons



Please refer to the section down below for more detail descriptions regarding to the following contents.

Control Buttons Descriptions	
	The **Save** button allows you to save the current counter reports to Microsoft Excel® format files.
	The **Clear** button allows you to clear all statistics displayed on the **Main Display Pane**.
	The **Port Map** button allows you set the ports the statistics of which you want to view. Only the statistics of the selected ports will be displayed in the **Main Display Pane**.
	The **Reset Port Map** button allows you to clear all the ports you selected in the **Port Map**.
	The **Hide** button allows you to hide some of the TX/Rx statistics, as well as fold all tree style tab statistics on the **Main Display Pane**.
	The **Show** button allows you to show all TX/Rx statistics, as well as unfold all tree style tab statistics on the **Main Display Pane**.
	The **Resize** button allows you to set the width of **Main Counter** window. The maximum/ minimum value for the Main Counter window width is from **80** to **300**.
	The **View** button allows you to set the detailed terms that will be displayed on the **Main Display Pane**. Click the **View** button and then a three style list will pop up. You can select the terms you want to display from the list.
	Learning packets will transmit to all the ports.
	Go to the first column.
	Go the last column.

6.5.2. Main Display Pane



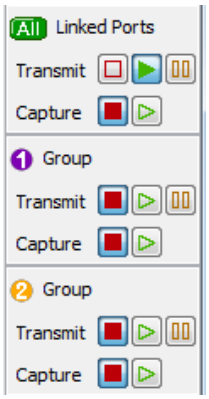
	A	B	C	D	E	F	G
1	Port	(0, 2, 1)	(0, 2, 2)	(0, 3, 1)	(0, 3, 2)	(0, 3, 3)	Total:5 Ports
2	Module	XM-RM731	XM-RM731	XM-RM751	XM-RM751	XM-RM751	-
3	Tx Control						-
4	Capture						-
5	Link	Link Up	Link Up	Link Up	Link Up	Link Up	-
6	Speed	Auto 1000M Full	Auto 1000M Full	Auto 1000M Full	Auto 1000M Full	Auto 1000M Full	-
7	Group	n/a	n/a	n/a	n/a	n/a	-
8	Tx Packet	0	0	0	0	0	0
9	Tx Byte	0	0	0	0	0	0
10	Tx Packet Rate	0	0	0	0	0	0
11	Tx Line Rate (Mbps)	0.00	0.00	0.00	0.00	0.00	0.00
12	Tx Utilization(%)	0.00	0.00	0.00	0.00	0.00	0.00
13	Rx Packet	0	0	0	0	0	0
14	Rx Byte	0	0	0	0	0	0
15	Rx Packet Rate	0	0	0	0	0	0
16	Rx Line Rate (Mbps)	0.00	0.00	0.00	0.00	0.00	0.00
17	Rx Utilization(%)	0.00	0.00	0.00	0.00	0.00	0.00
18	Collision(Sum)	0	0	0	0	0	0
23	Error & Loss Packet(Sum)	0	0	0	0	0	0
30	Packet Size Statistics(Sum)	0	0	0	0	0	0
39	Layer2 Packet Counts(Sum)	0	0	0	0	0	0
45	Network Layer(Sum)	0	0	0	0	0	0
57	SDFR (Self Discover Filtering Rules)(Sum)	0	0	0	0	0	0
65	X-TAG	0	0	0	0	0	0
66	Tx Start Time	-	-	-	-	-	-
67	Tx End Time	-	-	-	-	-	-
68	Tx Duration	-	-	-	-	-	-
69	First Error Time	-	-	-	-	-	-
70	Last Error Time	-	-	-	-	-	-

Main Display Pane Descriptions

The **Main Display Pane** displays counter report statistics of all ports you've selected for test. Also, you can start/stop capturing packets or start/stop transmitting packets by the control buttons in this field.

- **Stop:** To stop capturing test packets or transmitting packets, press  button. If the designated port is not capturing packets or transmitting packets, the button will be  instead.
- **Start:** To start capturing test packets or transmitting packets, press  button. If the designated port is capturing packets or transmitting packets, the button will be  instead.

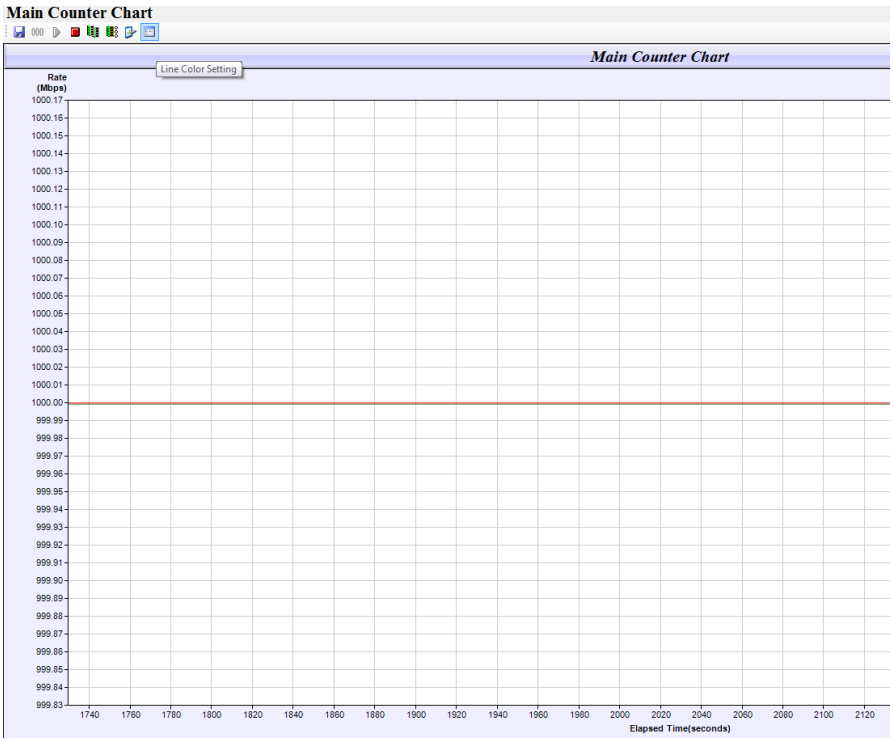
6.5.3. Group Control Buttons

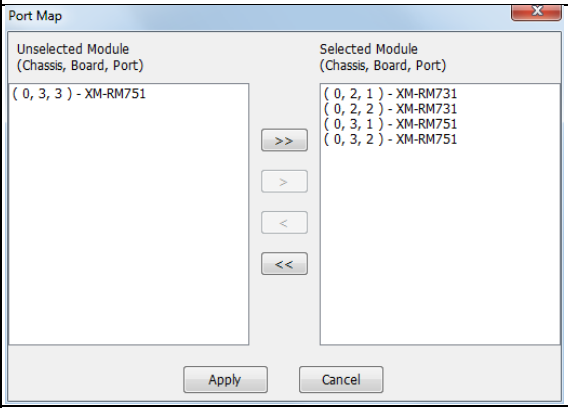


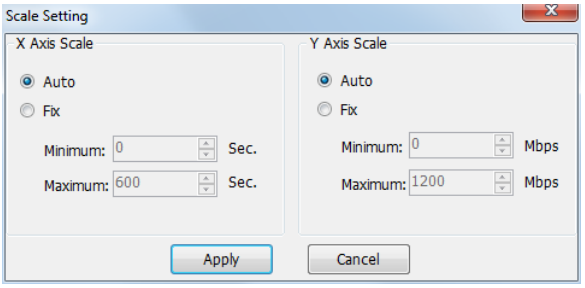
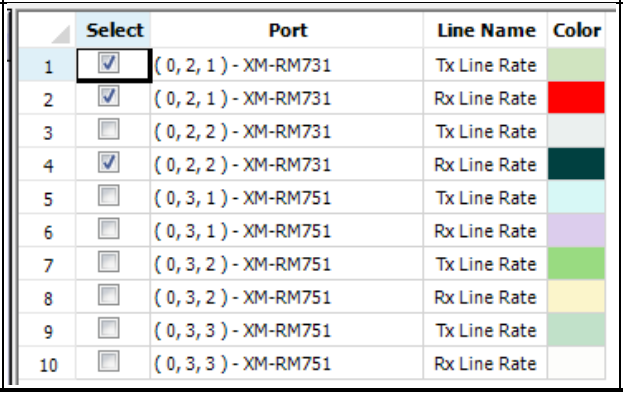
Group Control Buttons Descriptions
The **Group Control Buttons** allow you to start/stop capturing packets or start/stop transmitting packets in groups. You can assign a group ID number to reserved ports for test managements. ➢ **Stop:** To stop capturing test packets or transmitting packets, press button. If the designated group is not capturing packets or transmitting packets, the button will be instead. ➢ **Start:** To start capturing test packets or transmitting packets, press button. If the designated group is capturing packets or transmitting packets, the button will be instead.

6.6. Main Counter Chart

This function allows you to intuitively view the general trend of the TX/Rx line rate of the reserved port, shown as the picture down below. The x-axis stands for the Elapsed Time (seconds) while y-axis stands for the Rate (Mbps).



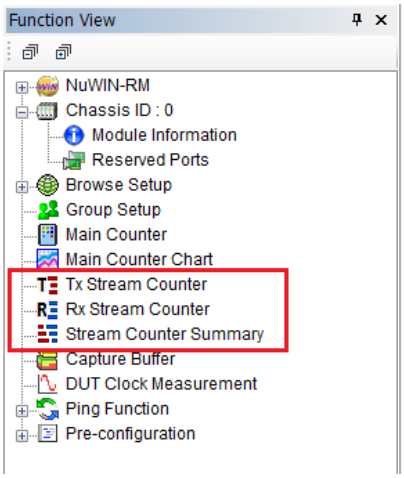
Control Buttons	
	Save the current chart in ".bmp" format.
	Clear the chart.
	Start to plot the chart.
	Stop to plot the chart..
	 Select the ports. Only the Tx/Rx curve of the selected ports could be plotted in the coordinate.
	Reset the Port Map setting.

Control Buttons		
		The window on the right will pop up after click this button. You can set the X/Y Axis Scale on this window. ➢ **Auto**: the system will set an X/Y Axis Scale automatically. ➢ **Fix:** You can input the range of the X/Y Axis Scale manually. ● **Minimum**: the lower boundary of the X/Y Axis Scale. ● **Maximum**: the upper boundary of the X/Y Axis Scale.
		This function is used to configure the colors of the plotted lines. ➢ **Select**: check the box to select the lines. Every port has two lines, the **Tx Line Rate** and the **Rx Line Rate**. Only the selected lines can be plotted. ➢ **Color**: double click the color block of a line to change the color.

6.7. Stream Counter

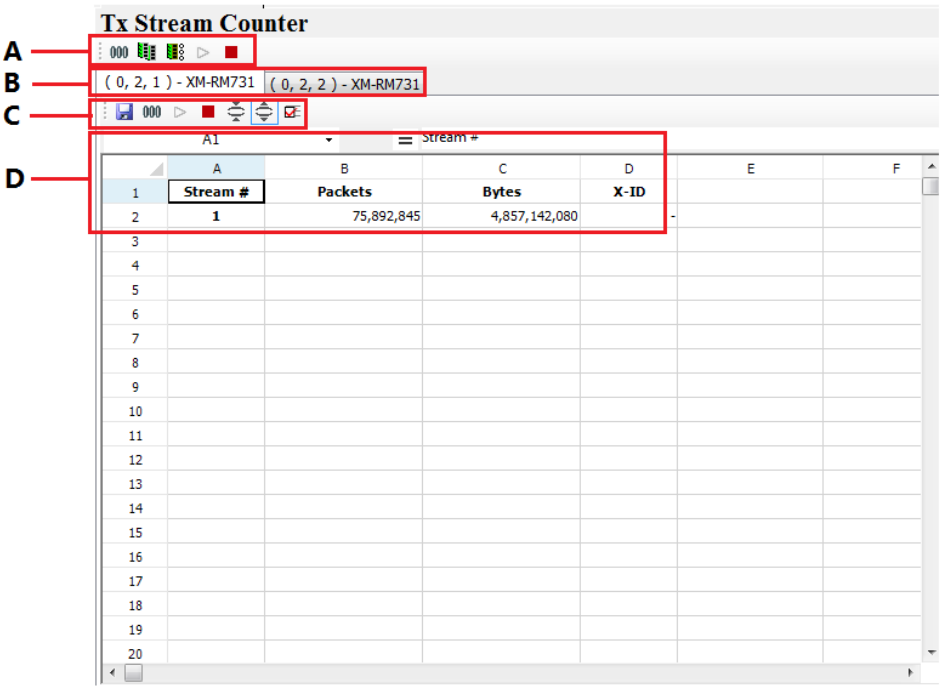
You can view the packet transmission and receiving statistics and edit the packet receiving rules here.

This function contains three sub-functions for **Stream Counter**, which are **Tx Stream Counter**, **Rx Stream Counter** and **Stream Counter Summary**.



6.7.1.Tx Stream Counter

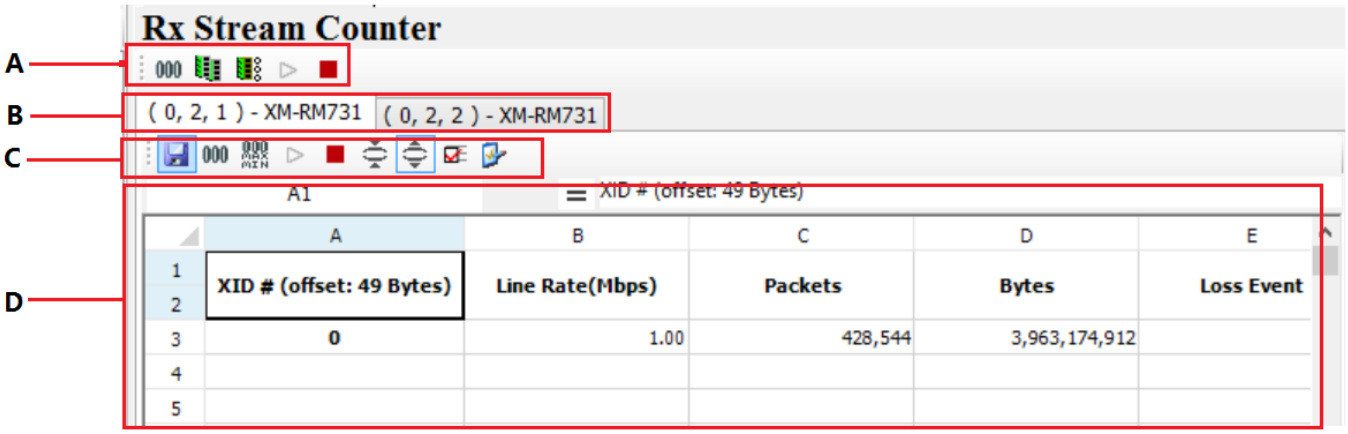
Click **Tx Stream Counter** on the **Function View**, the **Tx Stream Counter** window will pop up to allow you to view the data transmission items of your interest.

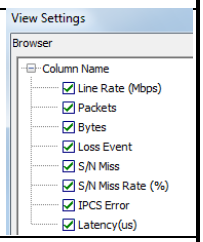


Tx Stream Counter		
A		Clear Tx Stream Counter of all ports.
		The **Port Map** button allows you set the ports the statistics of which you want to view. Only the statistics of the selected ports will be displayed in the **Main Display Pane**.
		The **Reset Port Map** button allows you to clear all the ports you selected in the **Port Map**.
		Start Tx Stream Counter of all ports.
		Stop Tx Stream Counter of all ports.
B	Click each tab, then the corresponding transmission data of the port will be displayed.	
C		Save Tx Stream Counter of the current port to Microsoft Excel® format files.
		Clear Tx Stream Counter of the current port.
		Start Tx Stream Counter of the current port.
		Stop Tx Stream Counter of the current port.
		Hide the zero-value rows in the table.
		Expand the hide rows in the table.
		A **Column View Setting** window will pop up if you press this button. Check the items you want to view here, then the data information of the item will be displayed in **D**.
D	The dynamic statistics of the selected items will be displayed here in a table form.	

6.7.2. Rx Stream Counter

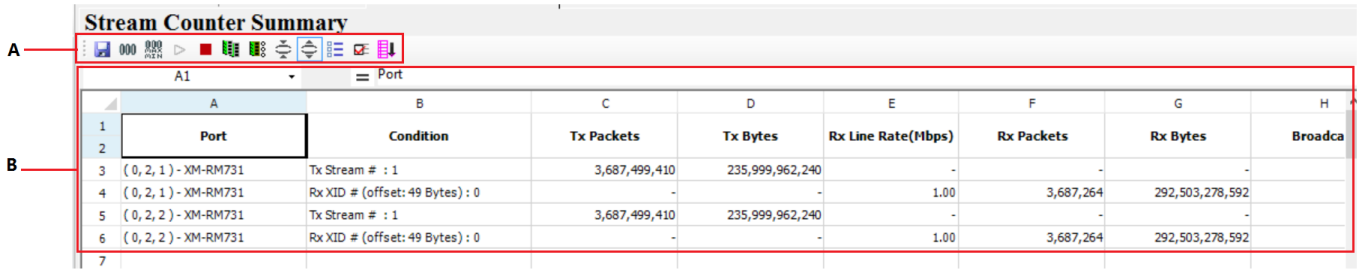
Click **Rx Stream Counter** on the **Function View**, the **Rx Stream Counter** window will pop up to allow you to view the data receiving items of your interest.



Rx Stream Counter		
A		Clear Rx Stream Counter of all ports.
		The **Port Map** button allows you set the ports the statistics of which you want to view. Only the statistics of the selected ports will be displayed in the **Main Display Pane**.
		The **Reset Port Map** button allows you to clear all the ports you selected in the **Port Map**.
		Start Rx Stream Counter of all ports.
		Stop Rx Stream Counter of all ports.
B	Click each tab, then the corresponding transmission data of the port will be displayed.	
C		Save the Rx Stream Counter data of the current port to Microsoft Excel® format files.
		Clear Rx Stream Counter of the current port.
		Clear maximum and minimum latency.
		Start Rx Stream Counter of the current port.
		Stop Rx Stream Counter of the current port.
		Hide the zero-value rows in the table.
		Expand the hide rows in the table.
		A **Column View Setting** window will pop up if you press this button. Check the items you want to view here, then the data information of the item will be displayed in **D**. 
		Please see **6.2.6 Stream Counter Setting** for detailed information.
D	The dynamic statistics of the selected items will be displayed here in a table form.	

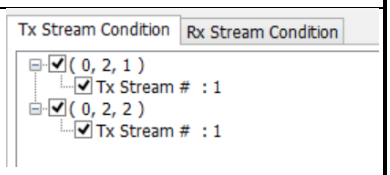
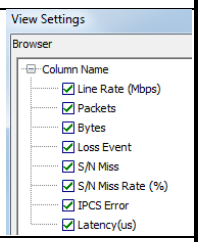
6.7.3. Stream Counter Summary

Click **Stream Counter Summary** on the **Function View**, the **Stream Counter Summary** window will pop up to allow you to view the data receiving items of your interest.



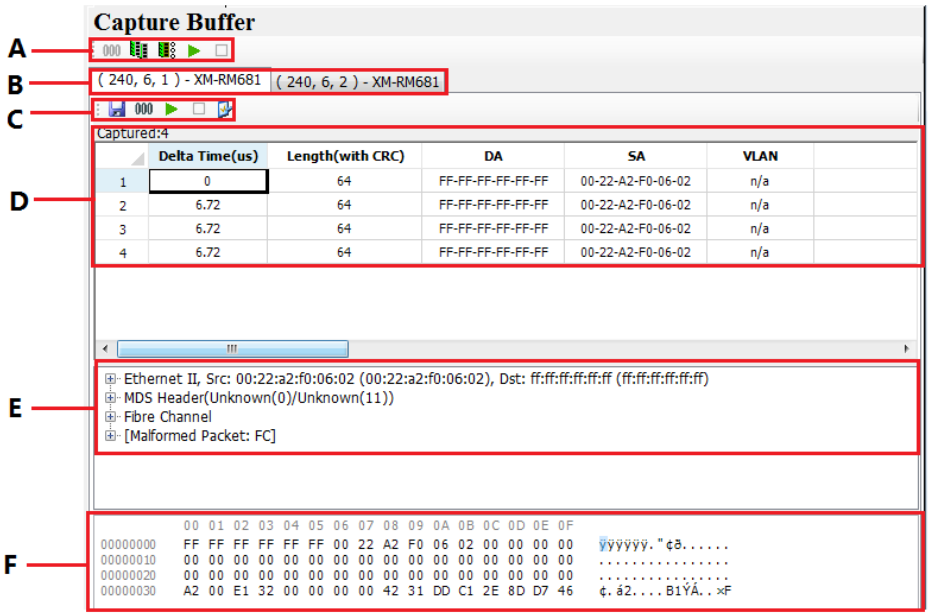
	A	B	C	D	E	F	G	H
1	Port	Condition	Tx Packets	Tx Bytes	Rx Line Rate(Mbps)	Rx Packets	Rx Bytes	Broadca
2								
3	(0, 2, 1) - XM-RM731	Tx Stream # : 1	3,687,499,410	235,999,962,240	-	-	-	
4	(0, 2, 1) - XM-RM731	Rx XID # (offset: 49 Bytes) : 0	-	-	1.00	3,687,264	292,503,278,592	
5	(0, 2, 2) - XM-RM731	Tx Stream # : 1	3,687,499,410	235,999,962,240	-	-	-	
6	(0, 2, 2) - XM-RM731	Rx XID # (offset: 49 Bytes) : 0	-	-	1.00	3,687,264	292,503,278,592	
7								

You can make stream counter settings here. Module card IDs are listed on the left part of the **SC Summary** tab page and are showed as the format of **(X, Y, Z)**, while X is the number of the chassis (which is displayed on NuSteams chassis), Y is the slot number where this module card is installed, and Z is the available port number located on the module card.

Stream Counter Summary		
A		Save the counter data to Microsoft Excel® format files.
		Clear all the counter data.
		Clear maximum and minimum latency.
		Start Tx&Rx Stream Counter.
		Stop Tx&Rx Stream Counter.
		The **Port Map** button allows you set the ports the statistics of which you want to view. Only the statistics of the selected ports will be displayed in the **Main Display Pane**.
		The **Reset Port Map** button allows you to clear all the ports you selected in the **Port Map**.
		Hide the zero-value rows in the table.
		Expand the hide rows in the table.
		A **Row View Setting** window will pop up if you press this button. Check the items you want to view here, then the checked item will be listed as a row in **B**. 
		A **Column View Setting** window will pop up if you press this button. Check the items you want to view here, then the checked item will be listed as a column in **B**. 
		Sort the ports in a ascend trend according to the port ID and Stream ID. This helps the user quickly set the ports in order when the port sequence is messed manually.
B	The dynamic statistics of the selected items will be displayed here in a table form.	

6.8. Capture Buffer

This function allows the user to capture the packets according to the set rules or protocols, as well as parse the protocols and payloads of the captured packets.

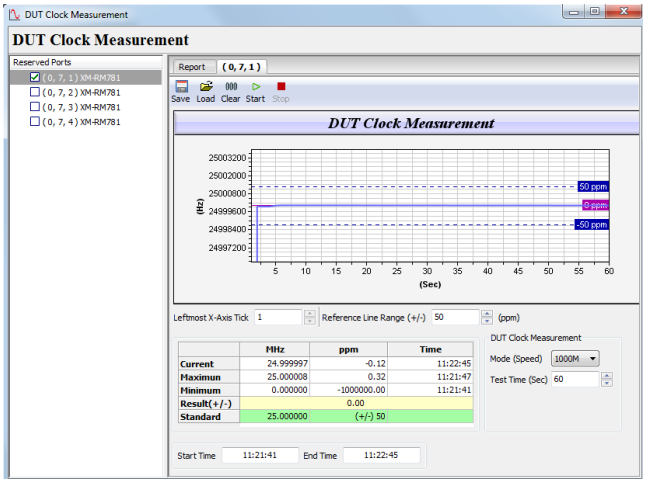


Capture Buffer		
A		Clear the captured packets of all ports.
		The **Port Map** button allows you set the ports from which the packets are captured.
		The **Reset Port Map** button allows you to clear all the ports you selected in the **Port Map**.
		Start the capture of all ports you selected in **Port Map**.
		Stop the capture of all ports you selected in **Port Map**.
B	Click each tab, then the corresponding capture data of the port will be displayed.	
C		Save the capture data of the current port to Microsoft Excel® format files.
		Clear the capture data of the current port.
		Start the capture of the current port.
		Stop the capture of the current port.
		Edit capture criteria. Please see **6.2.4 Capture Criteria** for detailed information.
D	This area lists the captured packets in sequence and displays the detailed information, including the **Delta Time**, **Length**, **DA**, **SA** and **VLAN**. **Delta Time** refers to the elapsed time between the previously captured packet and the next captured packet.	
E	Protocol analysis of the packet.	
F	Contents of the packet.	

6.9. DUT Clock Measurement

The **DUT Clock Measurement** function tests the crystal oscillator's frequency of the DUT and checks if it's either faster or slower than standard speed in ppm scale.

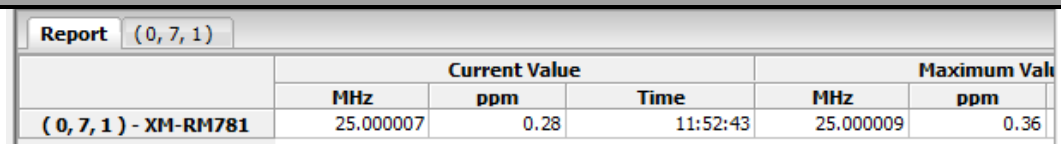
A **DUT Clock Measurement** window will pop up, as shown in the picture down below.
The port you've selected will be displayed on the Main Display Pane located on the right side of the **DUT Clock Measurement** window, as shown in the picture down below.



There are two tab-menus available for you on the **DUT Clock Measurement** window, including **Report**, and **(X, Y, Z)**. Please see the sections down below for more details.

6.9.1. Report

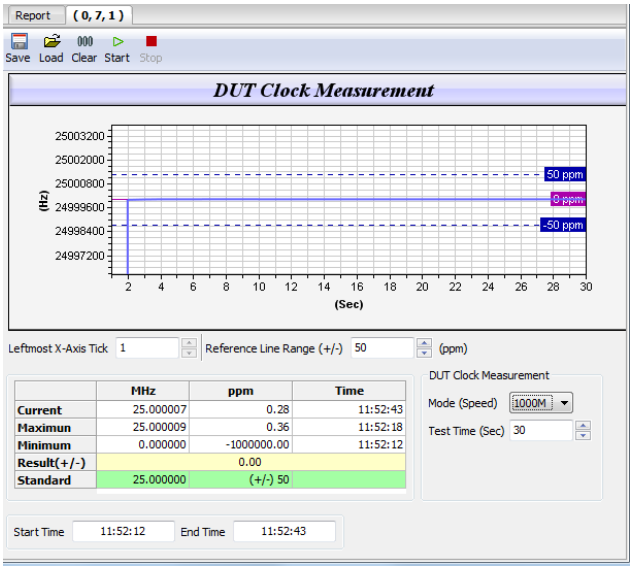
Report



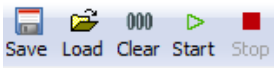
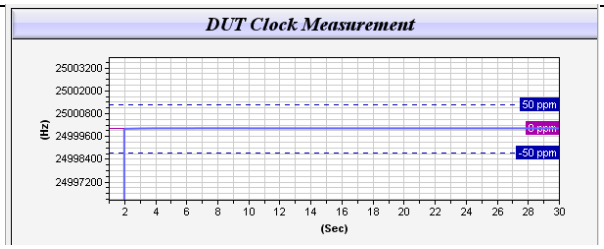
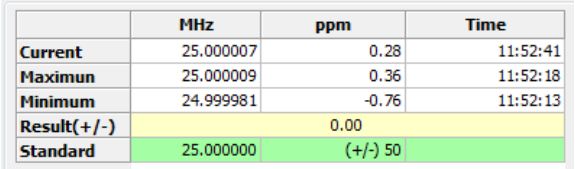
This tab page displays the test result of clock statistics.

- **Current Value:** the current clock information. The **MHz**, **ppm** and **Time** here respectively mean the current oscillating frequency, current oscillating frequency deviation and the current time.
- **Maximum Value:** the maximum clock information. The **MHz**, **ppm** and **Time** here respectively mean the maximum oscillating frequency, maximum oscillating frequency deviation and the maximum time.
- **Minimum Value:** the minimum clock information. The **MHz**, **ppm** and **Time** here respectively mean the minimum oscillating frequency, minimum oscillating frequency deviation and the minimum time.

6.9.2. Port: (X, Y, Z)



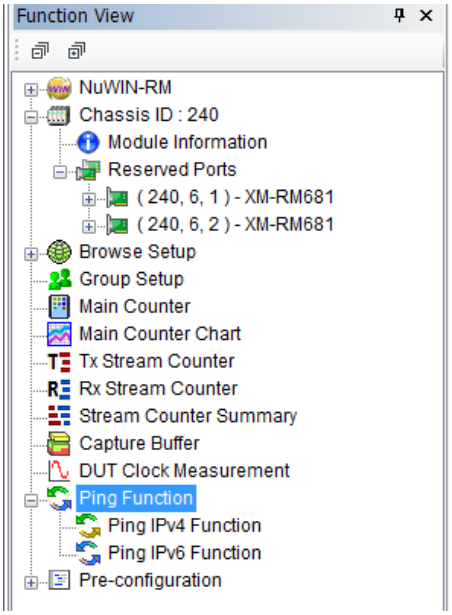
(X, Y, Z) stands for the chassis ID, slot number and port ID, respectively.

(X, Y, Z)	
 **Control Buttons**	 Press the **Save** button to save the test result in ".csv" file.  Press the **Load** button to load in the saved ".csv" file.  Press the **Clear** button to clear the test result.  Press the **Start** button to start the clock test.  Press the **Stop** button to start the clock test.
Coordination Chart Display	 This area intuitively displays the clock test result in a coordination chart. The x-axis represents the elapsed time and y-axis represents the oscillating frequency. There are two reference lines in the chart, which can be configure in **Reference Line Range (+/-)**.
Test Result statistics	 This table is the statistics of the clock test. For detailed information,

(X, Y, Z)	
	please refer to **6.8.1 Report**.
Configuration/Function	➢ **Leftmost X-Axis Tick:** In this filed you can set the starting time of the chart described above. ➢ **Reference Line Range (+/-):** In this filed, you can set the two reference lines of the chart described above. ➢ **Mode (Speed):** Set the transmitting speed here. ➢ **Test Time (Sec):** Set the total testing time. The settings here will be reflected in the chart described above. ➢ **Start Time:** This area will display the test start time after the test is finished. ➢ **End Time:** This area will display the test end time after the test is finished.

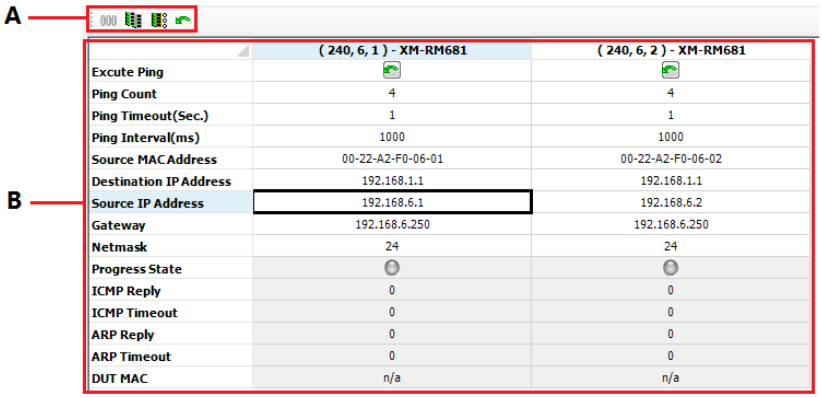
6.10. Ping Function

As a network utility, **Ping** is widely used for testing if one specific host is reachable through its IP address. Also, **Ping** can be used to measure the time it takes to transmit packets from a local host to the designated computer located on a network and back. The Ping Function supports both IPv4 and IPv6 protocols, namely the **Ping IPv4 Function** and the **Ping IPv6 Function**.



Ping IPv4/IPv6 Function

The interface of the **IPv4 Ping Function** and the **IPv6 Ping Function** are nearly the same. The difference is the formats of the IP addresses are expressed by different versions.

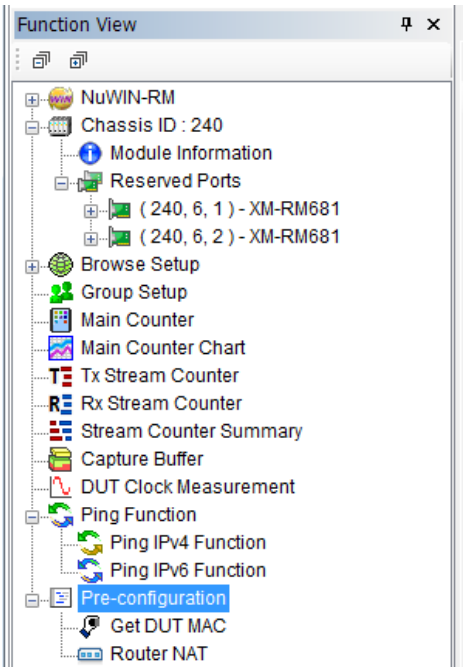


Ping Function	
A. Control Buttons for All Ports	Press the **Clear** button to set all counters to zero. **Port Map**: you can choose the ports you want to execute the ping function here. Only the selected ports are listed in the table. The default setting is all ports are selected. Reset Port Map. Execute the ping function of all ports.
B. Ping Settings/Report	You can change variables or view detailed information here. If you would like to change the value displayed here, please do so by double-click the column you would like to modify, and input the value manually. ➢ **Execute Ping**: Press to start the ping function of this port. ➢ **Ping Count:** The number of times to ping. ➢ **Ping Timeout**: Ping timeout setup. ➢ **Ping Interval (ms):** The time between each ping. ➢ **Source MAC Source:** The source MAC address. ➢ **Destination IP Address:** The destination IP address. ➢ **Source IP Source:** The source IP address. ➢ **Gateway:** The IP address for the network gateway. ➢ **Netmask**: The IP address for net mask. ➢ **Progress State:** After pressing the **Ping** button, the icon here will be changing accordingly. • NuWIN-RM is idle • system is perform ping command • System got reply from destination IP • Destination IP is not replying ➢ **ICMP Reply:** Number of ICMP (Internet Control Message Protocol) reply that occurs. ➢ **ICMP Timeout:** Number of ICMP (Internet Control Message Protocol) timeout that occurs.

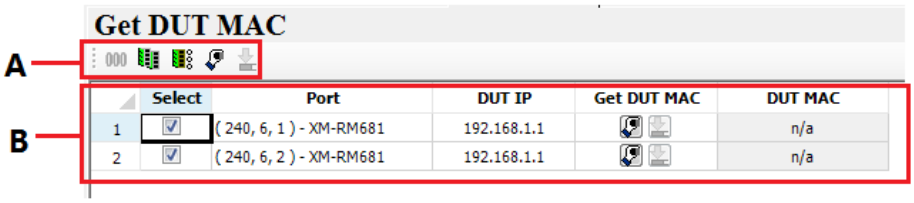
Ping Function	
	➢ **ARP Reply:** Number of ARP (Address Resolution Protocol) reply that occurs. ➢ **ARP Timeout:** Number of ARP (Address Resolution Protocol) timeout that occurs. ➢ **DUT MAC：** MAC address of DUT.

6.11. Pre-configuration

This is a function provided to facilitate the users to conduct the network address configuration. There are two sub-functions, **Get DUT MAC** and **Router NAT**.



6.11.1. Get DUT MAC

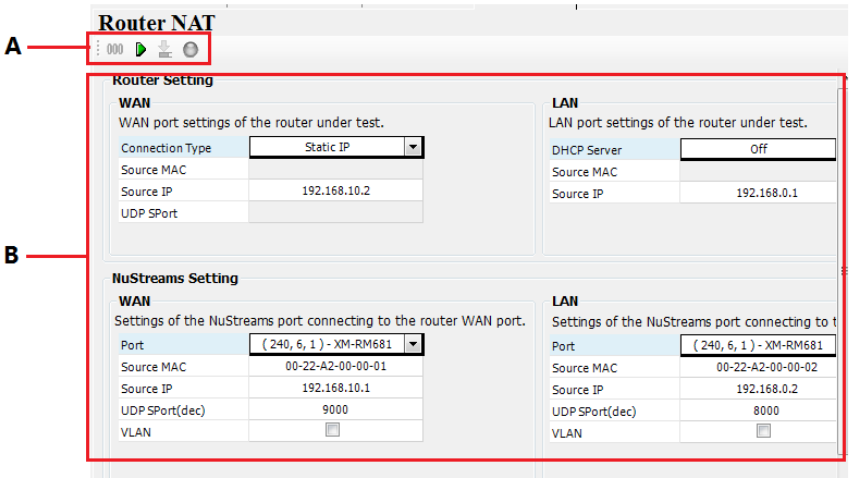


Get DUT MAC allows the user to automatically get the DUT MAC of the port and apply it to the packet settings of the stream.

Note: This function is available only when the DUT has an ARP reply function.

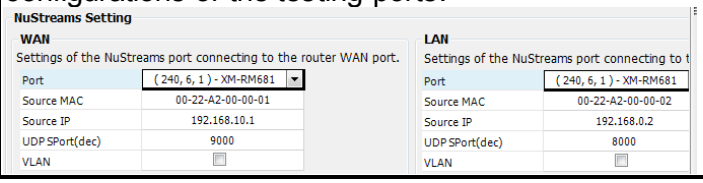
Get DUT MAC		
A. Control Buttons for All Ports	000	Press the **Clear** button to set all counters to zero.
		Port Map: you can choose the ports you want to execute the Get DUT MAC function here. Only the selected ports are listed in the table. The default setting is all ports are selected.
		Reset Port Map.
		Execute the Get DUT MAC function of all ports.
		The settings of all ports will be applied to the packet settings of the stream by clicking this button. You can check the result by view **Stream Generation**. For detailed information of **Stream Generation**, please refer to **6.2.1. Stream Generation**.
B. Settings/Report	➢ **Select:** only the ports check here can be further conducted functions as **Get DUT MAC** and **Set to Stream**. ➢ **DUT IP:** double-click the cell in this column, and then you can manually set the IP address of the DUT. ➢ **Get DUT MAC:** click button to execute the **Get DUT MAC** function of this port; Click button to set the settings to the stream. You can check the result by view **Stream Generation**. For detailed information of **Stream Generation**, please refer to **6.2.1. Stream Generation**. ➢ **DUT MAC:** This column will display the MAC addresses obtained by the **Get DUT MAC** function.	

6.11.2. Router NAT



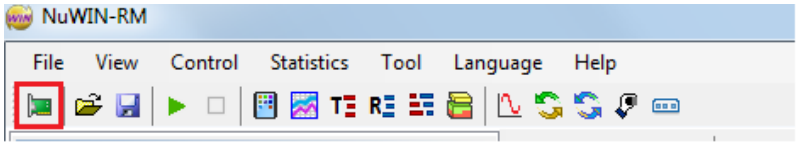
Router NAT is specially used when the DUT is a router. This function provides complete configuration information for testing the routers, which greatly facilitate the configuration work. The settings areas are divided into two types, the white areas and the gray areas. The content in the white area can be configured as the user's expectations while the content of the gray area is automatically obtained after running this function.

<table>
<tr><th colspan="3">Router NAT</th></tr>
<tr><td rowspan="4">A. Control Buttons for All Ports</td><td>  </td><td>Clear the settings in the gray cells.</td></tr>
<tr><td>  </td><td>Start running the Router NAT function.</td></tr>
<tr><td>  </td><td>The settings here will be applied to the packet settings of the stream by clicking this button. You can check the result by view Stream Generation. For detailed information of Stream Generation, please refer to 8. Stream Generation.</td></tr>
<tr><td>  </td><td>With Keep Active button activated, the system will transmit low flow data by correct configuration to ensure the smoothness of the link. If the correct configuration is not yet obtained, no actions should be taken.</td></tr>
<tr><td>B. Settings/Report</td><td colspan="2">The upper Router table shows the configurations of the router.
 

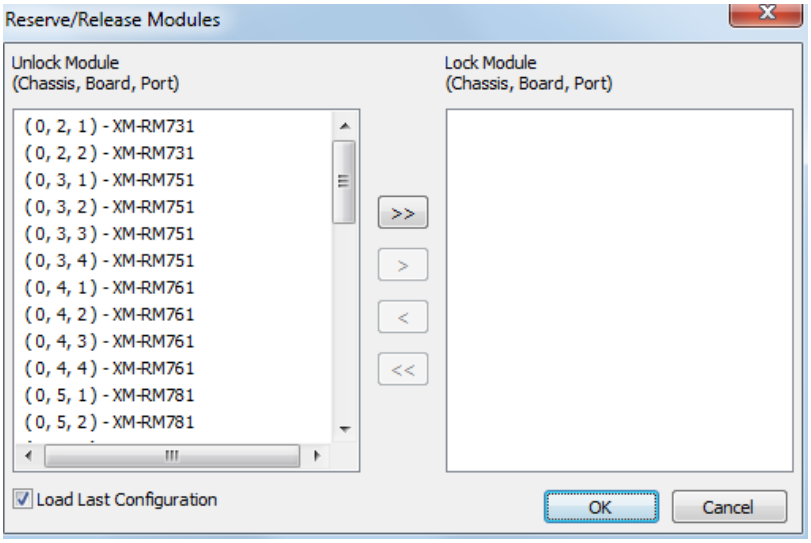
The lower NuStreams Port table shows the configurations of the testing ports.
 
</td></tr>
</table>

7. Reserve/Release Module

As mentioned previously, before making any test configurations, you have to reserve the ports. You can reserve/release the ports by click the **Reserve/Release Module** button.



Then the following window will pop up.

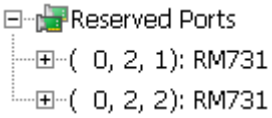


All available ports will be displayed in the **Unlock Module** field in the format of **(X, Y, Z) – Module Name**, where **(X, Y, Z)** is module card's port ID.

To reserve a port for tests, please click a port listed in the **Unlock Module** field, and click the **>** button. The port you've selected will be added to the **Lock Module** field. If you would like to reserve all ports available, click the **>>** button instead.

To release a port, please click a port listed in the **Lock Module** field, and click the **<** button. The port you've selected will be removed from the **Lock Module** field. If you would like to release you selected, click the **<<** button instead.

Please press **OK** to apply all the settings you've made, or press **Cancel** to cancel all the setting you've made.

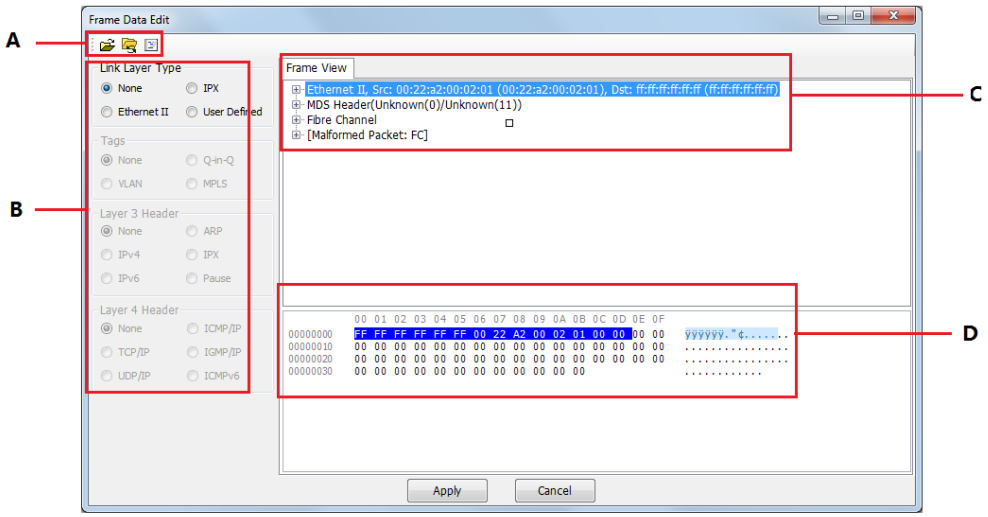


A **Processing…** window will pop up, displaying the port reserving/releasing process. All ports you've reserved will be displayed on **Function View** as shown left.

8. Editing Protocol with Frame Data Edit Window

You can set the frame protocol or view the contents of the frames with the **Frame Date Edit** window.

A **Frame Data Edit** window will pop up as shown in the picture down below:

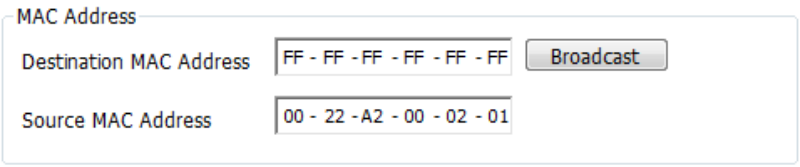


Descriptions		
A		Load a previously saved configuration file.
		Set all setting in **Frame Data Edit** window to default.
		Change to the user defined mode. You can edit the contents of the packet byte by byte through this function.
B	You can select the protocols for the frame here.	
C	**Frame View** displays the protocols of the frame.	
D	This section displays the detailed contents of the frame per byte.	

The following sections will be focusing on settings available for various protocols.

8.1. Link Layer Type

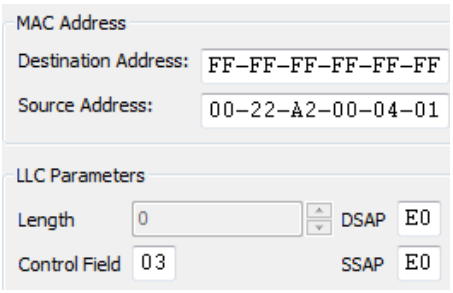
8.1.1. Ethernet II



The Ethernet II setting page allows you to set MAC Addresses.

MAC Address	
Destination Address	You can set the Destination MAC Address here in this field.
Source Address	You can set the Source MAC Address here in this field.
Broadcast	Press the **Broadcast** button to set the Destination MAC Address to broadcast MAC Address (FF-FF-FF-FF-FF-FF).

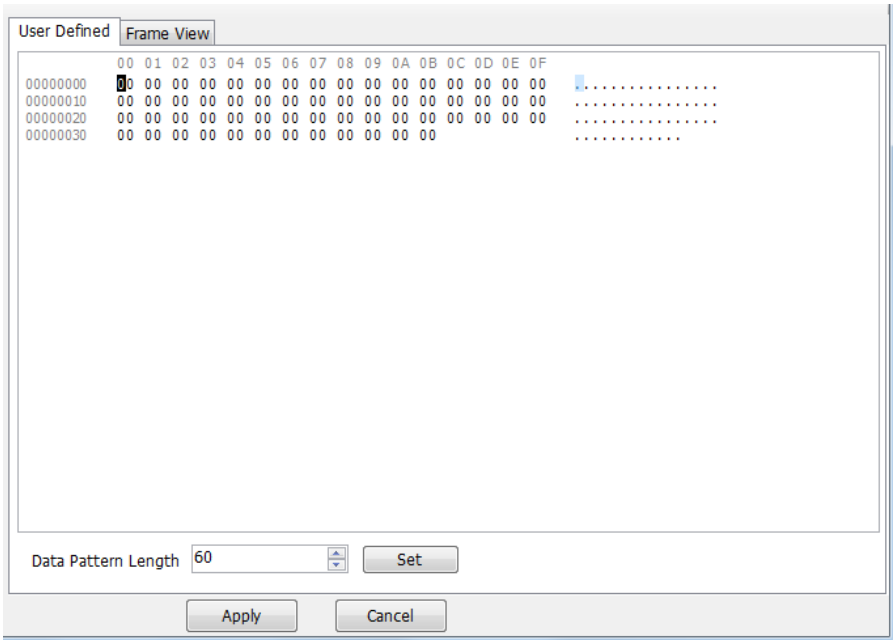
8.1.2. IPX



IPX stands for **Internetwork Packet Exchange**, an OSI-model Network layer protocol in the IPX/SPX protocol stack. Also, you can set LLC (Logical Link Control) headers on packets here as well.

MAC Address	
Destination Address	You can set the Destination MAC Address here in this field.
Source Address	You can set the Source MAC Address here in this field.
LLC Parameters	
Length	The length of LLC headers.
Control Field	The Control Field allows you to input codes that represent command, response, and sequence number information.
DSAP	DSAP stands for **Destination Service Access Point**. Service Access Point (SAP) is an identifying label for network endpoints.
SSAP	SSAP stands for **Source Service Access Point**. Service Access Point (SAP) is an identifying label for network endpoints

8.1.3. User Defined

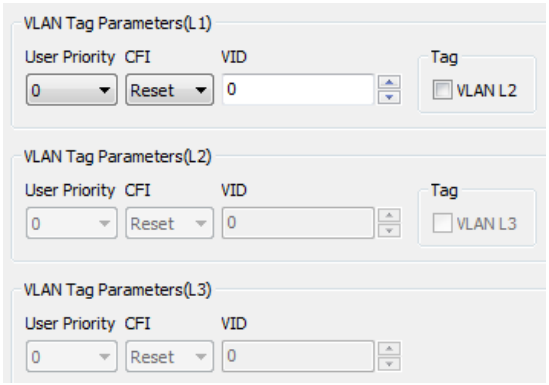


You can edit packets manually here. To input values, please click the value you would like to change.

User Defined	
Data Pattern Length	You can set the frame length here in this field. The range of the Data Pattern Length is from **54** to **2048**.
Set	Save and apply all the settings you've made here.
Apply	Save and apply all the settings you've made here and exit.
Cancel	Give up all the settings you've made here and exit.

8.2. Tags

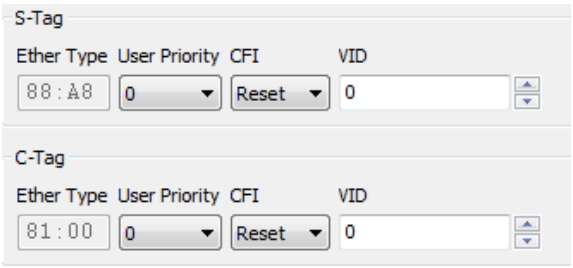
8.2.1. VLAN



VLAN (Virtual LAN) is a group of hosts with common requirements that communicate within the same Broadcast domain regardless of the physical location.

VLAN Tag Parameters (L1/L2/L3)	
User 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.
CFI	CFI stands for **Canonical Format Indicator**, a 1-bit field of the Ethernet frame that indicates if the packets' MAC addresses are non-canonical format or canonical format. To set the inserting packets as non-canonical format, please click the scroll-down menu and choose **Set**, and vice versa.
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.
Tag	You can add VLAN Tag Parameter (L2/L3) by check the VLAN L2/L3 check boxes.

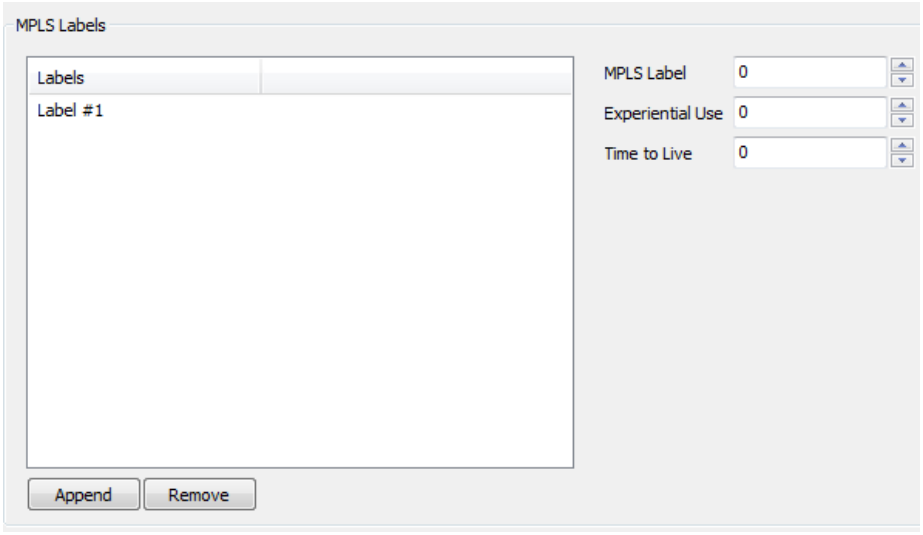
8.2.2. Q-in-Q



Q-in-Q is an Ethernet networking standard that allows multiple VLAN headers to be inserted into a single frame. You can set the S-TAG (Service-Tag) and C-TAG (Customer-Tag) here.

S-Tag/C-Tag	
Ether Type	You can input the **Ether Type** for the inserting packets here in this field. Ether Type is a two-octet field in an Ethernet frame, used to indicate which protocol is encapsulated in the Payload of an Ethernet Frame.
User 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.
CFI	CFI stands for **Canonical Format Indicator**, a 1-bit field in frames for compatibilities of Ethernet and Token Ring networks.
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.

8.2.3. MPLS

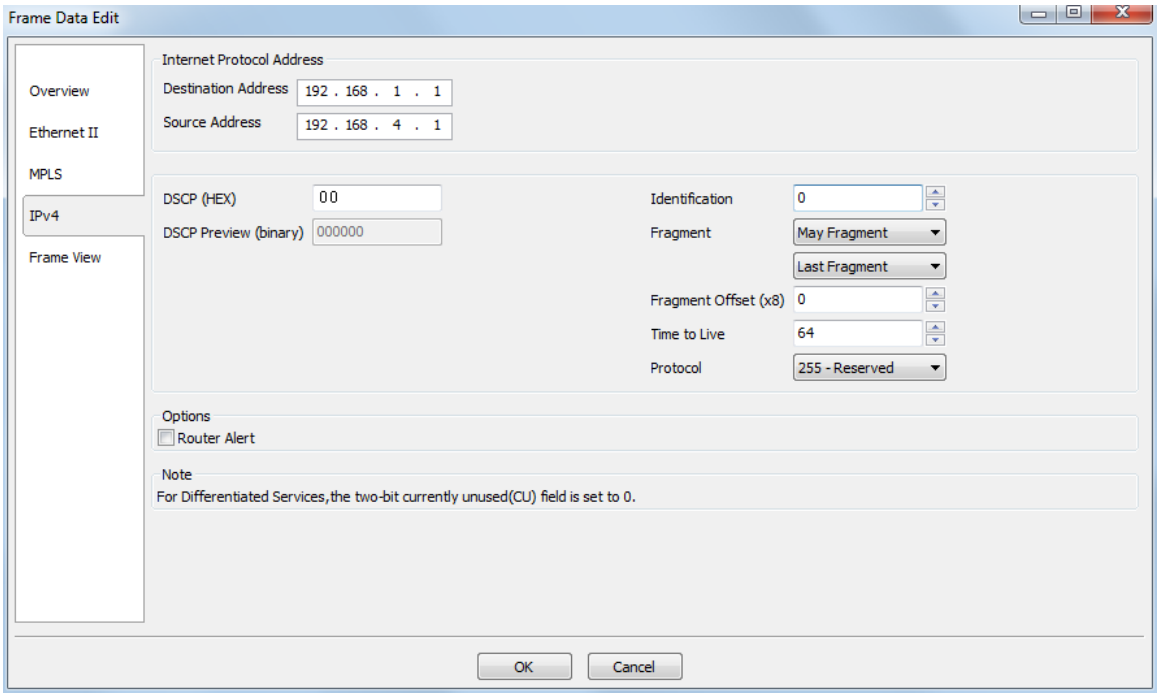


MPLS stands for **Multiprotocol Label Switching**, a mechanism in high-performance telecommunications networks which directs and carries data from one network node to the next with the help of labels.

MPLS Labels	
MPLS Label	You can add the MPLS label here in this field. The range of the **MPLS Label** is from **0** to **1048575**.
Experiential Use	This field allows you to set the VLAN priority. The value can be set from 0 to 7.
Time to Live	This field allows you to set the life span of the MPLS label. The range of the **Time to Live** is from **0** to **255**.
Append	Press this button to add the current settings to the **Label** field on the left part of **MPLS Labels**.
Remove	Press this button to remove the selected label from the **Label** field on the left part of **MPLS Labels**.

8.3. Layer 3 Header

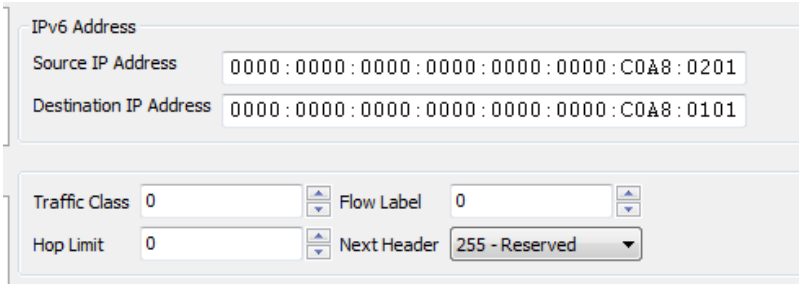
8.3.1. IPv4



IPv4 stands for **Internet Protocol version 4**, a connectionless protocol for use on packet-switched Link Layer networks. You can set destination/source IPv4 addresses here, as long as related headers here.

IPv4	
Internet Protocol Address	You can set the destination/source IPv4 addresses here in these fields.
DSCP(HEX)/ DSCP Preview(Binary)	DSCP stands for Differentiated Services Code Point. You can set the DSCP value in hex here. And the hex DSCP value will be automatically converted to binary in the down below **DSCP Preview (Binary)** field.
Identification	This field allows you to set the identification primarily used for uniquely identifying fragments of an original IP datagram. The range of the **Identification** is from **0** to **65535**.
Fragment	These two fields allow you to set the field that control or identify fragments.
Fragment Offset (x8)	The fragment offset field, measured in units of eight-byte blocks, is 13 bits long and specifies the offset of a particular fragment relative to the beginning of the original unfragmented IP datagram. The range of the fragment offset is from 0 to 8191.
Time to Live	This field allows you to set the life span of the data. The range of the **Time to Live** is from **0** to **255**.
Protocol	This field allows you to set the protocol tag. You can set the protocol as 1-ICMP, 2-IGMP, 6-TCP, 17-UDP, 255-Reserved, and User Select.
Router Alert	

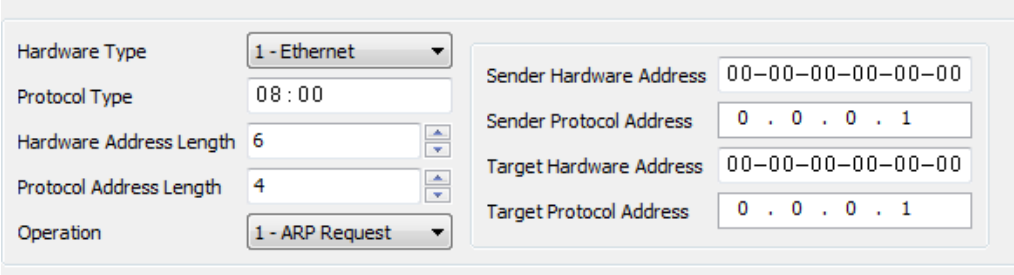
8.3.2. IPv6



IPv6 stands for **Internet Protocol version 6**, an Internet Layer protocol for packet-switched internetworking and provides end-to-end datagram transmission across multiple IP networks. You can set destination/source IPv6 addresses here, as long as related headers here.

IPv4	
IPv6 Address	You can set the destination/source IPv6 addresses here in these fields.
Traffic Class	This field allows you to set the IPv6 protocol Traffic Class header. The range of the **Traffic Class** is from **0** to **255**.
Payload Length	This field allows you to set the IPv6 protocol Payload Length header. The range of the **Payload Length** is from **0** to **65535**.
Next Header	This field allows you to set the IPv6 protocol Next Header. You can set the protocol as 1-ICMP, 2-IGMP, 6-TCP, 17-UDP, 58-ICMPv6, and 255-Reserved.
Flow Label	This field allows you to set the IPv6 protocol Flow Label header.
Hop Limit	This field allows you to set the IPv6 protocol Hop Limit header.

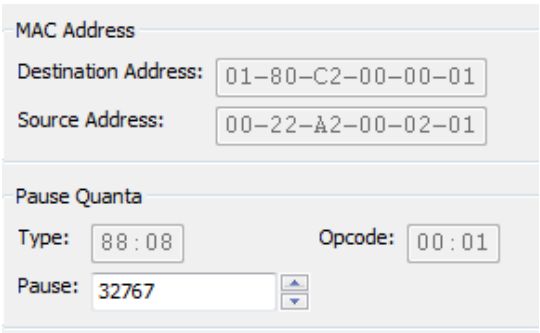
8.3.3. ARP



ARP stands for **Address Resolution Protocol**, a protocol used for resolution of Layer 3 addresses into Layer 2 addresses during internetwork transmissions.

ARP	
Hardware Type	This field specifies the network protocol type. You can set the Hardware Type as 0-Unknow or 1-Ethernet.
Protocol Type	The Protocol Type field allows you to set the Ethernet frame which is used to indicate which protocol is encapsulated in the Payload of an Ethernet Frame. For example, Protocol Type as **08:00** indicates IPv4 protocol.
Hardware Address Length	This field allows you to set length (in octets) of a hardware (MAC) address.
Protocol Address Length	This field allows you to set length (in octets) of a protocol (IP) address.
Operation	This field allows you to set the operations the sender will take. The operations include 0-Unknown, 1-ARP Request, 2-ARP Reply, 3-RARP Request, and 4-RARP Reply.
Sender Hardware/Protocol Address	You can set the sender's (source) MAC/IP addresses here.
Target Hardware/Protocol Address	You can set the target's (destination) MAC/IP addresses here.

8.3.4. Pause

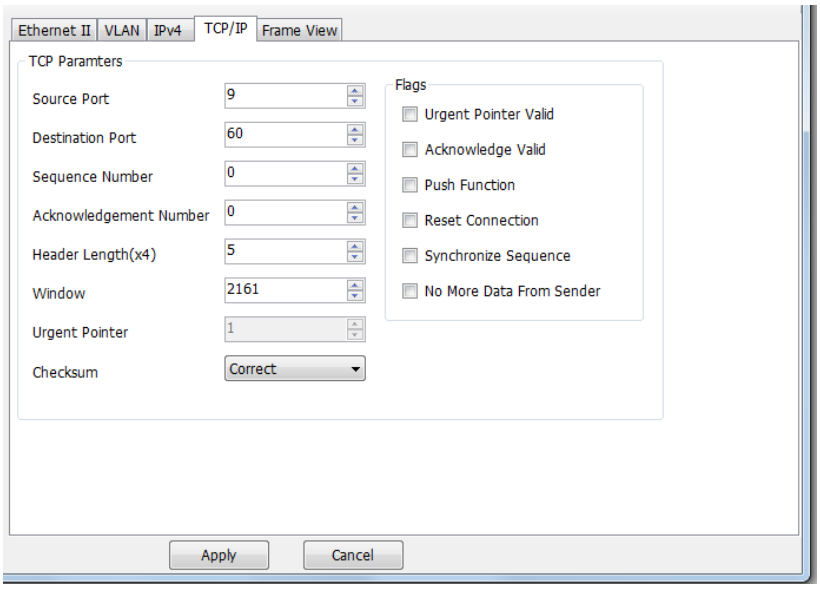


The PAUSE frame is a frame that halts the transmission of the sender for a specified period of time.

Pause	
Destination Address	This field displays the destination MAC address.
Source Address	This field displays the source MAC address.
Type	This field displays the protocol type of the Pause Frame (88:08).
Opcode	This field displays the Operation Code (opcode).
Pause	You can set the pause value here in this field.

8.4. Layer 4 Header

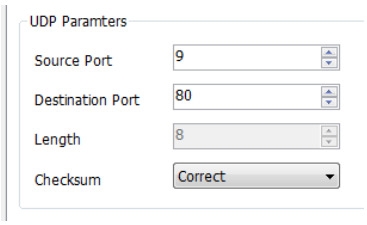
8.4.1. TCP/IP



TCP stands for **Transmission Control Protocol**, one of the two original components of the suite, complementing the Internet Protocol (IP), and therefore the entire suite is commonly referred to as TCP/IP.

TCP/IP	
Source Port	You can set the source port number here in this field.
Destination Port	You can set the destination port number here in this field.
Sequence Number	This field allows you to set the TCP sequence number.
Acknowledgement Number	This field allows you to set the TCP acknowledgement (ACK) number.
Header Length (x4)	This field allows you to set the header length.
Urgent Pointer	This field displays the Urgent Pointer. If you would like to set the urgent pointer, please check the **Urgent Pointer Valid** check box.
Flags	This field contains various flags of TCP, including **Urgent Pointer Valid**, **Acknowledge Valid**, **Push Function**, **Reset Connection**, **Synchronize Sequence**, and **No More Data From Sender**. To add a flag to the TCP header, please check the check box in the **Flags** field.

8.4.2. UDP/IP

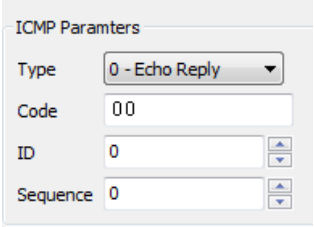


UDP stands for **User Datagram Protocol**, one of the core members of the Internet Protocol Suite that allows computer applications send messages (referred to as datagrams) to other hosts on an Internet

Protocol (IP) networks without requiring prior communications to set up special transmission channels or data paths.

UDP/IP	
Source Port	You can set the UDP source port number here in this field.
Destination Port	You can set the UDP destination port number here in this field.
Length	The length in bytes of the entire datagram including header and data.
Checksum	You can set the checksum of the datagram, including **Null**, **Correct** and **Incorrect**.

8.4.3. ICMP/IP



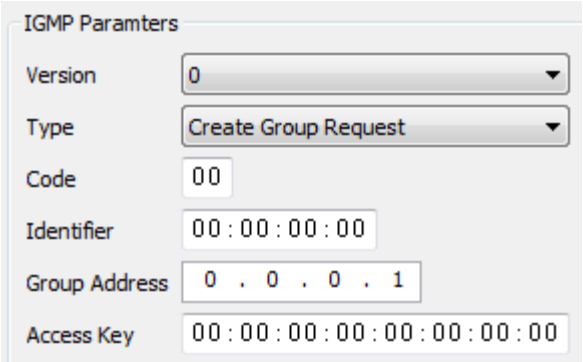
ICMP stands for **Internet Control Message Protocol**, one of the core protocols of the Internet Protocol Suite that is used by the operating systems of networked computers to send error messages indicating, for example, that a requested service is not available or that a host or router could not be reached.

ICMP/IP	
Type	You can set the ICMP type here with the scroll-down menu. The ICMP types available here include 0-Echo Reply and 8-Echo Request.
Code	You can set the subtype to the given type here in this field.
ID	You can set the ICMP ID here in this field.
Sequence	You can set the ICMP sequence number here in this field.

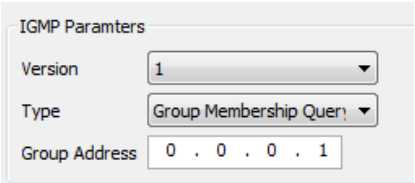
8.4.4. IGMP/IP

IGMP stands for **Internet Group Management Protocol**, a communications protocol used by hosts and adjacent routers on IP networks to establish multicast group memberships.

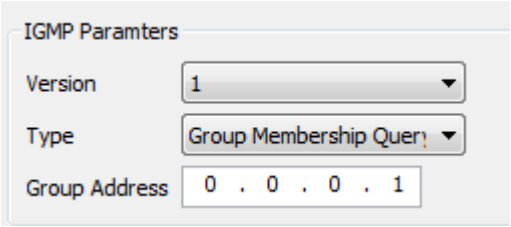
There are three different versions available here: **IGMP version 0** (defined in RFC 988), **IGMP version 1** (defined in RFC 1054, 1112, 1122, and 1812), and **IGMP version 2** (defined in RFC 2236 and 2113). The IGMP parameter setting pages will change according to the IGMP version you've chosen on the **Version** scroll down menu.



IGMP/IP Version 0	
Version	The **Version** scroll-down menu allows you to set the IGMP version.
Type	You can set the IGMP type here. The IGMP types in the scroll-down menu include Create Group Request/Reply, Join Group Request/Reply, Leave Group Request/Reply, and Confirm Group Request/Reply.
Code	You can input Max Resp Code here in this field.
Identifier	You can input the Identifier here in this field.
Group Address	You can set the group multi-cast address here in this field.
Access Key	You can set the access key values here in this field.

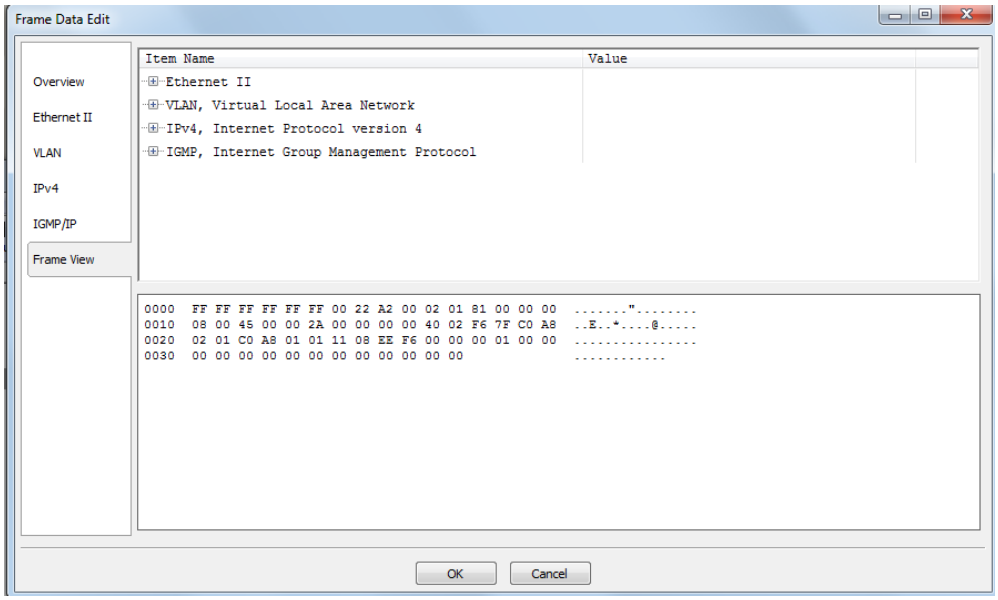


IGMP/IP Version 1	
Version	The **Version** scroll-down menu allows you to set the IGMP version.
Type	You can set the IGMP type here. The IGMP types in the scroll-down menu include Create Group Request/Reply, Join Group Request/Reply, Leave Group Request/Reply, and Confirm Group Request/Reply.
Group Address	You can set the group multi-cast address here in this field.



IGMP/IP Version 2	
Version	The **Version** scroll-down menu allows you to set the IGMP version.
Type	You can set the IGMP type here. The IGMP types in the scroll-down menu include Create Group Request/Reply, Join Group Request/Reply, Leave Group Request/Reply, and Confirm Group Request/Reply.
Max Response Time	This field allows you to set the maximum allowed time before sending a responding report.
Group Address	You can set the group multi-cast address here in this field.

8.5. Frame View



You can view the headers/tags you've configured here. Also, you can high-light and manually edit the specific code for the headers/tags here as well.

Doc #USM_C#NuWIN-RM_V1.0_ENG_20170523