



# NuWIN

## User Manual

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## 1. Introduction

### 1.1 NuWIN



NuWIN provides a powerful and sophisticated virtual front panel to manage the NuStreams-2000i and NuStreams-600 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 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 is available based on source and/or destination MAC and/or IP addresses, data patterns, and error conditions.

NuWIN 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.

## 1.2 NuStreams Chassis

NuStreams-2000i is an advanced built-in Ethernet testing system. NuStreams-600 is a compact, portable, and desktop Ethernet testing system. Both support layer 2~7 and wire-speed layer 2/3 packet generation/receipt for multiple DUT (Device Under Test).



NuStreams-2000i comprises XM-2113C (built-in IPC) and various module cards as below:

- ✓ XM-2S8G (internal switch module),
- ✓ XM-2S19 (Module card element collection module),
- ✓ XM-2301 (one RJ-45 port 10/100/1000 Mbps),
- ✓ XM-2301G (one Mini-GBIC port 1000 Mbps),
- ✓ XM-23L4 (four RJ-45 port 10/100/1000 Mbps),
- ✓ XM-23L4G (four Mini-GBIC port 1000 Mbps),
- ✓ XM-28L1(one XFT port 10Gbps),
- ✓ XM-28L1CX4 (one CX4 port 10 Gbps),
- ✓ XM-22R4 (four RJ-45 port 10/100 Mbps),
- ✓ XM-22R4F (four Mini-GBIC port 100 Mbps),
- ✓ XM-23R2 (two RJ-45 port 10/100/1000 Mbps),
- ✓ XM-23R2G (two Mini-GBIC port 1000 Mbps),
- ✓ XM-2WL1 (AC power monitor /control module),

Up to 16 module cards and 2 switch cards of various media types and speeds may be included in a single chassis.



NuStreams-600 also comprises various module cards, including:

- ✓ XM-2S23 (internal switch module),
- ✓ XM-2301 (one RJ-45 port 10/100/1000 Mbps),
- ✓ XM-2301G (one Mini-GBIC port 1000 Mbps),
- ✓ XM-23L4 (four RJ-45 port 10/100/1000 Mbps),
- ✓ XM-23L4G (four Mini-GBIC port 1000 Mbps),
- ✓ XM-28L1(one XFT port 10Gbps),
- ✓ XM-28L1CX4 (one CX4 port 10Gbps),
- ✓ XM-22R4 (four RJ-45 port 10/100 Mbps),
- ✓ XM-22R4F (four Mini-GBIC port 100 Mbps),
- ✓ XM-23R2 (two RJ-45 port 10/100/1000 Mbps),
- ✓ XM-23R2G (two Mini-GBIC port 1000 Mbps),
- ✓ XM-2WL1 (AC power monitor /control module),

Up to 7 module cards and 1 switch card may be included in a single chassis.



All chassis help administrators utilize full range of features available in each module card and configure frame content. NuStreams-2000i can be structured as a chain of chassis via the front-panel connections of XM-2S19 (10/100 Mbps) or XM-2S8G (1Gbps)—up to 256 of them. Daisy-chaining of 8 NuStreams-2000i has been successfully tested.

Designed for laboratorial and manufacturing testing, administrators can remotely monitor and control it with Client-Server architecture in host application using NuWIN, which offers complete configuration, control, and monitoring of all DUT.

NuWIN provides Group Panel for simultaneously configuring/controlling packets through selected ports, and its X-Trailer appendage function serves as verification of the forwarding packets. The front panel display of NuStreams-2000i/600 gives immediate indication of link status, transmission or reception of packets, and error conditions.

The receive-counters reveal detailed testing information, and Windows-based platform offers user-friendly UI. Administrators can configure and control the unit directly by sending commands via the front-panel connections of XM-2S8G (NuStreams-2000i) and XM-2S23 (NuStreams-600) to the rest of the module cards. NuStreams-2000i is driven by an Intel Pentium based IPC running Windows XP and NuStreams supplied software, and each chassis may be directly connected to a monitor, keyboard and mouse. NuStreams-2000i/600 is typical to connect all chassis via an Ethernet network and run the NuWIN or C++ API based software on one or more external workstation. NuStreams software runs on any Windows XP Professional/Advanced Server based system.

## 1.3 Specification

Product Function	NuStreams-2000i	NuStreams-600
Module Capability	Up to 16	Up to 7
Dimensions	295 mm X 485 mm X 196 mm	237 mm X 220 mm X 192 mm
Weight (including switch module, backplane, and IPC)	11 kg	3.2 kg
Chassis Size	4U	4U
Power Supply	400 Watt	250 Watt
AC Current	Maximum 7 AMP	Maximum 2.8 AMP
AC Voltage	90 to 240 VAC	
AC Frequency	50 to 60 Hz	
IPC	XM-2113C	N/A
Multiple User	4	4
Switch Module	XM-2S8G	XM-2S23
Connector	Power: Male IEC 320 receptacle Keyboard/ Mouse: PS/2 combo port Monitor: HD DB15 VGA port Ethernet: RJ-45 Gigabit port X 2 Serial: RS-232 port x 2 USB 2.0 x 2	Power: Male IEC 320 receptacle Ethernet: RJ-45 10/100 Mbps
Temperature	Operating: 0°C to 40°C (32°F to 104°F); Storage: 0°C to 50°C (32°F to 122°F)	
Humidity	Operating: 0% to 85% RH, non-condensing; Storage: 0% to 85% RH, non-condensing	

## 1.4 NuStreams Package

Check the package to insure the following items are shipped with NuStreams Testing Systems.

- ✓ One SJT Power Cord (XT03012103)
- ✓ One Cable Assembly (DB-9P (M)+(F) XT03012102)
- ✓ Plug Assembly (CAT5 8P8C PLUG Ass'y XT03012101-70)
- ✓ NuWIN CD
- ✓ NuWIN for NuStreams-2000i/600 User Manual (this document).

## 2. Function Description

### 2.1 NuStreams Hardware



#### 2.1.1 Chassis

Each chassis can operate as a complete stand-alone system when connected to a local monitor, keyboard and mouse. The PC embedded in the system (NuStreams-2000i) is an Intel compatible computer system that includes:

- ✓ A Pentium processor
- ✓ Main memory
- ✓ Keyboard interface
- ✓ Mouse interface
- ✓ Internal connection to the NuStreams Backplane
- ✓ Video interface capable of 1024 x 768 resolution
- ✓ Gigabit Ethernet network interface card



The NuStreams backplane is connected to the PC MB through a NuStreams custom PCI interface card and to the card slots into which the NuStreams port modules plug in.

## 2.1.2 Module Card

Model	XM-2301	XM-2301G
Photo		
Test Port	1	1
Interface	RJ-45	Mini-GBIC
CPU	32 bits communication processor	
Speed and Mode	10/100 Mbps: Half/ Full Duplex; 1000 Mbps: Full Duplex	1000 Mbps: Full Duplex
Auto MDI /MDIX	Yes	N/A
NWay	Enable /Disable	
Preamble	4 ~ 16 Bytes	
Frame Length (w/o VLAN Tag)	48 ~ 2,036 Bytes, Fixed /Increase /Random /Loop	48 ~ 16,379 Bytes, Fixed /Increase /Decrease /Random /Loop
Data Field	Fixed /increase /decrease /random in byte or in word; User defined; Pre-defined patterns	
Inter-frame Gap	Fixed /Random (10 Mbps: 400 ns ~ 13.42 sec; 100 Mbps: 40 ns ~ 1.342 sec; 1000 Mbps: 8 ns ~ 0.1342 sec)	Fixed /Random (1000 Mbps: 8 ns ~ 0.1342 sec)

Error Generation	10/100 Mbps: No CRC, CRC Error, Alignment Error, Collision, IP Checksum Error, Dribble Error; 1000 Mbps: No CRC, CRC Error, IP Check Sum Error	1000 Mbps: No CRC, CRC Error, IP Checksum Error
Collision	Single /Multi /Excess	
Data Integrity /Sequence Checking	Yes	
Source /Destination MAC Address	48 bits, Fixed /Increase /Decrease /Random	
Source /Destination IP Address	Fixed /Increase /Random	
IP Generation	Hardware	
VLAN (VLAN ID /COS Field)	Fixed /Increase /Decrease /Random	
MPLS (Label /COS /TTL Field)	Fixed /Increase /Decrease /Random (Up to 2 stack labels)	
Flow Control	Asymmetric; Response to 802.3x Flow Control Frames (default as reception)	
Capture Buffer Size	512 packets (2K bytes /packet)	
Capture Mode	After /Before /Event /8 Packets after Event	
Capture Event	All Condition, CRC Error, DI Error, Serial No. Error, Alignment Error, IP Checksum Error, Trigger 1 ~ 4,	
	Any Defined Packet Size	
QoS Testing	Up to 4 Priority Queues	
Line Performance	Wire Speed	


Please note that the module card can be removed with that slot being powered off in NuStreams-2000i. Or shut down the chassis before plugging/unplugging any module cards.

Model	XM-23L4	XM-23L4G
Photo		
Test Port	4	4
Interface	RJ-45	Mini-GBIC
CPU	32 bits communication processor	
Speed and Mode	10/100 Mbps: Half /Full Duplex; 1000 Mbps: Full Duplex	1000Mbps: Full Duplex
Auto MDI / MDIX	Yes	NA
NWay	Enable/ Disable	
Preamble	6 ~ 15 Bytes	
Frame Length	48 ~ 16,379 Bytes (without CRC): Fixed /Increase /Decrease /Random	
Inter-frame Gap	Fixed /Random (10 Mbps: 4800 ns ~ 13.42 sec; 100 Mbps: 480 ns ~ 1.342 sec; 1000 Mbps: 88 ns ~ 0.1342 sec)	Fixed /Random (1000 Mbps: 88 ns ~ 0.1342 sec)
Data Field	All zeros, All ones, 55, AA, 55AA, 5A5A, 00FF, 0000FFFF, 8-0's 8-F's, Fixed /Increase /Decrease /Random in byte or in word; User defined;	
Error Generation	10/100 Mbps: No CRC, CRC Error, Alignment Error, IP Checksum Error, Dribble Error;  1000 Mbps: No CRC, CRC Error, IP Checksum Error	No CRC, CRC Error, IP Checksum Error

Data Integrity / Sequence Checking	Yes
Source / Destination MAC Address	32 bits variation: Fixed /Increase /Decrease/Random
Source / Destination IP Address	16 bits variation: Fixed /Increase /Decrease/Random
IPv4 checksum Generation	Hardware
Hardware counters	TX Packet/Bytes, RX Packet/Byte, Unicast, Multicast, Broadcast, VLAN Packet, Pause Packet, CRC Error, DI Checksum Error, Serial Number Error, Alignment Error, Oversize Packet, Undersize Packet, Dribble Bit, IP Checksum Error, Trigger 1 ~ Trigger 8, Collision TxArpReq, TxArpReply, RxArpReq, RxArpReply, TxICMPReq, TxICMPReply, RxICMPReq, RxICMPReply
VLAN (VLAN ID / COS Field)	Fixed /Increase /Decrease /Random
Flow Control	Asymmetric; Response to 802.3x Flow Control Frames (default as reception)
QoS test	Up to 8 Priority Queues
Line Performance	Wire Speed


Please note that the module card can be removed with that slot being powered off in NuStreams-2000i. Or shut down the chassis before plugging/unplugging any module cards.



Model	XM-28L1
Photo	
Standard	IEEE 802.3ae-compliant 10GBASE-R (LAN)
Interface	Pluggable XFP (ordered separately)
Speed and Duplex Mode	10Gbps Full Duplex Only
CPU	32 bits communication processor
Preamble	8 Bytes (Fixed)
Frame Length	48 ~ 16,384 Bytes (without CRC): Fixed /Increase /Decrease /Random /Loop
Transmit Mode	Single /Burst /Multi Burst /Continuous
Inter-frame Gap	8.8 nSec. ~ 0.013422 Sec. Unit: Packets/Sec, %Utilization, Random, Databits/Sec, Frame bits/Sec, Total bits/Sec, nSec, uSec, mSec, Sec
Data Pattern	0055, AA, 55 AA, 5A 5A, FF FF, 8-0's 8-F's, 16-0's 16-F's, 32-0's 32-F's, 64-0's 64-F's, Random, Incrementing byte, Incrementing word, Decrementing byte, Decrementing word; Custom
Error Generation	CRC Error, IP Checksum Error, Undersize, Oversize
Data Integrity Verification /Sequence Checking	Yes
Source / Destination MAC Address	Fixed /Increase /Decrease /Random


Source /Destination IP Address	Fixed /Increment /Decrement /Random
IPv4 checksum generation	Hardware
Hardware Counters	TX Packet/Bytes, RX Packet/Byte, Unicast, Multicast, Broadcast, VLAN Packet, Pause Packet, CRC Error, DI Checksum Error, Serial Number Error, Oversize Packet, Undersize Packet, IP Checksum Error, Unframed BERT, Trigger 1 ~ 8, TxArpReq, TxArpReply, RxArpReq, RxArpReply, TxICMPReq, TxICMPReply, RxICMPReq, RxICMPReply
VLAN (VLAN ID /COS Field)	Fixed /Increase /Decrease /Random
QoS Testing	Up to 8 Priority Queues
Line Performance	10.3125 Gbps

Please note that the module card can be removed with that slot being powered off in NuStreams-2000i. Or shut down the chassis before plugging/ unplugging any module cards.

Model	XM-28L1CX4
Photo	
Standard	IEEE 802.3ak-compliant 10GBASE-CX4
Interface	CX4
Speed and Duplex Mode	10Gbps Full Duplex Only
CPU	32 bits communication processor
Preamble	8 Bytes (Fixed)
Frame Length	48 ~ 16,384 Bytes (without CRC): Fixed /Increase/Decrease /Random /Loop
Transmit Mode	Single /Burst /Multi Burst /Continuous
Inter-frame Gap	8.8 nSec. ~ 0.013422 Sec. Unit: Packets/Sec, %Utilization, Random, Databits/Sec, Frame bits/Sec, Total bits/Sec, nSec, uSec, mSec, Sec
Data Pattern	0055, AA, 55 AA, 5A 5A, FF FF, 8-0's 8-F's, 16-0's 16-F's, 32-0's 32-F's, 64-0's 64-F's, Random, Incrementing byte, Incrementing word, Decrementing byte, Decrementing word; Custom
Error Generation	CRC Error, IP Checksum Error, Undersize, Oversize
Data Integrity Verification /Sequence Checking	Yes
Source /Destination MAC Address	Fixed /Increase /Decrease /Random
Source /Destination	Fixed /Increase /Decrease /Random





IP Address	
IPv4 checksum generation	Hardware
Hardware Counters	TX Packet/Bytes, RX Packet/Byte, Unicast, Multicast, Broadcast, VLAN Packet, Pause Packet, CRC Error, DI Checksum Error, Serial Number Error, Oversize Packet, Undersize Packet, IP Checksum Error, Unframed BERT, Trigger 1 ~ 8, TxArpReq, TxArpReply, RxArpReq, RxArpReply, TxICMPReq, TxICMPReply, RxICMPReq, RxICMPReply
VLAN (VLAN ID /COS Field)	Fixed /Increase /Decrease /Random
QoS Testing	Up to 8 Priority Queues
Line Performance	10.3125 Gbps

Please note that the module card can be removed with that slot being powered off in NuStreams-2000i. Or shut down the chassis before plugging/unplugging any module cards.

Model	XM-22R4
Photo	
Interface	RJ-45
Speed and Duplex Mode	10/100Mbps Half/Full Duplex Mode
CPU	MPC852T
Preamble	8 Bytes (Fixed)
Frame Length	48 ~ 2,036 Bytes (without CRC): Fixed /Increment /Decrement /Random /Loop
Transmit Mode	Single /Burst /Multi Burst /Continuous
Inter-frame Gap	8.8 nSec. ~ 0.013422 Sec. Control: fixed/ random Unit: Packets/Sec, %Utilization, Bit Time, Line Rate, Databits/Sec, Frame bits/Sec, Total bits/Sec, nSec, uSec, mSec, Sec
Data Pattern	0055, AA, 55 AA, 5A 5A, FF FF, 8-0's 8-F's, 16-0's 16-F's, 32-0's 32-F's, 64-0's 64-F's, Random, Incrementing byte, Incrementing word, Decrementing byte, Decrementing word; Custom
Error Generation	CRC Error, Alignment Error, Dribble Error, IP Checksum Error, Undersize, Oversize
Data Integrity Verification /Sequence Checking	Yes
Source /Destination MAC Address	Fixed /Increase /Decrease /Random

	Variable fields can be set depends on UI, max length of each field is 32-bit
Source /Destination IP Address	Fixed /Increase /Decrease /Random
IPv4 checksum generation	Hardware
Hardware Counters	TX Packet/Bytes, RX Packet/Byte, Unicast, Multicast, Broadcast,UDF Logic ,VLAN Packet ,MPLS Packet ,Pause Packet ,IPv4 Packet ,IPv6 Packet ,TCP Packet ,CRC Error , DI Checksum Error, Serial Number Error ,Oversize Packet , Undersize Packet ,Fragment Packet ,Jabber Packet ,CAE Packet ,IP Checksum Error ,TCP Checksum Error ,UDP Checksum Error ,BERT Error ,64 Bytes ,64-127 Bytes ,128-255 Bytes ,256-511 Bytes ,512-1023 Bytes, 1024-1518 Bytes Trigger 1 ~ 8 ,Total Collision ,Single Collision ,Multi Collision ,Excess Collision ,Late Collision ,TxArpReq ,TxArpReply ,RxArpReq , RxArpReply ,TxICMPReq ,TxICMPReply ,RxICMPReq , RxICMPReply
VLAN (VLAN ID / COS Field)	Fixed /Increase /Decrease /Random
QoS Testing	Up to 8 Priority Queues
Line Performance	Wire Speed



Please note that the module card can be removed with that slot being powered off in NuStreams-2000i. Or shut down the chassis before plugging/unplugging any module cards.

Model	XM-22R4F WCO	XM-22R4F WCP	XM-22R4F SFP	XM-22R4F SFF
Photo				
Test Port	4			
Interface	<p>WCO: 155Mbps Bi-direction SC receptacle single fiber transceiver, Tx1550, Rx1310</p> <p>WCP: 155Mbps Bi-direction SC receptacle single fiber transceiver, Tx1310, Rx1550</p> <p>SFP: User-selectable 100 Base-X SFP transceiver</p> <p>SFF: 100Base-X Fiber transceiver in 2x5 package style</p>			
Speed	100 Mbps Fiber			
CPU	MPC852T			
Preamble	4 ~ 16 Bytes			
Frame Length	48 ~ 2,036 Bytes: Fixed /Increase /Decrease /Random /Loop			
Transmit Mode	Single /Burst /Multi Burst /Continuous			
Inter-frame Gap	<p>100 Mbps: 480 ns ~ 2 sec</p> <p>Control: fixed/ random</p> <p>Unit: Packets/Sec, %Utilization, Bit Time, Line Rate, Databits/Sec, Frame bits/Sec, Total bits/Sec, nSec, uSec, mSec, Sec</p>			
Data Pattern	0055, AA, 55 AA, 5A 5A, FF FF, 8-0's 8-F's, 16-0's 16-F's, 32-0's 32-F's, 64-0's 64-F's, Random, Incrementing byte, Incrementing word, Decrementing byte, Decrementing word; Custom			
Error Generation	CRC Error, Alignment Error, Dribble Error, IP Checksum Error			
Data Integrity Verification /Sequence	Yes			

Checking	
Source /Destination MAC Address	Fixed /Increment /Decrement /Random Variable fields can be set depending on UI, max length of each field is 32-bit
Source /Destination IP Address	Fixed /Increase /Decrease/Random
IPv4 checksum generation	Hardware
Hardware Counters	TX Packet/Byte, RX Packet/Byte, Unicast, Multicast, Broadcast, UDF Logic, VLAN Packet, MPLS Packet, Pause Packet, IPv4 Packet, IPv6 Packet, TCP Packet, CRC Error, DI Checksum Error, Serial Number Error, Oversize Packet, Undersize Packet, Fragment Packet, Jabber Packet, CAE Packet, IP Checksum Error, TCP Checksum Error, UDP Checksum Error, BERT Error, 64 Bytes, 64-127 Bytes, 128-255 Bytes, 256-511 Bytes, 512-1023 Bytes, 1024-1518 Bytes, Trigger 1 ~ 8, Total Collision, Single Collision, Multi Collision, Excess Collision, Late Collision, TxArpReq, TxArpReply, RxArpReq, RxArpReply, TxICMPReq, TxICMPReply, RxICMPReq, RxICMPReply
VLAN (VLAN ID / COS Field)	Fixed /Increase /Decrease /Random
MPLS (Label/COS/ TTL Field)	Fixed/ Increase/ Decrease/ Random (No. of labels not limited)
Flow Control	Yes
Capture Buffer Size	8 MB per port (up to 104 k frames)
Capture Mode	Event
Capture Event	All condition, CRC Error, DI Error, Serial No. Error, Alignment Error, IP Checksum Error, Trigger 1~8, Trigger Logic, Any Defined Packet Size
QoS Testing	Up to 8 Priority Queues
Line Performance	Wire Speed

Please note that the module card can be removed with that slot being powered off in NuStreams-2000i. Or shut down the chassis before plugging/unplugging any module cards.



Model	XM-23R2	XM-23R2G
Photo		
Test Port	2	2
Interface	RJ-45	Mini-GBIC
CPU	MPC352T	
Speed and Mode	10/100 Mbps: Half /Full Duplex; 1000 Mbps: Full Duplex	1000Mbps: Full Duplex
Preamble	4 ~ 16 Bytes	
Frame Length	48 ~ 8,192 Bytes: Fixed /Increase /Decrease /Random	
Inter-frame Gap	Control: Fixed /Random (10 Mbps: 4800 ns ~ 13.42 sec; 100 Mbps: 480 ns ~ 1.342 sec; 1000 Mbps: 48 ns ~ 0.2 sec)	
	Unit: Packets/Sec, %Utilization, Bit Time, Line Rate, Databits/Sec, Frame bits/Sec, Total bits/Sec, nSec, uSec, mSec, Sec	
Data Field	All zeros, All ones, 55, AA, 55AA, 5A5A, 00FF, 0000FFFF, 8-0's 8-F's, Fixed /Increase /Decrease /Random in byte or in word; User defined;	
Error Generation	No CRC, CRC Error, Alignment Error, Dribble Error, IP Checksum Error	

Data Integrity / Sequence Checking	Yes
Source / Destination MAC Address	Fixed /Increase /Decrease/Random Variable fields can be set depending on UI, max length of each field of 48-bit
Source / Destination IP Address	Fixed /Increase /Decrease/Random
IP/TCP Generation/ Analysis	Hardware
Hardware counters	TX Packet/Byte, RX Packet/Byte, Unicast, Multicast, Broadcast, VLAN Packet, Pause Packet, CRC Error, DI Checksum Error, Serial Number Error, Alignment Error, Oversize Packet, Undersize Packet, Dribble Bit, IP Checksum Error, Trigger 1 ~ Trigger 8, Collision TxArpReq, TxArpReply, RxArpReq, RxArpReply, TxICMPReq, TxICMPReply, RxICMPReq, RxICMPReply
VLAN (VLAN ID / COS Field)	Fixed/ Increase/ Decrease/ Random
MPLS(Label, COS, TTL Field)	Fixed/ Increase/ Decrease/ Random (No. of labels no limited)
Flow Control	Yes
Capture Buffer Size	63 MB per port (up to 825k frames)
Capture Mode	Event
Capture Event	DI Error, Serial No. Error, Alightmnet Error, IP Checksum Error, Trigger 1~8, Trigger Logic, Any Defined Packet Size
QoS Testing	Up to 8 Priority Queues
Line Performance	Wire Speed

Please note that the module card can be removed with that slot being powered off in NuStreams-2000i. Or shut down the chassis before plugging/unplugging any module cards.

Model	XM-2WL1
Photo	
Interface	1 IEC-320 C13 Inlet Outlet: Universal adaptor
Power Source	90 ~250 V AC, 30 ~ 80 Hz ( $\pm 0.1\%$ )
Outlet Power Supply Rating	850 W
Power Consumption	110V: 4 Watt; 220V: 6 Watt
Overload Protection	Internal breaker Software: Alarm Threshold Setting
Dection Measure	RMS Voltage, RMS Current, Active Power, Apparent Power, Power Factor, AC Frequency, Temperature, Peak Voltage, Peak Current
Device Control	Power off/ Power on/ Cycle Reboot
Cycle Reboot Config.	Burst/ Continue/ Multi-Burst
Crossing Mode	0 Degree/ 90 Degree/ 180 Degree/ 270 Degree/ Free Run
Report Format	History log/ Instant display
Operating Temperature	0 °C ~ 45 °C (32°F ~ 113°F)
Humidity	10 %~90 % RH (Non-condensing)

Please note that the module card can be removed with that slot being powered off in NuStreams-2000i. Or shut down the chassis before plugging/unplugging any module cards.



XM-2S8G  
(NuStreams-2000i Internal Switch Module)



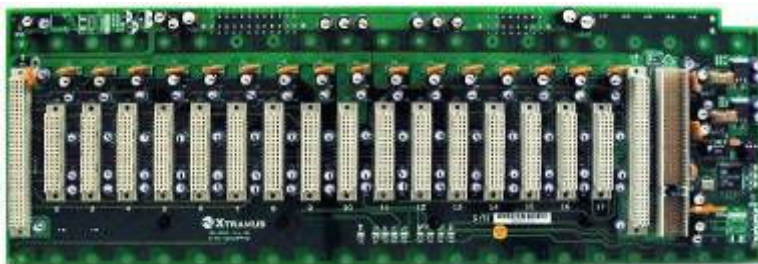
XM-2S23  
(NuStreams-600 Internal Switch Module)



XM-2S19  
(Module card element collection module)



XM-2113C  
(NuStreams-2000i Built-in IPC)  
**THE IPC RISKS EXPLOSION IF  
BATTERY IS REPLACED BY AN  
INCORRECT TYPE. FOLLOW  
INSTRUCTIONS TO DISPOSE OF USED  
BATTERIES.**



XM-2000i  
(NuStreams-2000i Backplane)



XM-600  
(NuStreams-600 Backplane)

## 2.1.3 Changing Filters

### 2.1.3.1 NuStreams-2000i



Remove the front bracket.



Change the black filter every year.

#### 2.1.3.2 NuStreams-600



Remove the bottom bracket and open it. Change the black filter every year. Change filters more frequently if working environment is unclean.



## 2.1.4 Port Hardware

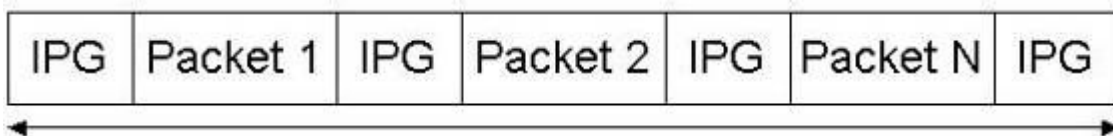
The ports on the NuStreams card modules which plug into the NuStreams Chassis provide high-speed sophisticated transmit, capture and statistics operations.

### 2.1.4.1 Matrix

1 to 1024 packets can be sent as a batch repeatedly with Ethernet packet, CRC Bit, CRC Error, Alignment Error, Packet Length and Preamble Length configuration.

### 2.1.4.2 Packets

Packets may contain a counted number of frames or a continuous set of frames when Continuous mode is used. Frames are separated by programmable Inter-Packet Gaps (IPG). The size of the Inter-Packet Gaps depends on the particular NuStreams module in use. The placement of Inter-Packet Gaps is shown below:



Counted of Infinite (for Continuous packets)

### 2.1.4.3 Frame Data

The contents of every packet are programmable in terms of structure and data content. The programmable fields are:

- ✓ Preamble size—depends on the particular NuStreams card module used.
- ✓ Frame size—depends on the particular NuStreams card module used.
- ✓ Destination and Source MAC Addresses—allows the MAC addresses to be set to a constant or vary randomly or increment/decrement under a mask.
- ✓ Data generators—five different data generators are available. The generators are listed below; the values from later generators overwrite data from earlier ones.
  - Protocol related data—formatted to correspond to particular data link, transport and protocol conventions. Data link layer controls allow for Ethernet II and 802.3 SNAP formatting, with support for VLANs. Protocol specific data for



formatting ARP, IP and IPX packets (such as source and destination IP address) is also supported.

- Data patterns—either pre-defined patterns up to 2k bytes in length, randomly generated data or algorithmically generated data.
- DA/SA and DIP/SIP configuration is provided. By choosing between VLAN Tag, MPLS Tag, MPLS Tunnel Tag, offset can be set through the window TxUDF. Or, if the user defined is chosen, offset value can be configured. Various items can be chosen individually or simultaneously through the window of MPLS or VLAN Setup.
- Frame Identity Record (FIR)—an identity record stored at the end of the packet. The information is very useful for determining the source of transmitted data found in capture buffers.
- Frame Check Sequence (FCS)—the checksum for packets may be omitted, formatted correctly or inserted with deliberate errors. Deliberate errors include incorrect checksum, dribble errors, and alignment errors.

## 2.2 NuStreams Software

### 2.2.1 NuWIN (NuStreams Window)

NuWIN is an interactive GUI-based software interface, which allows all features of the NuStreams hardware to be programmed and operated. The programming paradigm calls for each port to be individually set up, and included facilities for copying port configuration from one port to others. A number of displays are available for viewing captured packets, statistics and port latency.

#### 2.2.1.1 Chassis Chain

Chassis Chain is a set of NuStreams chassis. The NuStreams chassis chain corresponds to the hardware chain.

#### 2.2.1.2 Chassis

Chassis is a single NuStreams chassis capable of holding different NuStreams module cards. The ID of each chassis must be set (XM-2S19); the type of the chassis is automatically discovered by the software (NuStreams-2000i). A chassis may hold any mix of module cards.

#### 2.2.1.3 Card

The types of cards loaded in a chassis and the appropriate number of ports are automatically detected. Each port on a card has the same capabilities.

#### 2.2.1.4 Port

The NuStreams port corresponds to an individual port on a NuStreams module card. Each port is independently programmed in terms of its transmit, capture and statistics capabilities. The NuStreams software shows four separate views for programming and viewing operations:

- ✓ Address Tables—sets up a range of MAC addresses for which the port will respond to ARP requests and PING requests.
- ✓ Packet Generator

- ✓ Packet Flows—defines the streams within stream regions and the contents of packets.
- ✓ Capture View—shows the data gathered during capture operations. Data is displayed in raw form and interpreted for the corresponding protocols.
- ✓ Counter Window—shows the real time statistics gathered during transmit and receive operation.

#### 2.2.1.5 Port Properties

A Port Properties dialog allows other port related properties to be programmed:

- ✓ MII controls—low-level physical controls, such as 10 Mbps vs. 100 Mbps operation and full duplex vs. half duplex.
- ✓ Advanced MII controls—additional low level MII register controls.
- ✓ Flow control—related to pause control operation.
- ✓ Collision Backoff Algorithm—handling of collision situations.
- ✓ Transmit mode—the choice of streams or flows for the port.
- ✓ Forced Collisions—the generation of collision packets on receive ports.

#### 2.2.1.6 Counter Window

Counter windows let users consider a set of ports at once. Select ports through the port mapping function to view the counter windows for the assigned ports simultaneously.

In addition to NuWIN, individual manual for C++, an API, which allows programmers conversant with the C++ programming language to control all applications of NuStreams hardware operation, or other applications are also available.

### 2.2.2 NuApps-2889

NuApps-2889 is a user-friendly Windows-based application software program containing an enhanced GUI with real-time graphing. NuApps-2889 meets the testing requirements in RFC-2285 and RFC-2889, including Forwarding Rate, Congestion Control, Address Learning Rate, Address Caching Capacity, Errored Frame Filtering, Broadcast Forwarding Rate, Broadcast Latency, and Forward Pressure. It generates heavy bursts of multidirectional traffic with various protocols to test 10/100/100 Mbps Ethernet networks.

### 2.2.3 NuAPI

NuAPI is an application programming interface provided for the development of programs for MPT (Mass Production Testing) operations, which enhances efficiency when running multiple tests on DUT. NuAPI includes Microsoft Visual C++ Library and Borland C++ Builder Library. Xtramus provides the services of developing MPT programs for the clients.

### 2.2.4 NuApps-2544

NuApps-2544 is a user-friendly and automated test suite based on industry-standard RFC-1242 and RFC-2544 to analyze the performance of Ethernet switches, bridges, and routers using NuStreams chassis. The multiple topologies supported by NuApps-2544 and the load generation capabilities and the measurement accuracy of NuStreams chassis provide users an effective way to accurately evaluate the Throughput, Latency, Packet Loss, and Back-to-Back of a DUT or SUT in One-to-One, One-to-Many, and Many-to-One configurations.

### 2.2.5 NuApps-ACPower

NuApps-ACPower is a practical and effective virtual panel to operate AC power monitor and control module card XM-2WL1 in NuStreams chassis. The flexible interface helps XM-2WL1 to collect long term power measurement information from the DUT in order to be reviewed and analyzed directly from an outlet power or remotely across a network using NuStreams chassis.

### 2.2.6 Multiple Users

1. Find a PC with 2 Network Interface Cards (NICs). The PC should be running Windows- XP OS. This PC will be acting as the Server PC for NuServer (NuStreams Server) later;
2. Connect one of the NIC (NIC-1) of the above PC to any one of the two ports on the XM-2S19 module of the NuStreams-2000i chassis;
3. Connect the other NIC (NIC-2) of the above PC to an Ethernet Switch;
4. Open the "Network & Dial-Up Connection" under "Control Panel" of the Windows-XP and find the connection icon corresponding to the NIC (NIC-1) attached to XM-2S19. Select the "Property" of "Internet Protocol (TCP/IP)" and select "Auto Get IP" and "Auto Get DNS". Once it's done, click on "O.K." and leave the setting window for NIC-1;
5. Find the connection icon corresponding to the NIC (NIC-2) attached to the Ethernet Switch. Select the "Property" of "Internet Protocol (TCP/IP)" and set the IP, Subnet Mask, and Gateway of NIC-2 in a way so that it's possible for it to communication with other PCs connected to the same Ethernet Switch. After it's done, click on "O.K." and leave the setting window for NIC-2;
6. Run NuWIN (i.e. NuStreams Window) program on the PC with 2 NICs;
7. Run NuWIN program on the remote PC (please note that the remote PC must be running Windows- XP OS).

### 3. Installation

Unlike NuStreams-2000i, NuStreams-600 does not include PC. Before installing NuWIN to the PC controlling NuStreams-600, connect the XM-2S23 Internal Switch Module of the NuStreams-600 to the LAN port of the PC which users will be working on through a UTP cable.

#### 3.1 Starting NuWIN

1. Insert the CD-ROM containing NuWIN driver into the PC's CD-ROM drive (If AutoPlay is invoked, the installation starts automatically and skip step 2.)
2. Choose **Start/Run** and click **Browse** button, then the Browse window appears. In the Browse window, select CD-ROM drive and autorun.exe file, then click **Open**.
3. Follow the on-screen prompts to complete the installation from top to bottom. The files are copied to the directory specified by users (default C:\program files\NuStreams\NuWIN)

3.1 Please note that in order to update NuWIN, the older version should be uninstalled first before installing the newer one, otherwise NuWIN could not be installed properly. Reboot the system after installing the new NuWIN.

3.2 At the start of NuWIN, if "cannot find the module" message appears, there must be an old version of library not completely removed. Manually delete C:\WINNT\System32\dclul\*.bpl and reinstall the new version of NuWIN.

4. To update Firmware online, please go to **Report/Card Version/Updates Firmware** through the popup menu of Chassis window or **Tools/Option** of the Main Menu Bar.
5. Check the Log Window to see if all the cards respond with an ACK signal in about six minutes. If any of the cards fail to do so, check if its SYS LED indicator on the front panel on the chassis is on.
6. Go to **Report/Card Version** of popup menu of Chassis window to verify the current edition of Firmware/FPGA.

## 4. Operating Procedure

### 4.1 Starting NuWIN

NuStreams chassis includes NuStreams-2000i and NuStreams-600. NuStreams-2000i can function with or without an IPC.

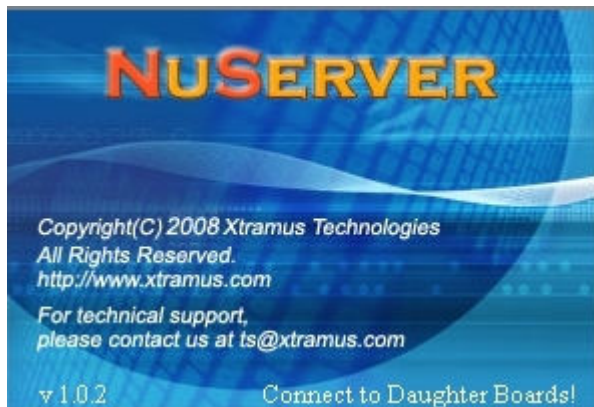


Double-click on the **NuWIN** icon NuWIN from desktop.

If the NuStreams-2000i is connected to a local server, click on the **Yes** button in the Mode window, then the **Network Interface Information** window will appear. If the NuStreams chassis is connected to a remote server, click on the **No** button, then the **Connect** window will appear.



Choose the NIC to which users would like the NuStreams chassis to connect. Click **OK** to activate NuServer.












NuServer has been activated.



If the NuServer has already been activated, double-click on the **NuWIN** icon NuWIN to start operation.

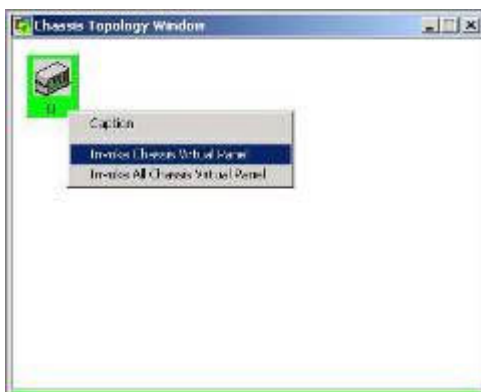
The buttons in the Main window tool bar are described in the table below:

Figure	Usage
	Arranges all windows in cascade.
	Arranges all windows vertically.
	Arranges all windows horizontally.
	Opens Counter window.
	Opens Counter window to see selected ports.
	Opens Counter Window Group to see grouped ports.
	Opens Group window.
	Opens Log window.
	Releases unknown deadlock and opens system log on ".\\Log\\debug.log."





The **Chassis Topology** window will automatically appear when NuWIN is started. The **Chassis Icon** stands for identity of the NuStreams chassis in use. Click on the desired Chassis Icon for testing configuration. Right mouse click on the chassis icon to bring out a popup menu.



Choose **Invoke Chassis Virtual Panel** to bring out the Chassis Panel. Most of the testing configuration is conducted through the Chassis Panel.



The **Chassis Panel** represents a graphical image of the current NuStreams chassis with all its installed cards.


### 4.1.1 Main Window

The top level menus of NuWIN includes: **File Menu**, **View Menu**, **Multiusers Menu**, **Tools Menu**, **Window Menu**, and **Help Menu**.

The choices for the **File Menu** are described in the table below:

Menu Choice	Shortcut	Usage
Load	Ctrl+L	Presents a dialogue for users to load workspace from the disk.
Save		Saves the current information to the current workspace in use.
Save As	Ctrl+A	Presents a dialogue for users to save the current workspace to the disk.
Exit	Ctrl+E	Exits NuWIN.


**View Menu** is divided into Control Menu and Report Menu. The choices for the **Control Menu** are described in the table below:

Menu Choice	Shortcut	Usage
Debug Panel	Ctrl+D	<p>Invokes Debug panel.</p>  <p>Debug panel is for debugging purpose of NuWIN. Only authorized technicians from Xtramus have access to this function.</p>
Group Control Window	Ctrl+G	Invokes Group Control window (please see <a href="#">4.20.1</a> for more information).
Chassis Topology Window	Ctrl+T	Invokes Chassis Topology window (please see <a href="#">4.20.2</a> for more information).
All Chassis Panel	Ctrl+Alt+V	Invokes all chassis panel.
Show NuServer		Invokes NuServer when it is visible at the task manage but invisible at the taskbar.

The choices for the **Report Menu** are described in the table below:

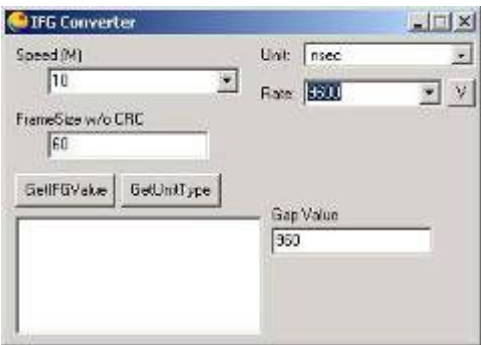
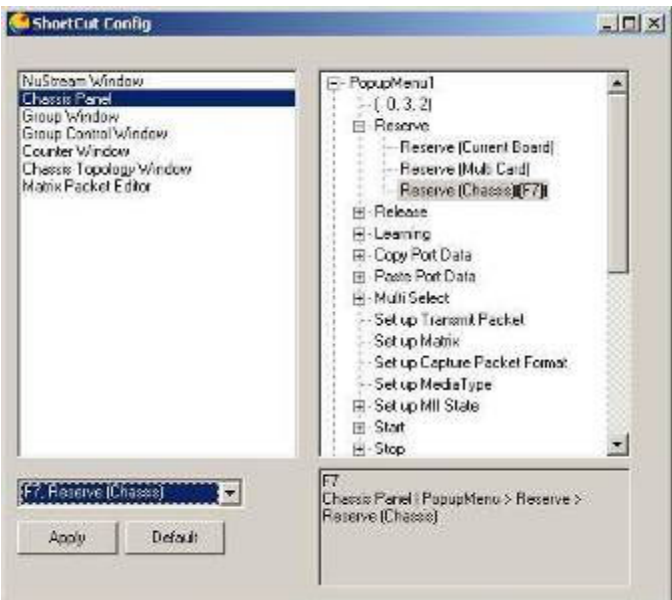
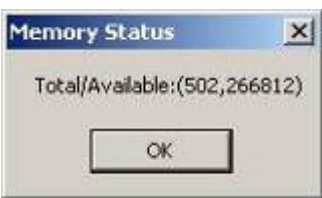

Menu Choice	Shortcut	Usage
Counter Window	Ctrl+W	Invokes Counter window (please see <a href="#">4.21.1</a> for more information).
Group Counter Window		Invokes Group Counter window (please see <a href="#">4.21.2</a> for more information).
Group Window	Ctrl+U	Invokes Group window (please see <a href="#">4.21.3</a> for more information).
Log Window	Ctrl+O	Invokes Log window (please see <a href="#">4.21.4</a> for more information).


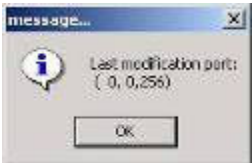
The choices for the **Multi User Menu** are described in the table below:

Menu Choice	Shortcut	Usage
Color Table		 <p>Invokes Color table for color information.</p>
Port Status		Invokes Port Status window (please see <a href="#">4.21.5</a> for more information).
Release My Ownership		Releases current chassis (please see <a href="#">4.2</a> for more information).
Release Partial Slot(s)		Releases multiple module cards.
Release All Ownership		Releases all chassis (please see <a href="#">4.4</a> for more information).
Reserve All Chassis		Reserves all chassis (please see <a href="#">4.4</a> for more information).

The choices for the **Tools Menu** are described in the table below:

Menu Choice	Shortcut	Usage
Option	Ctrl+P	Invokes Preference window (please see <a href="#">4.21.6.3</a> for more information).

IFG Converter		 <p>Invokes IFG Converter for measurement conversion of packet transmission.</p>
Shortcut Config		 <p>Invokes Shortcut Configuration dialogue. In this case the hotkey for the Reserve function of Chassis Panel is set as "F7."</p>
Query Memory Resource	Ctrl+M	 <p>Provides information regarding Memory Status.</p>
Query Work Space Resolution	Ctrl+R	 <p>Provides information regarding Resolution.</p>


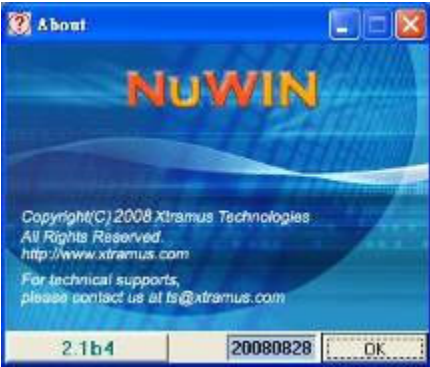
Query Program Running Duration		 <p>Provides information regarding duration from start.</p>
Last Modification Port	Ctrl+Alt+L	 <p>Provides information regarding the last modified port.</p>

The choices for the **Window Menu** are described in the table below:

Menu Choice	Shortcut	Usage
Cascade	Ctrl+S	Arranges all windows in cascade.
Tile Horizontally	Ctrl+H	Arranges all windows horizontally.
Tile Vertically	Ctrl+Y	Arranges all windows vertically.
Minimize All	Ctrl+I	Minimizes All windows.














The choices for the **Help Menu** are described in the table below:

Menu Choice	Shortcut	Usage
Help	F1	Invokes Help function.
Xtramus Web	F3	Links to the official website of Xtramus Technologies.
Packet View Combination	F4	Shows all protocol combination.

Shortcut List		 <p>Provides information regarding the Shortcut List.</p>
About...	Ctrl+B	 <p>Provides information regarding the current version of NuWIN.</p>

## 4.2 Chassis Panel


The buttons in the Chassis panel tool bar are described in the table below:

Figure	Usage
	Reserves all ports for local users.
	Releases all ports for local users.
	Starts packets transmission through all ports.
	Stops packets transmission through all ports.
	Start the selected ports.
	Stop the selected ports.
	Sends Learning Packets.
	Enables browse setup.
	Enables multiple selection toggles.
	Enables X-Trailer padding.
	Disables X-Trailer padding.
	Enables X-Trailer verification.
	Disables X-Trailer verification.

The LED indications in the Chassis panel are described in the table below:

Item	Symbol/Color	Description
Type	N/A	Card Type/ Card Number
Slot No.	N/A	Slot Number
10 100 1G 10G	Orange/Green/Yellow/Blue	10M/100M/1G/10G
Link	Green	The port is linked.
Half Full	Orange	Half Duplex Mode
	Green	Full Duplex Mode
Transmit	Flashing Green	Frame transmission
Receive	Flashing Green	Frame reception
Collision	Flashing Red	Packet collision
CRC	Flashing Red	Receiving packets with CRC Checksum Error
Checksum	Flashing Red	Receiving Packet IP Checksum Error
Multi select	Green	Port selected
	Gray	Port unselected
	Green with captured mode	Under captured mode(selected)
	Gray with captured mode	Under captured mode(unselected)
Start/Stop	Red	Stop transmitting packets
	Green	Start transmitting packets
(tx) Mode	C	Continuous packet transmission
	S	Single packet transmission
	B	Burst transmission
	M	Multiple-burst transmission
(tx) Length	F	Fixed packet length
	I	Increase packet length
	D	Decrease packet length
	R	Random packet length




Before making testing configurations, click on the **Reserve All** button  to reserve entire chassis of individual cards.

*reserve port: { 0, 2, 3 }*

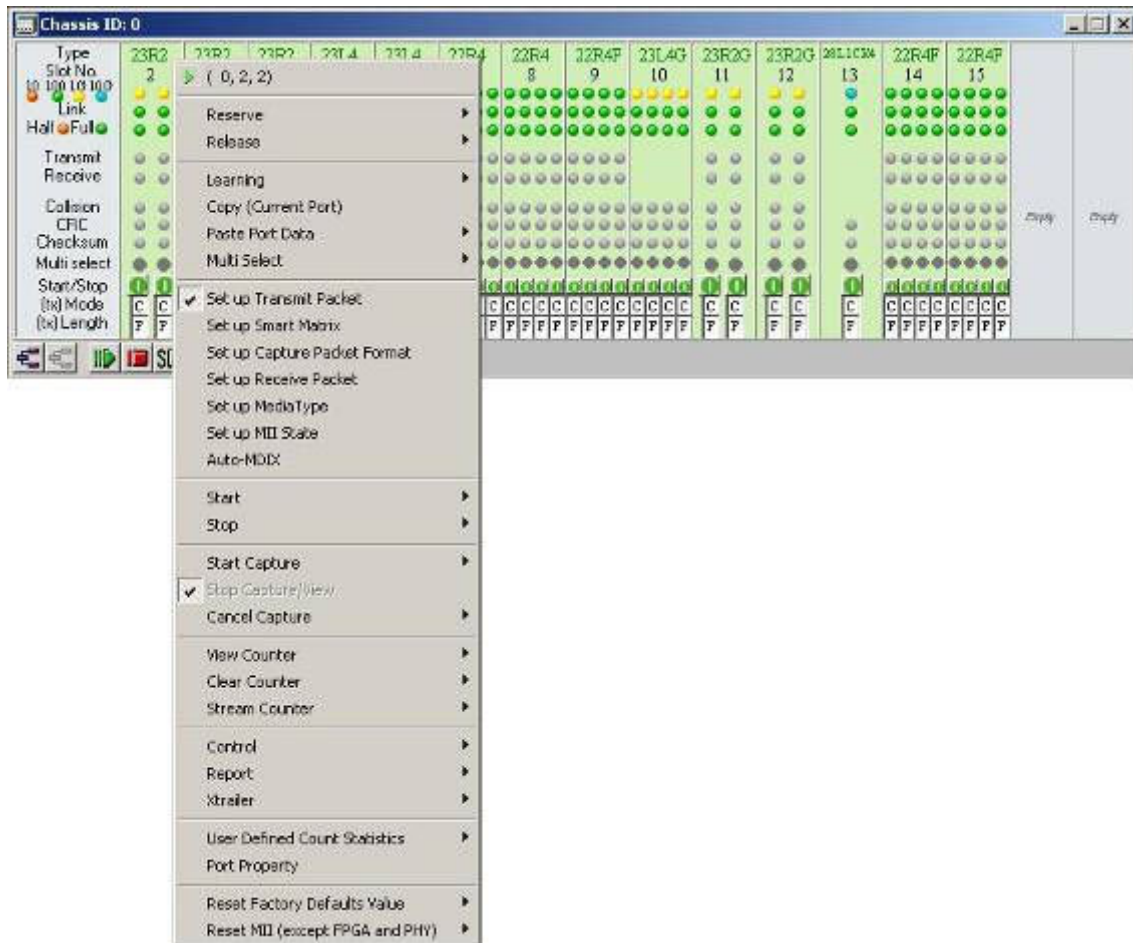
The **Message Box** indicates the processing status of reserving all module cards.



If the chassis is shared by multiple users (up to 4 users can use one NuStreams chassis at the same time), bring out the popup menu, choose **Reserve/Reserve Current Board** or **Reserve/Reserve(Multi Card)** and make selection through the **Port Map** to reserve the cards for one's own use (please see [4.4](#) for more information).

To disable the reserve function, click on the **Release All** button . And the reserved ports will all be released.

## 4.3 Popup Menu



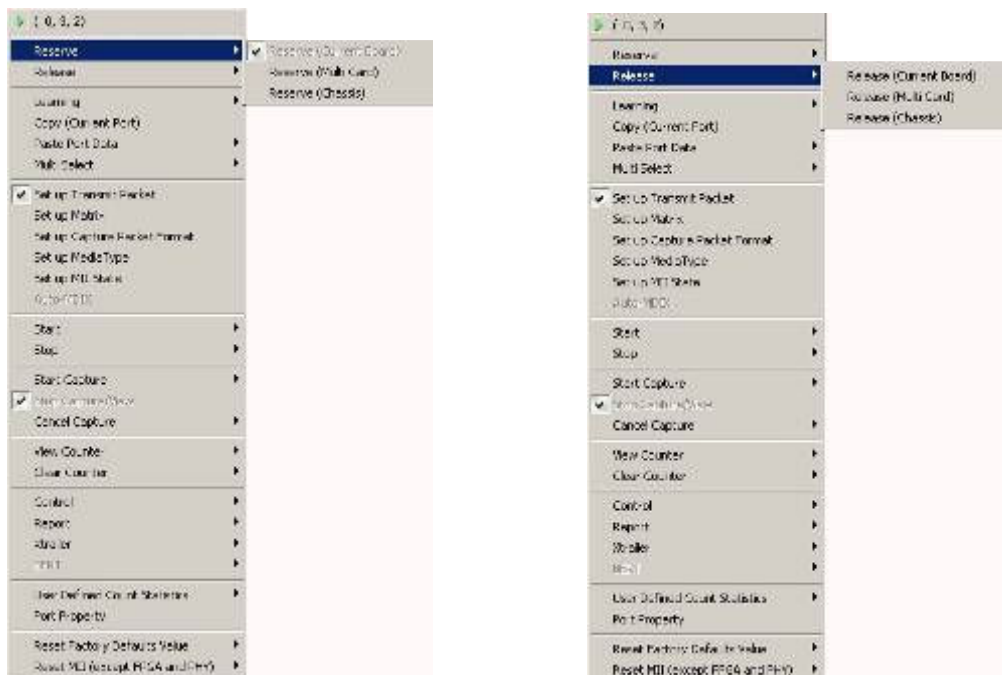
Move the cursor to any of the module cards on the Chassis panel and right mouse click to bring out the **Popup** menu of the current port. In this case, the caption indicates the menu describes the status of chassis 0, card 4, and port 2 of the chassis.

NuStreams chassis supports multiple module cards. Specific functions of the cards will also be mentioned.

XM-2301	XM-2301G	XM-23L4	XM-23L4G
<div>▶ (254, 5, 1)</div> <div>Reserve ▶</div> <div>Release ▶</div> <div>Learning ▶</div> <div>Copy (Current Port) ▶</div> <div>Paste Port Data ▶</div> <div>Multi Select ▶</div> <div> <input checked="" type="checkbox"/> Set up Transmit Packet           <div>Set up Matrix</div> <div>Set up Capture Packet Format</div> <div>Set up Media Type</div> <div>Set up MII State</div> <div>Auto-MDIX</div> </div> <div>Start ▶</div> <div>Stop ▶</div> <div>Start Capture ▶</div> <div> <input checked="" type="checkbox"/> Stop Capture/View           <div>Cancel Capture ▶</div> </div> <div>View Counter ▶</div> <div>Clear Counter ▶</div> <div>Stream Counter ▶</div> <div>Control ▶</div> <div>Report ▶</div> <div>Xtrailer ▶</div> <div>BERT ▶</div> <div>User Defined Count Statistics ▶</div> <div>Port Property ▶</div> <div>Reset Factory Defaults Value ▶</div> <div>Reset MII (except FPGA and PHY) ▶</div>	<div>▶ (254,11, 1)</div> <div>Reserve ▶</div> <div>Release ▶</div> <div>Learning ▶</div> <div>Copy (Current Port) ▶</div> <div>Paste Port Data ▶</div> <div>Multi Select ▶</div> <div> <input checked="" type="checkbox"/> Set up Transmit Packet           <div>Set up Matrix</div> <div>Set up Capture Packet Format</div> <div>Set up Media Type</div> <div>Set up MII State</div> <div>Auto-MDIX</div> </div> <div>Start ▶</div> <div>Stop ▶</div> <div>Start Capture ▶</div> <div> <input checked="" type="checkbox"/> Stop Capture/View           <div>Cancel Capture ▶</div> </div> <div>View Counter ▶</div> <div>Clear Counter ▶</div> <div>Stream Counter ▶</div> <div>Control ▶</div> <div>Report ▶</div> <div>Xtrailer ▶</div> <div>BERT ▶</div> <div>User Defined Count Statistics ▶</div> <div>Port Property ▶</div> <div>Reset Factory Defaults Value ▶</div> <div>Reset MII (except FPGA and PHY) ▶</div>	<div>▶ (18, 7, 1)</div> <div>Reserve ▶</div> <div>Release ▶</div> <div>Learning ▶</div> <div>Copy (Current Port) ▶</div> <div>Paste Port Data ▶</div> <div>Multi Select ▶</div> <div> <input checked="" type="checkbox"/> Set up Transmit Packet           <div>Set up Matrix</div> <div>Set up Capture Packet Format</div> <div>Set up Media Type</div> <div>Set up MII Simple</div> <div>Auto-MDIX</div> </div> <div>Start ▶</div> <div>Stop ▶</div> <div>Start Capture ▶</div> <div> <input checked="" type="checkbox"/> Stop Capture/View           <div>Cancel Capture ▶</div> </div> <div>View Counter ▶</div> <div>Clear Counter ▶</div> <div>Control ▶</div> <div>Report ▶</div> <div>Xtrailer ▶</div> <div>BERT ▶</div> <div>User Defined Count Statistics ▶</div> <div>Port Property ▶</div> <div>Reset Factory Defaults Value ▶</div> <div>Reset MII (except FPGA and PHY) ▶</div>	<div>▶ (254,16, 1)</div> <div>Reserve ▶</div> <div>Release ▶</div> <div>Learning ▶</div> <div>Copy (Current Port) ▶</div> <div>Paste Port Data ▶</div> <div>Multi Select ▶</div> <div> <input checked="" type="checkbox"/> Set up Transmit Packet           <div>Set up Matrix</div> <div>Set up Capture Packet Format</div> <div>Set up Media Type</div> <div>Set up MII Simple</div> <div>Auto-MDIX</div> </div> <div>Start ▶</div> <div>Stop ▶</div> <div>Start Capture ▶</div> <div> <input checked="" type="checkbox"/> Stop Capture/View           <div>Cancel Capture ▶</div> </div> <div>View Counter ▶</div> <div>Clear Counter ▶</div> <div>Control ▶</div> <div>Report ▶</div> <div>Xtrailer ▶</div> <div>BERT ▶</div> <div>User Defined Count Statistics ▶</div> <div>Port Property ▶</div> <div>Reset Factory Defaults Value ▶</div> <div>Reset MII (except FPGA and PHY) ▶</div>
XM-28L1	XM-28L1CX4	XM-22R4	XM-22R4F
<div>▶ (254,15, 1)</div> <div>Reserve ▶</div> <div>Release ▶</div> <div>Learning ▶</div> <div>Copy (Current Port) ▶</div> <div>Paste Port Data ▶</div> <div>Multi Select ▶</div> <div> <input checked="" type="checkbox"/> Set up Transmit Packet           <div>Set up Matrix</div> <div>Set up Capture Packet Format</div> <div>Set up Media Type</div> <div>Set up MII State</div> <div>Auto-MDIX</div> </div> <div>Start ▶</div> <div>Stop ▶</div> <div>Start Capture ▶</div> <div> <input checked="" type="checkbox"/> Stop Capture/View           <div>Cancel Capture ▶</div> </div> <div>View Counter ▶</div> <div>Clear Counter ▶</div> <div>Stream Counter ▶</div> <div>Control ▶</div> <div>Report ▶</div> <div>Xtrailer ▶</div> <div>BERT ▶</div> <div>User Defined Count Statistics ▶</div> <div>Port Property ▶</div> <div>Reset Factory Defaults Value ▶</div> <div>Reset MII (except FPGA and PHY) ▶</div>	<div>▶ (254,17, 1)</div> <div>Reserve ▶</div> <div>Release ▶</div> <div>Learning ▶</div> <div>Copy (Current Port) ▶</div> <div>Paste Port Data ▶</div> <div>Multi Select ▶</div> <div> <input checked="" type="checkbox"/> Set up Transmit Packet           <div>Set up Matrix</div> <div>Set up Capture Packet Format</div> <div>Set up Media Type</div> <div>Set up MII State</div> <div>Auto-MDIX</div> </div> <div>Start ▶</div> <div>Stop ▶</div> <div>Start Capture ▶</div> <div> <input checked="" type="checkbox"/> Stop Capture/View           <div>Cancel Capture ▶</div> </div> <div>View Counter ▶</div> <div>Clear Counter ▶</div> <div>Stream Counter ▶</div> <div>Control ▶</div> <div>Report ▶</div> <div>Xtrailer ▶</div> <div>BERT ▶</div> <div>User Defined Count Statistics ▶</div> <div>Port Property ▶</div> <div>Reset Factory Defaults Value ▶</div> <div>Reset MII (except FPGA and PHY) ▶</div>	<div>▶ (254, 7, 1)</div> <div>Reserve ▶</div> <div>Release ▶</div> <div>Learning ▶</div> <div>Copy (Current Port) ▶</div> <div>Paste Port Data ▶</div> <div>Multi Select ▶</div> <div> <input checked="" type="checkbox"/> Set up Transmit Packet           <div>Set up Matrix</div> <div>Set up Capture Packet Format</div> <div>Set up Media Type</div> <div>Set up MII State</div> <div>Auto-MDIX</div> </div> <div>Start ▶</div> <div>Stop ▶</div> <div>Start Capture ▶</div> <div> <input checked="" type="checkbox"/> Stop Capture/View           <div>Cancel Capture ▶</div> </div> <div>View Counter ▶</div> <div>Clear Counter ▶</div> <div>Control ▶</div> <div>Report ▶</div> <div>Xtrailer ▶</div> <div>BERT ▶</div> <div>User Defined Count Statistics ▶</div> <div>Port Property ▶</div> <div>Reset Factory Defaults Value ▶</div> <div>Reset MII (except FPGA and PHY) ▶</div>	<div>▶ (0, 9, 1)</div> <div>Reserve ▶</div> <div>Release ▶</div> <div>Learning ▶</div> <div>Copy (Current Port) ▶</div> <div>Paste Port Data ▶</div> <div>Multi Select ▶</div> <div> <input checked="" type="checkbox"/> Set up Transmit Packet           <div>Set up Smart Matrix</div> <div>Set up Capture Packet Format</div> <div>Set up Receive Packet</div> <div>Set up Media Type</div> <div>Set up MII State</div> <div>Auto-MDIX</div> </div> <div>Start ▶</div> <div>Stop ▶</div> <div>Start Capture ▶</div> <div> <input checked="" type="checkbox"/> Stop Capture/View           <div>Cancel Capture ▶</div> </div> <div>View Counter ▶</div> <div>Clear Counter ▶</div> <div>Control ▶</div> <div>Report ▶</div> <div>Xtrailer ▶</div> <div>User Defined Count Statistics ▶</div> <div>Port Property ▶</div> <div>Reset Factory Defaults Value ▶</div> <div>Reset MII (except FPGA and PHY) ▶</div>

XM-23R2	XM-23R2G	XM-2WL1	
<input checked="" type="checkbox"/> ( 0, 4, 12 ) Reserve ▶ Release ▶ Learning ▶ Copy (Current Port) ▶ Paste Port Data ▶ Multi Select ▶ <input checked="" type="checkbox"/> Set up Transmit Packet ▶ Set up Smart Matrix ▶ Set up Capture Packet Format ▶ Set up Receive Packet ▶ Set up Model type ▶ Set up MD Slave ▶ Auto-MDIO ▶ Start ▶ Stop ▶ Start Capture ▶ <input checked="" type="checkbox"/> Stop Capture/View ▶ Cancel Capture ▶ View Counter ▶ Clear Counter ▶ Stream Counter ▶ Control ▶ Report ▶ Xtrailer ▶ User Defined Count Statistics ▶ Port Property ▶ Reset Factory Defaults Main ▶ Reset MD (except FPGA and PHY) ▶	<input checked="" type="checkbox"/> ( 0, 12, 1 ) Reserve ▶ Release ▶ Learning ▶ Copy (Current Port) ▶ Paste Port Data ▶ Multi Select ▶ <input checked="" type="checkbox"/> Set up Transmit Packet ▶ Set up Smart Matrix ▶ Set up Capture Packet Format ▶ Set up Receive Packet ▶ Set up Packet type ▶ Set up MD Slave ▶ Auto-MDIO ▶ Start ▶ Stop ▶ Start Capture ▶ <input checked="" type="checkbox"/> Stop Capture/View ▶ Cancel Capture ▶ View Counter ▶ Clear Counter ▶ Stream Counter ▶ Control ▶ Report ▶ Xtrailer ▶ User Defined Count Statistics ▶ Port Property ▶ Reset Factory Defaults Value ▶ Reset MD (except FPGA and PHY) ▶	Reserve ▶ Release ▶ Copy (Current Board) ▶ Paste Board Data ▶ Multi Select ▶ Devic Control ▶ Alarm Setting ▶ Alarm Report ▶ Clear Alarm ▶ Start ▶ Stop ▶ View Counter Window ▶ Clear Counter ▶ Report ▶ Reset Factory Defaults Value ▶	

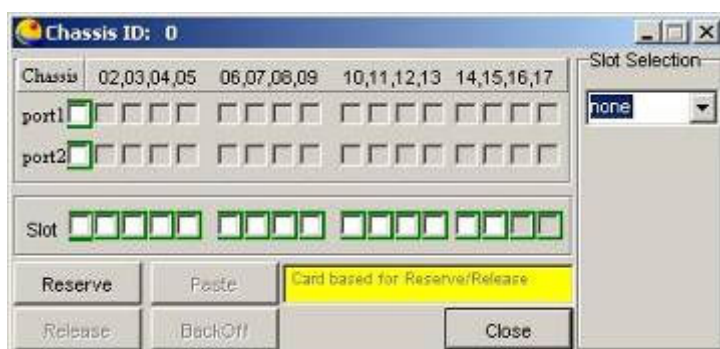
## 4.4 Reserve and Release



NuStreams chassis supports multiple users operation. Up to 4 users can share one NuStreams chassis at the same time. Reserve the current card, multiple cards, or all the cards in the chassis about to operate (left). Release the reservation of current card, multiple cards, or all the cards in the chassis (right).



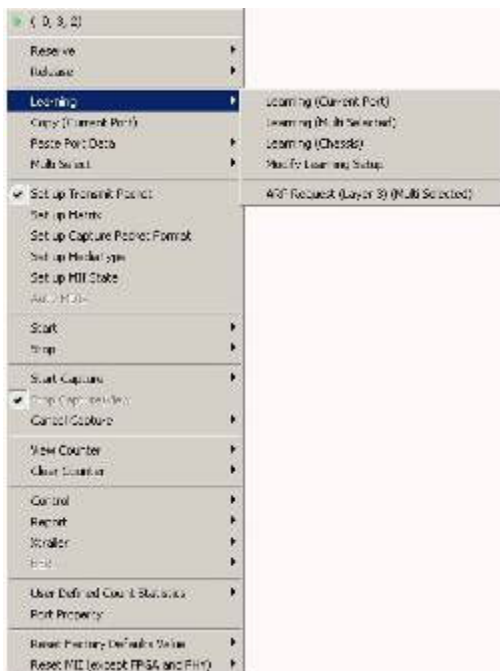
Choose **Reserve (Multi Card)** to bring out the Port Map (left). If users do not follow the instruction to reserve all the ports/cards, the **Reserve (Current Board)** option will be able to be chosen (right).



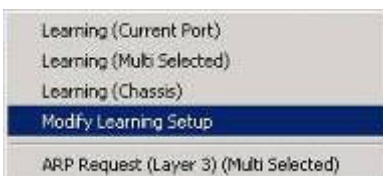
Reserve ports, cards, or type of cards with the Port Map.



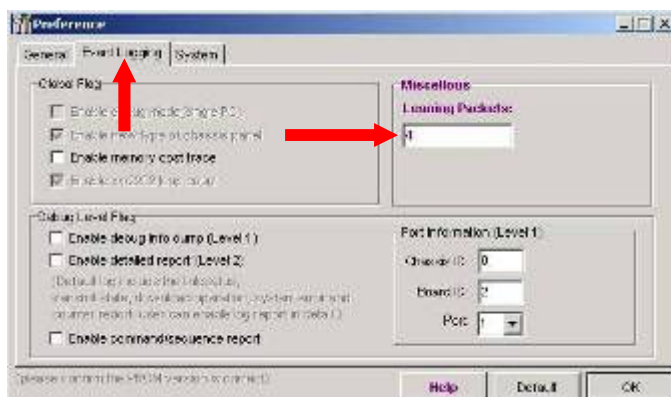
## 4.5 Learning



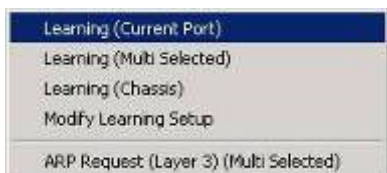
Choose **Learning** and its mode to enable the device under test (DUT) to create an address table according to the source address in the received frame. If **Current Port** is chosen, the address of current port will be built into the table. If **Multi Selected** is chosen, the SAs of the selected ports will be built into the table. If **Chassis** is chosen, the SAs of all the ports of the chassis will be built into the table.



Here is demonstration of this feature through port (0,4,2). Choose **Modify Learning Setup** to bring out the **Preference** window.



Choose **Event Logging** tab. Fill in the number of packets to be sent through the ports chosen to be learned for building address table. In this demonstration, the number for learning packet to be sent is 4.



Click on **Learning (Current Port)** to send Learning Packets through the current port.



The red light ball indicates the port is transmitting packets will show in a flash.



Choose port (0,4,1) and (0,4,2) to be viewed through the Counter window (click to show the green balls).

Counter Window				
(Chassis, Slot, Port)	( 0, 4, 1)	( 0, 4, 2)	Total 2 ports	
Group	0	0	N/A	
Module Card	XM-23R2	XM-23R2	N/A	
Link Status	Link Up	Link Up	N/A	
Full/Half	Full	Full	N/A	
Speed	1000	1000	N/A	
Transmit packet	0	4	4	
Receive packet (valid)	4	0	4	
Transmit byte	0	256	256	
Receive byte	256	0	256	
Transmit packet rate	0	0	N/A	
Receive packet rate	0	0	N/A	
Transmit byte rate	0	0	N/A	
Receive byte rate	0	0	N/A	
Collision	0	0	0	
Multi collision	0	0	0	
Excess collision	0	0	0	
Late collision	0	0	0	
Total collision	0	0	0	
Unicast	0	0	0	
Multicast	0	0	0	
Broadcast	4	0	4	
Undersize	0	0	0	
Oversize	0	0	0	
Vlan	0	0	0	
Pause	0	0	0	
Capture	0	0	0	
Drizzle error	-	-	0	
Alignment error	-	-	0	
CRC error	0	0	0	
Checksum error	0	0	0	
Sequence miss	0	0	0	
IP Checksum error	0	0	0	
Receive UDF1	0	0	0	
Receive UDF2	0	0	0	

Choose **Report/Counter Window** (please see section [4.19](#) for more information) to see the status of port (0,4,1) and (0,4,2). Port (0,4,2) has transmitted the 4 learning packets and port (0,4,1) has received them.



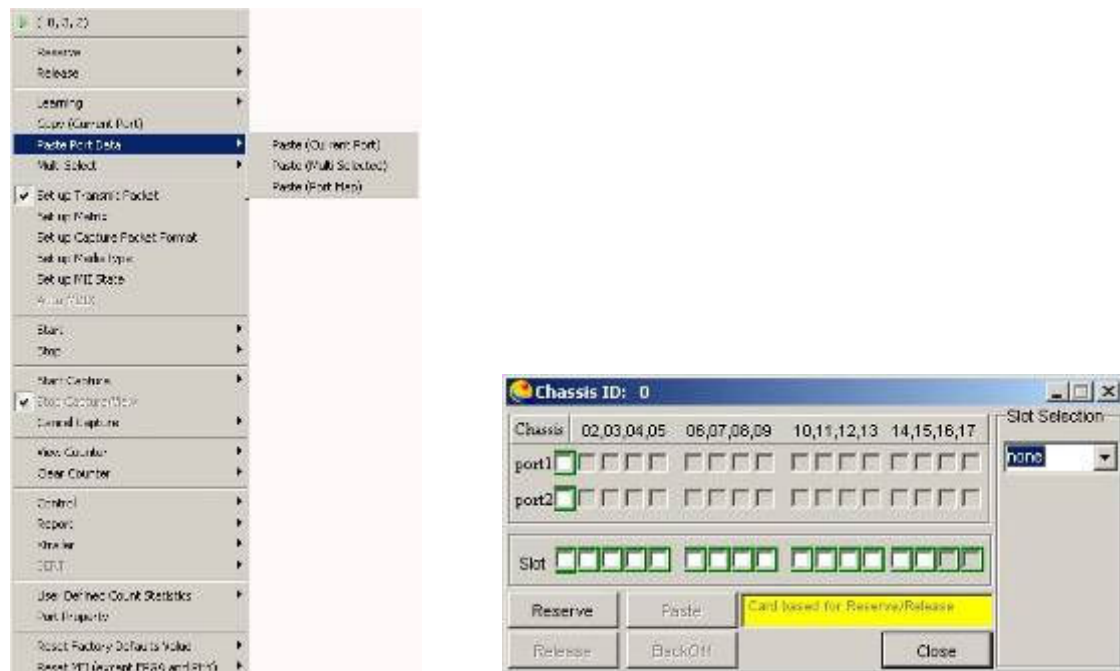


## 4.6 Copy Port Data



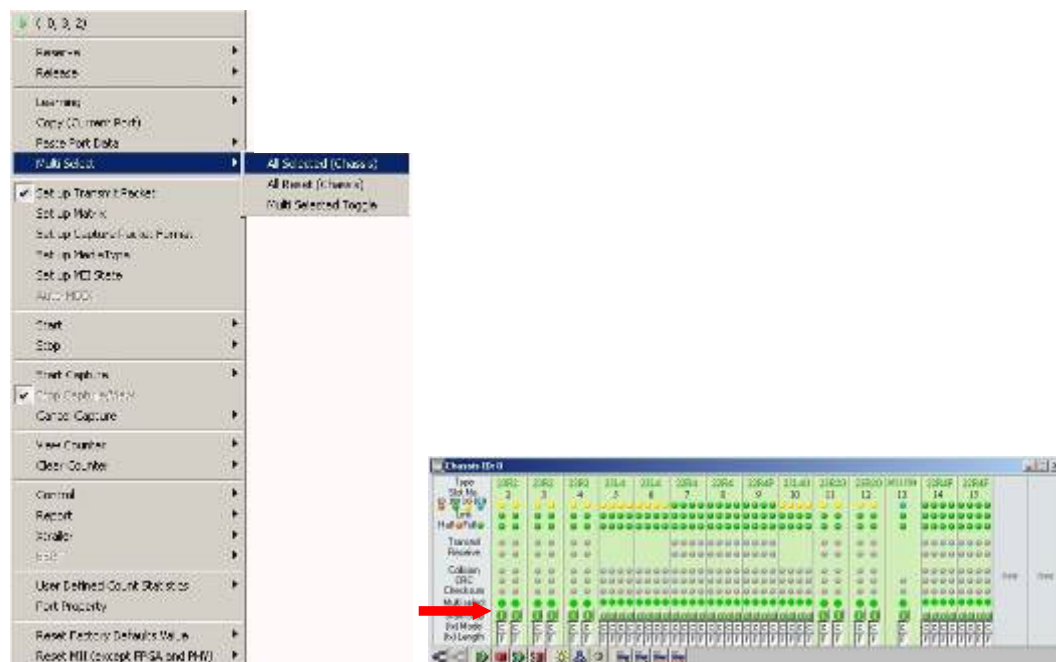
Copy the testing setup of the current card. Make further configurations by copying the setting of frame length, inter-packet gap, inter-burst gap, stream control, padding, transmission, media type, DA/SA, DIP/SIP, or all of the above of the current card.

## 4.7 Paste Port Data



Paste the copied port data to the current port or to multiple ports through the Chassis Window or the Port Map. Bring out the **Port Map** to paste the copied port data to the designated ports, cards/slots or type of cards (slot selection).

## 4.8 Multiple Selection



Choose **All Selected (Chassis)** to select all the ports in the chassis for testing configuration.



Choose **All Reset (Current Chassis)** to reset all the ports in the chassis.



Set some of the cards by clicking the LED indicators in the Chassis window.



Choose **Multi Selected Toggle** to toggle between the set ports and reset ones.

## 4.9 Set up Transmit Packet

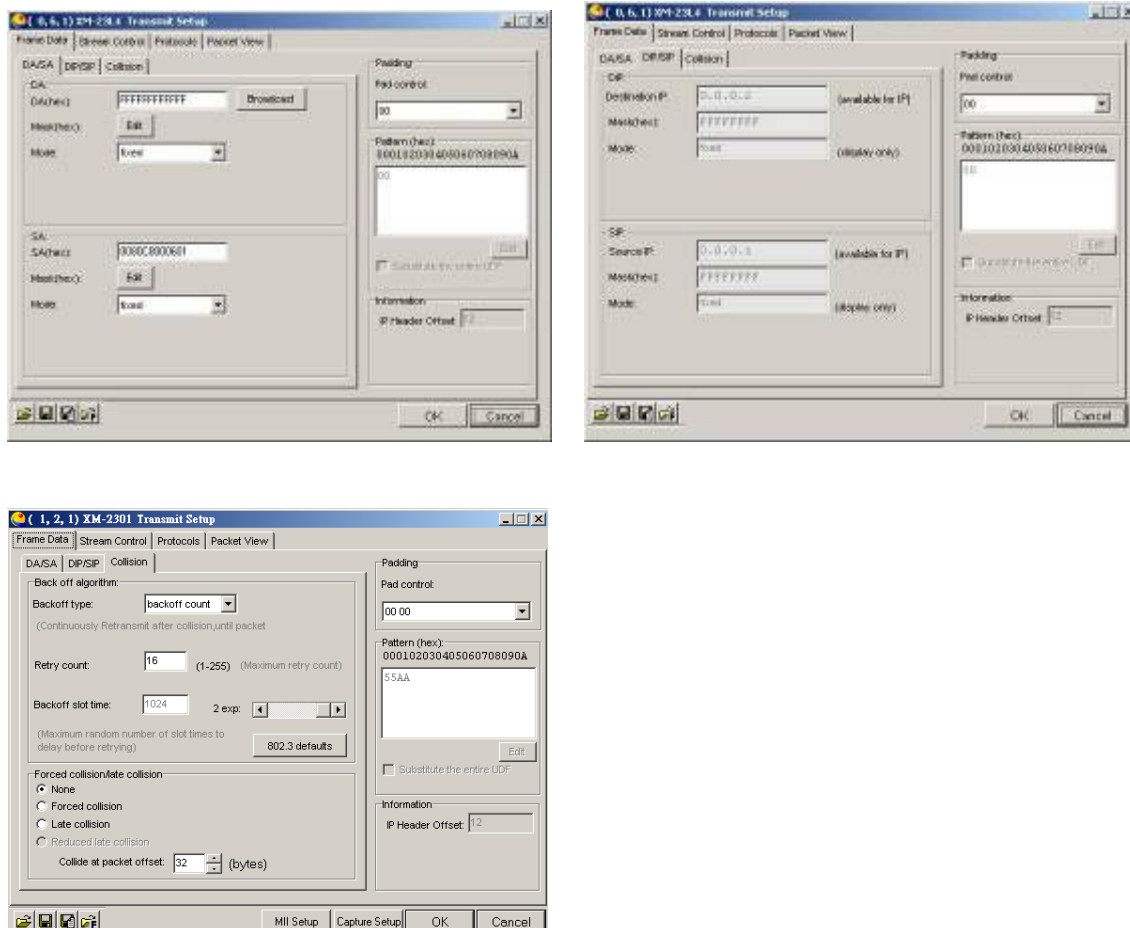


Choose **Set up Transmit Packet** to bring out the **Transmit Setup** window.

The **Frame Data Setup** provides the ability to control all aspects of packets transmitted by the NuStreams Testing Systems. These frames are also referred as packets in some contexts. Many frames may be generated in the processing of a stream; many of the controls available allow the specification of a series of values applied to subsequent frames.

## 4.9.1 Frame Data Setup

The Frame Data is programmed by the following three types of data generators. They are **DA/SA**, **DIP/SIP**, and **Collision**. The data created by each generator will overwrite data created by earlier generators.



Select **DA/SA**, **DIP/SIP**, and **Collision** tab of the **Frame Data** dialogue to view their individual property sheet.

### 4.9.1.1 Mask



Mask is a 6-byte (48-bit) value (in hexadecimal), which can be set to bind the range of setting based on bit. The **first two bytes** are set to be fixed; the last four bytes can be set as Mask value. The following table illustrates an example of XM-23L4 Mask fields setting.

(Module Card: XM-23L4, DA: "0080 C8000501", Mask: "XXXX XXXXXXXX", Mode: "Increase", Loop count: "10", Loop step: "1".)

Bit Mask Editor		Result
DA	Mask (in 6 bytes)	Masked DA Value
0080 C800 0501 (1)	XXXX XXXX XXXX (2)	0080 C800 0501 (3) 0080 C800 0502 0080 C800 0503 0080 C800 0504 0080 C800 0505 0080 C800 0506 0080 C800 0507 0080 C800 0508 0080 C800 0509 0080 C800 050A 0080 C800 0501 ...

If DA mode is set as “Increase,” the following DA of user-defined packets would be “0080 C800 0502,” “0080 C800 0503,” “0080 C800 0504,” etc., and bound by the Mask field, the actual DA of user-defined packets would be “0080 C800 0502”, “0080 C800 0503”, “0080 C800 0504”, etc.



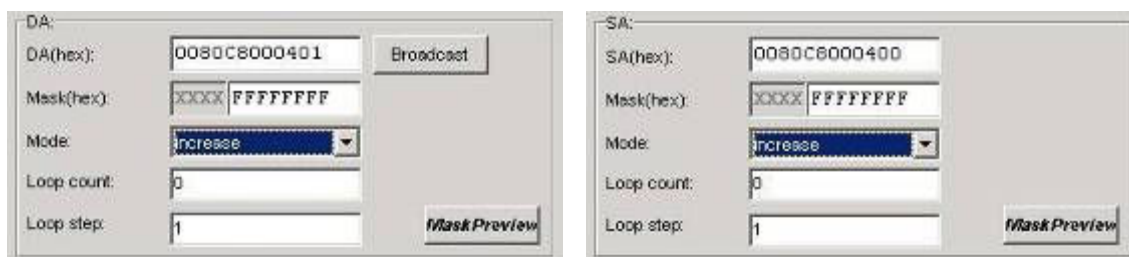
#### 4.9.1.2 Mode



Choose **DA/SA/DIP/SIP** mode setting for user-defined packets through Mode selection of each dialogue.

1. **Fixed** stands for fixed (constant) pattern of all transmitted packets.  
(000000000001, 000000000001, 000000000001...)
2. **Increase** stands for packets transmitted with incrementally increased value.  
(000000000001, 000000000002, 000000000003...)
3. **Decrease** stands for packets transmitted with decrementally decreased value.  
(000000000003, 000000000002, 000000000001...)
4. **Random** stands for packets transmitted with random value.  
(000000000001, 000000000003, 000000000002...)

#### 4.9.1.3 Loop



Loop Count indicates the number of transmitted packets in a loop, and Loop Step indicates the difference between every transmitted packet in the loop. Loop Count and Loop Step can be enabled for Increase and Decrease mode of DA/SA value setting. Please note that for the Increase and Decrease mode of DIP/SIP setting, Loop Step setting is not enabled.

If the DA value is set as “00000000001(expressed in hexadecimal format),” the transmission mode is set as “Increase,” the Loop Count value is set as “5,” and Loop Step value is set as “1,” the transmitted packets under this configuration shown in the Capture window will be like the following example:

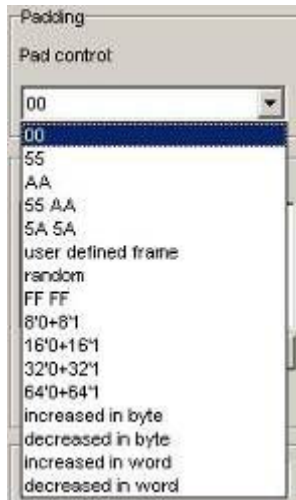
```
00000000001
00000000002
00000000003
00000000004
00000000005
00000000001
    ⋮
```

If the mask value of this configuration is set as “XXXX 00000001(expressed in hexadecimal format),” the actual reading on the Capture window will be:

```
00000000001
00000000000
00000000001
00000000000
00000000001
00000000000
    ⋮
```



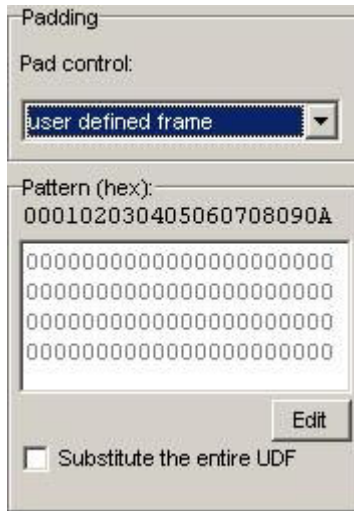
#### 4.9.1.4 Padding and Pattern



Padding makes a complement for the user-defined packet with insufficient length. When the actual transmitted packet length is less than the set value (please see 4.9.2.1 for Frame Length setting), the padding function will be enabled. The result of packets with padding can be seen on the Capture window. The factory default setting for padding is 00 (byte).

1. User defined frame: Inserted user defined frame.
2. Random: Inserted padding with random pattern
3. Increase in byte: Inserted byte with incremental increase (AA, AB, AC...)
4. Increase in word: Inserted word with incremental increase (AAAA, AAAB, AAAC...)
5. Decrease in byte: Inserted byte with decremental decrease (AC, AB, AA...)
6. Decrease in word: Inserted word with decremental decrease (AAAC, AAAB, AAAA...)

#### 4.9.1.5 Pattern Edit



Padding

Pad control:

user defined frame

Pattern (hex):

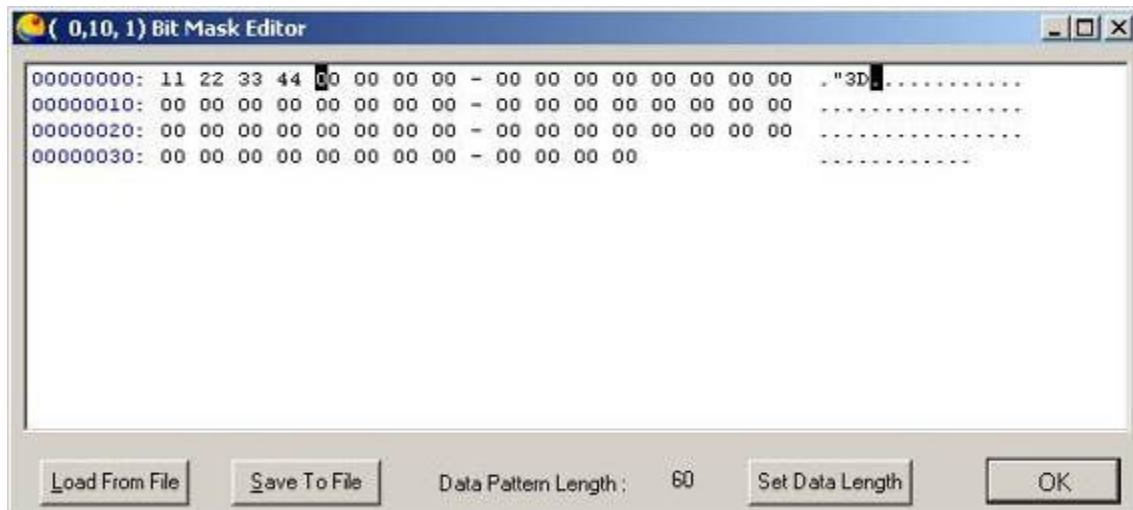
000102030405060708090A

000000000000000000000000  
000000000000000000000000  
000000000000000000000000  
000000000000000000000000

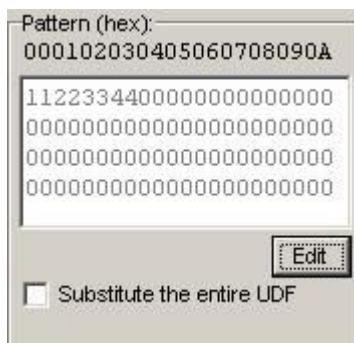
Edit

☐ Substitute the entire UDF

In **Transmit Setup** window, choose **user defined frame** as the padding selection, click **Edit** button to bring out the **Bit Mask Editor** for advanced editing of padding content or a new packet. Key in the word or byte value. Choose **Substitute the Entire UDF** to replace the entire original user defined packet with the padding setting or any new packets.



This is the **Bit Mask Editor** Window. Edit the padding content or the new packet and click the **OK** button to apply the editing result.



The editing value can be loaded from files or network or saved as new files by clicking on the **Load From File** or **Save To File** button.

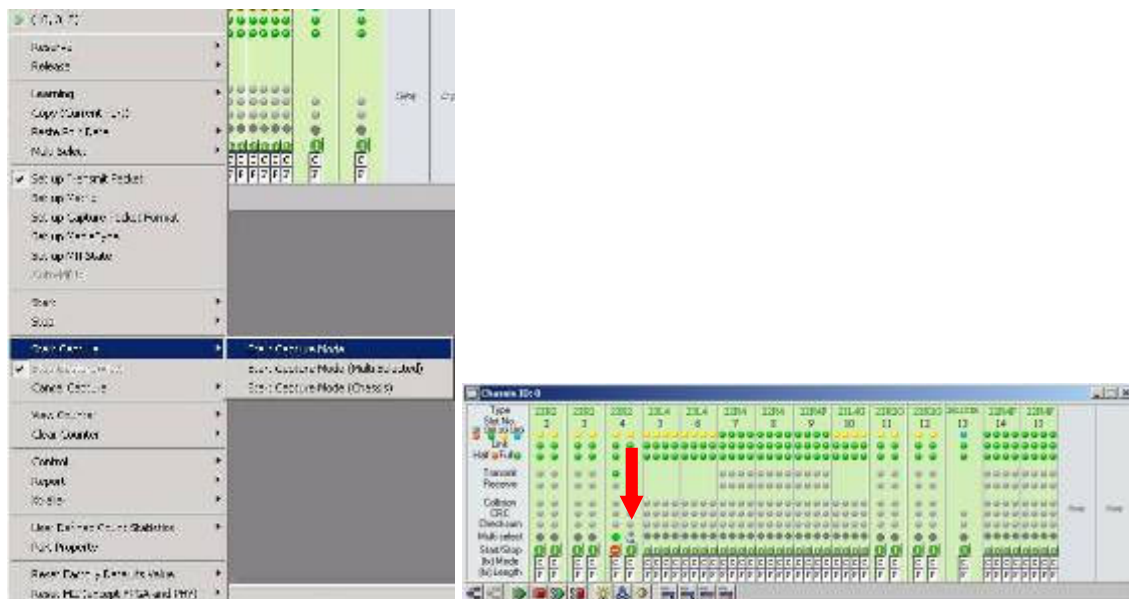


Click **Set Data Length** button on the **Bit Mask Editor** to set up the length of the padding content or new packet to replace original ones.

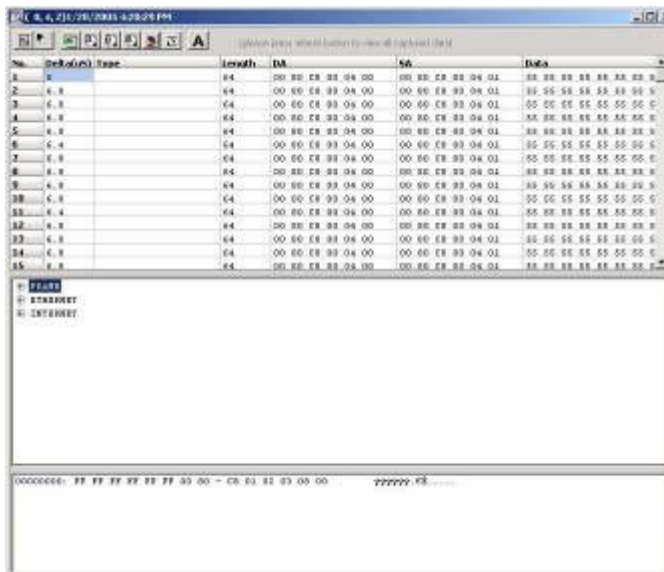
#### 4.9.1.6 Capture and View Packet



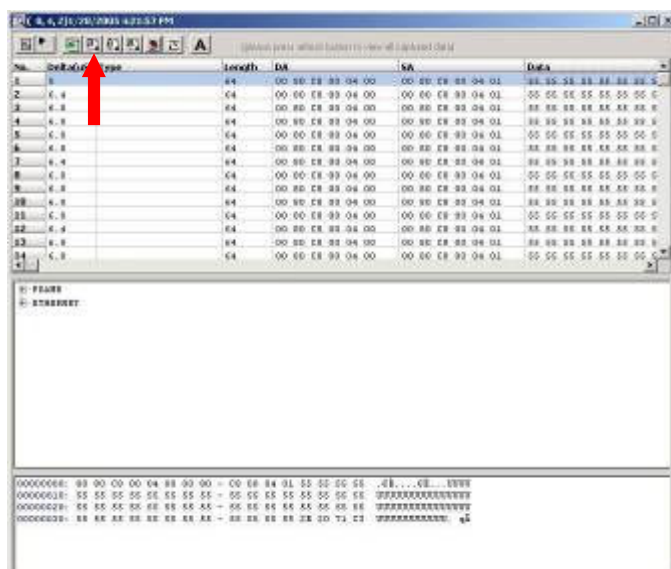
Select and send packet through (0,4,1).



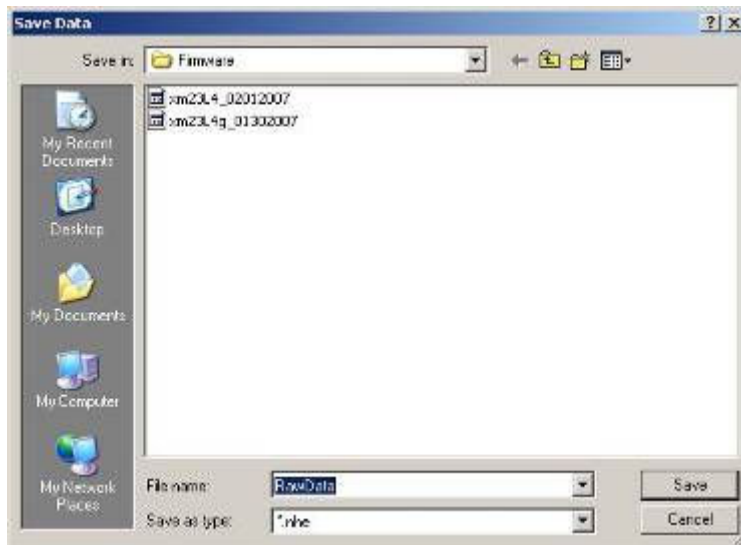
Choose **Start Capture Mode** to capture the packet received by (0,4,2). From the Chassis panel, there is a small blue arrow shown on the slot four of the module card.



Choose **Start Capture/View** to bring out the Capture window.

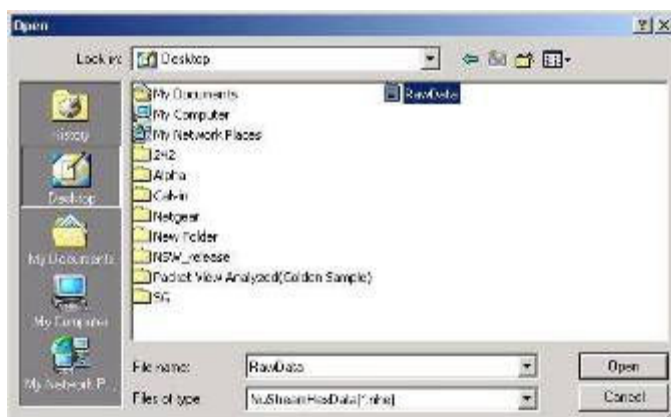


Choose the packet to be saved. It's packet No.1 in this case. Click on the **Export to Raw Data** button to save the binary data of the chosen packet as a default file with extension "nhe."

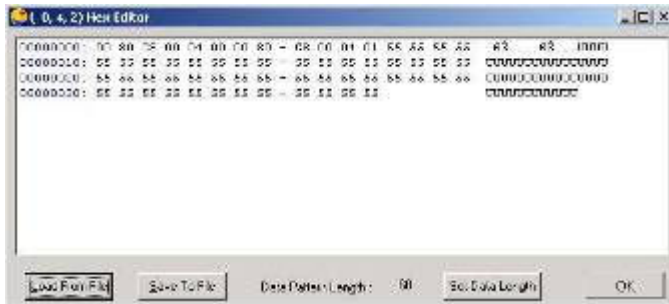


The **Save Data** window will automatically appear when **Export to Raw Data** button is clicked. Save the Raw Data file to any position preferred.

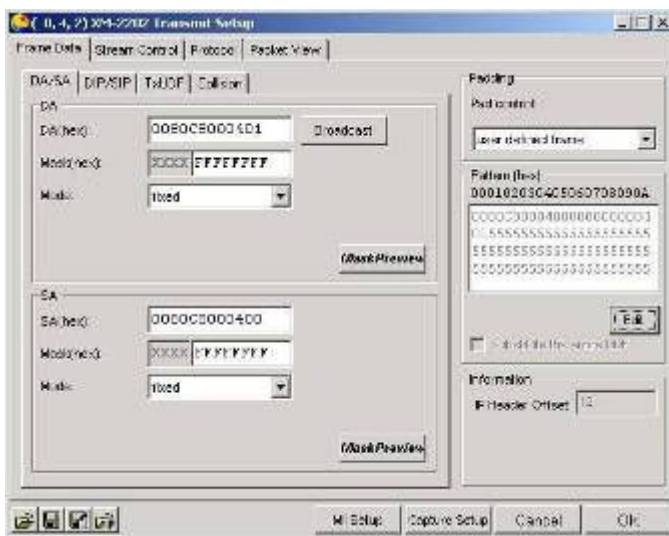
Go to Bit Mask Editor and click **Load From File...**



... to open nhe file previously saved.



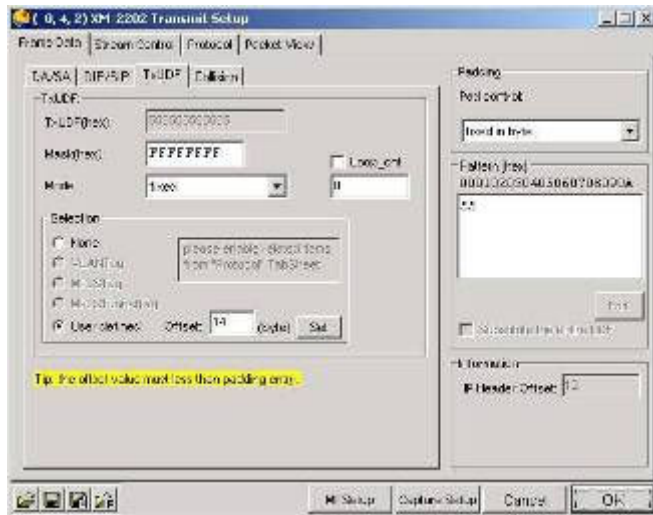
The binary data of the chosen packet are shown in the **Bit Mask Editor**.



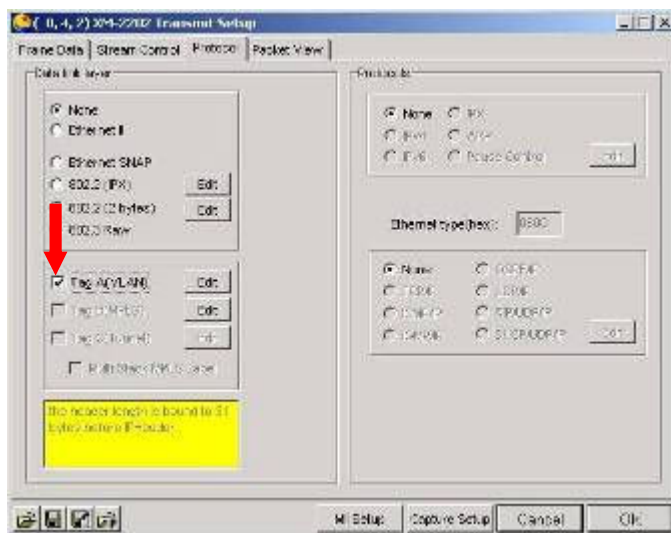
Now the binary data of the chosen packet is shown on the pattern dialogue, which will serve as a new packet to replace the original padding content. Make sure to select **User Defined Frame** as the padding mode and **Substitute the Entire UDF**.



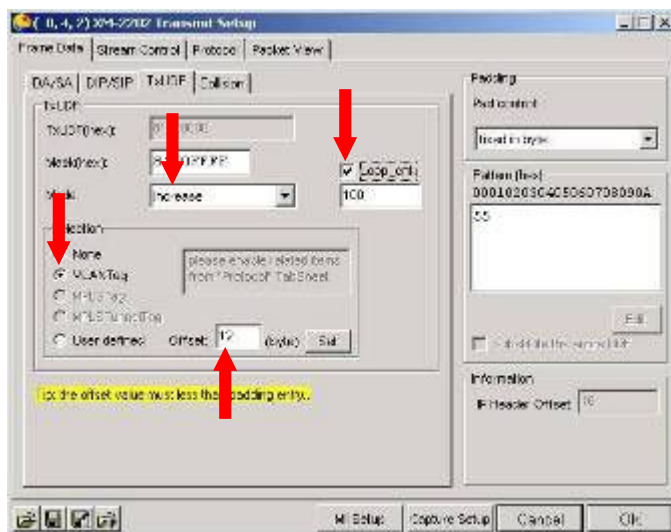
#### 4.9.1.7 TxUDF



Select **TxUDF** tab of the **Frame Data** dialogue to start customizing packet.



For example, to make packets with VLAN tag configuration in the UDF, choose **Tag A (VLAN)** in the **Protocol** dialogue.

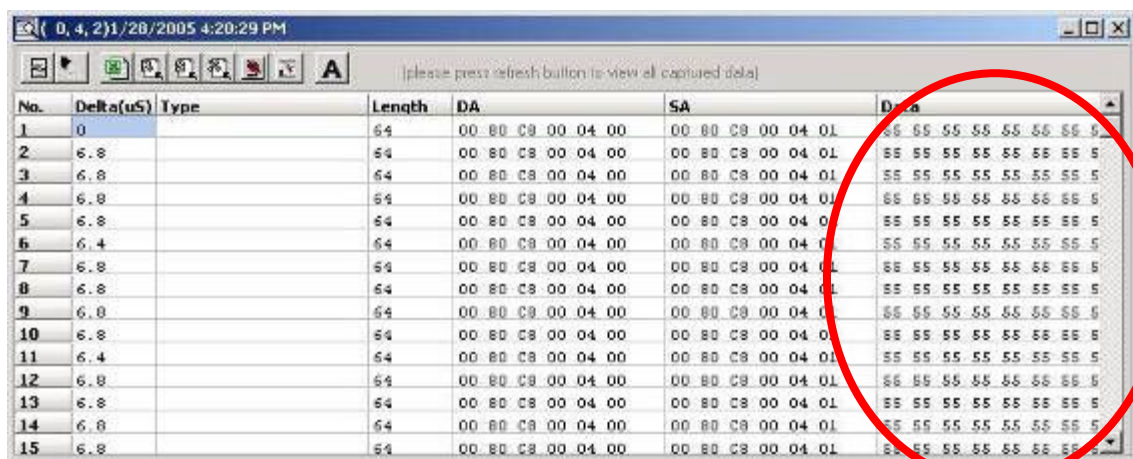


Choose **VLANTag** in the **Selection** dialogue. Please note that the **Offset** value will automatically change to 12 if **VLANTag** is chosen. Users may choose the desired **Mode** and **Loop count** for the configured packet.

After setting, send the defined packet through the chosen port. In this case, it's (0,4,1).

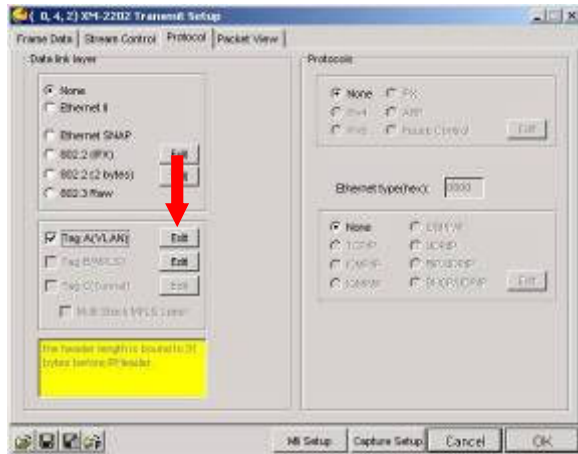
Move the cursor to port (0,4,2) on the chassis panel.

Choose **Start Capture Mode** and **Stop Capture/View** to view the packets received through port (0,4,2).

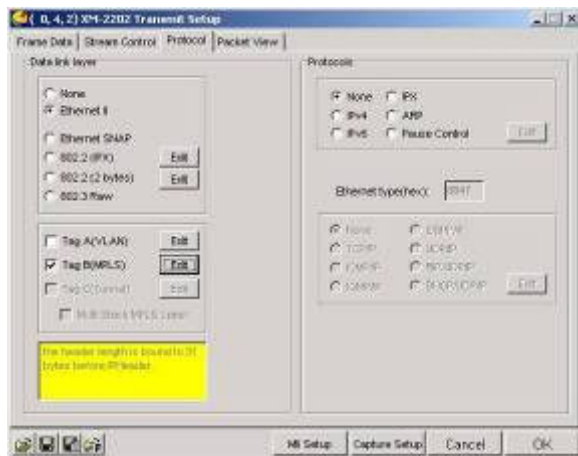


No.	Delta(uS)	Type	Length	DA	SA	Data
1	0		64	00 80 C8 00 04 00	00 80 C8 00 04 01	55 55 55 55 55 55 55 55
2	6.8		64	00 80 C8 00 04 00	00 80 C8 00 04 01	55 55 55 55 55 55 55 55
3	6.8		64	00 80 C8 00 04 00	00 80 C8 00 04 01	55 55 55 55 55 55 55 55
4	6.8		64	00 80 C8 00 04 00	00 80 C8 00 04 01	55 55 55 55 55 55 55 55
5	6.8		64	00 80 C8 00 04 00	00 80 C8 00 04 01	55 55 55 55 55 55 55 55
6	6.4		64	00 80 C8 00 04 00	00 80 C8 00 04 01	55 55 55 55 55 55 55 55
7	6.8		64	00 80 C8 00 04 00	00 80 C8 00 04 01	55 55 55 55 55 55 55 55
8	6.8		64	00 80 C8 00 04 00	00 80 C8 00 04 01	55 55 55 55 55 55 55 55
9	6.8		64	00 80 C8 00 04 00	00 80 C8 00 04 01	55 55 55 55 55 55 55 55
10	6.8		64	00 80 C8 00 04 00	00 80 C8 00 04 01	55 55 55 55 55 55 55 55
11	6.4		64	00 80 C8 00 04 00	00 80 C8 00 04 01	55 55 55 55 55 55 55 55
12	6.8		64	00 80 C8 00 04 00	00 80 C8 00 04 01	55 55 55 55 55 55 55 55
13	6.8		64	00 80 C8 00 04 00	00 80 C8 00 04 01	55 55 55 55 55 55 55 55
14	6.8		64	00 80 C8 00 04 00	00 80 C8 00 04 01	55 55 55 55 55 55 55 55
15	6.8		64	00 80 C8 00 04 00	00 80 C8 00 04 01	55 55 55 55 55 55 55 55

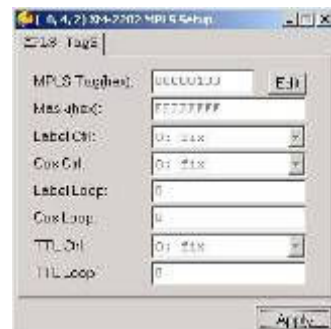
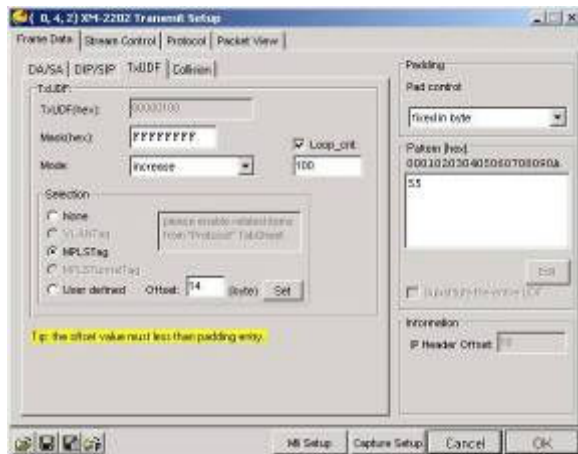
Now the contents of the defined packets show with all the customized features captured through port (0,4,2).



To further configure user-defined packet with VLAN tag, go to the **Protocol** dialogue and click on the **Edit** button to bring out **(0,4,1) XM-2202 VLAN Setup** window.

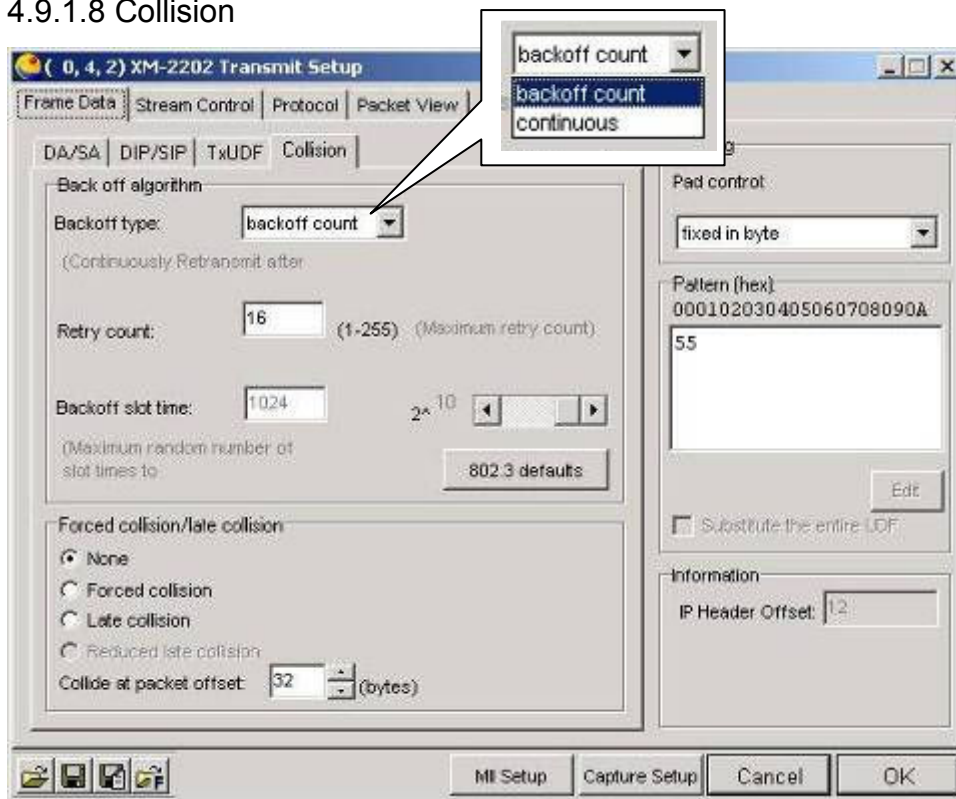


For other protocol variation supported by UDF function, choose the desired selection in the **Protocol** dialogue. It's **MPLS** in this case.



Follow the previous procedure to set up MPLS configuration. Go to the **Protocol** dialogue and click on the **Edit** button to bring out **MPLS Setup** window to further configure user-defined packet with MPLS tag.

#### 4.9.1.8 Collision

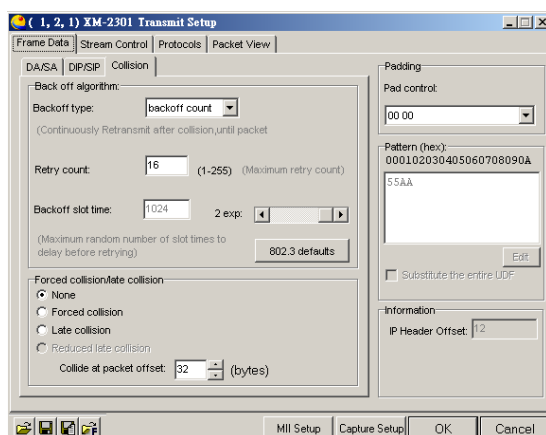


The **Collision** tab controls the setting of collision.

**Backoff Count** stands for the number of retry when collision occurs. 16 is the default value for **Backoff Count**.

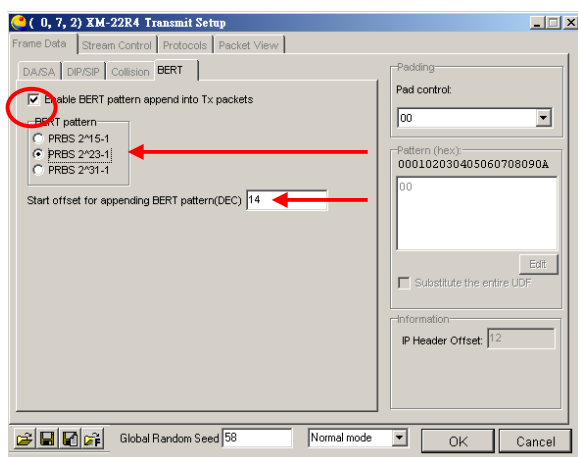
**Continuous** stands for continuous retransmission. The back off random mask (random amount of time waiting for retransmission) can be configured between  $2^1 \times 51.2$  (slot time) to  $2^{10} \times 51.2$  (slot time) ms.

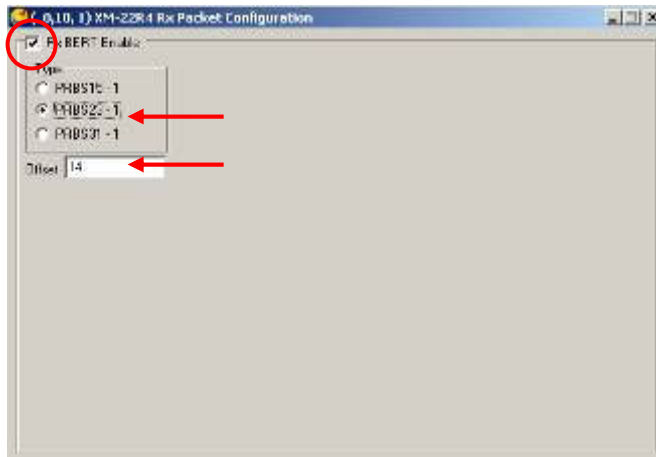
Force collision can be activated when receiving packets. In addition to normal capture operation, forced collisions can be generated at the receive end of 10/100 module ports, but only when the port is in half duplex mode. The collision takes the form of a number of nibbles generated at a specific offset within a packet. A number of consecutive collisions are generated, followed by a non-colliding period. Please note that module card XM-22R4 does not support force collision/late collision yet.



#### 4.9.1.9. BERT

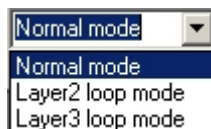
Please note that module card XM-28L1 only supports BERT on layer 1 and module card XM-22R4 and XM-23R2 support BERT on layer 2. Choose the appropriate type by clicking the radio button and input an offset value for test. The offset value should be always at least 14 or larger. The settings of BERT in **Set up Transmit Packet** must be exactly the same with the settings of BERT in **Set up Receive Packet**. If the settings do not match, BERT error would occur.



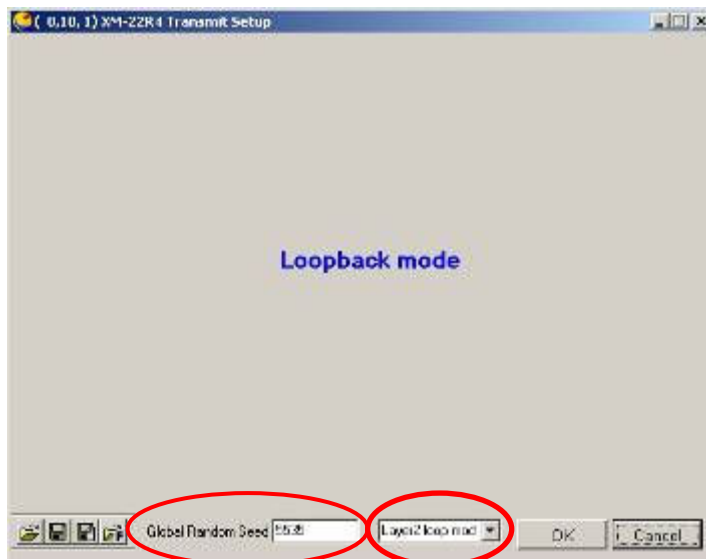


#### 4.9.1.10 Loopback

Please note that only module card XM-22R4 supports this function. Choose either in **Layer-2 loop mode** or in **Layer-3 loop mode** and then click **OK** button at the lower part of the **Transmit Setup** window to complete setup.



The window would appear as the following once the loop mode is chosen.

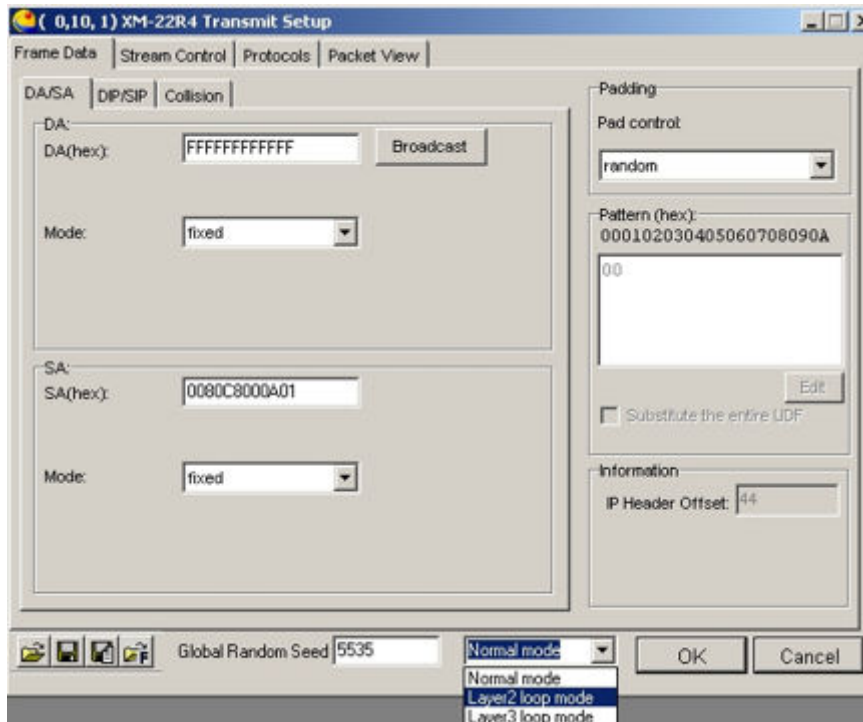


Layer 2 refers to DA and SA settings while Layer 3 refers to IP settings. Global Random Seed is a default value generated by hardware from ID of its corresponding chassis, slot and port such as module card XM-22R4 at (0,10,1) with global random seed of 5535.



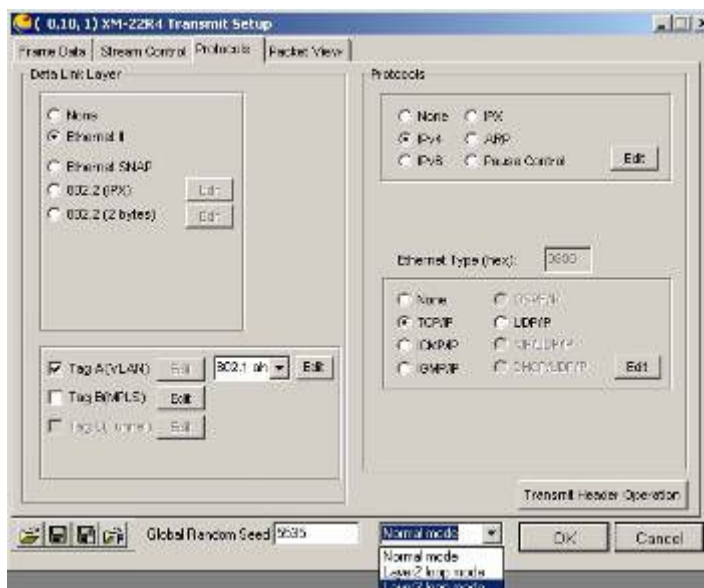
Layer 2:

Click **Set up Transmit Packet> Frame Data> DA/SA- Layer2 loop mode** at the bottom.



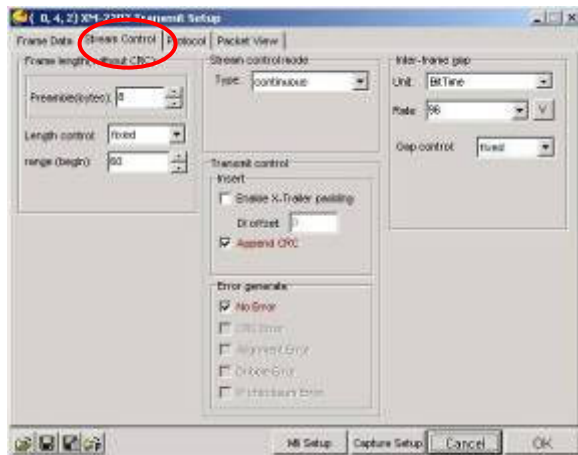
Layer 3:

Click **Set up Transmit Packet> Protocols> Ethernet II- IPv4- Layer3 loop mode**



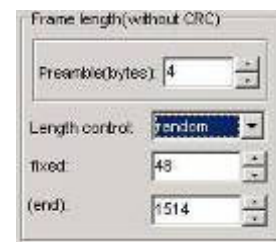
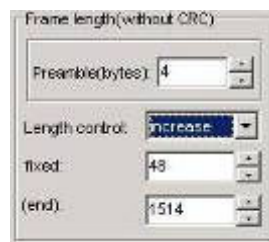
Once the setup is complete, the port can only be used as the receive port and can no longer be the transmit port.

## 4.9.2 Stream Control Setup



This section details the setting of **Stream Control** setup.

### 4.9.2.1 Frame Length (Without CRC)



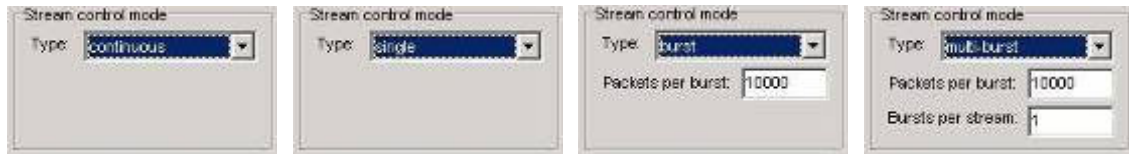
The range for **Preamble** setting is from 4 to 16 bytes. For **Length Control** setting, **fixed**, **increase**, **random**, and **loop** modes are provided. Each mode provides a range (48 to 2036 bytes) to be set with.



For **loop** mode, another dialogue will appear for further setup. Up to 4 types of length can be chosen for the setting.



#### 4.9.2.2 Streams Control Mode



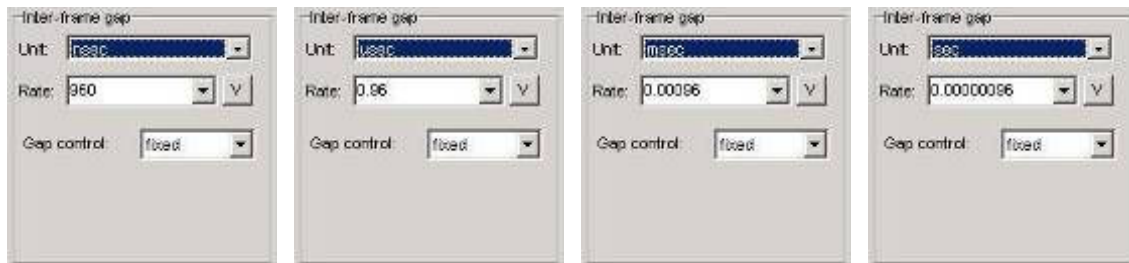
For **Stream control**, packets are sent continuously (with gaps) in the **continuous** mode. In the **single** mode, only one packet is sent. In the **burst** mode, a number of packets are sent at once, and their number can be adjusted. In the **Multi-burst** mode, multiple batches of packets will be sent, and the dialogue will stretch for further setup. Up to  $2^{32} - 1$  packets can be set for **Packets per Burst**, and up to 16,777,215 bursts can be set for **Bursts per Stream**.

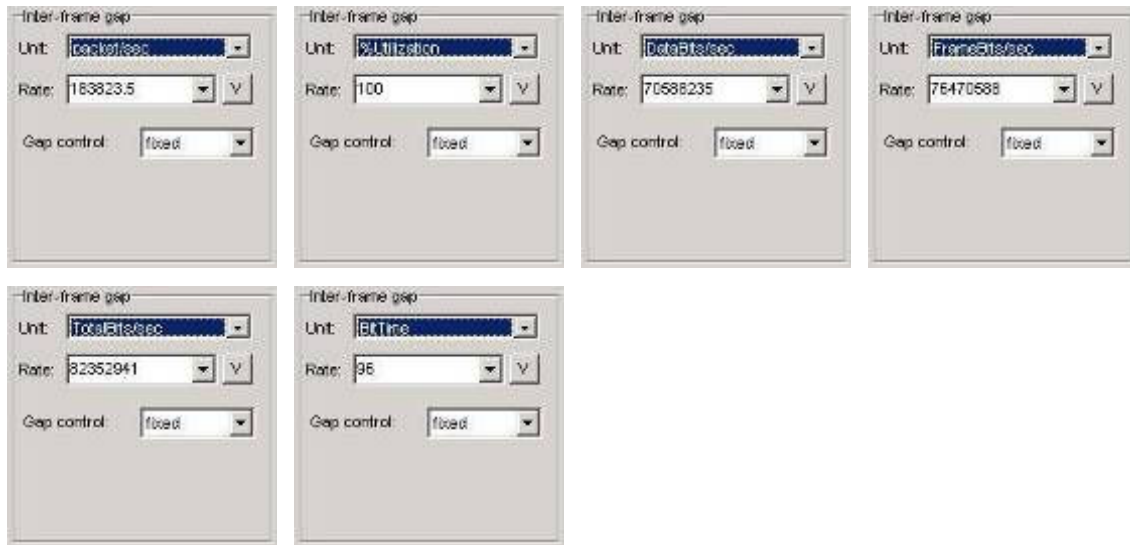
#### 4.9.2.3 Transmit Control



**X-Trailer** appendage is not supported in default setting. Choose to enable it. **CRC** Checksum can be chosen to remove its appendage. For error configuration, choose desired errors in the **Error Generation** dialogue.

#### 4.9.2.4 Inter-Frame Gap

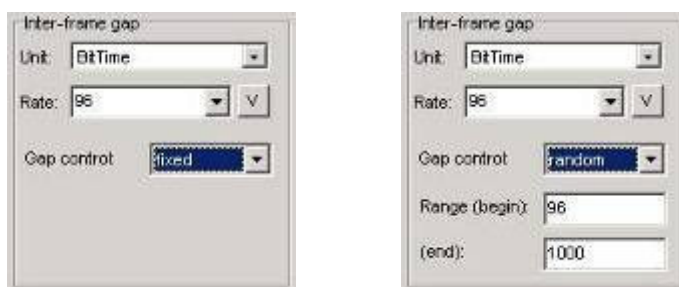




Multiple **Units** can be chosen for **Inter-frame gap** configuration. Different **Rate** will show for different unit of the same value.

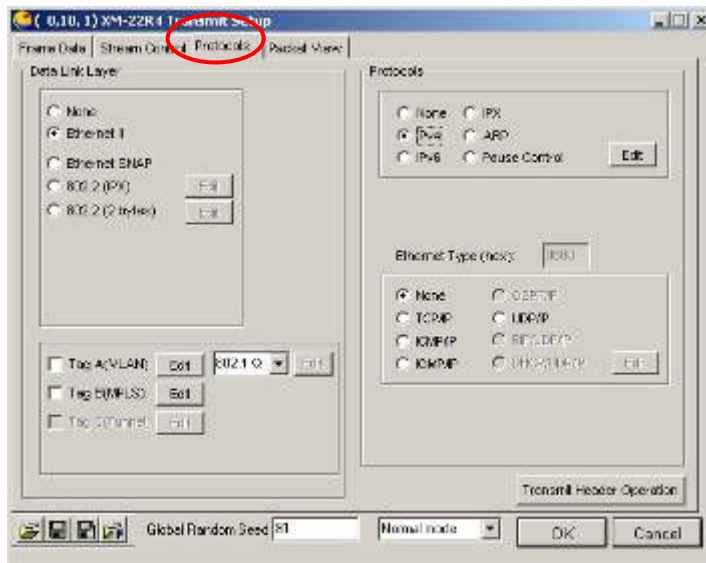
nsec:	2240
usec:	2.24
msec:	0.00224
sec:	0.00000224
packet/sec:	390625.0
%Utilization:	50.00
DataBps/sec:	0
FrameBps/sec:	12500000
TotalBps/sec:	12500000
BitTime:	224

Click on  button to see the Conversion table for all units.



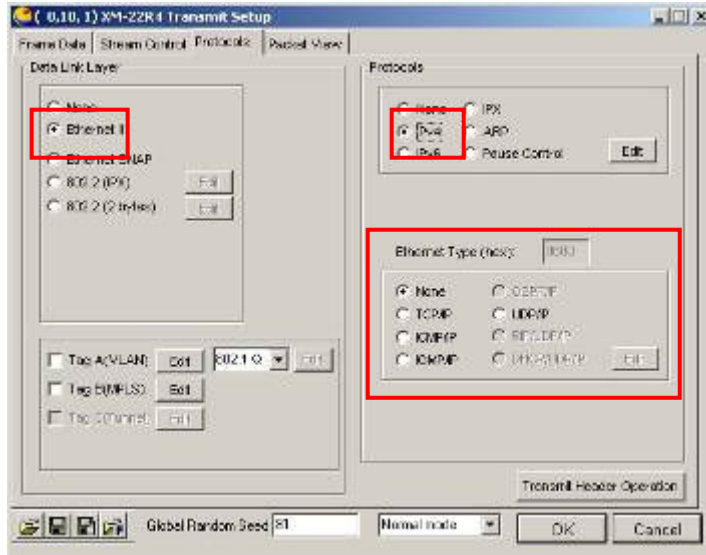
**Gap Control** supports fixed and random mode. For random mode, the dialogue will stretch for further setup.

### 4.9.3 Protocol Setup



The **Protocol** tab controls the selection of protocols. NuWIN allows the initial bytes of the packet contents to be formatted according to different conventions and protocols.

Please note that module card XM-22R4 or XM-23R2 only supports five types in **Ethernet Type of IPv4 Protocols** as shown in the following picture.



## 4.9.4 Transmit Header Operation

**Transmit Header Operation** is a powerful function to provide detailed variations among DA, SA and TxUDF1~4 protocol parameters. Users could change TxUDF1~TxUDF4 columns in Fixed, Increase, Decrease or Random mode by bytes. Only module card XM-22R4 supports **Transmit Header Operation**, which could be operatable through **Set up Transmit Packet** and **Smart Matrix**.

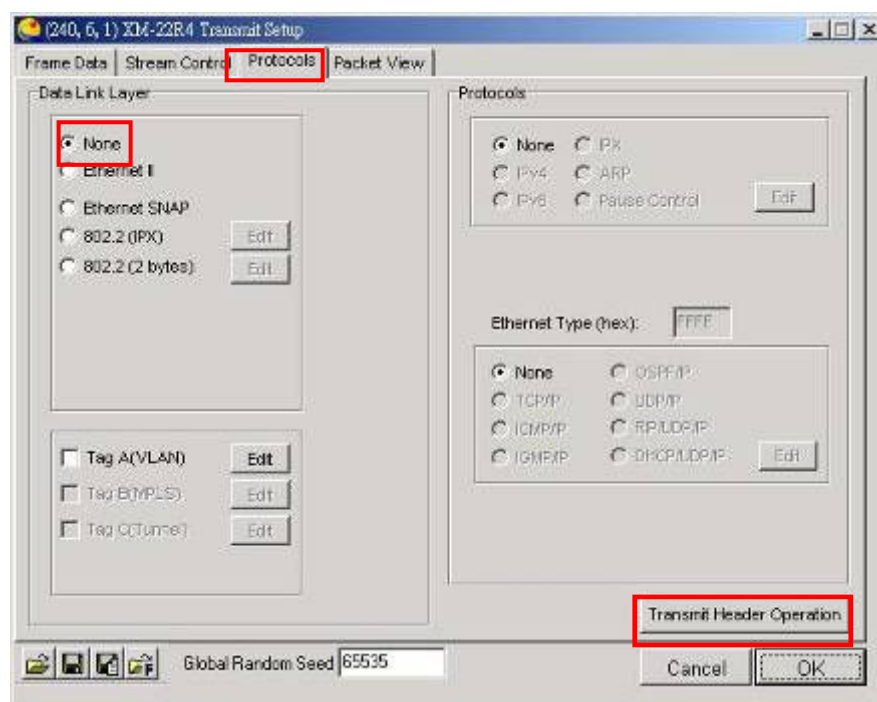
### 4.9.4.1 How to Set up Transmit Header Operation

6 parameters are divided into 2 groups to demonstrate DA /SA (Control Mode, Count and/ or Step) and TxUDF1~4 Settings.

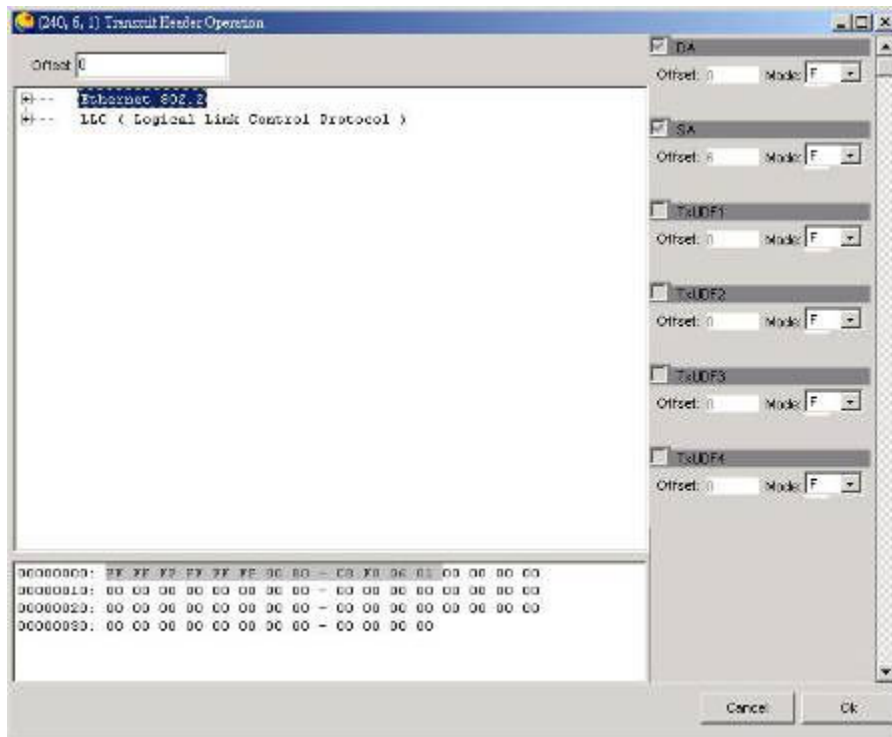
Part 1. Simple DA and SA settings:

Step 1. Click the desired port and click right mouse on **Set up Transmit Packet**.

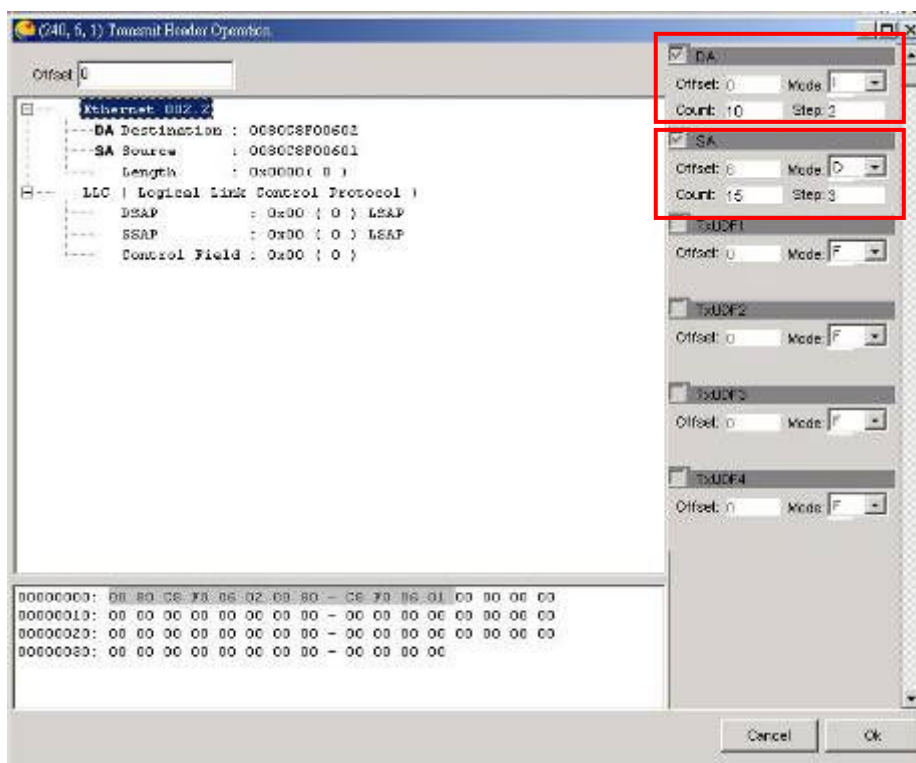
Choose **Protocols** tab and select **None** in **Data Link Layer** dialogue.



Step 2. Click **Transmit Header Operation** button in the lower right corner to bring out checked DA and SA as defaults in Fixed (F) mode.



Step 3. Set up DA: Mode =I (Increase), Count =10, Step =2,  
SA: Mode =D (Decrease), Count =15, Step =3

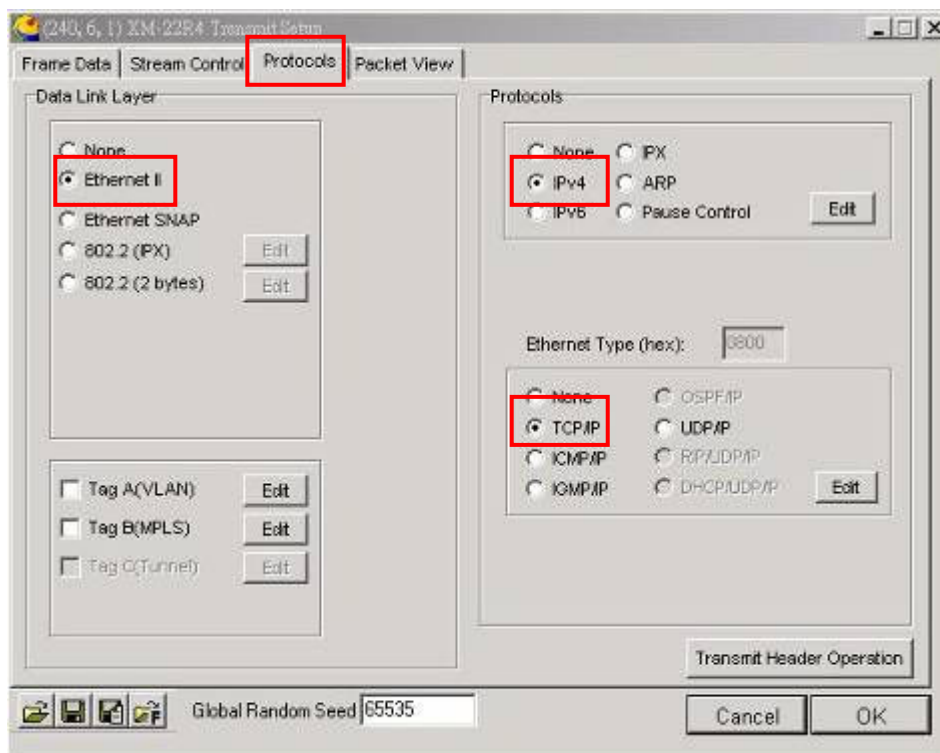


Step 4. Capture to compare packet data to determine whether expectations/ results are being met /same.

No.	Delta(μs)	Type	Length	DA	SA	Data
1	0.00		64	00 80 C8 F0 06 02	00 80 C8 F0 06 01	00 FF 00 FF 00 FF 00 FF 00
2	6.72		64	00 80 C8 F0 06 04	00 80 C8 F0 06 02	00 FF 00 FF 00 FF 00 FF 00
3	6.72		64	00 80 C8 F0 06 06	00 80 C8 F0 06 03	00 FF 00 FF 00 FF 00 FF 00
4	6.72		64	00 80 C8 F0 06 08	00 80 C8 F0 06 04	00 FF 00 FF 00 FF 00 FF 00
5	6.72		64	00 80 C8 F0 06 0A	00 80 C8 F0 06 05	00 FF 00 FF 00 FF 00 FF 00
6	6.72		64	00 80 C8 F0 06 0C	00 80 C8 F0 06 06	00 FF 00 FF 00 FF 00 FF 00
7	6.72		64	00 80 C8 F0 06 0E	00 80 C8 F0 06 07	00 FF 00 FF 00 FF 00 FF 00
8	6.72		64	00 80 C8 F0 06 10	00 80 C8 F0 06 08	00 FF 00 FF 00 FF 00 FF 00
9	6.72		64	00 80 C8 F0 06 12	00 80 C8 F0 06 09	00 FF 00 FF 00 FF 00 FF 00
10	6.72		64	00 80 C8 F0 06 14	00 80 C8 F0 06 0A	00 FF 00 FF 00 FF 00 FF 00
11	6.72		64	00 80 C8 F0 06 02	00 80 C8 F0 06 0B	00 FF 00 FF 00 FF 00 FF 00
12	6.72		64	00 80 C8 F0 06 04	00 80 C8 F0 06 0C	00 FF 00 FF 00 FF 00 FF 00
13	6.72		64	00 80 C8 F0 06 06	00 80 C8 F0 06 0D	00 FF 00 FF 00 FF 00 FF 00
14	6.72		64	00 80 C8 F0 06 08	00 80 C8 F0 06 0E	00 FF 00 FF 00 FF 00 FF 00
15	6.72		64	00 80 C8 F0 06 0A	00 80 C8 F0 06 0F	00 FF 00 FF 00 FF 00 FF 00
16	6.72		64	00 80 C8 F0 06 0C	00 80 C8 F0 06 01	00 FF 00 FF 00 FF 00 FF 00

Part 2. Define TxUDF 1 ~ TxUDF 4

Step1. Select **Protocols** tab, and select **Ethernet II – IPv4 – TCP/IP**.



Step 2. Set up IP and TCP.



**[240, 6, 1] IPv4 Header**

Version	4	<input type="checkbox"/> Length Override	45
Header Length	20	Identifier	0
Precedence (TOS Bits 0-2)	000 - Routine	Fragment	May Fragment
Delay (TOS Bits 3)	0 - Normal		Last Fragment
Throughput (TOS Bits 4)	0 - Normal	Fragment Offset (x8)	0
Reliability (TOS Bits 5)	0 - Normal	Time to Live	64
Cost (TOS Bits 6)	0 - Normal	Protocol	6 - TCP
Reserved (TOS Bits 7)	0	Valid Checksum	auto

Dest Address	Address: 192.168.1.2	Mode: fixed	Mask: xxx.xxx.xxx.xxx
Source Address	Address: 192.168.1.1	Mode: fixed	Mask: xxx.xxx.xxx.xxx

**IP Header Encoding**

```

00000000: 45 00 00 20 00 00 00 00 - 40 06 00 00 00 01 01  E.....8...
00000010: 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00  .
  
```

Decode

OK

**[240, 6, 1] TCP Header**

Source Port	40 00	<b>Flags</b> <input type="checkbox"/> Urgent Pointer Valid <input type="checkbox"/> Reset Connection <input type="checkbox"/> Acknowledge Valid <input type="checkbox"/> Synchronize Sequence <input type="checkbox"/> Push Function <input type="checkbox"/> No More Data From Sender
Destination Port	50 00	
Sequence Number	00 00 00 00	
Acknowledgement Number	00 00 00 00	
Header Length(x4)	5	
Window	08 71	
Checksum	auto	
Urgent Pointer	00 01	

**TCP Header Encoding**

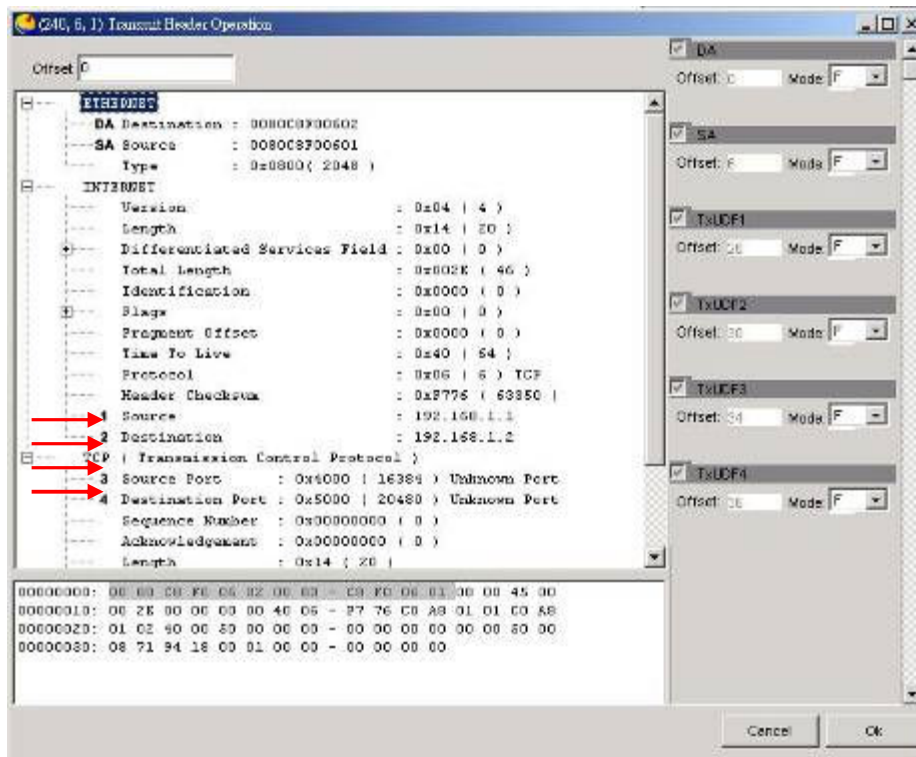
```

00000000: 40 00 00 00 00 00 00 00 - 00 00 00 00 50 00 08 71  Q.....P..q
00000010: 00 00 00 01 - 00 00 00 00 00 00 00 00  .
  
```

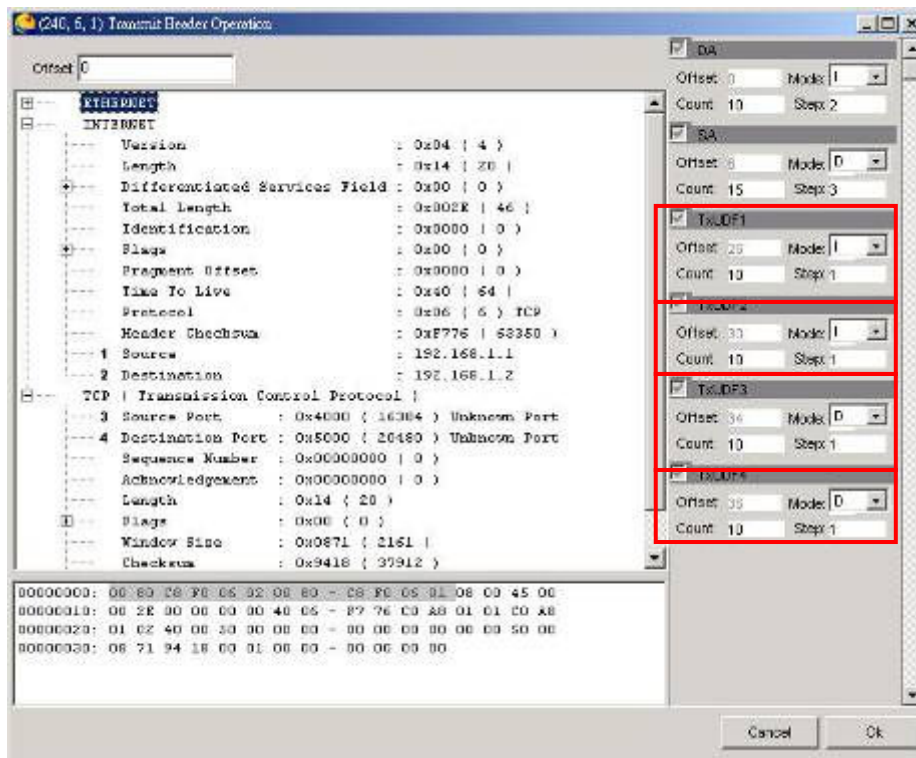
Decode

IP    OK

Step 3. Click **Transmit Header Operation** to display tree diagram. Click right mouse on the desired column to define TxUDF 1 ~ TxUDF 4 as SIP, DIP, Source Port and Destination Port.



Step 4. Set up TxUDF 1 and TxUDF 2: Mode =I (Increase), Count =10, Step =1,  
TxUDF 3 and TxUDF 4: Mode =D (Decrease), Count =10, Step =1.



Step 5. Capture to compare packet data to determine whether results are the same.



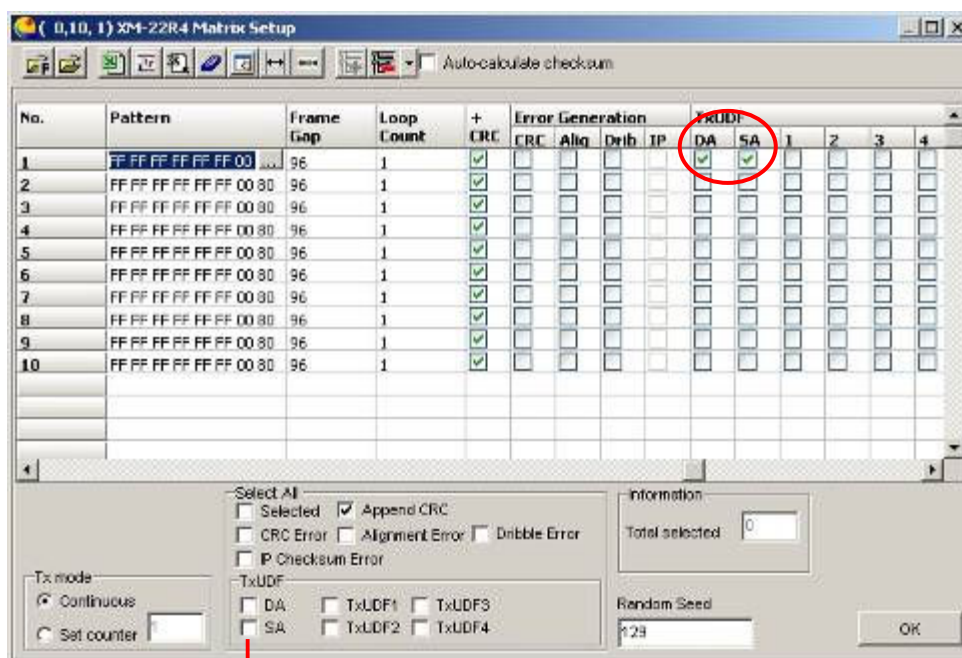
No.	Delta	T	Lenq	DA	SA	Data
1	0.00	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 76 C0 A8 01	01 C0 A8 01 02 40 00 50 00 00
2	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 74 C0 A8 01	02 C0 A8 01 03 3F FF 4F FF 00
3	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 72 C0 A8 01	03 C0 A8 01 04 3F FF 4F FF 00
4	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 70 C0 A8 01	04 C0 A8 01 05 3F FF 4F FF 00
5	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 6E C0 A8 01	05 C0 A8 01 06 3F FF 4F FF 00
6	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 6C C0 A8 01	06 C0 A8 01 07 3F FF 4F FF 00
7	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 6A C0 A8 01	07 C0 A8 01 08 3F FF 4F FF 00
8	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 68 C0 A8 01	08 C0 A8 01 09 3F FF 4F FF 00
9	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 66 C0 A8 01	09 C0 A8 01 0A 3F FF 4F FF 00
10	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 64 C0 A8 01	0A C0 A8 01 0B 3F FF 4F FF 00
11	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 76 C0 A8 01	01 C0 A8 01 02 40 00 50 00 00
12	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 74 C0 A8 01	02 C0 A8 01 03 3F FF 4F FF 00
13	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 72 C0 A8 01	03 C0 A8 01 04 3F FF 4F FF 00
14	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 70 C0 A8 01	04 C0 A8 01 05 3F FF 4F FF 00
15	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 6E C0 A8 01	05 C0 A8 01 06 3F FF 4F FF 00
16	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 6C C0 A8 01	06 C0 A8 01 07 3F FF 4F FF 00
17	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 6A C0 A8 01	07 C0 A8 01 08 3F FF 4F FF 00
18	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 68 C0 A8 01	08 C0 A8 01 09 3F FF 4F FF 00
19	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 66 C0 A8 01	09 C0 A8 01 0A 3F FF 4F FF 00
20	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 64 C0 A8 01	0A C0 A8 01 0B 3F FF 4F FF 00
21	6.72	64	00 00 00 00	08 00 45 00 00	28 00 00 00 00 40 06 P7 76 C0 A8 01	01 C0 A8 01 02 40 00 50 00 00

#### 4.9.4.2 Set up and Operate in Smart Matrix

Transmit Header Operation in Smart Matrix is similar to the operation in Transmit Setup. Only the setting steps between these two are slightly different. The protocol parameters are divided into 2 groups: DA/ SA and TxUDF 1~TxUDF 4.

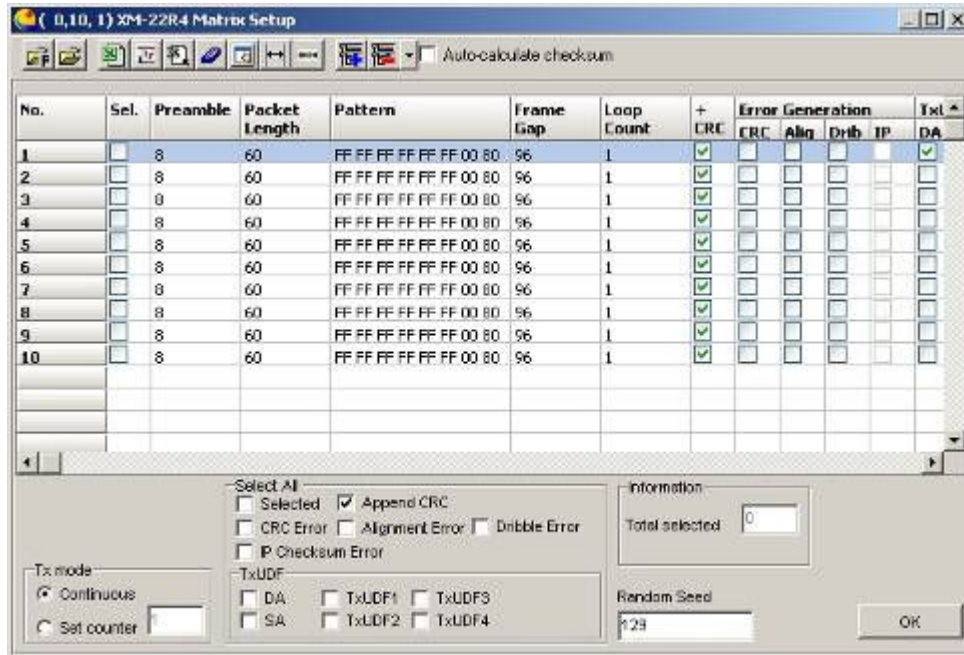
##### Part 1. Simple DA and SA settings

Step 1. Click right mouse on desired port to select **Set up Smart Matrix** to bring out the window. Choose the desired packet to check DA and SA in TxUDF to activate.

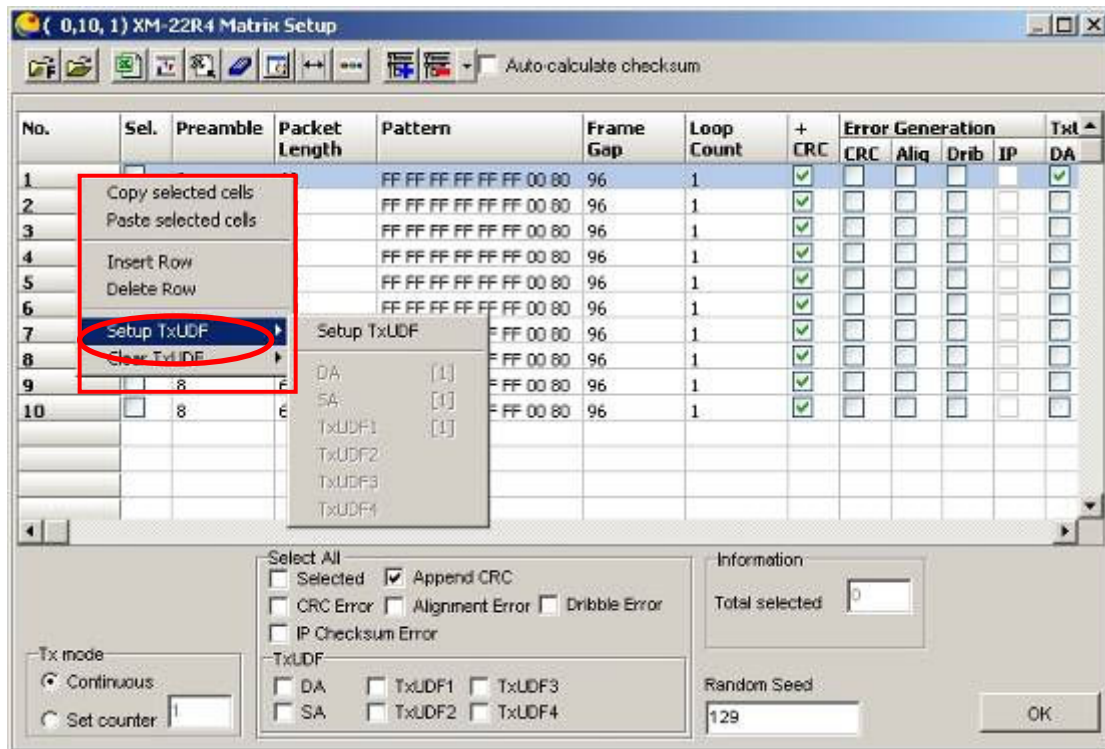


Check the box(es) to enable all TxUDF parameters at once.

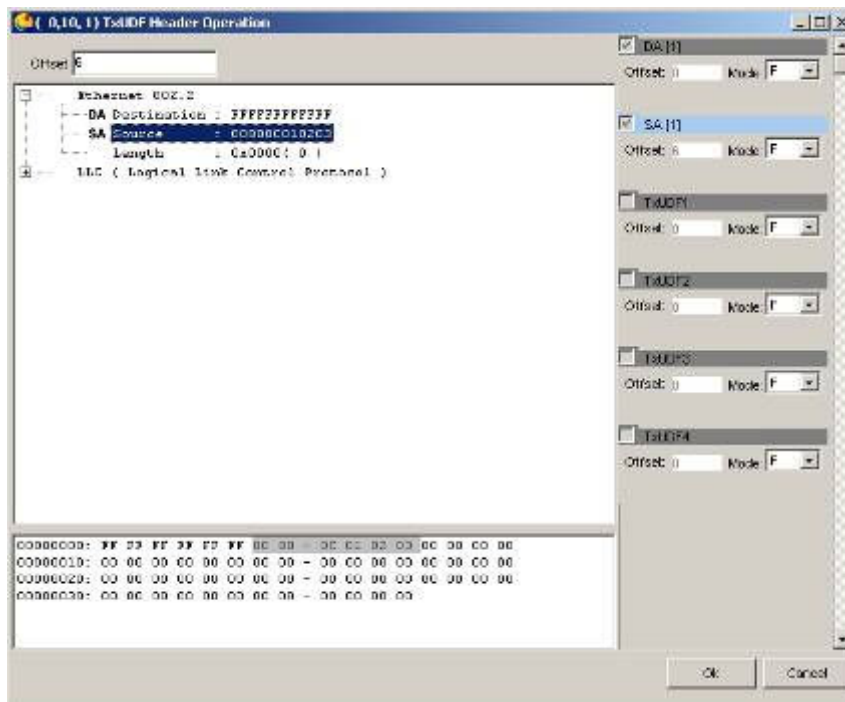
Step 2. Click left mouse on No. column to turn blue in order to set up.



Step 3. Click right mouse on No. column to bring out menu to choose **Setup TxUDF**.



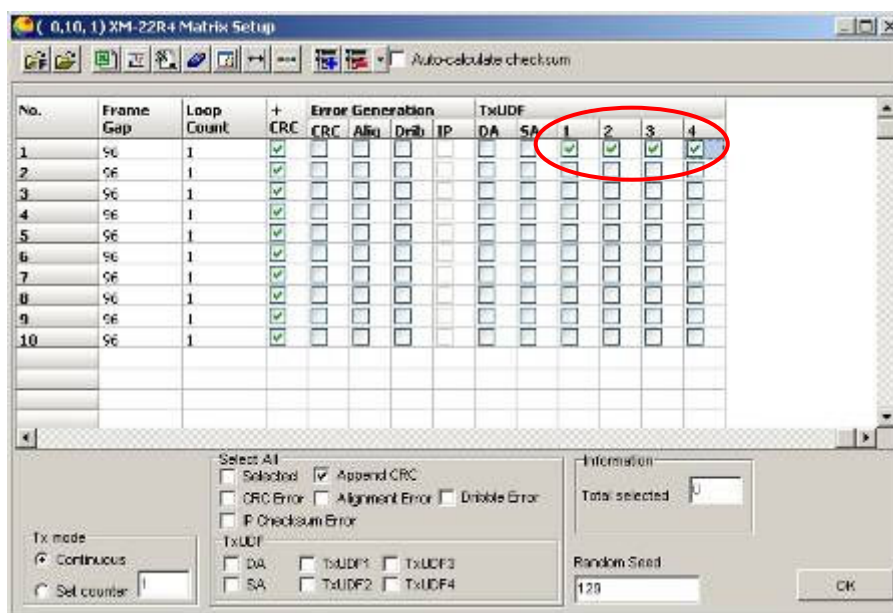
Step 4. Open up tree diagram to click Destination to turn blue and click right mouse on DA. Click Source to turn blue and click right mouse on SA to complete settings.




Step 5. Repeat Step 3 and 4 for DA and SA settings in Transmit Setup to complete the whole configuration.

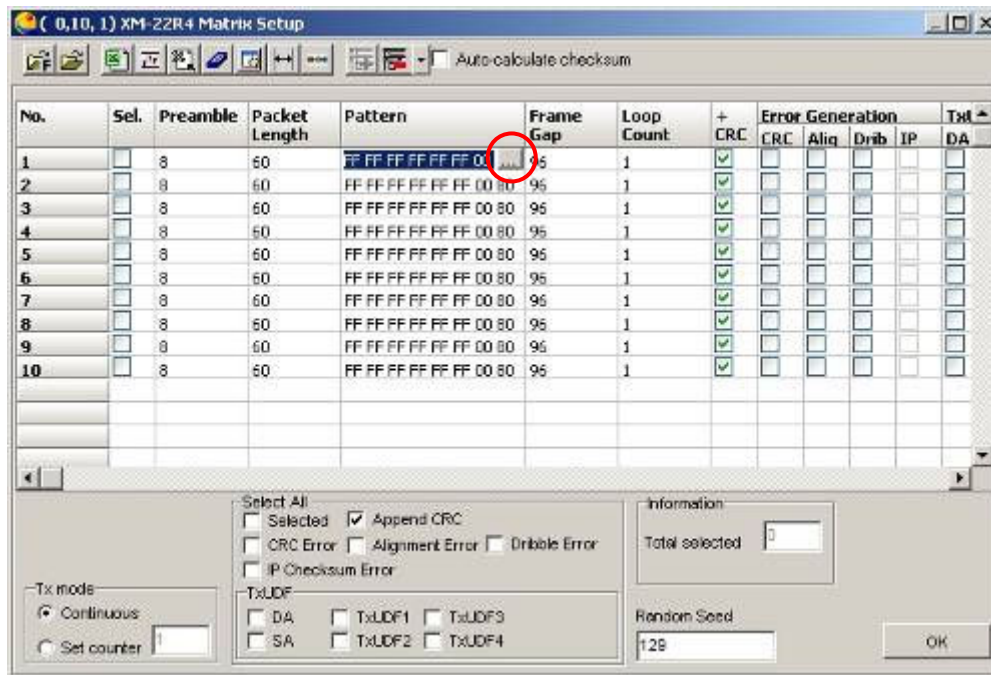
## Part 2. Change TxUDF 1 ~ TxUDF 4 settings

Step 1. Click right mouse on desired port to select **Set up Smart Matrix** to bring out menu. Choose desired packet to check TxUDF 1 ~ TxUDF 4 to activate.

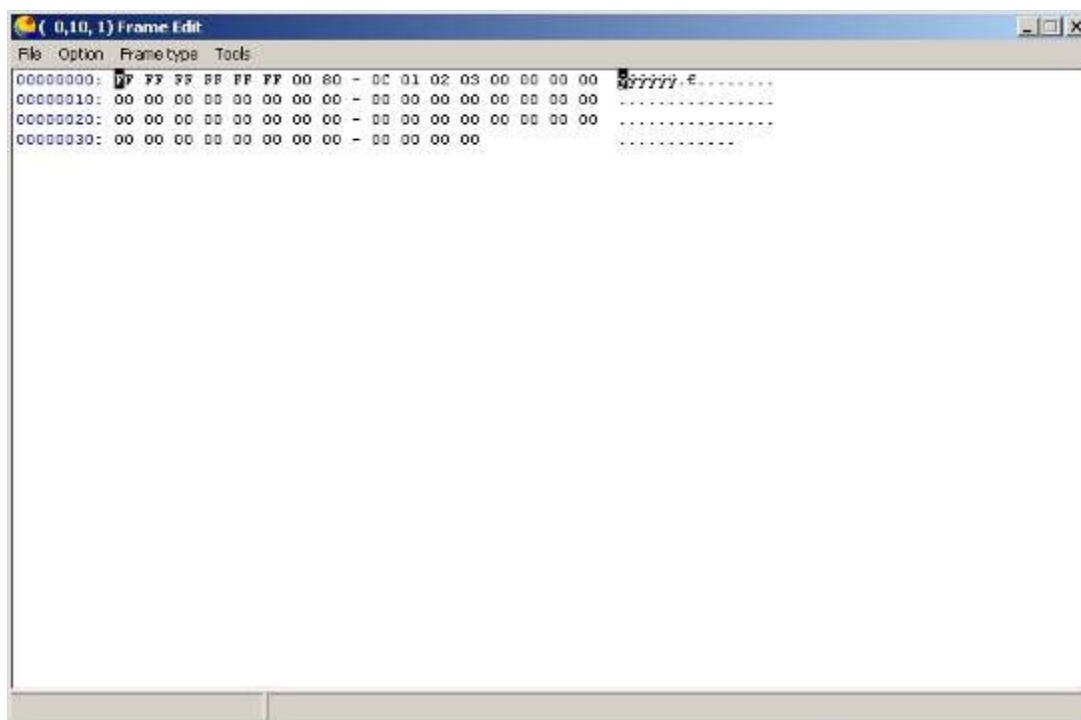




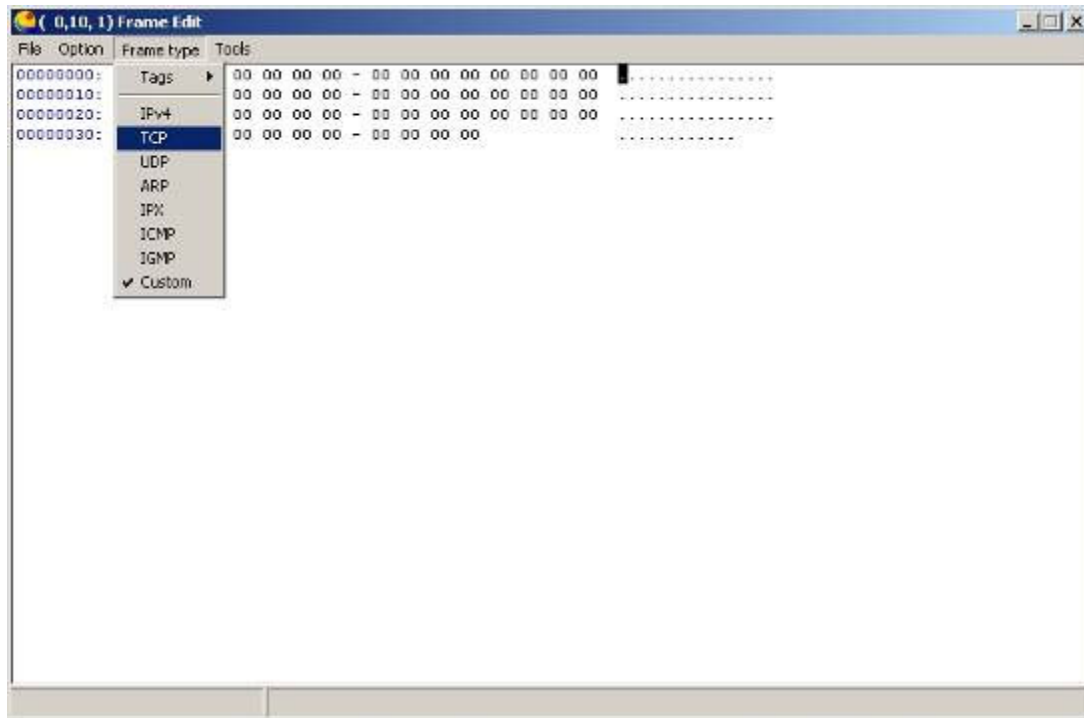
Step 2. Click **Pattern** to appear an extra button .



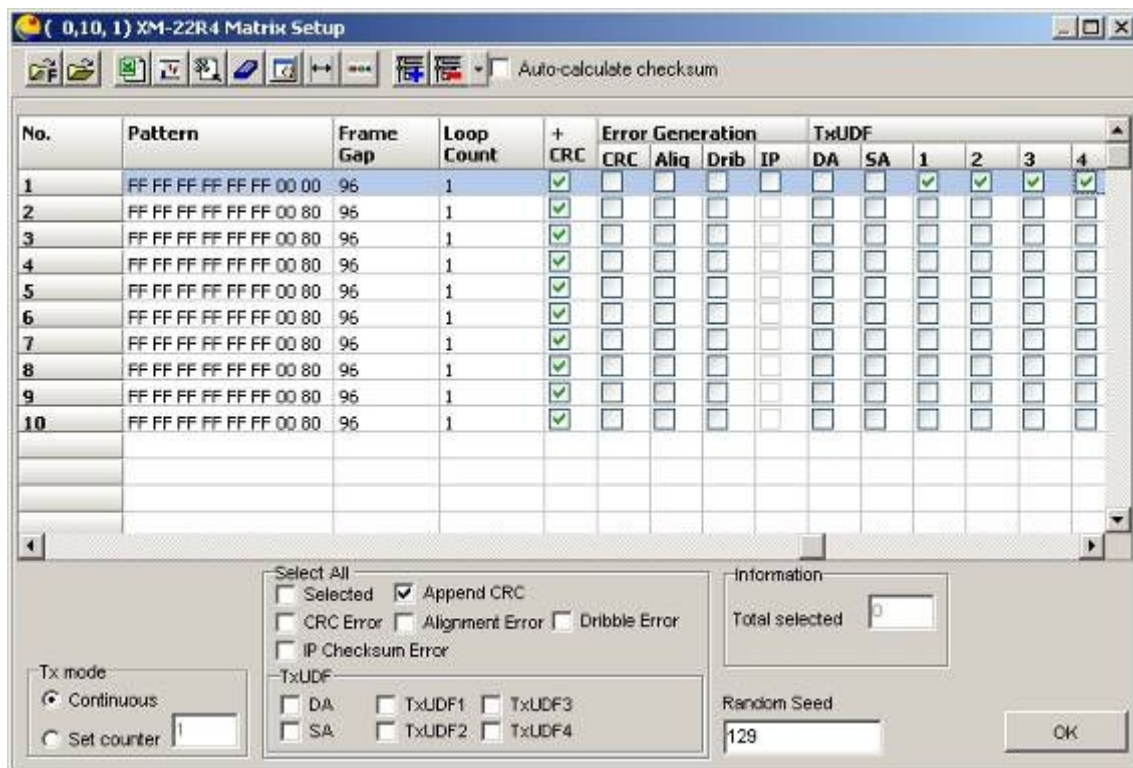
Step 3. Click Button to open protocol setup window.



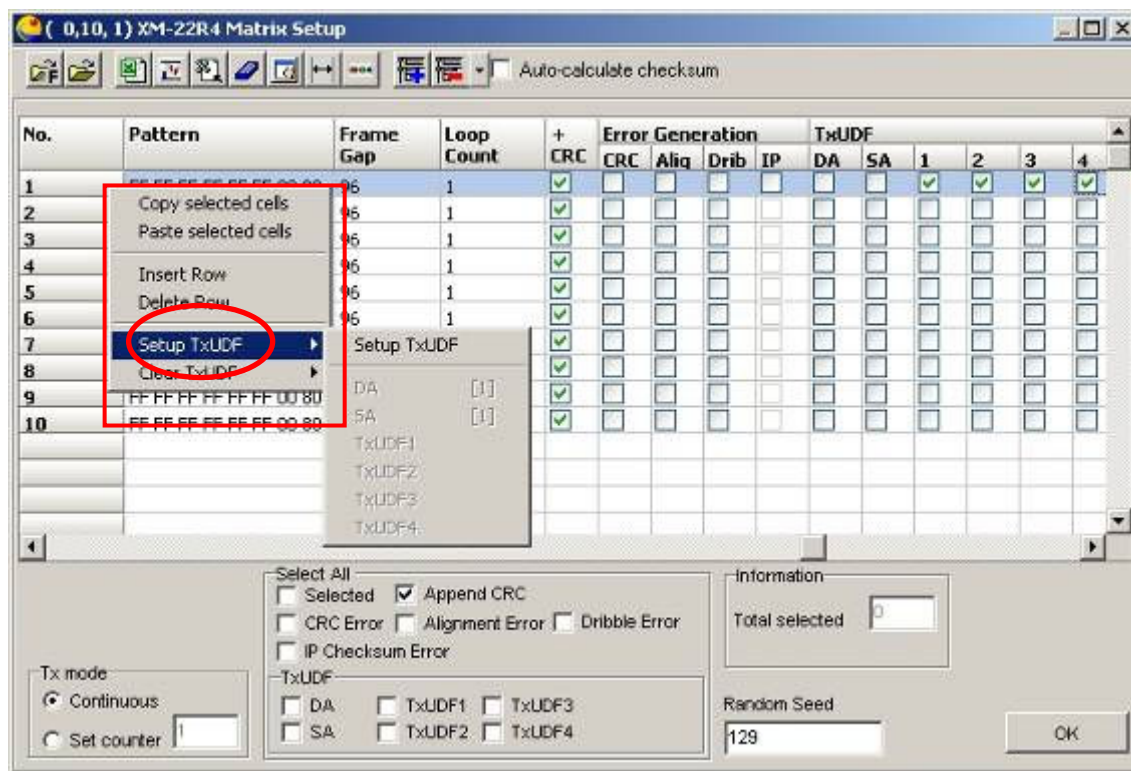
Step 4. Choose **Frame Type** and click **TCP Protocol**.



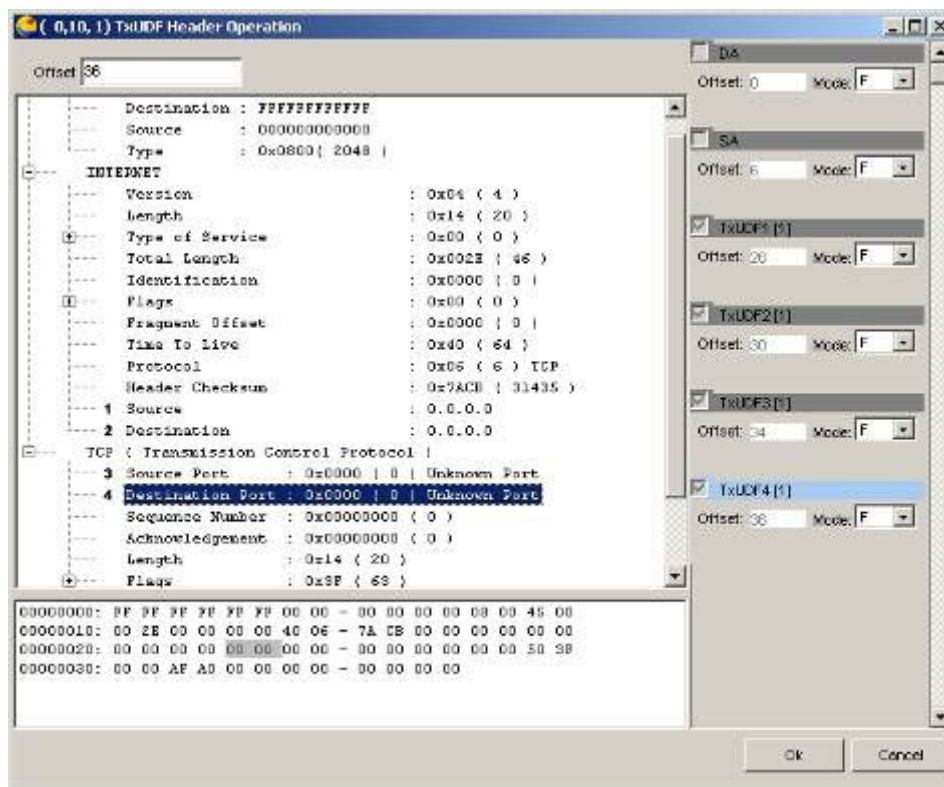
Step 5. Click left mouse on **No.** column to enable setup.



Step 6. Click right mouse on **No.** column to bring out menu and choose **Setup TxUDF**.

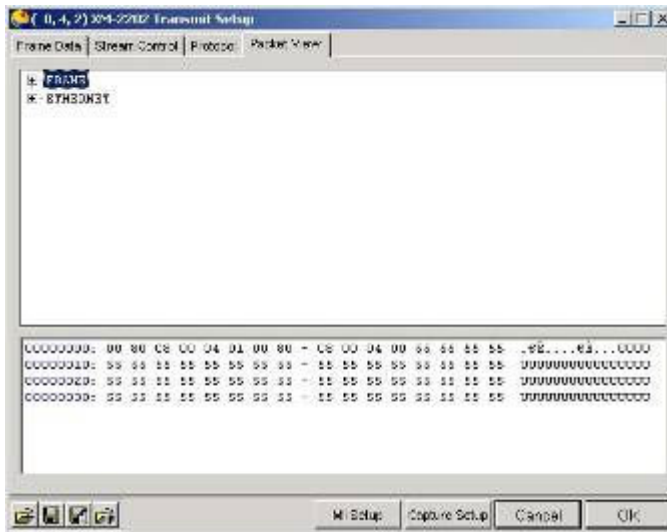


Step 7. Open up tree diagram to select the desired column to turn blue. Click right mouse on designated items to check TxUDF 1 ~ TxUDF 4 to complete settings.



Step 8. Repeat Step 4 and 5 to set up DA and SA in Transmit Setup to complete.

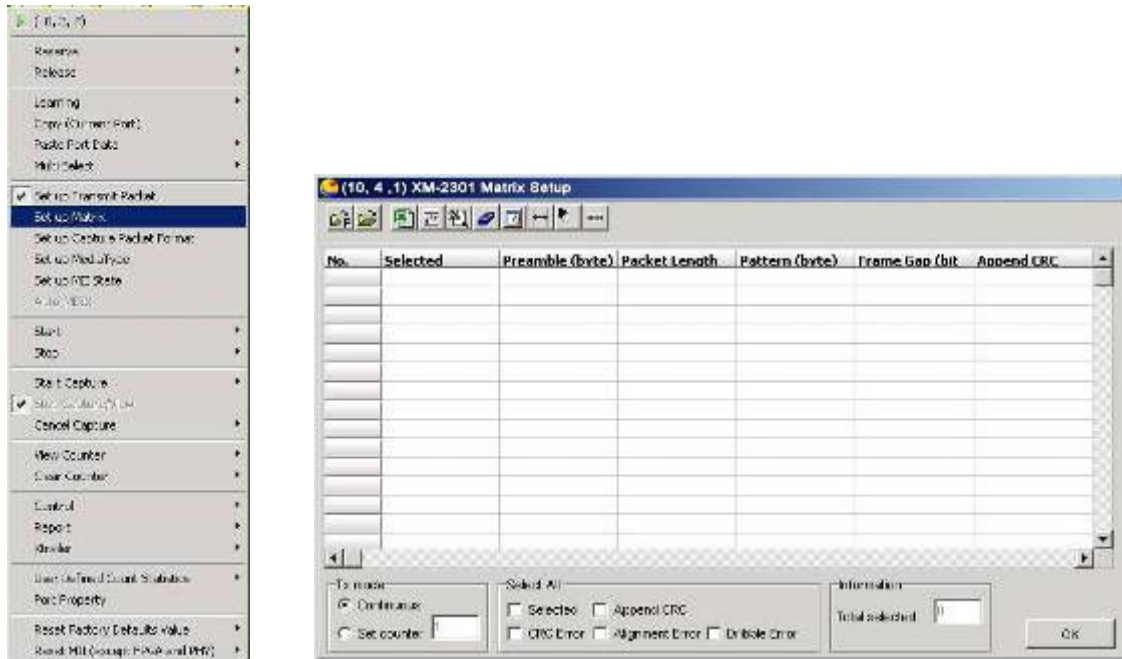
#### 4.9.5 Packet View Setup



**Packet View** tab controls the view of packets configured. The complete Ethernet packet for the protocol configuration will be demonstrated in the **Capture View** window. Packets are captured by the module cards for in-depth analysis. Specifications of various protocols as well as packets contents are clearly displayed in hexadecimal and ASCII format.









## 4.10 Set up Matrix

Please note that only XM-2301(G) support this function.





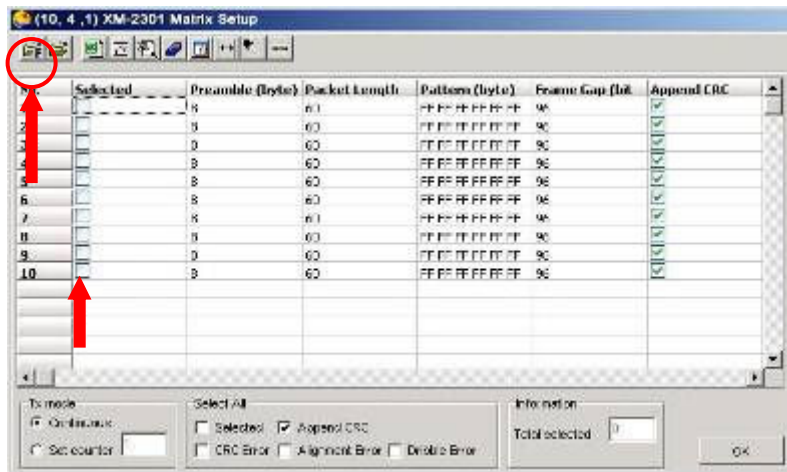
Choose **Set up Matrix** to bring out the **Matrix Setup** window. Except from making user defined packets through the Transmit Setup window (section 4.9), please use Matrix to edit a series of packets with various combinations to be simultaneously transmitted.


The buttons in the Matrix Setup window toolbar are described in the table below:


Figure	Usage
	Loads default setting.
	Loads from file.
	Exports to Excel format.
	Exports to Pattern Generation format.
	Clears all setting.
	Adds new frames.
	Sets column width.
	Loads from Sniffer .enc file

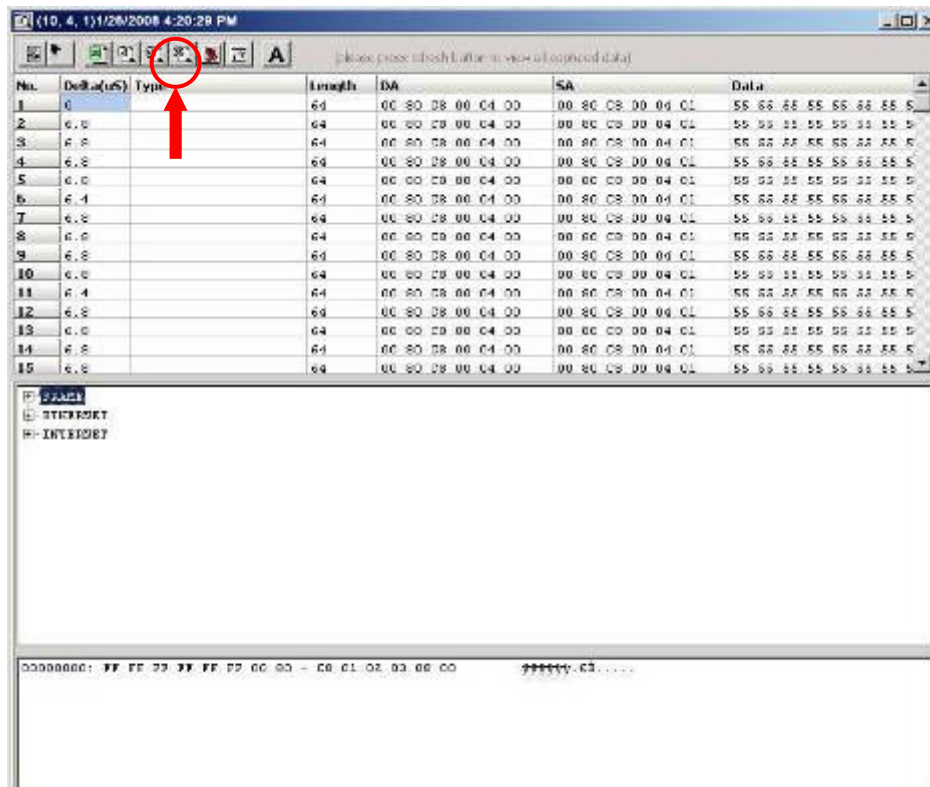


	Multi-Stream tool
	Sets up TxUDF
	Clears TxUDF.




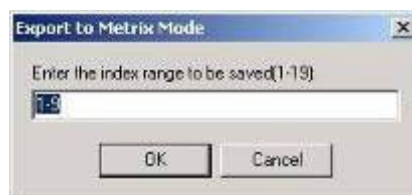
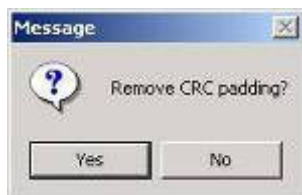
Click on the  button to invoke the factory default for Matrix setting. There are 10 packets designed in the Matrix default setting. Select packets for further configurations.

Or click on the  button to load user-defined packet.

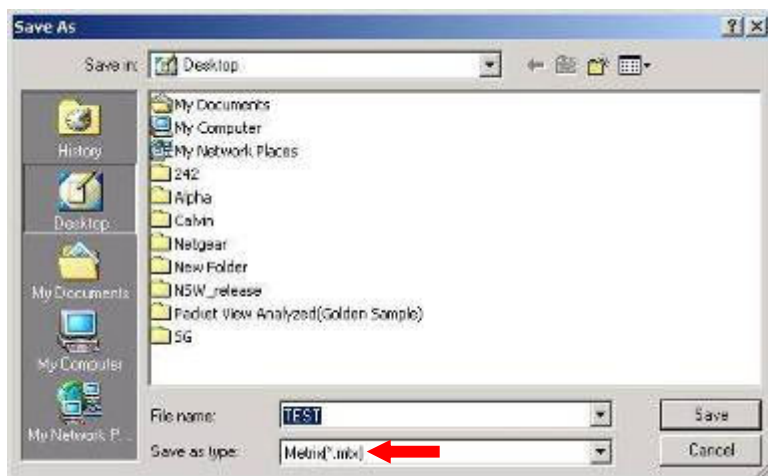


If there is no user-defined packet, please capture packets through the capture window.

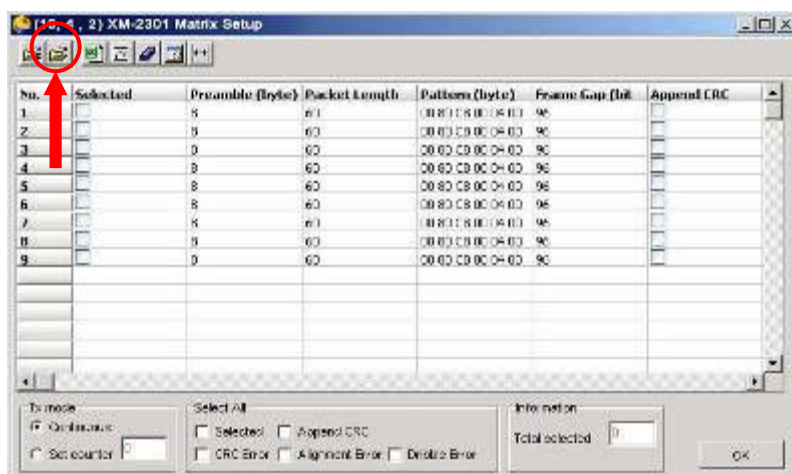
Click on the  button to save the captured file as the Matrix file.



After clicking on the  button, a message widow will appear for CRC padding removal selection and the **Export to Matrix Mode** will show. Fill in the number of customized packets desired.



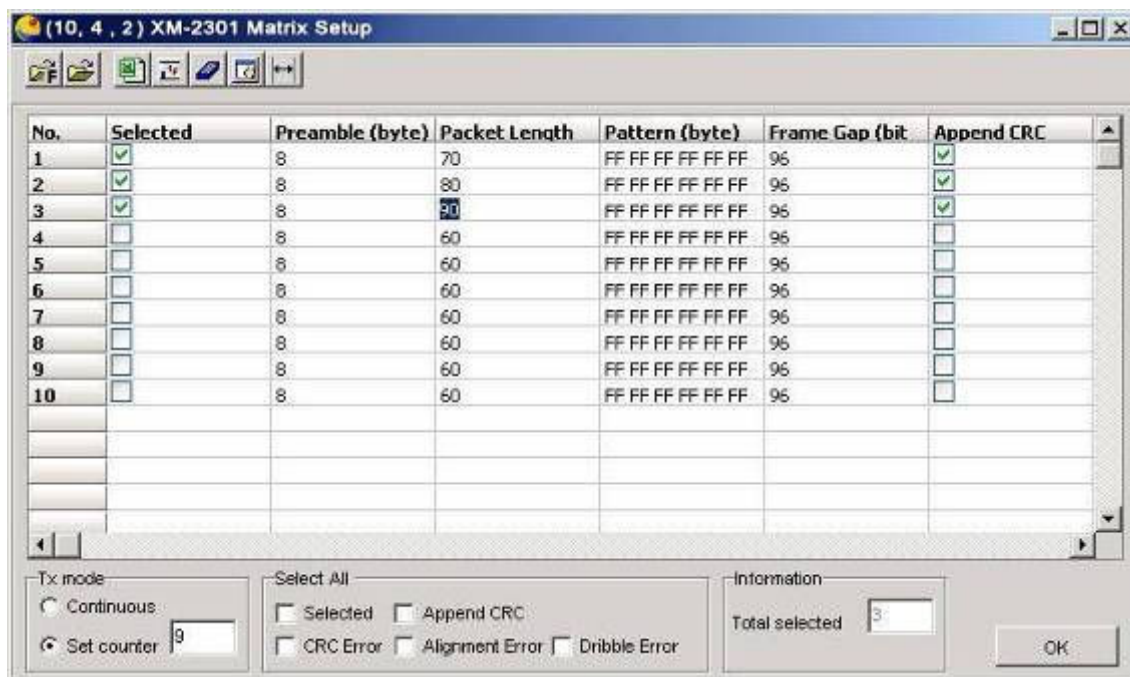
Save the captured file as a Matrix file (with extension “mtx”).



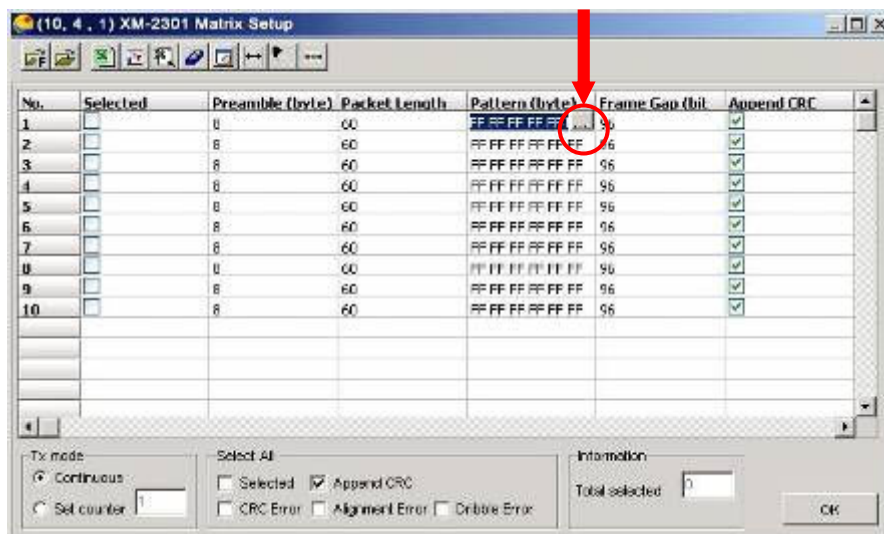
Go back to the Matrix Setup window and click on the  button.




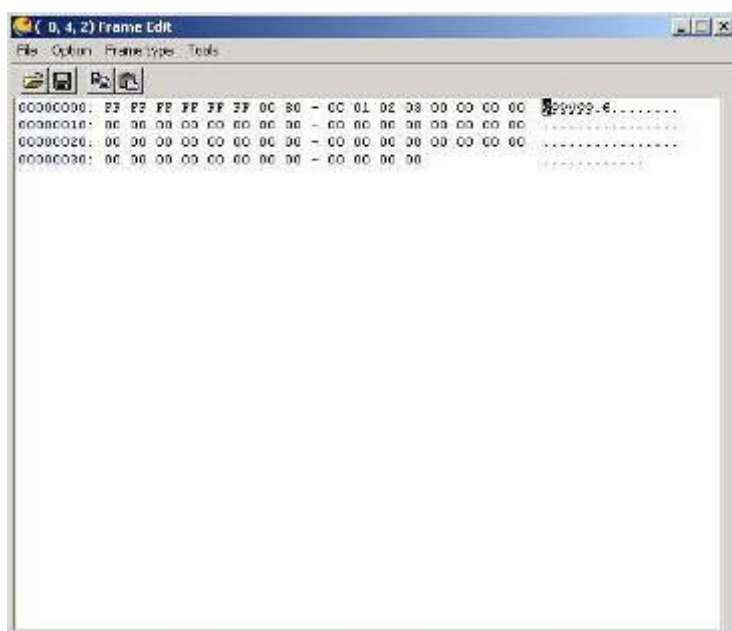
When **Open** window appears, open the saved Matrix file to load packets.



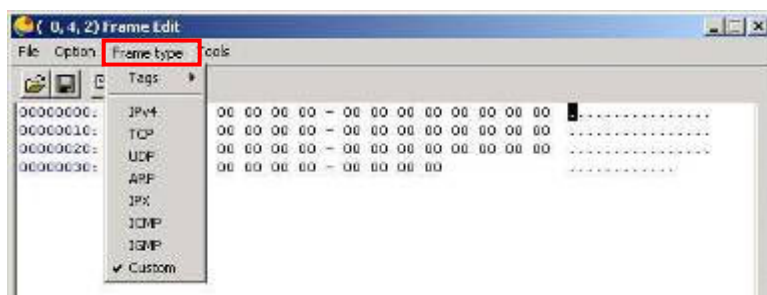
These captured nine packets in the saved Matrix file will show on the Matrix Setup window. Choose packets through the **Selected** column for further configuration (CRC Bit, CRC Error, Alignment Error, etc.)



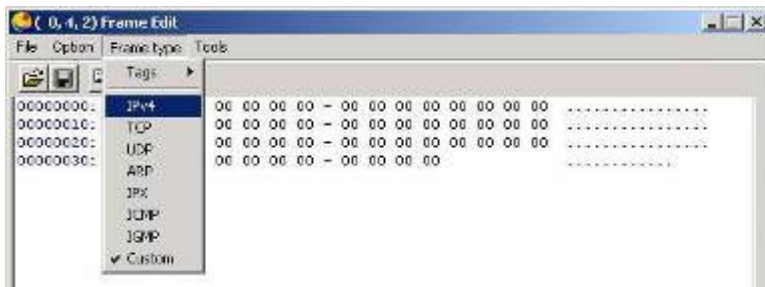
To edit packet pattern, click on the pattern of the exact packet and the  button will show. Click on the button to see the complete packet pattern.



This **Frame Edit** window for the chosen packet will appear for more configurations.

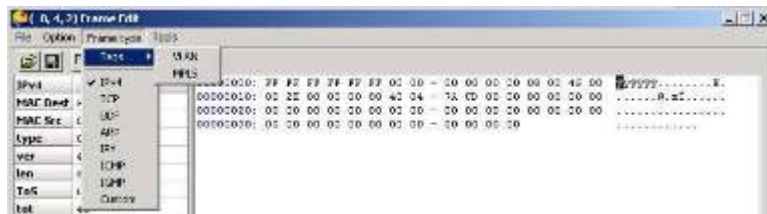


Move the cursor to the **Frame Type** tab and the popup menu for protocol type will show.

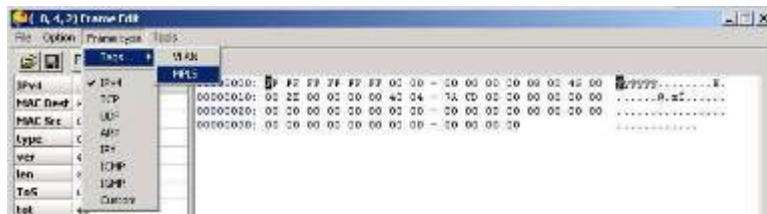


In addition to Custom setting, users may choose other protocols, such as IPv4.

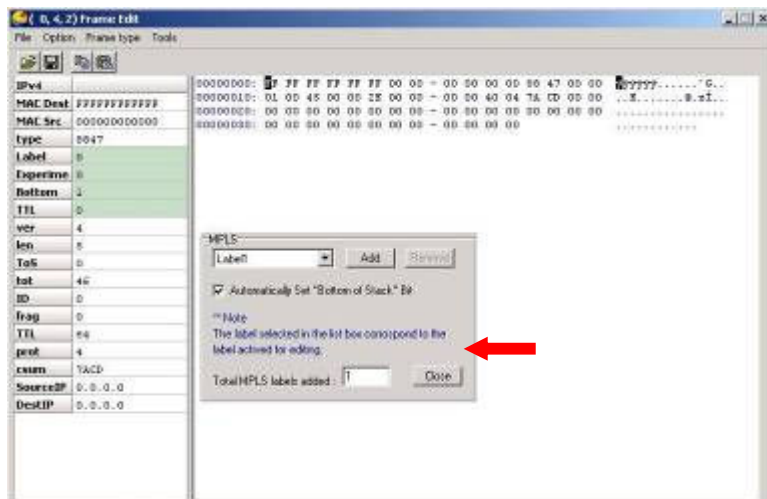




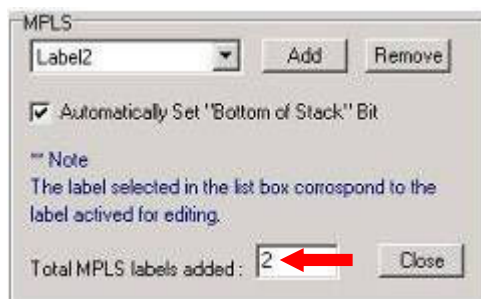
For **Tags** selection, choose between VLAN and MPLS.



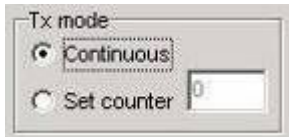
For example, if **MPLS** is picked...



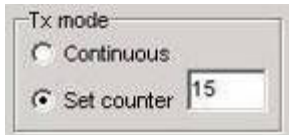
...the MPLS dialogue will appear.



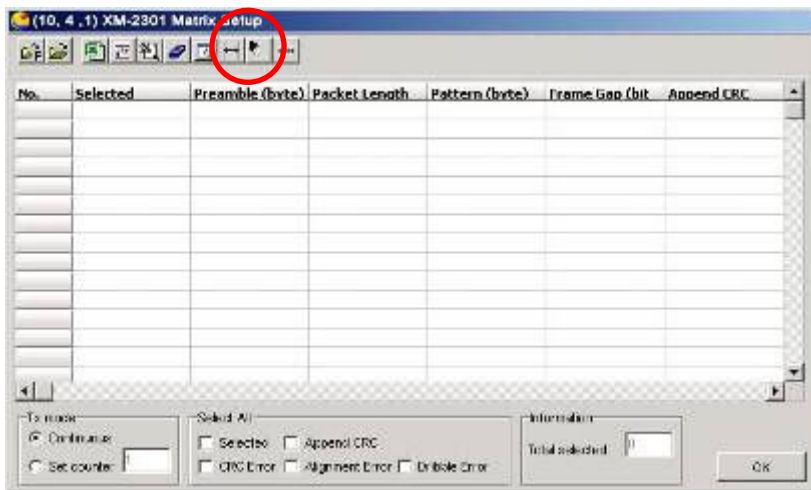
Choose the number of MPLS labels. Please note that there can only be 6 MPLS Labels added. The arrow indicates 2 MPLS labels are added to the corresponding packet.




To send packets continuously, choose **Continuous** mode for transmit setup.



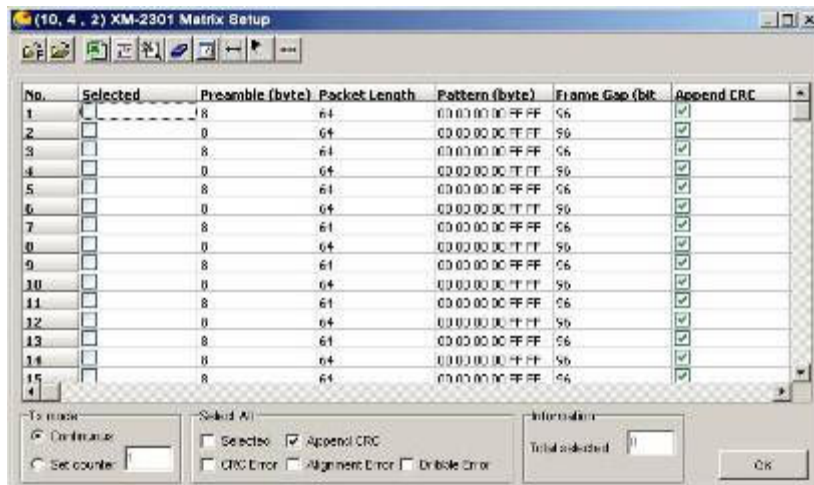
To send packets as a batch, choose **Set Counter** mode and packets number for transmit setup. For XM-2301(G) module card, users may set  $1 \sim 2^{23}-1$  for Set Counters.



**Sniffer** is a software-based fault and performance management tool. It captures data, monitors network traffic, and collects key network statistics. For the latest version of NuWIN, Data captured by Sniffer can be downloaded into Matrix setup. Click on the Sniffer button  to invoke the Open dialogue.



When **Open** window appears, open the saved enc file to load the Sniffer file.



Now get the best use of the data captured by Sniffer through the Matrix window.



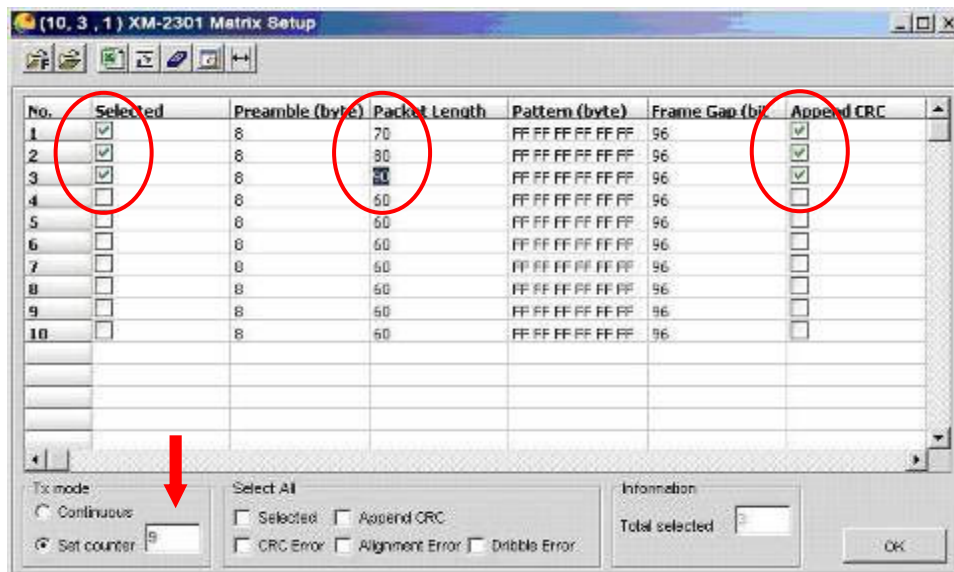
#### 4.10.1 Frame Data Setup vs. Matrix Setup

Like Matrix Setup, Frame Data Setup (please see section [4.9.1](#)) also supports packets customization. To customize packets of a specific section in detail, Frame Data Setup is recommended. Because Frame Data Setup is based on Run Time Generation, packet data is varied through parameter.

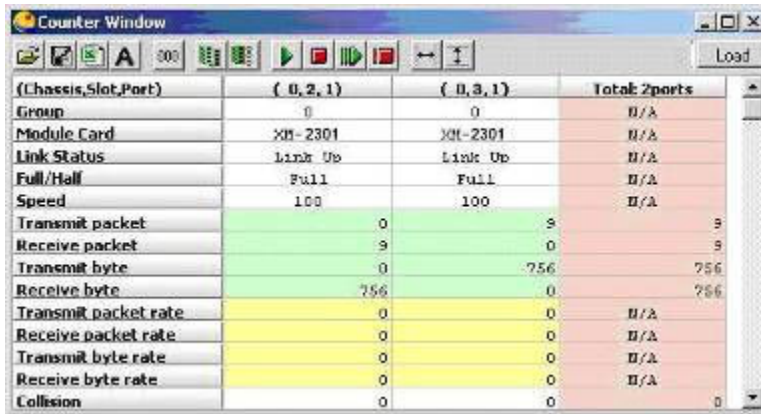
Unlike Frame Data Setup, Matrix Setup employs All Users Predefined method, so simultaneous configuration of multiple packets are possible (up to 512 for XM-2301(G)), and all these configured packets can be set in the loop count of Matrix Setup.

User can import many kinds of captured file, such as Sniffer ENC format, Matrix-Defined format, and Default Excel File. For application, the data captured by NuStreams module cards from real traffic can be exported and imported into Matrix Setup for users to simulate and generate the same traffic.

In the demonstration below, send packets from port (0,3,1) to (0,2,1).




Open **Matrix Setup** window in order to start configuration. In this case, three packets of 70, 80, and 90 bytes are set up with **CRC** checksum (FCS) appended. Please note that the counter is set as 9, which means there will be 9 packets sent for this demonstration.



(Chassis,Slot,Port)	( 0, 2, 1)	( 0, 3, 1)	Total 2ports
Group	0	0	N/A
Module Card	XM-2301	XM-2301	N/A
Link Status	Link Up	Link Up	N/A
Full/Half	Full	Full	N/A
Speed	100	100	N/A
Transmit packet	0	9	9
Receive packet	9	0	9
Transmit byte	0	756	756
Receive byte	756	0	756
Transmit packet rate	0	0	N/A
Receive packet rate	0	0	N/A
Transmit byte rate	0	0	N/A
Receive byte rate	0	0	N/A
Collision	0	0	0

Open **Counter Window** (please see section [4.19](#)), and 9 packets have been sent by port (0,3,1) and received by port (0,2,1).

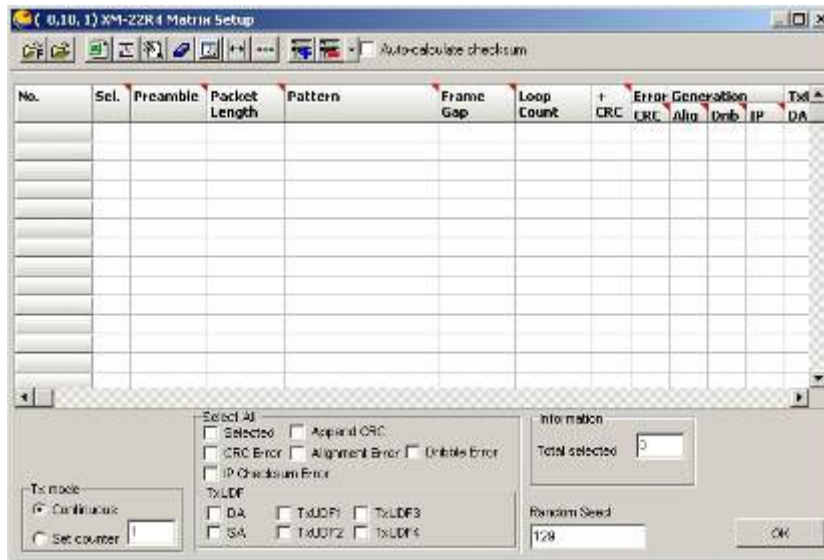


No.	Delta(uS)	Type	Length	DA	SA	Data
1	0		74	FF FF FF FF FF FF	00 80 0C 01 02 03	00 00 00 00 00 00 00 0
2	7.6		84	FF FF FF FF FF FF	00 80 0C 01 02 03	00 00 00 00 00 00 00 0
3	1.4		94	FF FF FF FF FF FF	00 80 0C 01 02 03	00 00 00 00 00 00 00 0
4	1.2		74	FF FF FF FF FF FF	00 80 0C 01 02 03	00 00 00 00 00 00 00 0
5	1.6		84	FF FF FF FF FF FF	00 80 0C 01 02 03	00 00 00 00 00 00 00 0
6			94	FF FF FF FF FF FF	00 80 0C 01 02 03	00 00 00 00 00 00 00 0
7	1.2		74	FF FF FF FF FF FF	00 80 0C 01 02 03	00 00 00 00 00 00 00 0
8	7.6		84	FF FF FF FF FF FF	00 80 0C 01 02 03	00 00 00 00 00 00 00 0
9	8.4		94	FF FF FF FF FF FF	00 80 0C 01 02 03	00 00 00 00 00 00 00 0

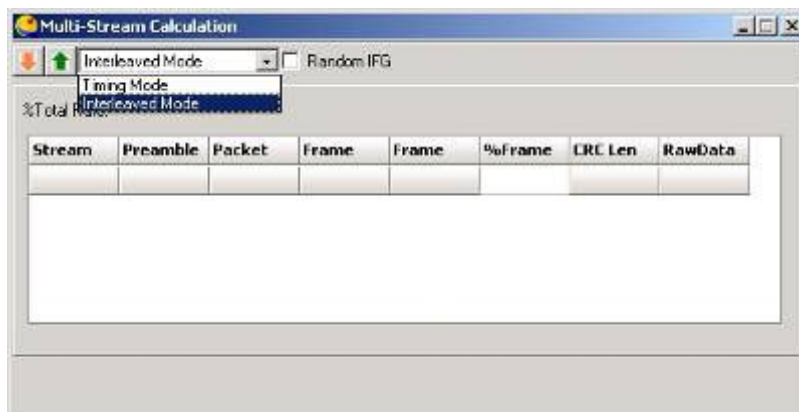
Open **Catch and View** window (please see section [4.16](#)), and 9 packets have been captured through port (0,2,1) with 4 bytes of CRC checksum (FCS) appended.

## 4.10.2 Multi-Stream




Multi-Stream is one of the functions among NuWIN Matrix, only supported by XM-22R4, XM-23R2 module cards or any modules with Matrix function. Its main purpose is to simulate flow control. Users only need to set up Matrix cells, have Multi-Stream activated, and import Matrix settings in flow control of every cell. Export to Matrix to complete flow control.



Multi-Stream provides two modes to control flow: Timing mode and Interleaved mode. Different methods are used in these two modes to calculate flow control and distribution. In addition, there are two IFG (Inter-Frame Gap) options in Interleaved mode: random IFG and fixed IFG by checking the box to its right, and the configurations and result data will still come out the same.



The buttons in the Multi-Stream tool bar are described in the table below:

Figure	Usage
	Invoke Multi-Stream (upper toolbar of Matrix Setup Window)
	Import Matrix cells to Multi-Stream
	Multi-Stream flow control export back to Matrix

※ Common conditions as follow:

MAC address config

Transmitting port: 0080c8000012

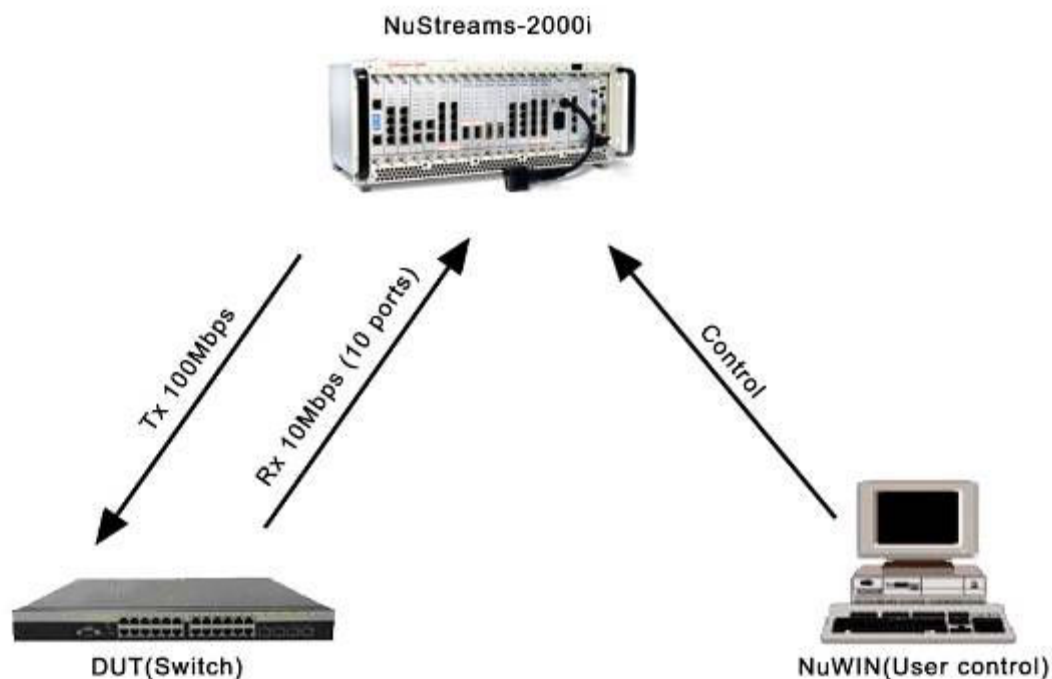
Receiving port: 0080c8000001, 0080c8000002, 0080c8000003, ~ 0080c8000010 (10 ports)

IP address config

Transmitting port: 172.17.5.120

Receiving port: 172.17.5.10, 172.17.5.20, 172.17.5.30, ~ 172.17.100 (10 ports)

※ Application Diagram



Here are demonstrations of receive settings of Total Rate Stream being 100% and Total Rate Stream not being 100%.

Total receive stream rate= 100%

	Transmit Port	Receive Port									
Stream	100 Mbps	10 Mbps	10 Mbps	10 Mbps	10 Mbps	10 Mbps	10 Mbps	10 Mbps	10 Mbps	10 Mbps	10 Mbps

※ Total transmit stream =100 Mbps (100%)

※ Total receive stream =100 Mbps (100%)

Step1-1. Load 10 default matrix cells and edit DA/SA and DIP/SIP.

No.	Selected	Preamble (byte)	Packet	Pattern (byte)	Frame Gap	Loop	Append CRC
1	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 01 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
2	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 02 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
3	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 03 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
4	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 04 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
5	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 05 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
6	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 06 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
7	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 07 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
8	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 08 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
9	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 09 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
10	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 10 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>

Step1-2. Import to Multi-Stream and edit.

%Total Rate:100.0000000							
Stream	Preamble	Packet	Frame	Frame	%Frame	CRC Len	RawData
0	8	60	96	14880	10.00000	4	00 80 C8 00
1	8	60	96	14880	10.00000	4	00 80 C8 00
2	8	60	96	14880	10.00000	4	00 80 C8 00
3	8	60	96	14880	10.00000	4	00 80 C8 00
4	8	60	96	14880	10.00000	4	00 80 C8 00

Figure1. Stream 0~4

%Total Rate:100.0000000							
Stream	Preamble	Packet	Frame	Frame	%Frame	CRC Len	RawData
5	8	60	96	14880	10.00000	4	00 80 C8 00
6	8	60	96	14880	10.00000	4	00 80 C8 00
7	8	60	96	14880	10.00000	4	00 80 C8 00
8	8	60	96	14880	10.00000	4	00 80 C8 00
9	8	60	96	14880	10.00000	4	00 80 C8 00

Figure2. Stream 5~9

### Step1-3. Export to Matrix

No.	Selected	Preamble (byte)	Packet	Pattern (byte)	Frame Gap	Loop	Append CRC
1	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 01 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
2	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 02 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
3	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 03 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
4	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 04 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
5	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 05 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
6	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 06 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
7	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 07 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
8	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 08 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
9	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 09 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
10	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 10 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
11	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 01 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
12	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 02 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
13	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 03 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
14	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 04 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
15	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 05 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>

Figure1. Matrix Table in Timing Mode

Figure2. Matrix Table in Interleaved Mode (with Random IFG)

No.	Selected	Preamble (byte)	Packet	Pattern (byte)	Frame Gap	Loop	Append CRC
1	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 01 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
2	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 02 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
3	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 03 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
4	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 04 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
5	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 05 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
6	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 06 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
7	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 07 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
8	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 08 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
9	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 09 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
10	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 10 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
11	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 01 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
12	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 02 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
13	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 03 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
14	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 04 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
15	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 05 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>

Figure3. Matrix Table in Interleaved Mode (with Fixed IFG)

※Frame gap stays the same in either Timing or Interleaved mode because stream used 100%.



#### Step1-4. Result chart for comparison

(Chassis,Slot,Port)	( 1, 2, 1)	( 1, 2, 2)	( 1, 3, 1)	( 1, 3, 2)	( 1, 4, 1)	( 1, 4, 2)	( 1, 5, 1)	( 1, 5, 2)	( 1, 5, 3)	( 1, 5, 4)
Group	0	0	0	0	0	0	0	0	0	0
Module Card	XM-2202	XM-2202	XM-2202	XM-2202	XM-2202	XM-2202	XM-23L4	XM-23L4	XM-23L4	XM-23L4
Link Status	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up
Full/Half	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Speed	100	100	100	100	100	100	100	100	100	100
Transmit packet	55,894,65	55,872,50	55,817,44	55,893,93	55,844,56	55,811,45	55,667,93	55,665,68	55,664,60	55,663,37
Receive packet (valid)	5,657,353	5,657,353	5,545,429	5,557,864	5,555,231	5,554,264	5,532,044	5,537,677	5,539,604	5,541,531
Transmit byte	3,577,258	3,575,840	3,572,316	3,577,212	3,574,052	3,571,933	3,562,747	3,562,603	3,562,534	3,562,455
Receive byte	362,070,5	362,070,5	354,907,5	355,703,2	355,534,8	355,472,9	354,050,8	354,411,3	354,534,7	354,658,0
Transmit packet rate	148,810	148,810	148,809	148,809	148,809	148,809	148,809	148,809	148,809	148,809
Receive packet rate	15,114	15,114	14,822	14,823	14,822	14,822	14,823	14,822	14,822	14,822
Transmit byte rate	9,523,869	9,523,866	9,523,772	9,523,760	9,523,772	9,523,786	9,523,836	9,523,803	9,523,803	9,523,803
Receive byte rate	967,291	967,294	948,677	948,676	948,677	948,675	948,643	948,675	948,643	948,643
Unicast	5,657,353	5,657,353	5,545,429	5,557,864	5,555,231	5,554,264	5,532,044	5,537,677	5,539,604	5,541,531
Line Rate	10.16	10.16	9.96	9.96	9.96	9.96	9.96	9.96	9.96	9.96
Utilization	10.16	10.16	9.96	9.96	9.96	9.96	9.96	9.96	9.96	9.96

Figure1. Result in Timing mode

(Chassis,Slot,Port)	( 1, 2, 1)	( 1, 2, 2)	( 1, 3, 1)	( 1, 3, 2)	( 1, 4, 1)	( 1, 4, 2)	( 1, 5, 1)	( 1, 5, 2)	( 1, 5, 3)	( 1, 5, 4)
Group	0	0	0	0	0	0	0	0	0	0
Module Card	XM-2202	XM-2202	XM-2202	XM-2202	XM-2202	XM-2202	XM-23L4	XM-23L4	XM-23L4	XM-23L4
Link Status	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up
Full/Half	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Speed	100	100	100	100	100	100	100	100	100	100
Transmit packet	4,693,355	4,670,424	4,739,414	4,699,594	4,646,377	4,488,906	4,617,865	4,615,589	4,614,354	4,613,273
Receive packet (valid)	451,019	451,019	460,253	460,253	457,255	443,802	448,829	454,931	456,865	458,800
Transmit byte	300,374,9	298,907,3	303,322,7	300,774,2	297,368,3	287,290,2	295,543,3	295,397,6	295,318,5	295,249,4
Receive byte	28,865,21	28,865,21	29,456,19	29,456,19	29,264,38	28,403,32	28,725,05	29,115,58	29,239,42	29,363,20
Transmit packet rate	148,811	148,810	148,809	148,809	148,809	148,809	148,809	148,809	148,809	148,809
Receive packet rate	14,881	14,882	14,881	14,881	14,880	14,881	14,881	14,881	14,880	14,880
Transmit byte rate	9,523,877	9,523,859	9,523,749	9,523,748	9,523,780	9,523,792	9,523,803	9,523,802	9,523,802	9,523,834
Receive byte rate	952,376	952,378	952,379	952,379	952,378	952,379	952,354	952,354	952,386	952,354
Unicast	451,019	451,019	460,253	460,253	457,255	443,802	448,829	454,931	456,865	458,800
Line Rate	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Utilization	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Figure2. Result in Interleaved mode (with Random Gap)

(Chassis,Slot,Port)	( 1, 2, 1)	( 1, 2, 2)	( 1, 3, 1)	( 1, 3, 2)	( 1, 4, 1)	( 1, 4, 2)	( 1, 5, 1)	( 1, 5, 2)	( 1, 5, 3)	( 1, 5, 4)
Group	0	0	0	0	0	0	0	0	0	0
Module Card	XM-2202	XM-2202	XM-2202	XM-2202	XM-2202	XM-2202	XM-23L4	XM-23L4	XM-23L4	XM-23L4
Link Status	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up
Full/Half	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Speed	100	100	100	100	100	100	100	100	100	100
Transmit packet	7,736,699	7,701,276	7,645,187	7,621,899	7,693,002	7,660,217	7,753,170	7,751,625	7,750,080	7,748,380
Receive packet (valid)	760,977	760,977	757,710	757,710	767,133	766,162	766,552	768,487	770,422	772,356
Transmit byte	495,148,9	492,881,9	489,292,2	487,801,7	492,352,3	490,254,1	496,202,8	496,104,0	496,005,1	495,896,3
Receive byte	48,702,59	48,702,59	48,493,44	48,493,44	49,096,51	49,034,36	49,059,39	49,183,16	49,307,00	49,430,84
Transmit packet rate	148,810	148,811	148,809	148,809	148,809	148,809	148,809	148,809	148,809	148,809
Receive packet rate	14,881	14,881	14,881	14,881	14,881	14,881	14,880	14,880	14,881	14,880
Transmit byte rate	9,523,869	9,523,885	9,523,759	9,523,774	9,523,777	9,523,779	9,523,835	9,523,802	9,523,802	9,523,802
Receive byte rate	952,414	952,415	952,376	952,377	952,378	952,378	952,386	952,354	952,354	952,354
Unicast	760,977	760,977	757,710	757,710	767,133	766,162	766,552	768,487	770,422	772,356
Line Rate	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Utilization	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Figure3. Result in Interleaved mode (with Fixed Gap)

※ Results are the same between Timing and Interleaved (with Random /Fixed Gap) mode.



Total receive stream rate ≠ 100%

	Transmit Port	Receive Port									
Stream	100 Mbps	1 Mbps	1 Mbps	1 Mbps	1 Mbps	1 Mbps	1 Mbps	1 Mbps	1 Mbps	1 Mbps	1 Mbps

※ Total transmit stream = 100 Mbps (100%)

※ Total receive stream = 10 Mbps (10%)

Step2-1. Load 10 default matrix cells and edit DA /SA and DIP/SIP

No.	Selected	Preamble (byte)	Packet	Pattern (byte)	Frame Gap	Loop	Append CRC
1	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 01 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
2	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 02 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
3	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 03 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
4	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 04 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
5	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 05 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
6	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 06 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
7	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 07 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
8	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 08 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
9	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 09 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
10	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 10 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>

Step2-2. Import to Multi-Stream and edit

%Total Rate: 10.0000000

Stream	Preamble	Packet	Frame	Frame	%Frame	CRC Len	RawData
0	8	60	96	1488	1	4	00 80 C8 00
1	8	60	96	1488	1	4	00 80 C8 00
2	8	60	96	1488	1	4	00 80 C8 00
3	8	60	96	1488	1	4	00 80 C8 00
4	8	60	96	1488	1	4	00 80 C8 00

Figure1. Stream0~4

%Total Rate: 10.0000000

Stream	Preamble	Packet	Frame	Frame	%Frame	CRC Len	RawData
5	8	60	96	1488	1	4	00 80 C8 00
6	8	60	96	1488	1	4	00 80 C8 00
7	8	60	96	1488	1	4	00 80 C8 00
8	8	60	96	1488	1	4	00 80 C8 00
9	8	60	96	1488	1	4	00 80 C8 00

Figure2. Stream 5~9

### Step2-3. Export to Matrix

No.	Selected	Preamble (byte)	Packet Length	Pattern (byte)	Frame Gap	Loop	Append
1	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 01 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
2	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 02 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
3	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 03 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
4	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 04 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
5	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 05 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
6	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 06 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
7	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 07 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
8	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 08 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
9	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 09 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
10	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 10 00 80 C8 00 00 12	60576	1	<input checked="" type="checkbox"/>
11	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 01 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
12	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 02 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
13	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 03 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
14	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 04 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>
15	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 05 00 80 C8 00 00 12	96	1	<input checked="" type="checkbox"/>

Figure1. Matrix Table in Timing Mode

No.	Selected	Preamble (byte)	Packet Length	Pattern (byte)	Frame Gap	Loop	Append
1	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 01 00 80 C8 00 00 12	4712	1	<input checked="" type="checkbox"/>
2	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 02 00 80 C8 00 00 12	6128	1	<input checked="" type="checkbox"/>
3	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 03 00 80 C8 00 00 12	5632	1	<input checked="" type="checkbox"/>
4	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 04 00 80 C8 00 00 12	11008	1	<input checked="" type="checkbox"/>
5	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 05 00 80 C8 00 00 12	9168	1	<input checked="" type="checkbox"/>
6	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 06 00 80 C8 00 00 12	5032	1	<input checked="" type="checkbox"/>
7	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 07 00 80 C8 00 00 12	5352	1	<input checked="" type="checkbox"/>
8	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 08 00 80 C8 00 00 12	6648	1	<input checked="" type="checkbox"/>
9	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 09 00 80 C8 00 00 12	680	1	<input checked="" type="checkbox"/>
10	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 10 00 80 C8 00 00 12	2912	1	<input checked="" type="checkbox"/>
11	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 01 00 80 C8 00 00 12	3176	1	<input checked="" type="checkbox"/>
12	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 02 00 80 C8 00 00 12	6368	1	<input checked="" type="checkbox"/>
13	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 03 00 80 C8 00 00 12	3912	1	<input checked="" type="checkbox"/>
14	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 04 00 80 C8 00 00 12	128	1	<input checked="" type="checkbox"/>
15	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 05 00 80 C8 00 00 12	11448	1	<input checked="" type="checkbox"/>

Figure2. Matrix Table in Interleaved Mode (with Random Gap)

No.	Selected	Preamble (byte)	Packet Length	Pattern (byte)	Frame Gap	Loop	Append
1	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 01 00 80 C8 00 00 12	6144	1	<input checked="" type="checkbox"/>
2	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 02 00 80 C8 00 00 12	6144	1	<input checked="" type="checkbox"/>
3	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 03 00 80 C8 00 00 12	6144	1	<input checked="" type="checkbox"/>
4	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 04 00 80 C8 00 00 12	6144	1	<input checked="" type="checkbox"/>
5	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 05 00 80 C8 00 00 12	6144	1	<input checked="" type="checkbox"/>
6	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 06 00 80 C8 00 00 12	6144	1	<input checked="" type="checkbox"/>
7	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 07 00 80 C8 00 00 12	6144	1	<input checked="" type="checkbox"/>
8	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 08 00 80 C8 00 00 12	6144	1	<input checked="" type="checkbox"/>
9	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 09 00 80 C8 00 00 12	6144	1	<input checked="" type="checkbox"/>
10	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 10 00 80 C8 00 00 12	6144	1	<input checked="" type="checkbox"/>
11	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 01 00 80 C8 00 00 12	6144	1	<input checked="" type="checkbox"/>
12	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 02 00 80 C8 00 00 12	6144	1	<input checked="" type="checkbox"/>
13	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 03 00 80 C8 00 00 12	6144	1	<input checked="" type="checkbox"/>
14	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 04 00 80 C8 00 00 12	6144	1	<input checked="" type="checkbox"/>
15	<input checked="" type="checkbox"/>	8	60	00 80 C8 00 00 05 00 80 C8 00 00 12	6144	1	<input checked="" type="checkbox"/>

Figure3. Matrix Table in Interleaved Mode (with Fixed Gap)

※ Frame Gaps in Timing mode are different from the ones in Interleaved mode

## Step2-4. Result chart for comparison

(Chassis,Slot,Port)	( 1, 2, 1)	( 1, 2, 2)	( 1, 3, 1)	( 1, 3, 2)	( 1, 4, 1)	( 1, 4, 2)	( 1, 5, 1)	( 1, 5, 2)	( 1, 5, 3)	( 1, 5, 4)
Group	0	0	0	0	0	0	0	0	0	0
Module Card	XM-2202	XM-2202	XM-2202	XM-2202	XM-2202	XM-2202	XM-23L4	XM-23L4	XM-23L4	XM-23L4
Link Status	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up
Full/Half	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Speed	100	100	100	100	100	100	100	100	100	100
Transmit packet	1,673,169	1,651,323	1,718,644	1,695,713	1,637,685	1,729,564	1,641,773	1,640,442	1,638,064	1,636,591
Receive packet (valid)	242,703	264,551	265,181	265,181	264,833	265,984	265,528	265,707	265,915	266,168
Transmit byte	107,083,0	105,684,9	109,993,4	108,525,8	104,812,0	110,692,3	105,073,4	104,988,2	104,836,0	104,741,8
Receive byte	15,532,99	16,931,26	16,971,58	16,971,58	16,949,31	17,022,97	16,993,79	17,005,24	17,018,56	17,034,75
Transmit packet rate	148,811	148,810	148,809	148,809	148,809	148,809	148,809	148,809	148,809	148,809
Receive packet rate	1,516	1,516	1,487	1,487	1,487	1,488	1,487	1,487	1,487	1,487
Transmit byte rate	9,523,873	9,523,870	9,523,772	9,523,762	9,523,783	9,523,772	9,523,803	9,523,802	9,523,835	9,523,803
Receive byte rate	97,046	97,046	95,177	95,177	95,177	95,215	95,184	95,216	95,216	95,216
Unicast	242,703	264,551	265,181	265,181	264,833	265,984	265,528	265,707	265,915	266,168
Line Rate	1.02	1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Utilization	1.02	1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Figure1. Result in Timing mode

(Chassis,Slot,Port)	( 1, 2, 1)	( 1, 2, 2)	( 1, 3, 1)	( 1, 3, 2)	( 1, 4, 1)	( 1, 4, 2)	( 1, 5, 1)	( 1, 5, 2)	( 1, 5, 3)	( 1, 5, 4)
Group	0	0	0	0	0	0	0	0	0	0
Module Card	XM-2202	XM-2202	XM-2202	XM-2202	XM-2202	XM-2202	XM-23L4	XM-23L4	XM-23L4	XM-23L4
Link Status	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up
Full/Half	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Speed	100	100	100	100	100	100	100	100	100	100
Transmit packet	4,699,313	4,675,453	4,618,064	4,468,909	4,658,533	4,622,949	4,470,139	4,467,919	4,466,759	4,464,440
Receive packet (valid)	45,356	45,356	45,015	43,766	45,908	45,811	43,517	43,725	44,172	44,366
Transmit byte	300,756,2	299,229,2	295,556,3	286,010,4	298,146,3	295,868,9	286,088,8	285,946,8	285,872,5	285,724,1
Receive byte	2,902,784	2,902,784	2,880,960	2,801,024	2,938,112	2,931,904	2,785,088	2,798,400	2,827,008	2,839,424
Transmit packet rate	148,810	148,810	148,809	148,809	148,809	148,809	148,809	148,809	148,809	148,809
Receive packet rate	1,488	1,488	1,488	1,488	1,488	1,488	1,487	1,487	1,487	1,488
Transmit byte rate	9,523,872	9,523,854	9,523,746	9,523,758	9,523,774	9,523,796	9,523,803	9,523,834	9,523,802	9,523,802
Receive byte rate	95,253	95,253	95,215	95,253	95,215	95,253	95,216	95,216	95,216	95,280
Unicast	45,356	45,356	45,015	43,766	45,908	45,811	43,517	43,725	44,172	44,366
Line Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Utilization	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Figure2. Result in Interleaved mode (with Random Gap)

(Chassis,Slot,Port)	( 1, 2, 1)	( 1, 2, 2)	( 1, 3, 1)	( 1, 3, 2)	( 1, 4, 1)	( 1, 4, 2)	( 1, 5, 1)	( 1, 5, 2)	( 1, 5, 3)	( 1, 5, 4)
Group	0	0	0	0	0	0	0	0	0	0
Module Card	XM-2202	XM-2202	XM-2202	XM-2202	XM-2202	XM-2202	XM-23L4	XM-23L4	XM-23L4	XM-23L4
Link Status	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up	Link Up
Full/Half	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Speed	100	100	100	100	100	100	100	100	100	100
Transmit packet	980,667	957,117	899,616	875,445	930,470	985,008	896,865	895,355	893,965	892,420
Receive packet (valid)	8,014	8,014	7,672	7,671	8,561	9,712	8,068	8,261	8,454	8,648
Transmit byte	62,762,94	61,255,74	57,575,68	56,028,73	59,550,33	63,040,76	57,399,36	57,302,72	57,213,76	57,114,88
Receive byte	512,896	512,896	491,008	491,008	547,904	621,568	516,352	528,704	541,056	553,472
Transmit packet rate	148,811	148,810	148,809	148,809	148,809	148,809	148,809	148,809	148,809	148,809
Receive packet rate	1,488	1,488	1,488	1,488	1,488	1,488	1,488	1,488	1,487	1,488
Transmit byte rate	9,523,879	9,523,865	9,523,766	9,523,753	9,523,781	9,523,777	9,523,802	9,523,801	9,523,803	9,523,802
Receive byte rate	95,215	95,215	95,253	95,253	95,215	95,215	95,248	95,248	95,216	95,248
Unicast	8,014	8,014	7,672	7,671	8,561	9,712	8,068	8,261	8,454	8,648
Line Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Utilization	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Figure3. Result in Interleaved mode (with Fixed Gap)

※ Results are the same in both Timing and Interleaved (with Random/ Fixed Gap) modes.

## 4.11 Set up Capture Packet Format

Please note that XM-23L4, XM-23L4G and XM-28L1 do not support this function.



Each port has an extensive buffer (XM-2301: 512 frames, XM-22R4(F): 8MB, XM-23R2(G): 63MB); this buffer may be used to capture the data “raw” as it is received.

Data recorded into the capture buffer is triggered by a set of conditions. Packets are filtered as well. During capture mode operation, the amount of data per packet can be limited.

When defining a trigger pattern, the receiving card captures all packets that contain the trigger pattern and ignores all packets that do not contain it. Trigger can also be set for counters to display the QoS testing results. Users can fill in four sets of data for packet filtering.



**Trigger Condition** is inserted into test packets by the specific transmitting module cards then used by the receiving card to capture specific packets out of all packets received.

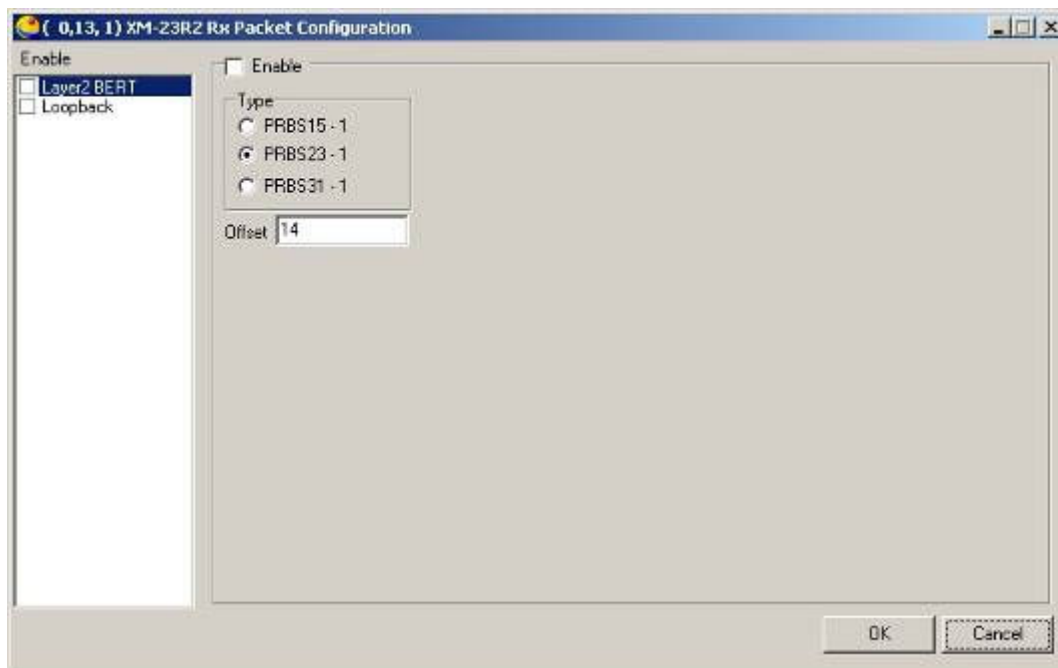
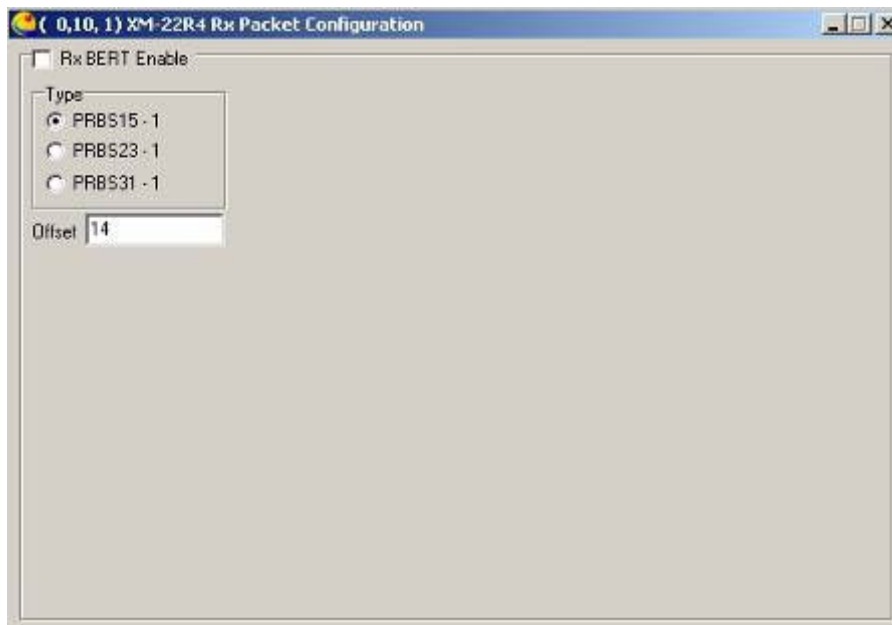
**Capture Control** defines the type of packets captured before or after captured setup.

**Logical Select** is for the filtering combination

**Capture by Size** defines the range of the capture size..

## 4.12 Set up Receive Packet

Please note that only XM-22R4 and XM-23R2 support this function.



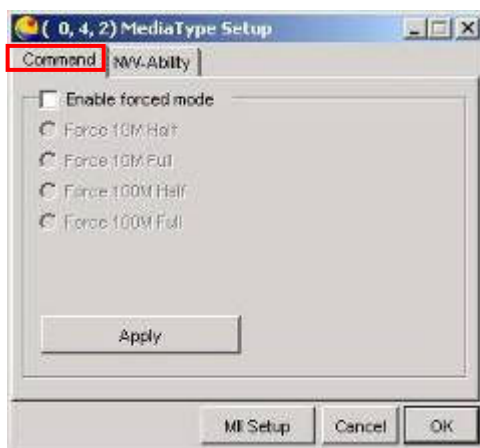
Make sure to select the same type in **Set up Transmit Packet** to avoid BERT error occurs.

## 4.13 Set up Media Type

Please note that XM-2301G, XM-23L4G, XM-28L1 and XM-28L1CX4 do not support this function.

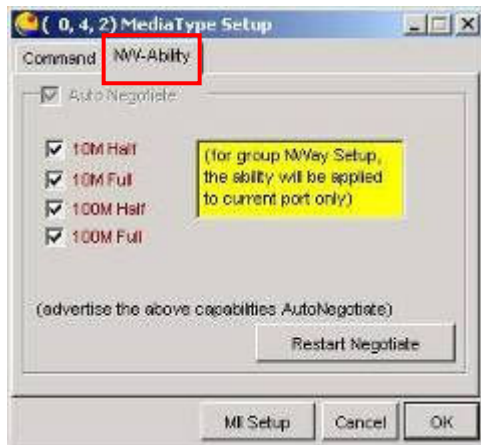


Choose **Set up Media Type** to bring out the **Media Type Setup** window.



The **Command** tab controls the selection of various speeds and modes.





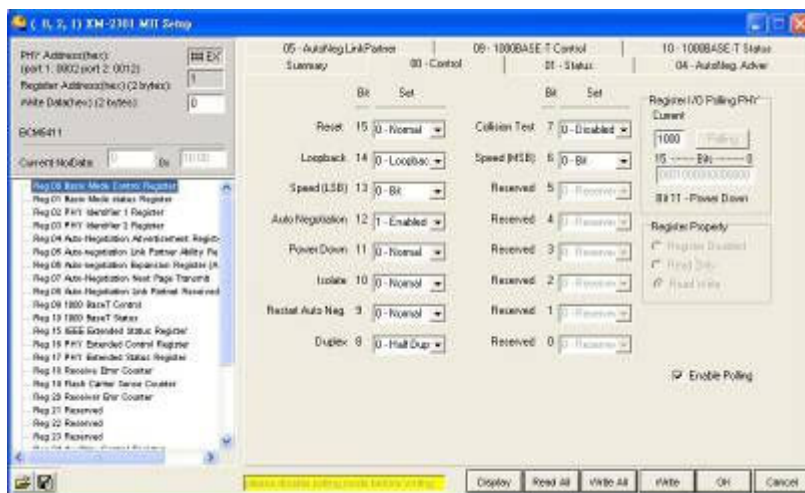
The **NW-Ability** tab controls the use of auto-negotiation for advertising various speeds and modes.

## 4.13 Set up MII State

Please note that module card XM-2301G, XM-23L4, XM-23L4G and XM-28L1 do not support this function.



MI I setup is available through the **Set up MII State**. The MII Setup window allows the current MII register values to be read and written.



This **MI I Setup** window shows the status of **all 31 MII registers**. Each register's value is shown in the value column as well as the state of each register. Click on the **View** boxes to add particular tabs on the top of the window for viewing contents of the MII template in use. They correspond to the MII registers available for the port.

## 4.14 Auto-MDIX

Please note that only XM-2301, XM-23L4, XM-22R4(F) and XM-23R2 support this function.



If DUT supports this function, it can be connected to the chassis with parallel cable. If not, activate this function.

## 4.15 Start Transmission





Choose **Start** to start transmitting packets (through the current port, selected ports, or each and every port in the chassis).



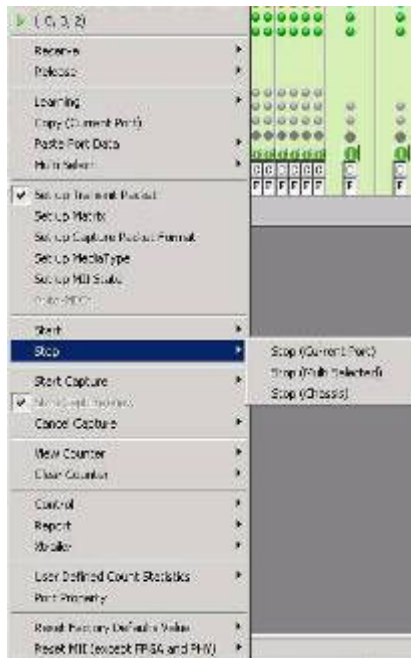
If choose **Start Chassis**, all the green lights will turn red.



The flashing green lights of the Chassis window indicate that packets are being transmitted through each and every port of all the module cards.

-  The red light ball indicates the port is transmitting packets.
-  The green light ball indicates the port stops transmitting packets.

## 4.16 Stop Transmission



Choose **Stop** to stop transmitting packets (through the current port, selected ports, or each and every port in the chassis).



The green lights for Transmit and Receive are turning off.

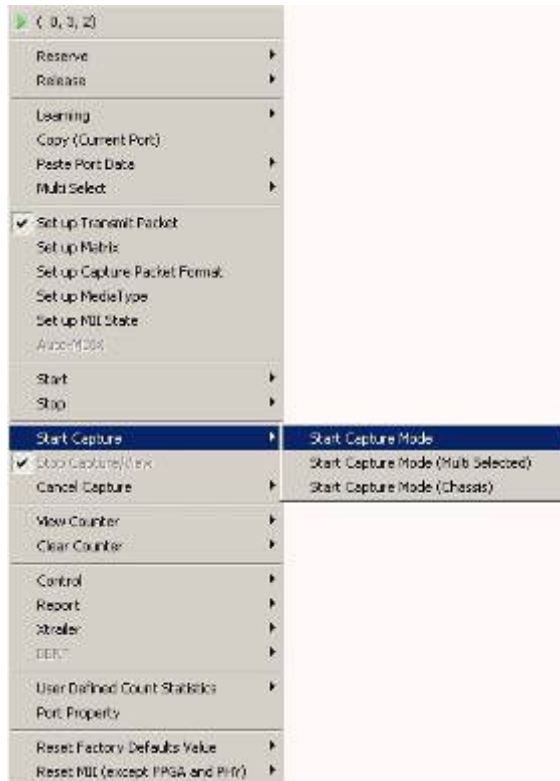


The green lights stops flashing, and there are no packets being transmitted.



## 4.17 Start Capture Mode

Please note that XM-23L4 and XM-23L4G do not support this function.

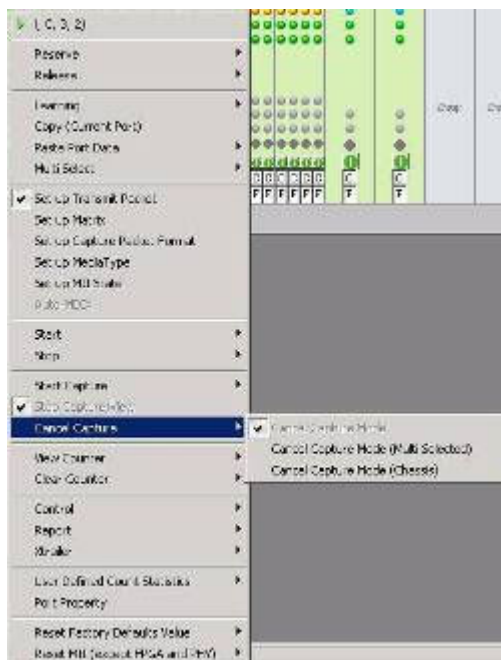


**Start Capture Mode** on all ports in the present scope. The complete Ethernet packet for the Protocol Configuration will show in the decoded window. Packet Parsing is implemented through the Capture View window. Packets are captured by module cards for in depth analysis.



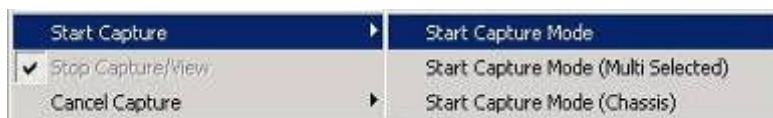


Choose **Stop Capture/View** to view the packets received through the designated port.

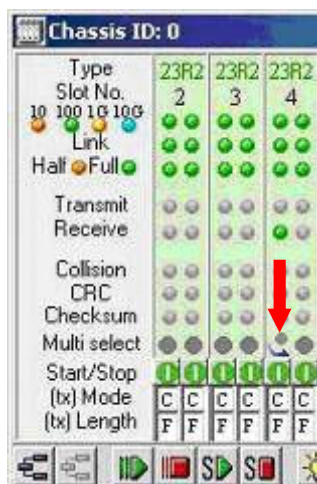


Choose **Cancel Capture** to stop capture operation.

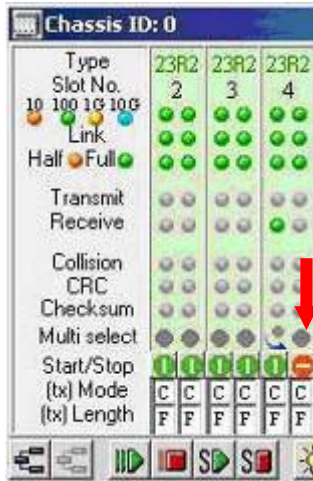
In the following demonstration, packets will be sent from port (0,4,2) to port (0,4,1), so the Capture mode will be started at port (0,4,1).



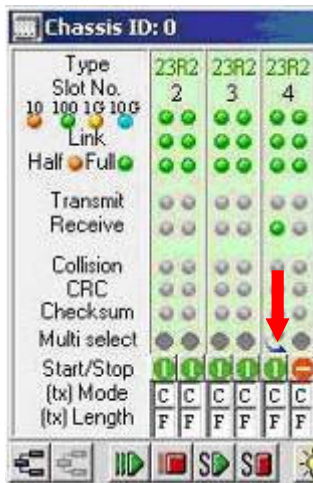
Move the cursor to port (0,4,1) and choose **Start Capture Mode** through the popup menu.



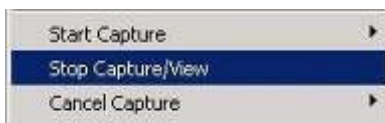
A blue curved arrow will show at port (0,4,1).



Send Packets through port (0,4,2).



The blue curved arrow at port (0,4,1) will turn orange, which means port (0,4,1) has captured the packets sent by port (0,4,1).













Choose **Stop Capture/View** to bring out the Capture and View window. Users may view the contents of user-defined packets with all the customized features captured through the designated port.

## Data Display

**Data Display:** The bottom of the Capture View window shows the entire contents of the selected packet. The left hand column is the packet offset, expressed in hexadecimal. This is followed by sixteen bytes of data display, all in Hexadecimal, and the right hand column contains a display of the data in ASCII.

The buttons in the Capture View window tool bar are described in the table below:

Figure	Usage
	Enlarges Frame Display.
	Shows Raw packets.
	Exports to Excel file.
	Exports to Raw packets.
	Exports to Sniffer.
	Exports to Matrix format.
	Exports to Test format.
	Exports to Packet Generation Format.
	Invokes Ethereal.
	Sets up font.

## 4.18 View and Clear Counter

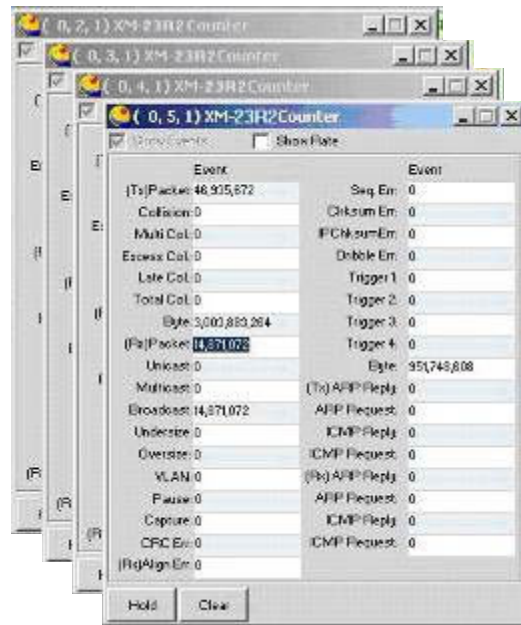


Choose **View Counter (Current Port)** to view the transmission/receive statistics for a specific port. If users transmit packet through a single port, the status of the packet will be shown. Users may also click **Show Rate** for more information of the transmit rate.

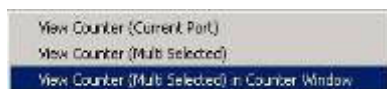


If select more than one packet-transmitted ports,





... and choose **View Counter (Multi Selected)**, the status of those packets will be shown. Users may also click **Show Rate** for more information about the transmit rate. All counters can be cleared by clicking the **Clear** button.



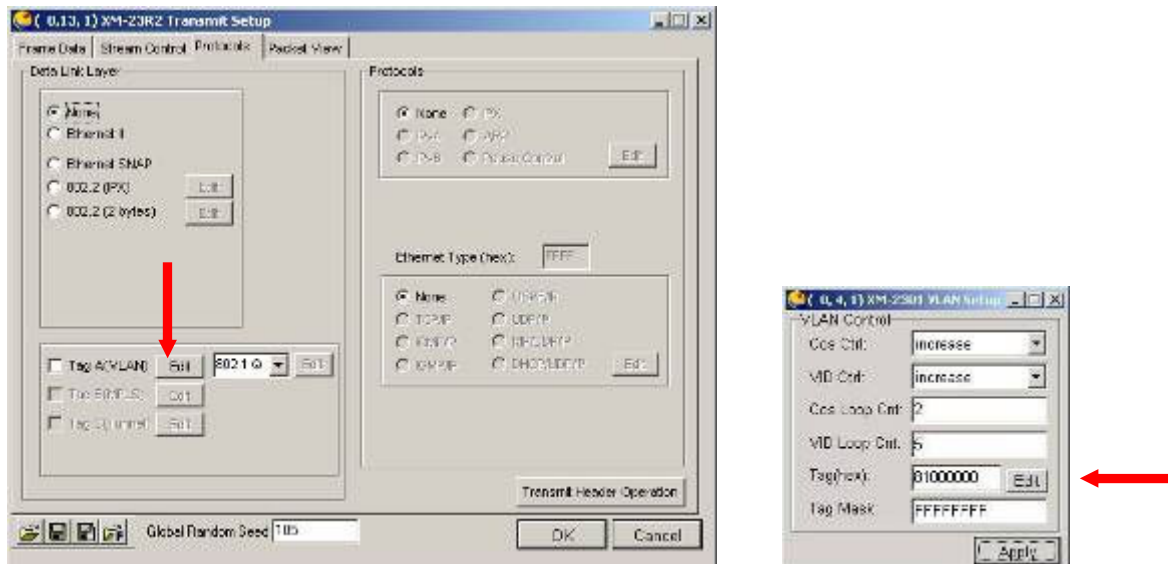

Chassis/Slot/Port	( 0, 2, 1 )	( 0, 3, 1 )	( 0, 4, 1 )	( 0, 5, 1 )	Total Ports
Group	0	0	0	0	N/A
Module Card	200-2202	200-2202	200-2202	200-2202	N/A
Link Status	Link Up	Link Up	Link Up	Link Up	N/A
Full/Half	Full	Full	Full	Full	N/A
Speed	100	100	100	100	N/A
Transmit packet	11,377,795	18,789,069	10,647,759	10,410,769	80,139,432
Receive packet	0	0	0	0	0
Transmit byte	709,179,114	694,998,690	681,456,020	606,209,472	1,760,924,332
Receive byte	0	0	0	0	0
Transmit packet rate	149,889	148,009	148,009	148,009	N/A
Receive packet rate	0	0	0	0	N/A
Transmit byte rate	9,523,818	9,523,818	9,523,818	9,523,773	N/A
Receive byte rate	0	0	0	0	N/A
Collision	0	0	0	0	0
Multi collision	0	0	0	0	0
Excess collision	0	0	0	0	0
Late collision	0	0	0	0	0
Total collision	0	0	0	0	0
Unicast	0	0	0	0	0
Multicast	0	0	0	0	0
Broadcast	0	0	0	0	0
Undersize	0	0	0	0	0
Oversize	0	0	0	0	0
Vlan	0	0	0	0	0
Pause	0	0	0	0	0
Capture	0	0	0	0	0
Double error	0	0	0	0	0
Alignment error	0	0	0	0	0

Choose **View Counter (Multi Selected)** with **Counter Window** to show Counter window for detailed description of selected ports statistics. Choose **Clear Counter** to clear all counters.



## 4.19 Stream Counter

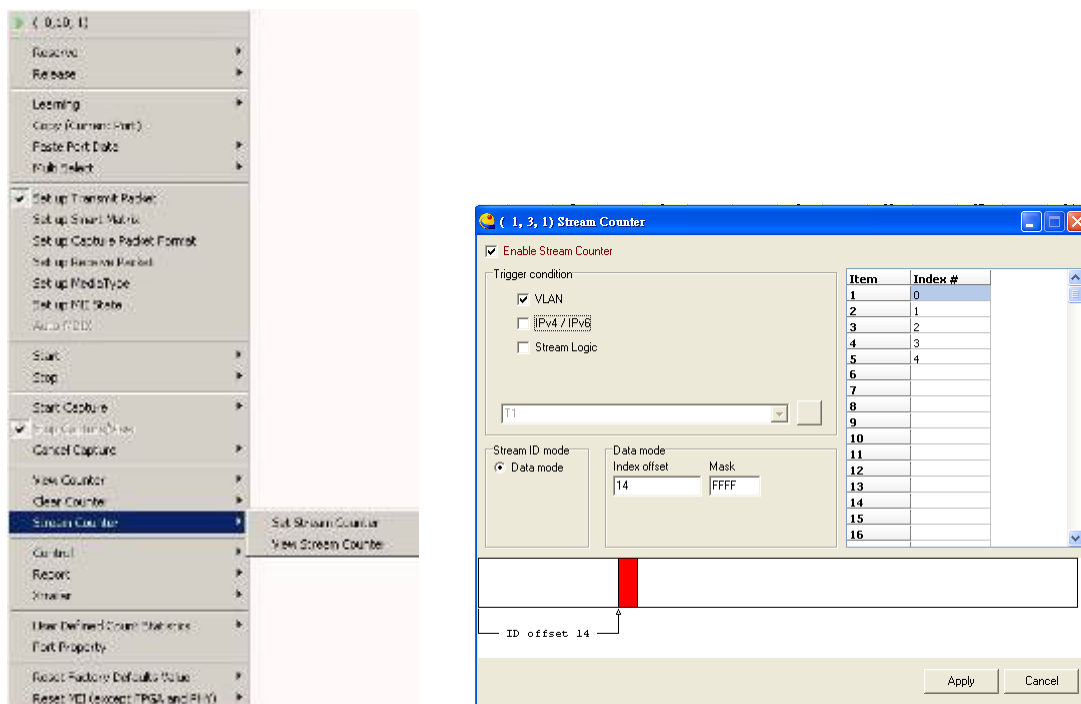
Please note that only XM-2301, XM-28L1, XM-22R4(F), 23R2(G) module cards support this function.



Stream Counter function is for verification of the Cos (4 bits) and VID (12 bits) of VLAN tag (4 bytes). Before sending traffic, go to the **Protocols** tab of **Transmit Setup** window, check off **Tag A (VLAN)** and press the **Edit** button to bring out **VLAN Setup** window. In this case, loop count of VID is 5 with 1 bit of increment.



In this case, traffic is sent from card 4 to card 5, so VLAN is set at card 4, and Stream Counter is set at card 5.



Click on the **Set Stream Counter** to bring it out.

Trigger	E	Offset	Data	Length	Result
A	<input checked="" type="checkbox"/>	0	FF FF FF FF FF FF	6	FF FF FF FF FF FF
B	<input checked="" type="checkbox"/>	6	00 80 C8 FF 0F FF	6	00 80 C8 FF 0F FF
C	<input checked="" type="checkbox"/>	12	81 00 00 00 00 00	2	81 00

For explanation purpose, Stream Counter is divided into three sections. In the upper part, Trigger A is set from the start of packet (Offset: 0) with content (Data: FF FF FF FF FF FF) of 6 bytes (Length: 6). Please note that for XM-2301(G), the maximum length of trigger for Stream Counter is 6 bytes.

There are three combinations of Trigger. In addition to Trigger A (Offset: 0) and Trigger B (Offset: 6), Trigger C is either of 12 bytes of offset or X-Trailer set from NuStreams chassis.

Trigger	Index offset
A	14
B	14

In the middle part, 14 bytes of Index Offset value is set from the start of packet to start of Cos and VID field.

Stream A		Stream B	
Item	Index #	Item	Index #
1	2	1	5
2	3	2	6
3	4	3	7
4	4	4	8
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	

Cancel Apply

In the lower part, each Stream supports 4,096 sets of variation. In Item 1 of Stream A, 2 stands for 0000 0000 0000 0010 of the exact packet.

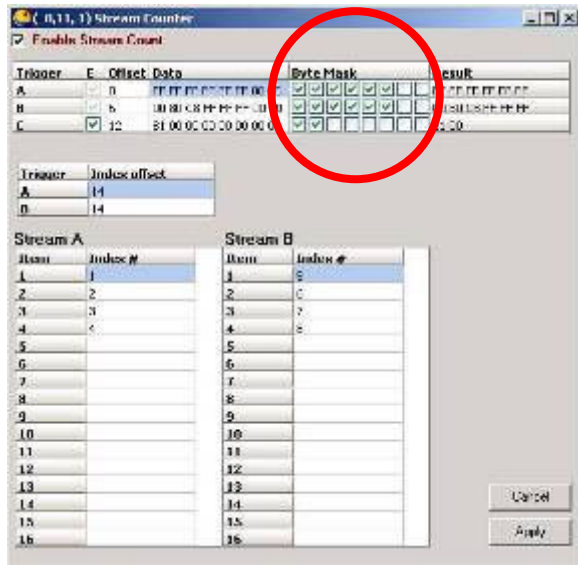
Set Stream Counter  
View Stream Counter

( 0, 5, 0) Stream Counter View

Index	A	B
2	1,173,032	0
3	1,173,033	0
4	1,173,033	0
5	0	0
6	0	0
7	0	0
8	0	0

Stop Clear Close

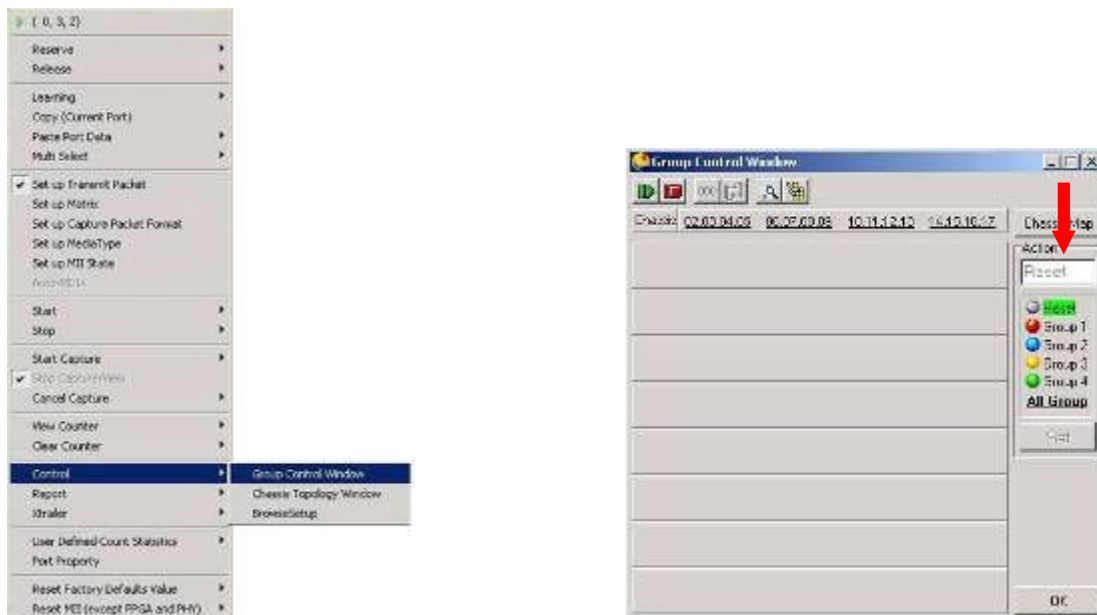
Click on the **View Stream Counter** to bring it out. Please see A column of Index 2. The number stands for that currently 1,173,032 packets match the triggers set beforehand.



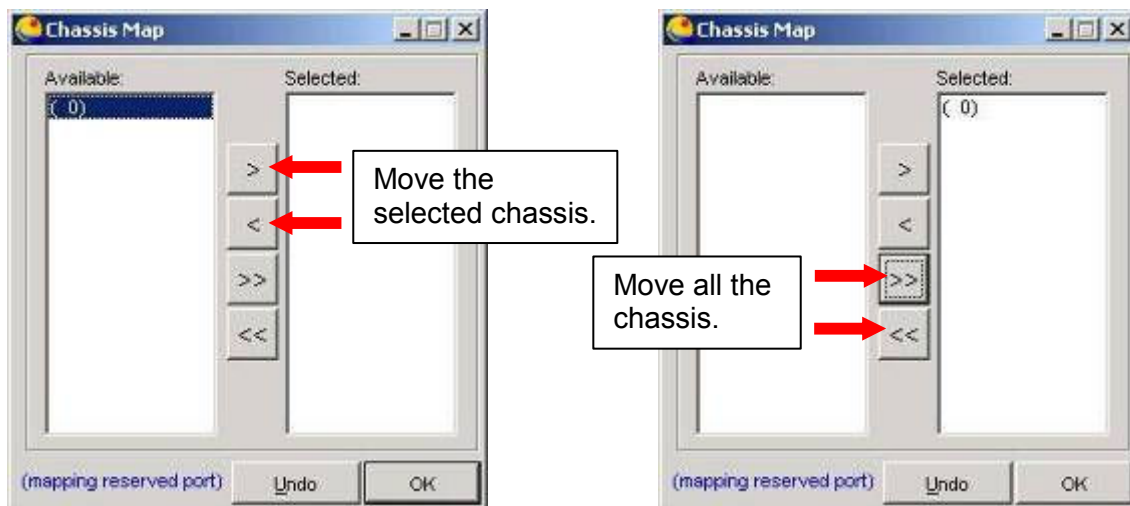
For XM-28L1, the upper part of Stream Counter is slightly different. The previous Length column is replaced by the column of Byte Mask. Check off bytes to choose bytes of Data setting. In the case of Trigger A, the first six bytes of Trigger A “FF FF FF FF FF FF 00 00” are chosen. The result is FF FF FF FF FF FF. Please note that for XM-28L1, the maximum length of trigger for Stream Counter is 86 bytes.

## 4.20 Control

### 4.20.1 Group Control Window



Click on the **Group Control** window to bring it out. **Group Control Window** allows multiple ports of different cards to be configured and trigger setup simultaneously. Click on **Chassis Map**.



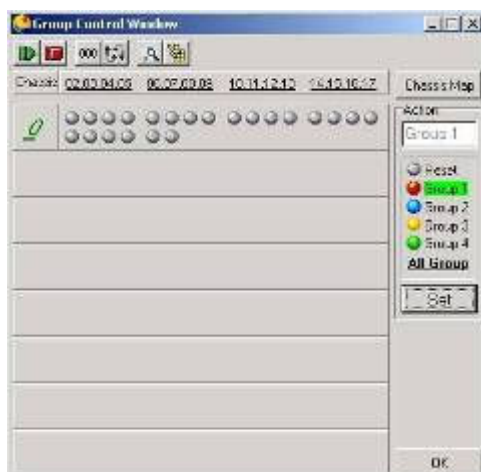
Use **Arrow** key to choose chassis. Chassis 0 is chosen for grouping. Click on the **OK** button of the **Chassis Map**.



Click on the **Set** button. The gray balls stand for the ports of the chassis 0.

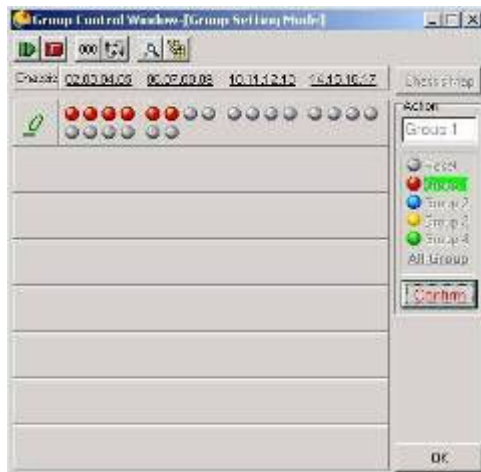


Click on the **Confirm** button.

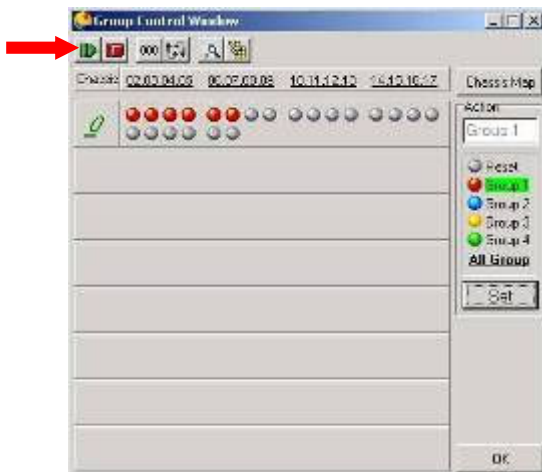


Click on **Group 1** and then click on the **Set** button.





Click on ports desired to set as group 1, and then click on **Confirm**. In this case, it's the first port of card 2 to card 7 of chassis 0.

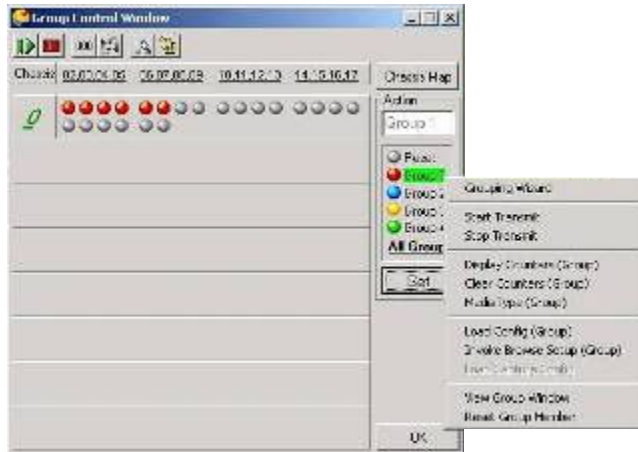


Click on the **Transmit All** button and send packets through ports of group 1.

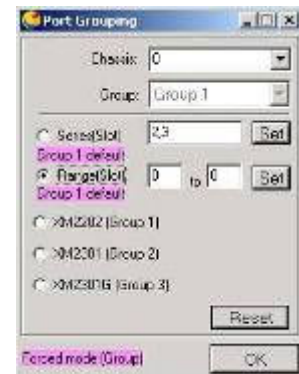


After clicking on the **Transmit All** button, users can see from the Chassis window that the ports of group 1 are transmitting packets simultaneously.





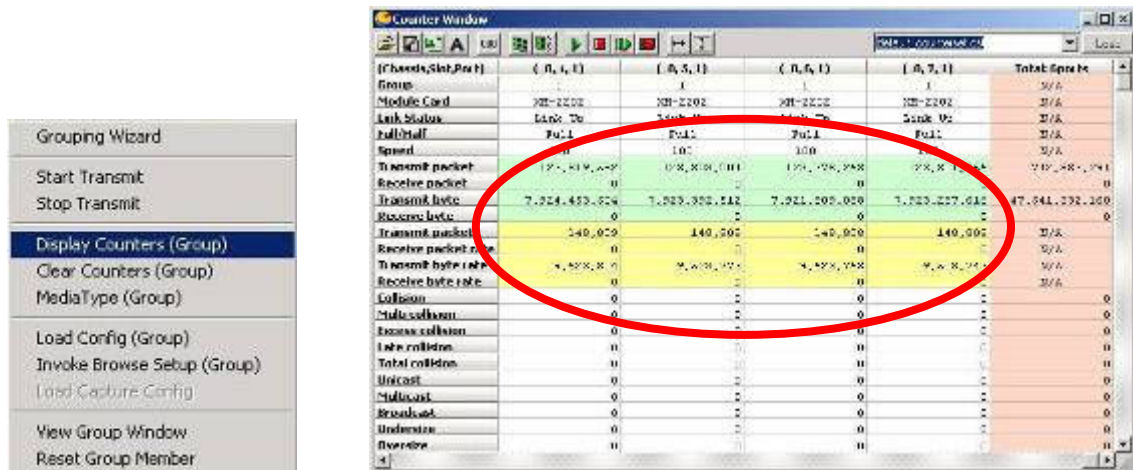
Right mouse click the Group 1 icon to bring out the **Popup** menu.



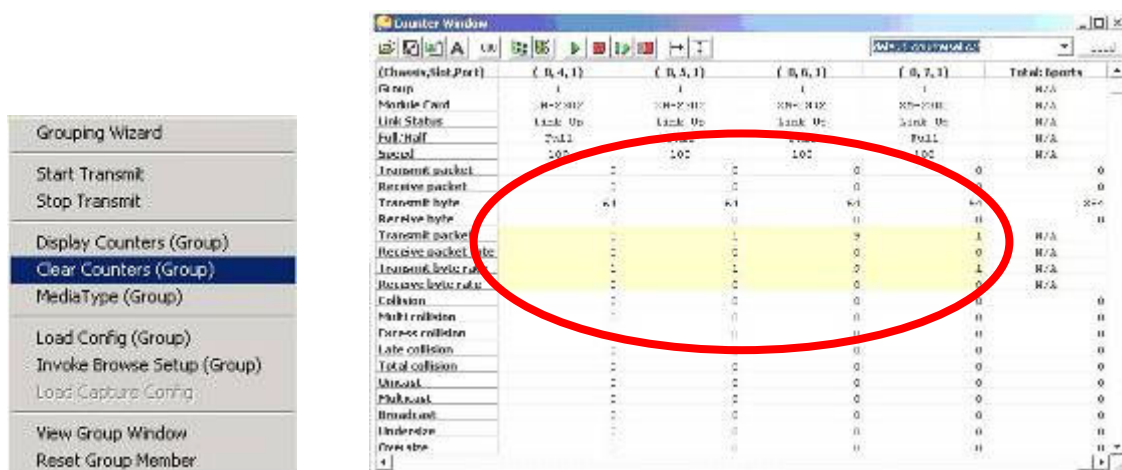
Choose **Grouping Wizard** to set groups based on module card types or any cards desired to have in a group. Please press **Set** after setting **Grouping Wizard**.



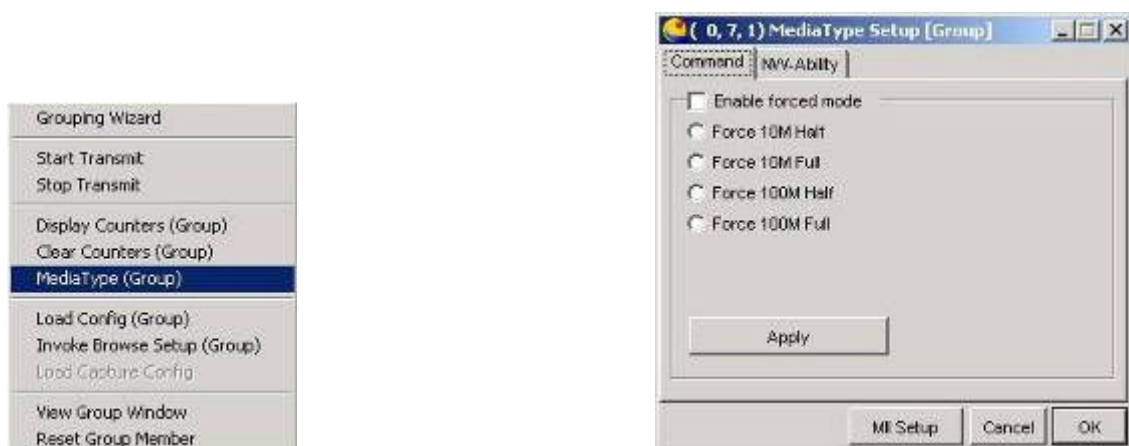
Choose **Start Transmit** or **Stop Transmit** to transmit or stop transmitting packets through ports of Group 1.



Choose **Display Counters (Group)** to see the status of the ports of Group 1.



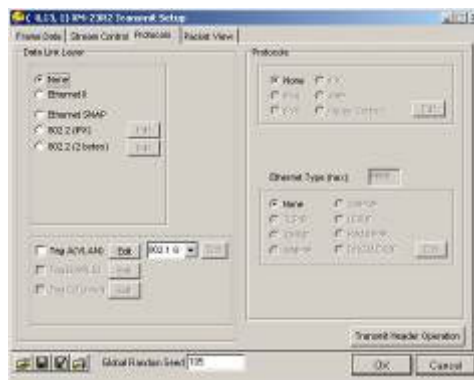
Choose **Clear Counter (Group)** to reset Counter window.



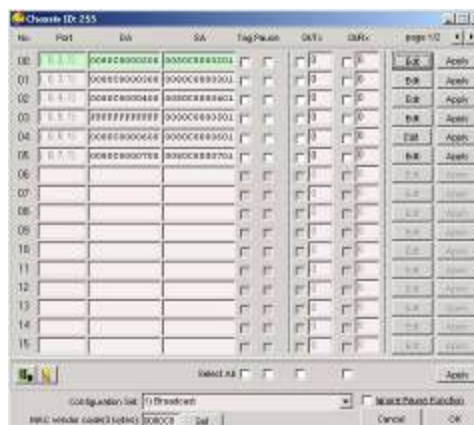
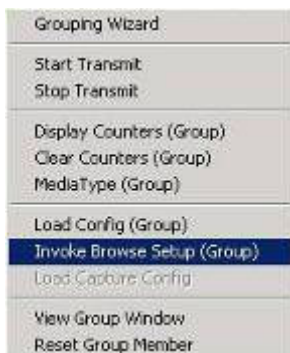
Choose **Media Type** to set up transmission mode.



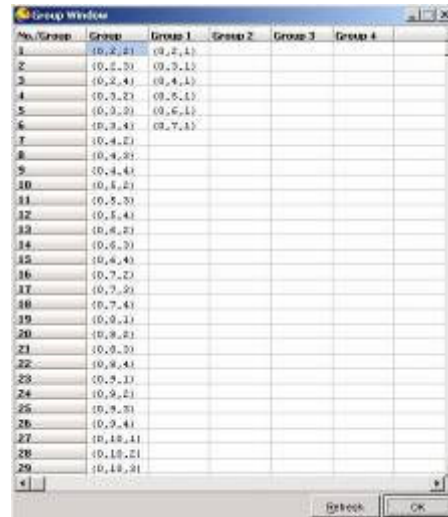
Please note that for media type setting, make sure to set ports of the same type of card in the same group, or the **Warning** message will appear.



Choose **Load Config (Group)** to configure packets transmitted.



Choose **Invoke Browse Setup (Group)** to invoke the Browse Setup window.

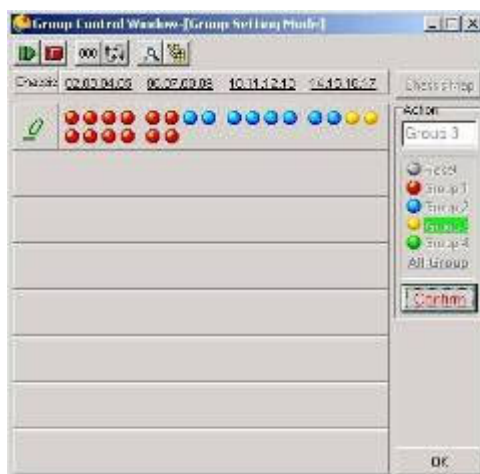



No.	Group	Group 1	Group 2	Group 3	Group 4
1	(0,2,4)	(0,2,4)			
2	(0,2,3)	(0,3,1)			
3	(0,2,4)	(0,4,1)			
4	(0,3,2)	(0,5,1)			
5	(0,3,2)	(0,6,1)			
6	(0,3,4)	(0,7,1)			
7	(0,4,2)				
8	(0,4,3)				
9	(0,4,4)				
10	(0,4,2)				
11	(0,5,3)				
12	(0,5,4)				
13	(0,6,2)				
14	(0,6,3)				
15	(0,6,4)				
16	(0,7,2)				
17	(0,7,3)				
18	(0,7,4)				
19	(0,8,1)				
20	(0,8,2)				
21	(0,8,3)				
22	(0,9,4)				
23	(0,9,1)				
24	(0,9,2)				
25	(0,9,3)				
26	(0,9,4)				
27	(0,10,1)				
28	(0,10,2)				
29	(0,10,3)				

Choose **View Group Window** to see the grouping status of ports of the chassis.  
Please note that the ungrouped ports belong to Group 0.




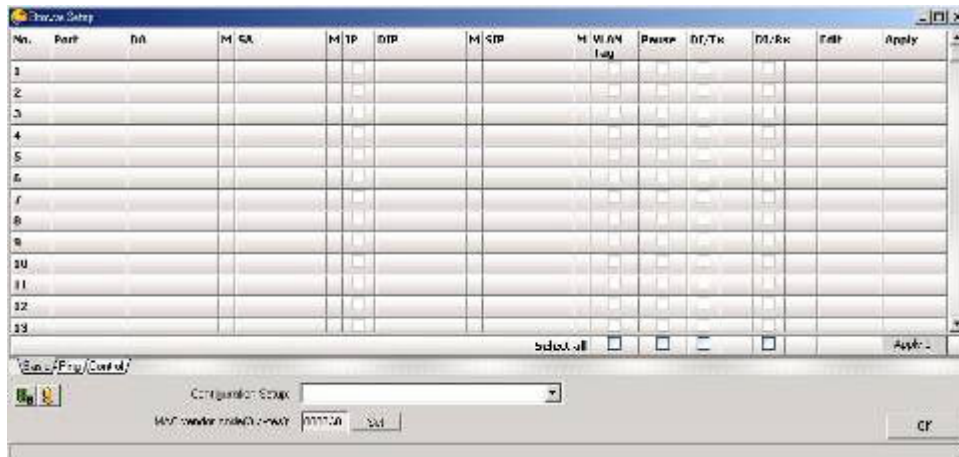
Choose **Reset Group Member** to erase group setting.




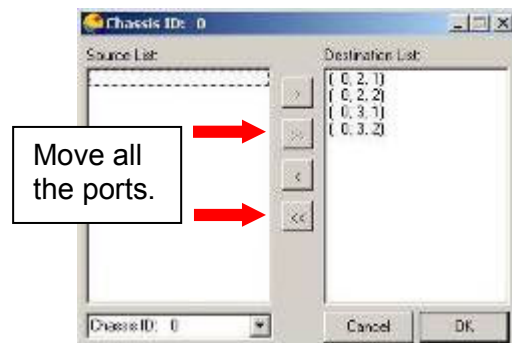
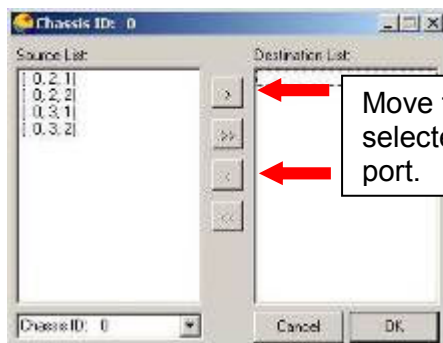
Set other ports as group 2 (blue balls), or 3 (yellow balls)

## 4.20.2 Browse Setup Window

To open the Browse window for configuration, click on the Browse Setup button  on the Chassis Panel.

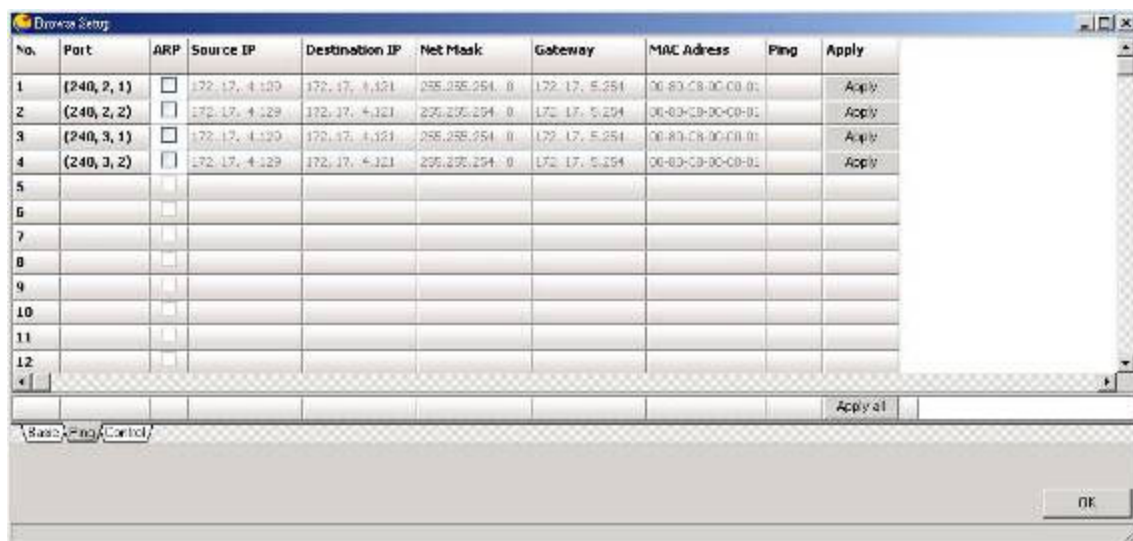


This is the Browse window to configure. Click on the Port Mapping button  to choose ports for the window.



Use Arrow Key to choose all the ports on the Port map. Click **OK** on the Port map to browse the setup of every port of the chassis.





This is the Browse Setup window, which can be divided three parts: **Basic**, **Ping** and **Control**.

#### 4.20.2.1 Basic

In **VLAN Tag** column, VLAN tag can be added to the packets transmitted.

In **Pause** column, ports can be set with Flow Control function. The port can react to the switch (DUT) sending flow control packets by stop sending packets.

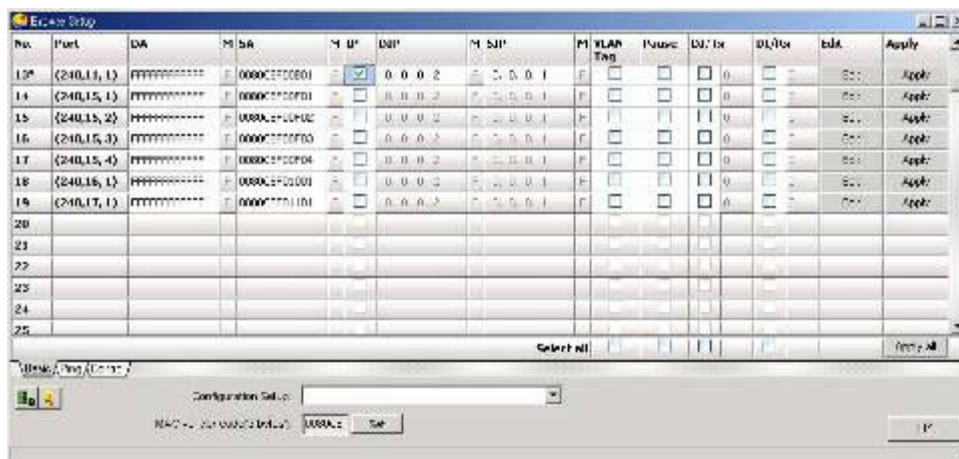
In **DI/Tx** column, packets transmitted can be set with X-Trailer attached.

In **DI/Rx** column, packets have X-Trailer attached can be set to be received.

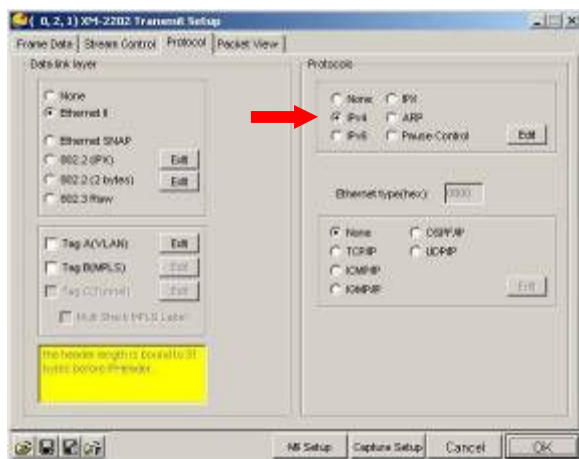
In the box of **MAC vendor code(3 bytes):**  **Set**, MAC vendor code (3 bytes) can be configured and MAC vendor code set.

In **Select all** column, all ports can be chosen for the above configuration.

In the box of ☐ Ignore Pause Function, PHY register checking can be chosen to be stopped.



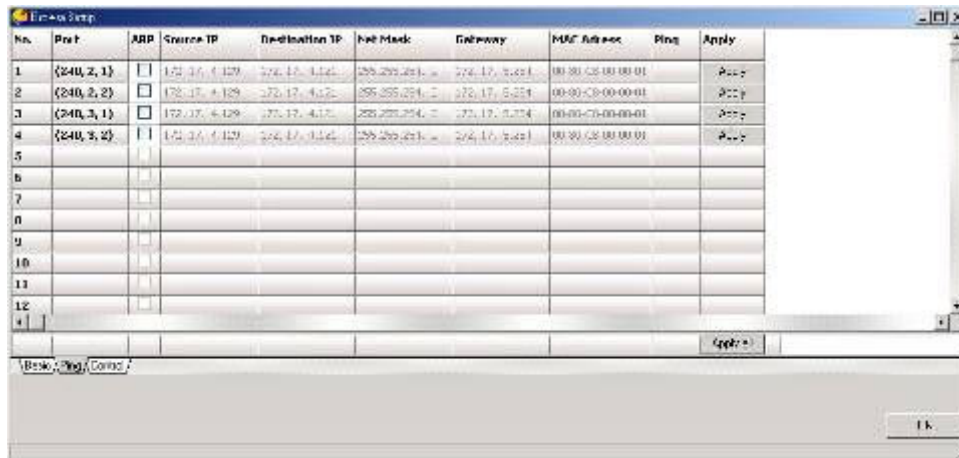
In the **Basic** part of the setup, for **M** column, F stands for “Fixed,” I stand for “Increase,” and R stands for “Random.” And the setting of **DIP** and **SIP** can only be accessible when box of **IP** column is checked.





If the box of **IP** column is checked, the protocol setting of this port will vary accordingly. Please invoke the Protocol dialogue for verification.

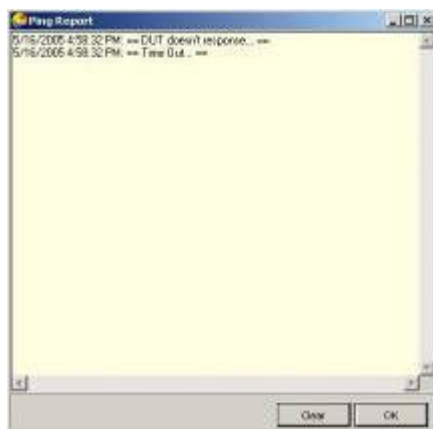



#### 4.20.2.2 Ping



No.	Port	ARP	Source IP	Destination IP	Net Mask	Gateway	MAC Address	Ping	Apply
1	(240, 2, 1)	<input type="checkbox"/>	172.17.4.129	172.17.4.129	255.255.254.0	172.17.4.254	00:80:C8:00:00:01	Ping	
2	(240, 2, 2)	<input type="checkbox"/>	172.17.4.129	172.17.4.129	255.255.254.0	172.17.4.254	00:80:C8:00:00:01	Ping	
3	(240, 3, 1)	<input type="checkbox"/>	172.17.4.129	172.17.4.129	255.255.254.0	172.17.4.254	00:80:C8:00:00:01	Ping	
4	(240, 3, 2)	<input type="checkbox"/>	172.17.4.129	172.17.4.129	255.255.254.0	172.17.4.254	00:80:C8:00:00:01	Ping	
5									
6									
7									
8									
9									
10									
11									
12									

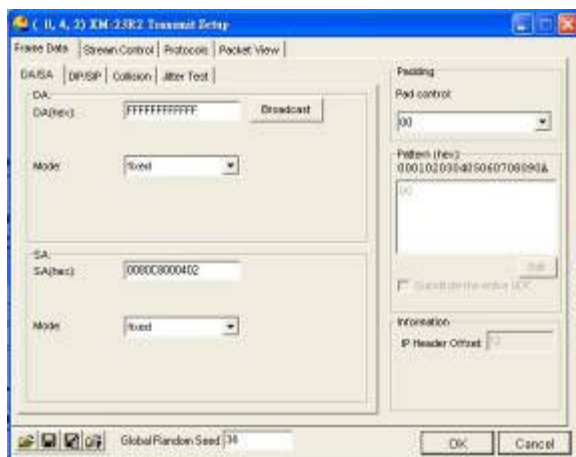
In the **Ping** part of the setup, check the box of ARP , and the Ping button  will emerge.



Click on the  button to invoke the **Ping Report** to see the record of transmitted ARP requests and the record of ARP replies.




Source IP, Destination IP, Net Mask, Gateway, and MAC Address can also be configured through the following **Port Property** window.



Click on the **Edit** button  to invoke **Transmit Setup** window for in depth setup.

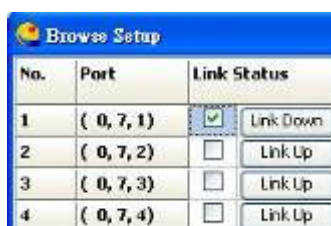


Please remember to click on the **Apply** button  for every setup. The **Message** dialogue will show for verification.

#### 4.20.2.3 Control

In **Browse Setup** of **Control**, check the box in front of the link status first and press the button of **Link Status** to force the module card/ the port to change the status between Link Up and Link Down.

Or check the box of **Change sel.** at the bottom to change all the link status of all ports. The message box will appear for verification.



Click OK button to exit the window.

### 4.20.3 Configuration Setup

**Configuration Setup** column is located at the bottom of **Basic** part of **Browse Setup** window. There are total of eight (8) options as following:

All ports sending broadcast packets.

Browse Setup					
No.	Port	DA	M	SA	M
1*	( 0, 2, 1)	FFFFFFFFFFFF	F	00000000201	F
2*	( 0, 2, 2)	FFFFFFFFFFFF	F	00000000200	F
3*	( 0, 3, 1)	FFFFFFFFFFFF	F	00000000301	F
4*	( 0, 3, 2)	FFFFFFFFFFFF	F	00000000300	F

Return SA to default address.

Browse Setup					
No.	Port	DA	M	SA	M
1*	( 0, 2, 1)	FFFFFFFFFFFF	F	00000000201	F
2*	( 0, 2, 2)	FFFFFFFFFFFF	F	00000000202	F
3*	( 0, 3, 1)	FFFFFFFFFFFF	F	00000000301	F
4*	( 0, 3, 2)	FFFFFFFFFFFF	F	00000000302	F

Start rotate flow from port 1(seed) to other ports with random address (Port 1 → Port 2 → Port 3 → Port 4 → Port 1).

Browse Setup					
No.	Port	DA	M	SA	M
1*	( 0, 2, 1)	0066D80208B	F	00000000201	F
2*	( 0, 2, 2)	003CB40048AB	F	0066D80208B	F
3*	( 0, 3, 1)	002F7100DE9	F	003CB40048AB	F
4*	( 0, 3, 2)	00000000201	F	002F7100DE9	F

Pair ports and send packets to each other through default address (Port 1 ↔ Port 2, Port 3 ↔ Port 4).

Browse Setup					
No.	Port	DA	M	SA	M
1*	( 0, 2, 1)	00000000200	F	00000000201	F
2*	( 0, 2, 2)	00000000201	F	00000000200	F
3*	( 0, 3, 1)	00000000300	F	00000000301	F
4*	( 0, 3, 2)	00000000301	F	00000000300	F

Pair ports and send packets to each other through random address.

Browse Setup					
No.	Port	DA	M	SA	M
1*	( 0, 2, 1)	000881002C6D	F	00550F005735	F
2*	( 0, 2, 2)	00550F005735	F	000881002C6D	F
3*	( 0, 3, 1)	006D9C007602	F	007F55003997	F
4*	( 0, 3, 2)	007F55003997	F	006D9C007602	F

7) Build multi to single scenario

Browse Setup					
No.	Port	DA	M	SA	M
1*	{ 0, 2, 1}	005010004491	F	000881002C6D	F
2*	{ 0, 2, 2}	000881002C6D	F	00550F005736	F
3*	{ 0, 3, 1}	000881002C6D	F	00550F005737	F
4*	{ 0, 3, 2}	000881002C6D	F	00550F005738	F


All ports send packets to port 1 (Port 4, Port 3, Port 2 → Port 1).

8) Build one to multi scenario

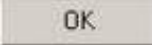
Browse Setup					
No.	Port	DA	M	SA	M
1*	{ 0, 2, 1}	000000000001	1	000000000003	F
2*	{ 0, 2, 2}	000000000002	F	000000000001	F
3*	{ 0, 3, 1}	000000000003	F	000000000002	F
4*	{ 0, 3, 2}	000881002C6D	F	00550F005738	F

3/15/32 ports are grouped to send packets in a rotate fashion. In this case, Port 1, Port 2, and Port 3 are grouped (Port 1 → Port 2, Port 2 → Port 3, Port 3 → Port 1). Please note that DA of Port 1 will automatically be switched to "I (Increased)," so the following scenario will also happen: Port 1 → Port 3, Port 2 → Port 3 and Port 3 → Port 1.



Press the Information button  to see detailed information of all configuration items.



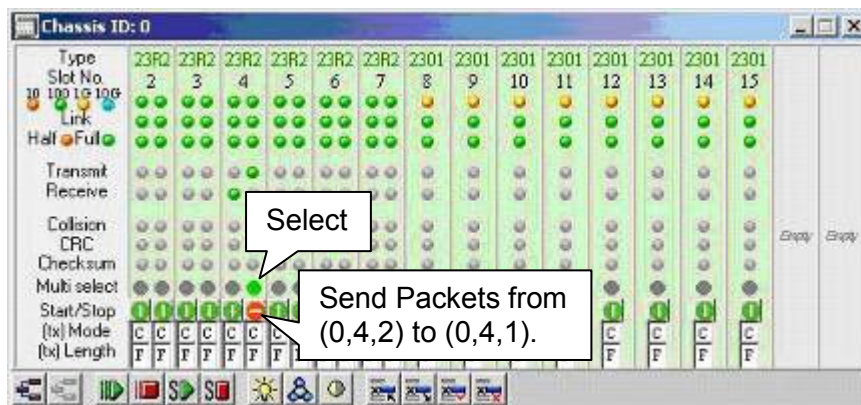
Click on the OK button  at the lower right Browse, the **Confirm** window will show for confirmation.


## 4.21 Report

### 4.21.1 Counter Window



Choose **Counter Window** to bring out the counter window for detailed statistics of selected ports.




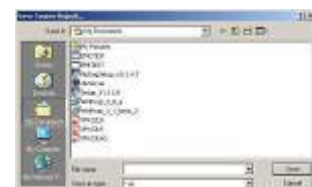
Please do not forget to select ports for Counter window. In this demonstration, port (0,4,2) is selected. Or select ports through the Port Map. If the data of selected ports through **Report/Counter Window** does not appear, open the window through **View Counter/View Counter (Multi Selected) with Counter Window**. Or simply click the  button on the tool bar to bring out the Counter window.



(Chassis,Slot,Port)	( 0, 3, 1)	( 0, 3, 2)	Total 2ports
Group	0	0	N/A
Module Card	XM-23R2	XM-23R2	N/A
Link Status	Link Up	Link Up	N/A
Full/Half	Full	Full	N/A
Speed	100	100	N/A
Transmit packet	2,054,114	655,519	2,709,633
Receive packet (valid)	655,519	2,029,859	2,685,378
Transmit byte	213,627,856	68,173,976	281,801,832
Receive byte	68,173,976	211,105,440	279,279,416
Transmit packet rate	20,161	0	N/A
Receive packet rate	0	20,161	N/A
Transmit byte rate	2,096,768	0	N/A
Receive byte rate	0	2,096,820	N/A
Collision	0	0	0
Multi collision	0	0	0
Excess collision	0	0	0
Late collision	0	0	0
Total collision	0	0	0
Unicast	0	0	0
Multicast	0	0	0
Broadcast	655,519	2,029,859	2,685,378
Undersize	0	0	0

**Dark Blue** and black fonts in the column of Port# distinguish Tx and Rx item. **Light blue** represents the chosen port (Port A). In the column of Port B, **light green** area is for the packet related items, **light yellow** area is for the rate related items, and **light pink** area is for the error related items. **Light orange** is used for the column of total value.

Click on the **Start Selected Port Counter** button  to send packets through the selected port. Click on the **Stop Selected Port Counter** button  to stop sending packets through the selected port. Click on the **Send All Counter**  to send packets through all the ports. Click on the **Stop All Counter**  to stop sending packets through all the ports.



Click on the **Export to Excel File** button  to export current file into an Excel file.







**A**




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To enhance user-friendliness, press the **Item Select** button  to bring out the **Row Selection** dialogue to select desired items to be shown on the Counter window.

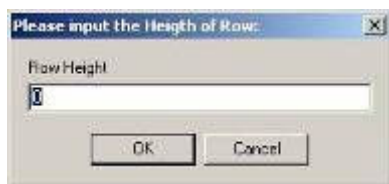


(Interface, Port)	(IP, MAC)	Total
Module Card	201-2352	N/A
Link Status	Link Up	N/A
Full-Duplex	Full	N/A
Speed	100	N/A
Transmit packet	1,000,711	1,000,711
Transmit byte	188,064,448	188,064,448
Transmit packet rate	20,161	N/A
Transmit byte rate	2,096,774	N/A
Link Rate	0.00	20.02

Click on the **Hide Zero Rows** button  to remove items with 0 value to avoid confusion.




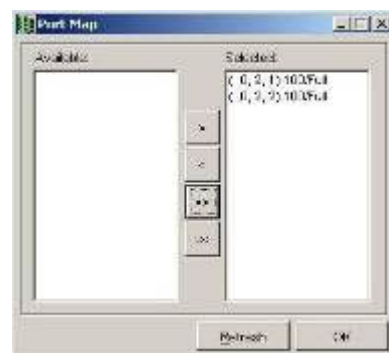
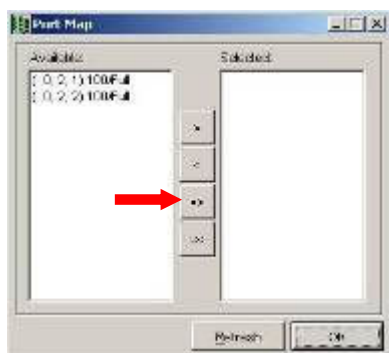
Click on the **Adjust Column Width** button  to adjust column width (in pixel).



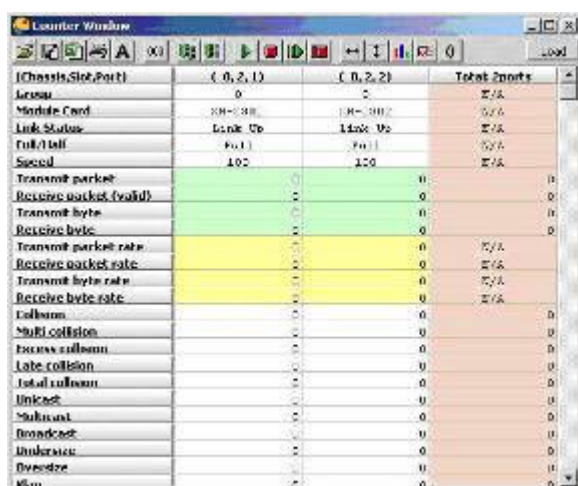
Click on the **Adjust Row Height** button  to adjust row height (in pixel).

#### 4.21.1.1 Counter Chart

Counter window provides **Chart Configuration** function to visually present traffic analysis status. In this case, use port (0,2,1) and (0,2,2) to transmit packets to each other. Press the Port Mapping button  to bring out the Port Map.

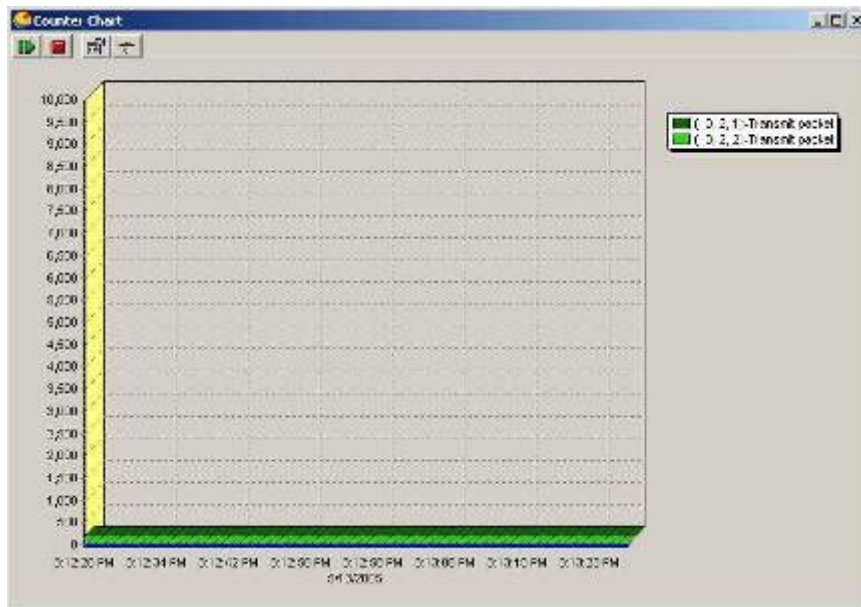



Use Arrow key to choose both port (0,2,1) and (0,2,2) and click OK.

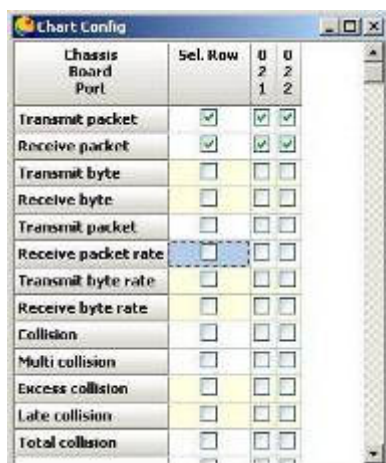



(Chassis, Slot, Port)	( 0, 2, 1 )	( 0, 2, 2 )	Total Counts
Access	0	0	N/A
Module Card	RM-0300	RM-0300	N/A
Link Status	Link Up	Link Up	N/A
Full/Dupl	Full	Full	N/A
Speed	100	100	N/A
Transmit packet	0	0	0
Receive packet (valid)	0	0	0
Transmit byte	0	0	0
Receive byte	0	0	0
Transmit packet rate	0	0	N/A
Receive packet rate	0	0	N/A
Transmit byte rate	0	0	N/A
Receive byte rate	0	0	N/A
Collision	0	0	0
Multi collision	0	0	0
Excess collision	0	0	0
Late collision	0	0	0
Total collision	0	0	0
Unicast	0	0	0
Multicast	0	0	0
Broadcast	0	0	0
Undersize	0	0	0
Oversize	0	0	0
Jitter	0	0	0

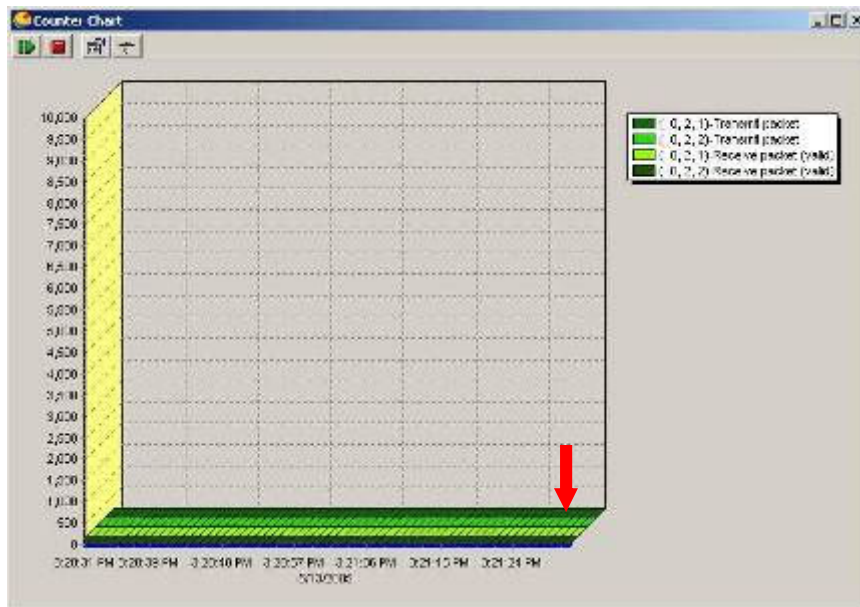
Now port (0,2,1) and (0,2,2) are shown in the Counter window.



Press the **Counter chart** button  to invoke it. Data shown on the Counter window can also be presented through the three dimensional format.



Click on the Configuration button  to bring out the **Chart Configuration** dialogue to choose counter items to be presented on the Counter Chart.

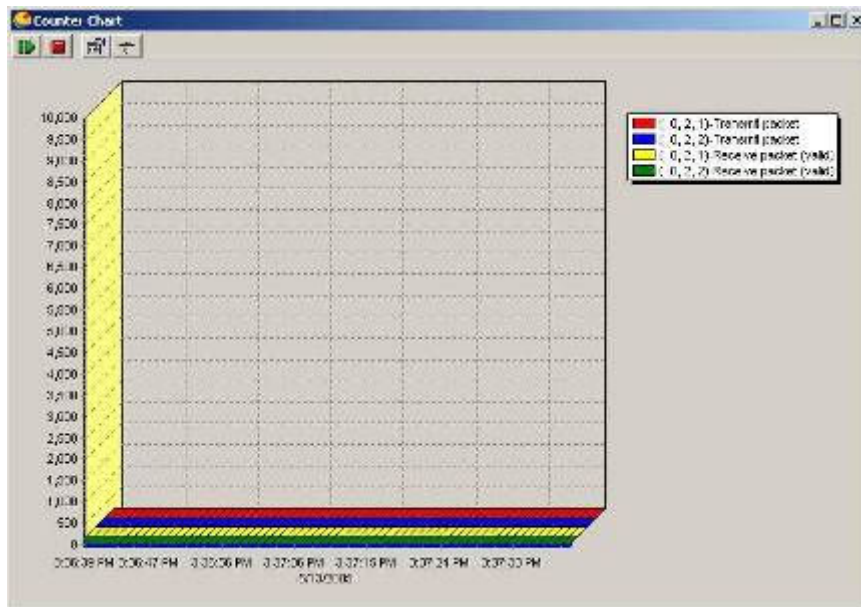


In this case, 4 counter items are chosen to be presented in the chart. Move the cursor and left mouse click on the horizontal color area to bring out the **Color** dialogue.




Use this Color dialogue as a palette to choose color for specific counter item.

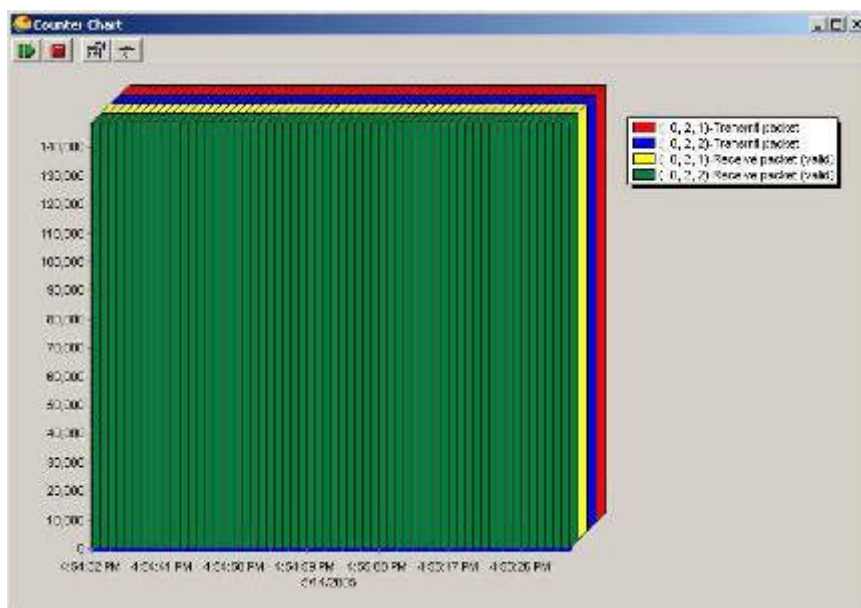





In this case, red, blue, yellow, and green are selected for better contrast.



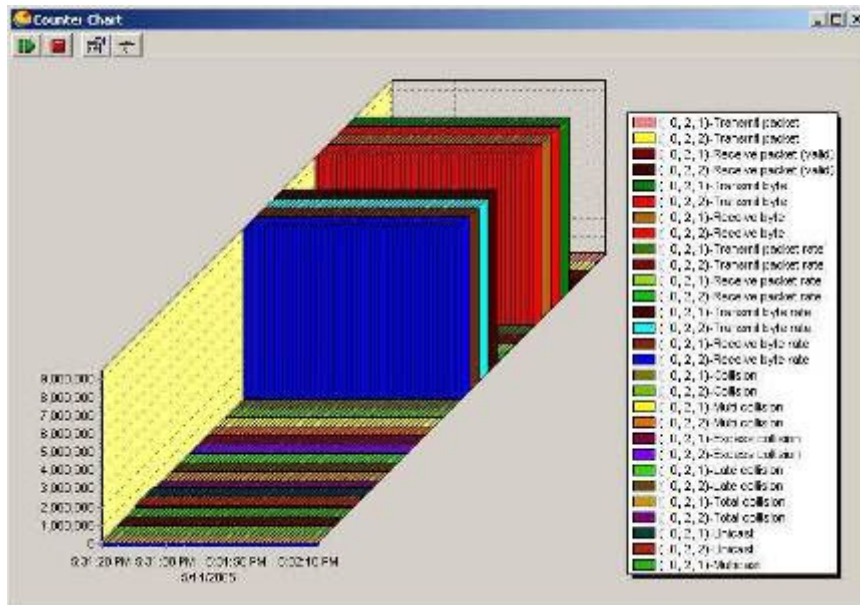
Click on the X-Axis button  and the **Time Interval** dialogue will show. In this case, the Counter Chart will update every second.



Press the Transmit All button  for port (0,2,1) and (0,2,2) to start transmitting traffic to each other, and the Counter Chart reflects this latest maneuver.



Please note that the maximum number for Counter window items to be shown on the Counter Chart is 32. The following picture is an example of 32 selected items from the Counter window shown in the three dimensional format.





## 4.21.2 Counter Group Window

### 4.21.2.1 Definition

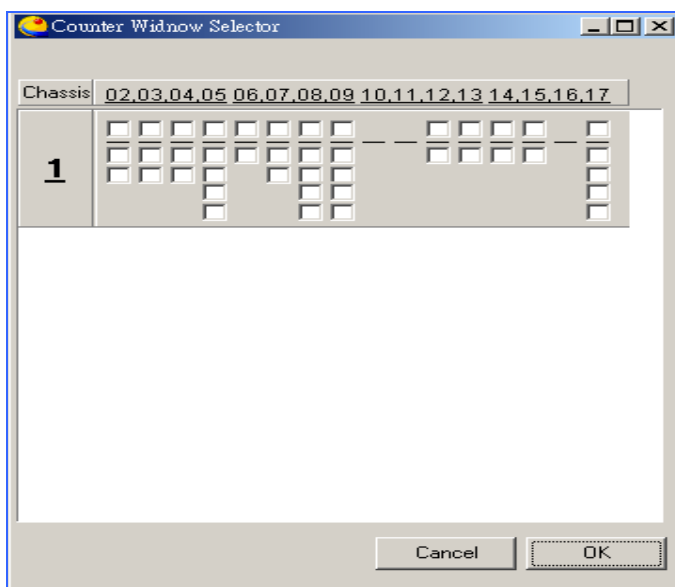
Users could select ports to create different Counter Window Groups. Each Window Group will display different test items in terms of different module card types selected. If all the ports selected are from the same type of module cards, all accessible test items from that type will appear in the counter window group. If not, only test items in common will appear.

Notice that NuStreams chassis supports up to 16 Counter Window Groups and each port could be repeatedly selected.

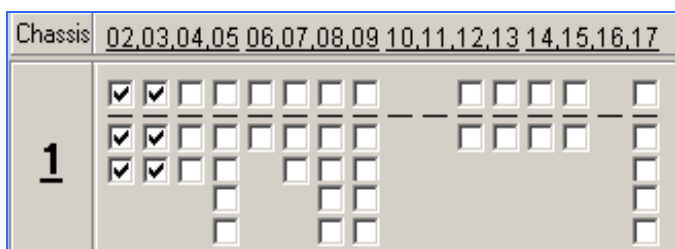
### 4.21.2.2 Create /Close Counter Window Group

Step 1. Go to **Report> Counter Group Window** to Invoke the selector table.

Or click the  icon on the top toolbar to open the selector.




Step 2. Check each desired port or the slot box to apply.



### Step 3. Counter Window Group

Counter Window Group 1					
(Chassis,Slot,Port)	( 1, 2, 1)	( 1, 2, 2)	( 1, 3, 1)	( 1, 3, 2)	Total: 4 port(s)
Group	0	0	0	0	N/A
Module Card	XM2202	XM2202	XM2202	XM2202	N/A
Link Status	Link Up	Link Up	Link Up	Link Up	N/A
Full/Half	Full	Full	Full	Full	N/A
Speed	100	100	100	100	N/A
Rx Packet	0	0	0	0	0
Rx Byte	0	0	0	0	0
Tx Packet	0	0	0	0	0
Tx Byte	0	0	0	0	0
Rx Packet Rate	0	0	0	0	N/A
Rx Byte Rate	0	0	0	0	N/A
Tx Packet Rate	0	0	0	0	N/A
Tx Byte Rate	0	0	0	0	N/A
Rx BroadCast	0	0	0	0	0
Rx MultiCast	0	0	0	0	0
Rx UniCast	0	0	0	0	0
Rx Pause	0	0	0	0	0
Rx VLAN	0	0	0	0	0
Tx Collision	0	0	0	0	0
Tx TotalCollision	0	0	0	0	0
Tx MultiCollision	0	0	0	0	0
Tx ExceedCollision	0	0	0	0	0
Tx LateCollision	0	0	0	0	0
Rx UnderSize	0	0	0	0	0
Rx OverSize	0	0	0	0	0

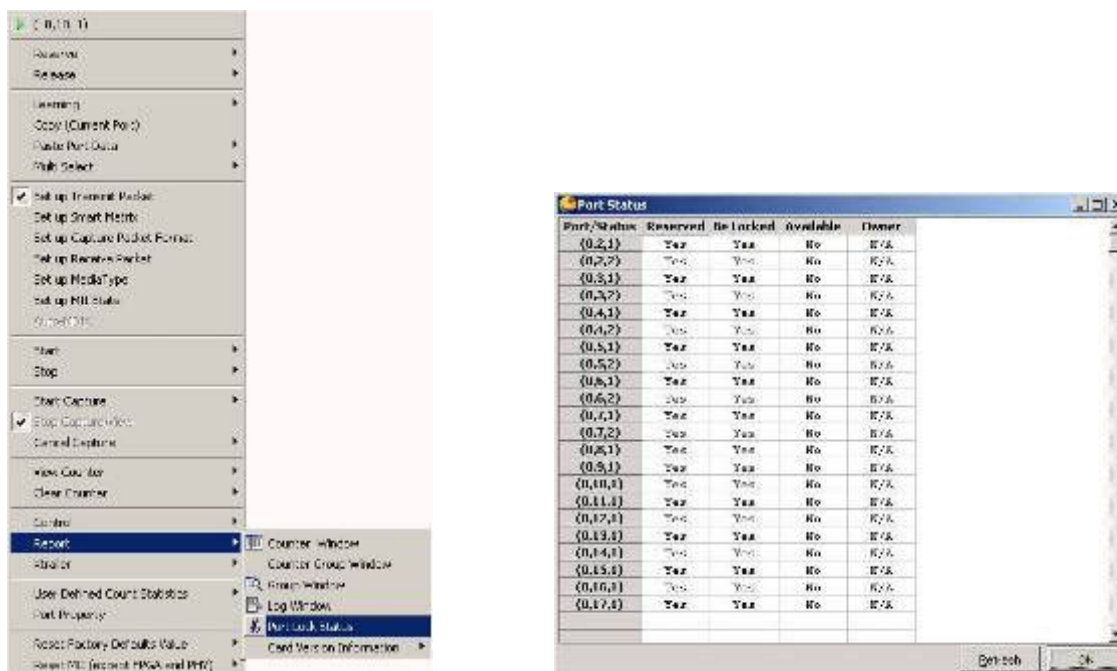
### Step 4. Create more Window Groups

Click  icon at the left bottom to create more new Window Groups. An icon with a number then appears in order aside with the icon at the left bottom.





#### 4.21.5 Port Lock Status Window



Choose **Port Lock Status** to bring out the **Port Status** window for detailed description of the status (reserved/locked/available) of each port.

#### 4.21.6 Card Version Information



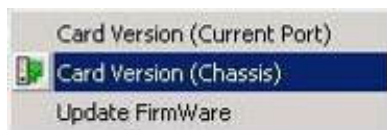
Choose **Card Version** window to bring out the **Card Version** window for detailed information on each module card in the chassis.

##### 4.21.6.1 Card Version (Current Port)

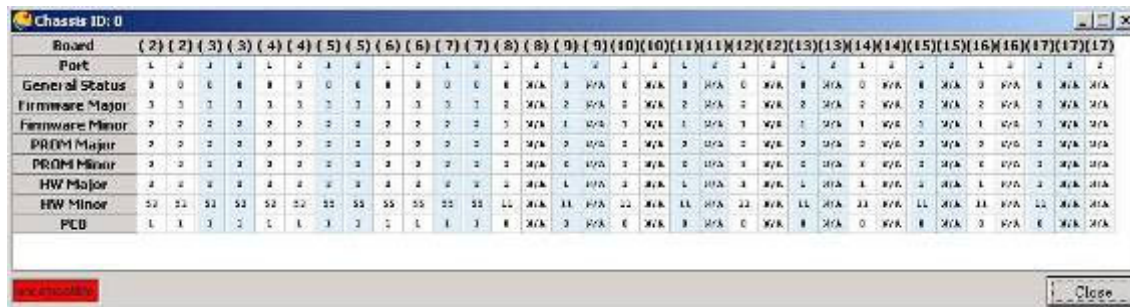


Choose **Card Version** (Current Port) to see **Firmware Version** of the port. Click on the **OK** button, the **FPGA Version** will show afterwards.

#### 4.21.6.2 Card Version (Chassis)



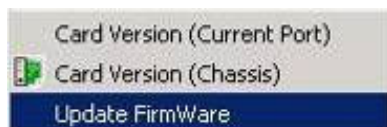
Choose **Card Version (Chassis)** to receive information of every module card inserted in the chassis.



The screenshot shows a window titled 'Chassis ID: 0' containing a table with 18 columns representing different ports. The rows include 'Board', 'Port', 'General Status', 'Firmware Major', 'Firmware Minor', 'PROM Major', 'PROM Minor', 'HW Major', 'HW Minor', and 'PCB'. Each cell in the table contains a value representing the status or version of the card in that specific port.

#### 4.21.6.3 Update Firmware

In the process of updating FW, SYS LED may be flashing due to power shortage, unstable voltage, jammed network, or defective hub or switch. The lights will go out when FW is successfully updated. Close the NuWIN and then shut down the chassis after Firmware update. Follow the procedures below to solve the issue.



Choose **Update Firmware** to open **Preference window**. Download the latest firmware and FPGA or to enhance Log Window information.



Press to open file.

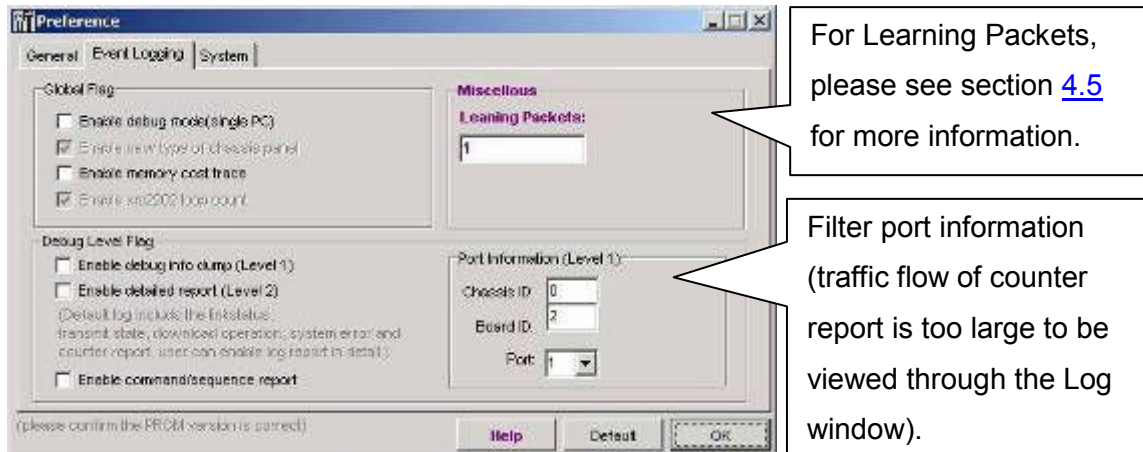
There are two tabs in the General tab of Preference window.

For **Port Based** dialogue, select chassis/card/port and choose the location of the new FW and press **Download for Port** to update Firmware or FPGA.

For **Chassis Based** dialogue, select certain or **ALL** cards and press **Download for Chassis** to update Firmware or FPGA.



#### 4.21.6.4 Global Flag



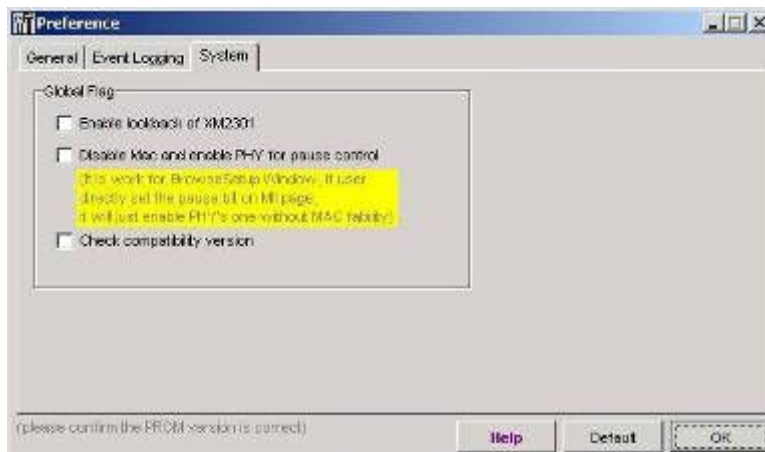
**Enable Memory Cost Trace:** Trace changes of memory status during run time.

**Enable Debug Info Dump (Level 1):** Trace the changes of basic work flow.

**Enable Detailed Report (Level 2):** Trace the changes of detailed work flow, such as LED status, capture dump data, and link status, etc.

**Enable Command/Sequence Report:** Detect command loss through its serial number.

#### 4.21.6.5 System Flag



**Enable Lookback of XM-2301:** XM-2301 is not defaulted with lookback function.

Choose to enable the function.

**Disable MAC and Enable PHY Pause Control:** MAC is defaulted as enabled. Choose to disable.

## 4.22 X-Trailer

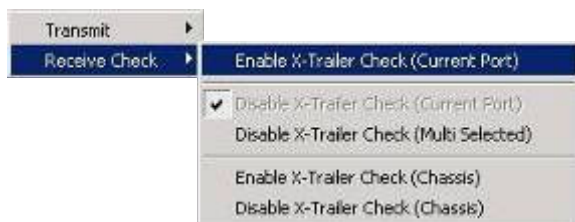


**X-Trailer** is the checksum computed on the contents of the frame from the offset through the end of the data field, inclusive. If data is corrupted by DUT and FCS is affected by the errored data, X-Trailer will serve as the checksum. Any mismatches of X-Trailer of transmitted and received packets are recorded as X-Trailer errors.

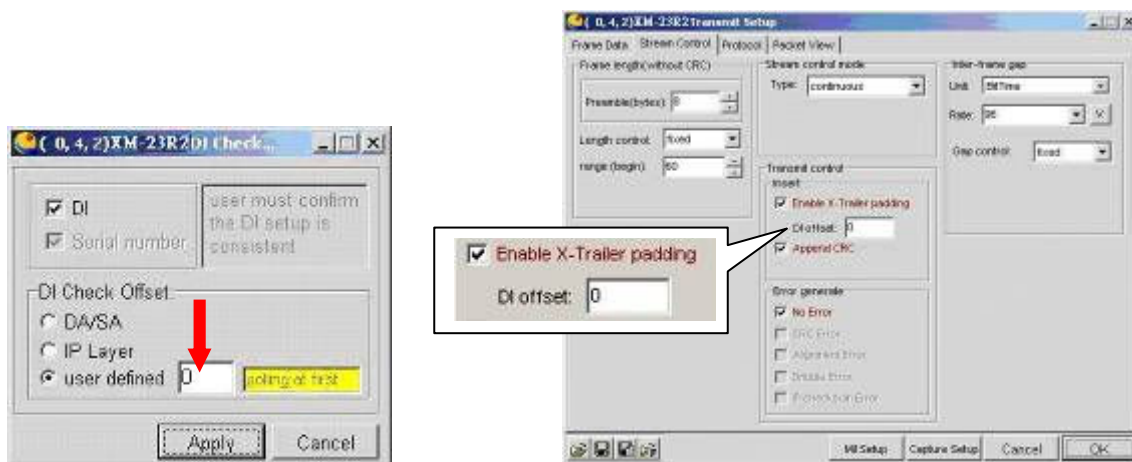
Move the cursor to the port transmitting packets with X-Trailer attached. In this case, it's (0,4,1). Choose **Enable X-Trailer Padding** for the current port.



From the **Chassis Panel**, port (0,4,1) with **Continuous(C)** and **Fixed(F)** Length mode is ready to send packets with X-Trailer attached.



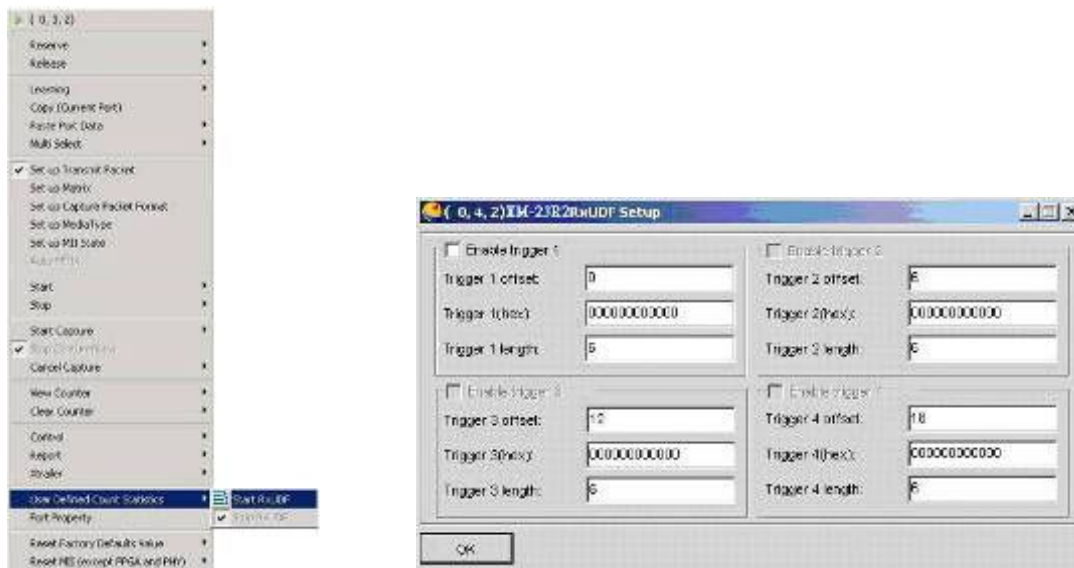
Move the cursor to the port receiving packets with X-Trailer attached. In this case, it's (0,4,2). Choose **Enable X-Trailer Check** for the port.



The **DI Check** window will appear for DI setting. The factory default value for DI is 0. Please note that the DI value set at the receive end must match the DI value set at the transmit end, which is set through the **Transmit Setup** window.

There is another approach to set DI value for transmitting and receiving packets with X-Trailer, which is set through **Browse Setup** window. Please see [4.20.3](#) for detailed instruction.

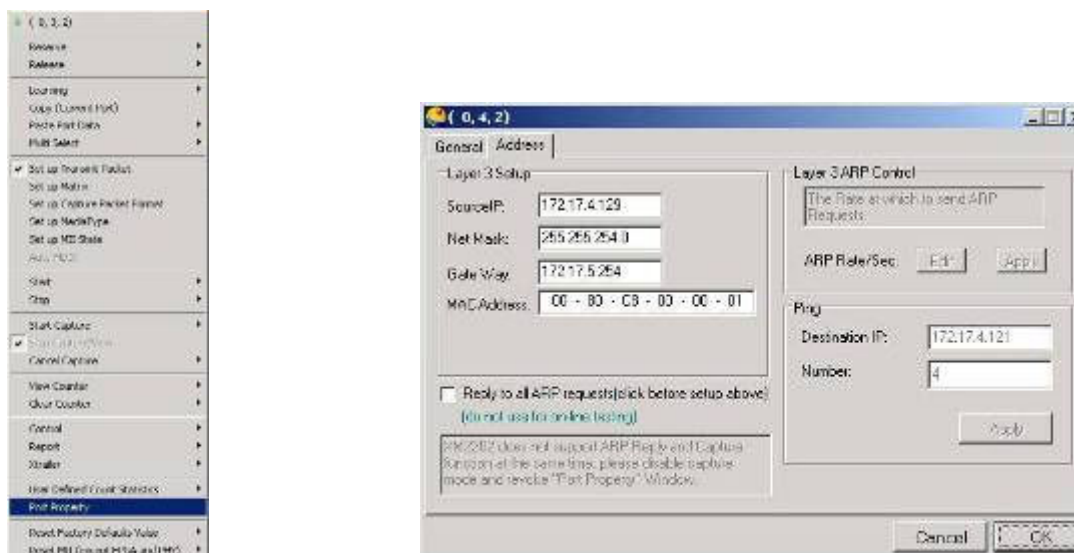
## 4.23 User Defined Counter Statistics



Choose **User Defined Count Statistics** to set up four sets of trigger/counter statistics condition at the receive end.

## 4.24 Port Property

Please note that XM-23L4(G) and XM-28L1 do not support this function.



Choose **Port Property** to click on the **Reply to All ARP Requests** to send MAC address to the enquiry client. Set the number of times for Ping transmission for Echo Request function.

## 4.25 Reset Factory Default Value



Reset the designated port as the factory default value.

## 4.26 Reset MII (except FPGA and PHY)

Please note that XM-2301G, XM-23L4, XM-23L4G and XM-28L1 do not support this function.



Choose **Reset Sending Status** to reset MII.