



Standard XM-RMQX61 Modules

QSFP-Port 40 Giga-bit Test Modules

Saving valuable time and expenses for tests of network product designs and quality control in mass-production scale, XM-RM series modules provide a flexible, reliable, and high-precision solution.

Specifically designed for NuStreams chassis (such as NuStreams-2000i and Nustreams-600i), XM-RM series modules support hot swap, multi-user operation, and Rapid-Matrix, a technology that can generate multi-stream traffic different kinds of frames/packets of almost any required protocol headers, tags and payload for each port.

XM-RM series can be divided into Standard and Professional types. The advantage of Standard XM-RM series is that there are more testing ports on each module. The cost per test port is lower for mass-production scale DUT tests. Having similar features like Professional XM-RM series, Standard XM-RM series, XM-RM series modules provide reliable DUT test results at mass-production line.

NuStreams-2000i and NuStreams-600i chassis with XM-RM series test module cards can perform synchronized tests to ensure the test precision. Also, the time consumed for all DUTs' multi-task testing will be shortened dramatically.

Along with the advanced technology mentioned above, Xtramus also provides several software applications, such as NuWIN-RM, APMPT-4, and other ongoing softwares complied with RFC-2544, RFC-2889 and etc. XM-RM series can test the network equipments in conformance, performance and stress tests.

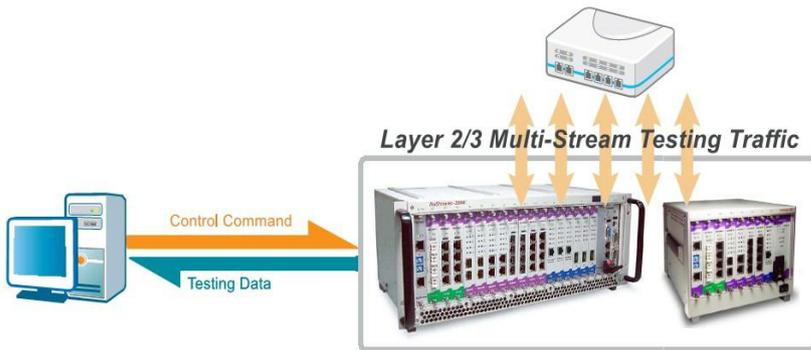


KEY FEATURES

- Support 40 Giga-bit Ethernet test equipment
- Wirespeed hardware based traffic generation and analysis
- High test performance with low-cost testing ports
- Stream based wire-speed layer 2~3 traffic load generation
- RFC 2544/2889 test suite
- Wirespeed traffic capture with programmable filter and trigger criteria
- High-precision performance measurement of throughput, latency, loss, sequence and mis-ordering error
- Remote management of testpoints
- Validation with negative and abnormal test conditions per packet byte
- Real-time statistics for each port, including transmitted/received frames for VLAN, IPv4, IPv4 fragment, IPv4 extension, ICMP, ARP, total bytes/packets, CRC, IPCS error and over-and-under size frames
- Support QSFP (Quad Small Form-factor Pluggable) ports



MAIN APPLICATIONS



- Test modules for Ethernet device.
- Test modules for network device quality control in mass production line.
- Test modules used in R&D laboratory for new product design
- Can be applied to Telecommunication room, R&D laboratory, Data center, etc.



SPECIFICATION

Model	XM-RMQX61
Interface	QSFP (Quad Small Form-factor Pluggable) × 1
LED Indicator	SYS, Link/Tx (Link/Transmitting), Rx/Err (Receiving/Error), Capture, X-TAG
Speed & Mode	40 Giga bits
Frame Length	Tx Packet Length: 48 ~ 2Kbytes
Payload	<ul style="list-style-type: none"> • Burst Mode: User-defined pattern, User-defined raw data, Random • Rapid-Matrix Mode: User-defined pattern: Byte Increase/Decrease, Word Increase/Decrease, 8'0 8'1, 16'0 16'1, 32'0 32'1, 64'0 64'1, Random. (Bit is presented by 0 or 1. 8'0 means 8-bit 0, 8'1 means 8-bit 1.)
Data Integrity/Sequence	<ul style="list-style-type: none"> • 2nd level CRC check function independent from standard CRC • Sequence miss check and frame loss check by X-TAG
BERT Test	Support Layer 2 BERT Test
Error Packet Generation	CRC (Good/Bad/None), Undersize, Oversize, Alignment Error, Dribble Error, IP Checksum Error
Hardware Counters	<p>Port-based Statistics Counters:</p> <ul style="list-style-type: none"> • Tx Counters per Port: Frame Count, Byte Count, Pause Frame Count, Collisions, Single Collision, Multiple Collision, Excess Collision, Tx ARP/ICMP Request/Reply • Rx Counters per Port: Valid Rx Frame Count, Valid Rx Byte Count, Broadcast Frame Count, Multicast Frame Count, Unicast Frame Count, Pause Frame Count, VLAN Tagged Frame Count, IPv4 Frame Count, Rx ARP/ICMP Request/Reply, RMON counters, Alignment Error, Dribble Error, Undersize, Oversize, CRC Error, Data Integrity Error, IP Checksum Errors • Tx / Rx Rate Counter: Tx/Rx Packet Rate, Tx/Rx Line Rate, Tx/Rx Utilization
Streams Counter	<p>Advanced Stream-based Statistics Counters:</p> <ul style="list-style-type: none"> • Tx Stream Counter Set: 32 (2Kbytes) sets by Rapid Matrix, and supports up to 512 (128Byte) sets • Tx Counters per Stream: Frame Count, Byte Count • Rx Stream Counter Set: 1 group of 256 sets USC (Universal Stream Counter) per port • Rx Counters per Stream: Frame Count, Byte Count, Frame Loss, Sequence Miss, IP Checksum Error, Latency <p>USC (Universal Stream Counter) are packet filtering rules based on:</p> <ul style="list-style-type: none"> ➢ DA (Destination Address) ➢ SA (Source Address) ➢ VID (VLAN ID) ➢ MPLS ➢ DIP (Destination IP) ➢ SIP (Source IP) ➢ D Port (Destination Port) ➢ S Port (Source Port) ➢ VLAN CoS (Class of Service)
Capture Criteria	<p>SDFR (Self-Discover Filtering Rules) technique is able to capture packets by different criteria in either a unique value or a range of values by user-friendly UI.</p> <ul style="list-style-type: none"> • MAC Layer Event • Network Layer Event • SDFR Pattern (set) • 2nd level CRC
Transmit Mode	<ul style="list-style-type: none"> • Single Mode • Continuous Mode • Burst Mode • Transmitting-by-time Mode
Software Support	<ul style="list-style-type: none"> • NuWIN-RM: Virtual control suit for NuStreams chassis • APMPT-4: Advanced all-purpose mass production test • NuApps-MultiUnits-RM: Test suit for multi users • NuApps-2544-RM: Test suit based on RFC 2544 and RFC 1242 • NuApps-2889-RM: Test suit based on RFC 2889 and RFC 2285 • NuCommander: Hardware control (voltage, fan speed, and temperature) of NuStreams chassis
Miscellaneous	<ul style="list-style-type: none"> • Support cross-module latency test • Support global command • Different ports can be shared by different users • Support jumbo frame • Support hot swap



TECHNICAL TERMS

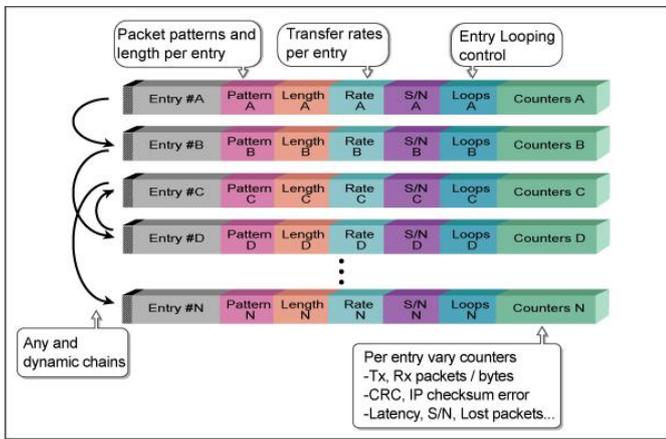
Rapid-Matrix

Rapid-Matrix, specifically designed for generating multi-stream traffic per port simultaneously, is used to verify functions and performance of Ethernet devices/solutions /networks.

Features & Advantages

- **Generate up to 64 Streams Per Port**

Rapid-Matrix consists of 64 individual entries for each port. Each entry has independent settings for a unique data stream. Multiple entries can be correlated to compose a complicated data streams.



- **Flexible/Versatile Protocol Support**

Rapid-Matrix supports various network protocol headers/ tags defined based on testing requirements in order to create multi-stream testing traffic.

- **Flexible Packet Length and User Define Pattern**

In order to meet advanced/complex testing requirements, jumbo frames are also supported by Rapid-Matrix for packet generation.

The packet length generated by the same Rapid-Matrix entry can range from 48 bytes to 2K bytes. Other than defined headers/ tags, the rest of packet is filled up with selected patterns based on testing requirements.

- **Configuring Settings Online Dynamically**

All settings regarding to Rapid-Matrix entries can be changed under Rapid-Matrix's transmission mode. Therefore, it is possible to modify bandwidth and traffic simultaneously during transmitting.

- **Dynamic Multi-stream Traffic Generation**

In real network traffic, different data streams' packet sequence is changing dynamically. In other words, each data stream's loading is a very important factor to be managed in order to verify the function/ performance of DUT.

The module card generates dynamic variations of test traffic, and each stream's bandwidth can be controlled individually based on testing requirements.

- **Transmission Statistics per Entry**

For generating multi-stream traffic, information regarding to statistics in every stream is very important. Rapid-Matrix supports the following statistics functions per entry:

- Total transmitted packet count
- Total transmitted byte
- Transmitting packet rate (packets/sec.)
- Transmitting byte rate (bytes/sec.)

Comparing statistics regarding to packets generated by Rapid-Matrix and statistics from receiving ports can help users analyzing how DUT handles the multi-stream traffic.

SDFR

SDFR (Self-Discover Filtering Rules) is a technology that makes capturing or filtering over Ethernet easy and convenient.

- User- friendly interface that display values such as source IP, destination IP and other criteria for filtering. All these values can be input directly without calculating mask.
- SDFR value for capture or filter includes several network protocols (such as TCP, UDP, FTP, OSFP...), various frame length (oversize, undersize), and various frame/packet types (CRC error, IP checksum error...).
- SDFR values can be a single value or a range of values between specified values. All packets that fit the value will be captured.
- Multiple filter condition can be activated easily simply by clicking different options.
- Displaying captured packet in real-time while the network is still running.
- Value of SDFR and filter condition can be changed dynamically during capture procedure.
- Displaying captured packet in real-time while the network is still running.

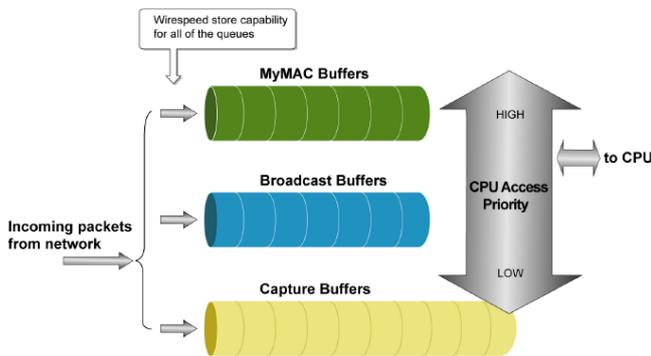


RxHost

RxHost: Smart Function for receiving packet.

- Received packets are divided into different priorities for different buffers. MyMAC packets with destination addresses have higher priority on the receiving side.
- Incoming packets are stored in separated buffer so the system can keep receiving important packets (such as ARP, Ping, and etc.) even the buffer itself is overflowed with broadcast packets.
- Received packets can be captured for applications or stored in buffer for other purposes at the same time.

Host Priority Queues



Streams Counter

This counter is the statistics of multi-stream traffic. Counters for each individual stream in a single port are very essential data to analyze performances of DUT's multi-stream traffic. The streams counters are based on X-TAG and VLAN for each port. The system shows its related counters (such as Packet counts, Bytes, S/N Error, Packet Loss, Latency and Transmission Rate (Mbps)) as illustrated below.

X-TAG Streams Counter

Streams Counter (per network port)							
Transmitting Side							
Transmit Streams	Packets	Bytes					
N'	2,445	500,991					
N'+1	90,343	7,103,151					
N'+2	88,672	8,092,043					
.....							
Receiving side							
Received Streams	Packets	Bytes	S/N Error	Packet Loss	Source port information	Latency	Rate (Mbps)
N'	9,320	710,573	13	0	Slot=2 Port=1	3.2 us	1.3
N'+1	41,117	5,900,988	3	1	Slot=8 Port=1	4.5 us	17.2
N'+2	15,095	18,678,003	87	21	Slot=9 Port=2	4.4 us	25.8
.....							

Features & Advantages

➤ Wirespeed Performance:

The performance of Multi-stream Counter can support up to wirespeed (100% utilization of Gigabit Ethernet traffic). Receiving frames are processed in real time.

➤ Flexible Protocols Support:

Several often-used protocols (like VLAN ID) are served as pre-defined patterns for Multi-stream Counter's trigger conditions. Multi-stream Counter also supports user-defined patterns by SDFR. Proprietary protocols or private headers/tags can also be triggered by Multi-stream Counter based on user- SDFR.

➤ Pre-filtering to Trigger Designated Packets:

Multi-stream Counter can correlate with filtering. Incoming packets will be filtered first. Only packets meet filtering settings are forwarded to Multi-stream Counter. Filtering options are very flexible in order to meet different testing requirements. Several default parameters are available for frequently-used protocols such as IPv4 and etc. User defined triggers are also supported for custom testing requirements

Features & Advantages of X-TAG Stream Counter:

➤ Real-Time Hardware-generated Statistics:

All statistics are provided by hardware instead of software, making real-time network statistics possible.

➤ Real-time Statistics for Individual Stream:

The information provided by X-TAG SC is real-time statistics for the target data streams. Instead of getting the final statistics at the end of the test, X-TAG SC is capable of providing real-time statistics of individual stream for each port in every second during testing process. This feature helps when analyzing any dynamic changes of target data streams.

➤ Sequence Miss and Packet Loss Check:

Sequence number is embedded in X-TAG generated by Rapid-Matrix. X-TAG SC uses this to check any sequence miss or packet loss occurrences for each individual stream.

➤ Latency Measurement:

X-TAG SC can analyze data carried by X-TAG in the receiving frames of designated data streams for Latency Measurement.



REQUIREMENTS

The XM-RM series modules are specifically designed to support NuStreams-2000i and NuStreams-600i.



NuStreams-600i Chassis

- **Slot:**
7-slot for test modules
- **Connectors:**
Power: AC 90~240V
Ethernet: RJ-45 10/100 Mbps
- **Dimensions:**
237 mm x 220 mm x 192 mm



NuStreams-2000i Chassis

- **Slot:**
16-slot for test modules, plus installed IPC
- **Connectors (on IPC):**
Power: AC 90~240V
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 port x 2
- **Dimensions:**
295 mm x 485 mm x 196 mm



ORDER INFORMATION

Standard Type Modules

- XM-RMQX61 module card

Chassis

- NuStreams-2000i
- NuStreams-600i

CONTACT INFORMATION

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