xtramus

NuStreams-900
User's Manual

Foreword

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Revision History

Date	Version	History
2024/4/11	1.0	First draft version

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1. NuStreams-900 Overview

1.1. NuStreams-900 General Description

Built on open software platform and a highly scalable architecture, **NuStreams-900** is highly flexible and its functionality and applications can be enhanced by applying software upgrade or adopting new test modules.

NuStreams-900 provides various interfaces for different testing requirements. Also, all slots of NuStreams-900 support hot-swapping. Therefore, swapping or changing test modules can be done easily without powering off NuStreams-900.

There is an optional module - CKM, it has GPS chip for clock synchronization between chassis and chassis, so NuStreams-900 can measure the latency between different places.

To provide a safe and reliable testing environment, NuStreams-900 has sensors embedded inside. Vital system information such as system temperature, rotation speed of the fans and system voltage can be picked up by these embedded sensors. This information can be read and interpreted by the web service running on management card, and the management card will alarm users when system failures occur. Furthermore, NuStreams-900 has new mechanism design, it's more convenient to replace the cooling fan, so NuStreams-900 became easier to maintain.

With cards of different types installed, NuStreams-900 chassis can perform multiple, different tests simultaneously to ensure the test precision. As the result, the time consumed for all DUTs' multi-task testing will be shortened dramatically.

1.2. Key Features of NuStreams-900

- Intuitive utility software for monitoring system temperature and the fan speed

- All slots support hot-swapping

- Performing synchronized tests between module cards

- Supporting multi-user mode, namely multiuser using the chassis and cards installed simultaneously

- Utility software provided by Xtramus Technologies which can analyze the test results and DUT performance with intuitive GUI interface.

- Cards supporting different Ethernet transferring rate, from 10M to 100G

- Simple and easy-to-understand system status LEDs

- Replaceable fan tray

- Utility softwares that complied with RFC-2544, RFC-2889 and RFC-3918.

1.3. Main Applications

- Performance validation and analysis of DUT in mass production line

- Troubleshooting of DUT in the lab

- Production testing and quality assurance during manufacturing process of network products


NuStreams-900 block diagram
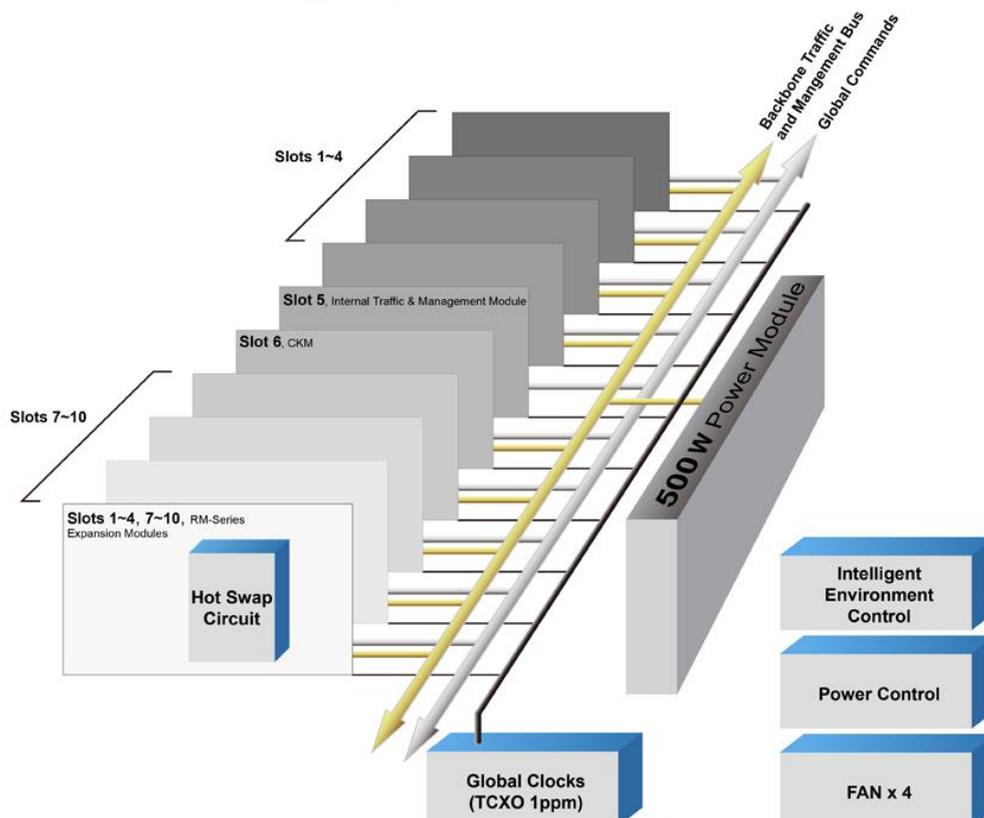
2. NuStreams-900 Functions and Structure Overview

2.1. Structure Overview
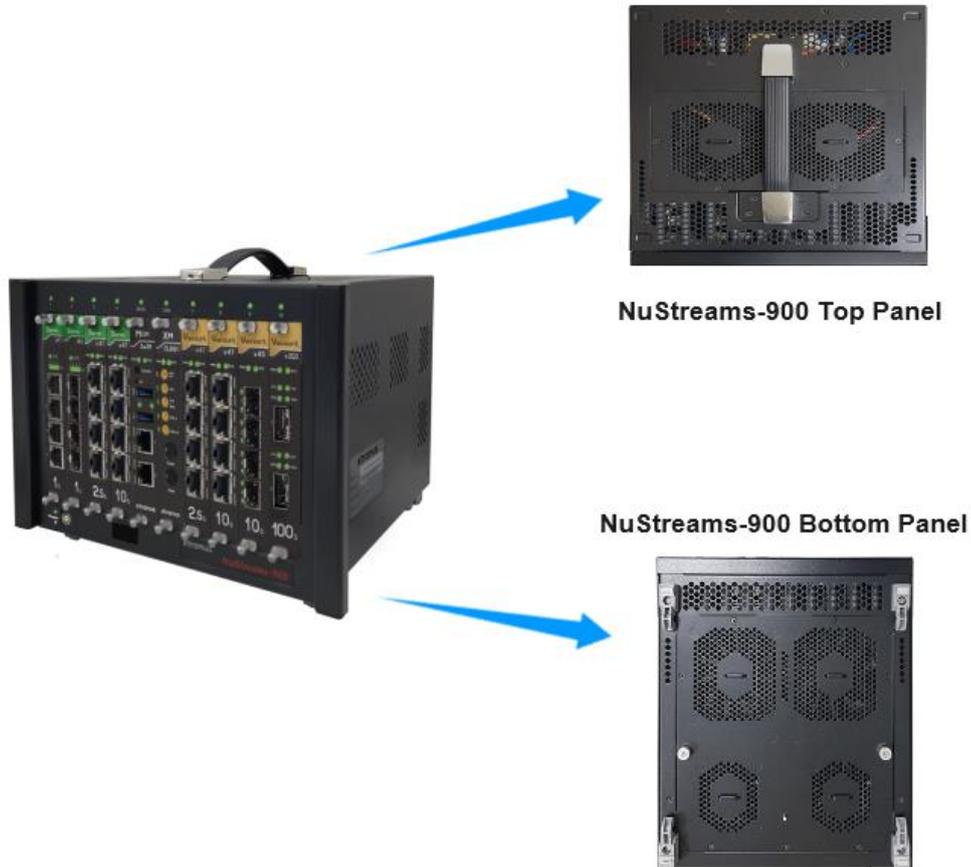
NuStreams-900's outer case is dedicatedly designed in its **Front Panel**, **Top Panel** and **Bottom Panel**.
The figure above shows the outer case of NuStreams-900.

NuStreams-900 Outer Case Overview	
Front Part	NuStreams-900 has 8 slots for installation of module cards, where each module card provides streams generating platforms for different types of media. Besides, the Front Part includes 2 slots(5th and 6th slots) with system and clock synchronization module card installed, which should not be withdrawn.
Top Panel	On the top cover of the chassis, a plastic handle is set up for the convenience of carrying it around. And replaceable fans are attached on the downside of the cover.
Bottom Panel	Replaceable fans are attached on the upside of the cover.

2.2. Module Cards

NuStreams-900's module cards can be divided into 2 categories: **System Module Cards** and **Test Module Cards**.

Module Card Type	Module Card	Description
System Module Cards	• MGM-3s3A • CKM	MGM-3s3A is the system management module of NuStreams-900. CKM is an optional module, it has GPS chip for clock synchronization between chassis and chassis **Note**: System Module Cards do not support hot-swap, and must be installed to their designated slots on NuStreams-900 chassis.
Test Module Cards	• XM-RM Series • Viscount/Baron Series	Test Module cards for Packets sending/receiving. These Test Module cards can be installed in NuStreams-900 support hot-swap.

The **MGM-3s3A** comes with your NuStreams-900 chassis, and shall be installed on the **5th** slot of NuStreams-900 chassis. MGM-3s3A allows you to connect your NuStreams-900 to your PC.

Interface Ports	
Console Port	RJ45 console port of 115200 baud rate for debugging.
WiFi Port	Install WiFi module.
USB Port	Connect external USB storage device to upgrade the chassis and modules.
Mgm Port	10/100/1000M Mbps RJ45 x 2 for management.
LED	
SYS	Yellow ON: MGM-3s3A is booting and preparing for test
	Green ON: MGM-3s3A is booting properly and is ready for test
PWR	Power status.
WiFi	Displays the status of the WiFi module.
USB	Displays the status of the USB Port.
Speed	Link speed of management port.
Lk/Act	Display the link status between PC and NuStreams-900.
Button	
R2d	Restore all settings to default

*Note: Please do not draw the MGM-3s3A module card from NuStreams-900 chassis when the system is power on.

3. NuStreams-900 Installation

As cited above, NuStreams-900 is a chassis with 8 slots for installation of module cards. Installing NuStreams-900 is very easy and simple: all you have to do is to plug the proper fiber/UTP cables into NuStreams-900 ports. Selecting the proper physical media and applications in your network environment is crucial when installing NuStreams-900. Besides, using the proper method for installing module cards into NuStreams-900' slots is also crucial for the proper functionality of NuStreams-900. Please see the sections down below for detailed information regarding to physical media types and the proper method for installing a module card.

3.1. Choices of UTP Cable and Optical fiber

3.1.1. 10GBASE-T (Copper Wire)

10GBASE-T, or IEEE 802.3an-2006, is a standard released in 2006 to provide 10 gigabit/second connections over unshielded or shielded twisted pair cables and over distances up to 100 meters (330 ft). 10GBASE-T cable infrastructure can also be used for 1000BASE-T, allowing a gradual upgrade from 1000BASE-T, and auto-negotiation to select which speed to use.

10GBASE-T Connectors
10GBASE-T uses 650 MHz versions of the venerable IEC 60603-7 8P8C (RJ-45) connectors, which is already widely used in Ethernet.

10GBASE-T Cables
10GBASE-T works up to 55 m (180 ft) with existing Category 6 cabling. In order to allow deployment at the usual 100 m (330 ft), the standard uses a new partitioned Category 6a cable specification, designed to reduce crosstalk between UTP cables.

The table down below is a reference regarding to UTP cable categories.

UTP Cable Categories References	
Cat 5	Provides performance of up to 100 MHz, and was frequently used on 100 Mbps Ethernet networks. Cat 5 may not be suitable for 1000BASE-T gigabit Ethernet.
Cat 5e	Provides performance of up to 100 MHz, and is frequently used for both 100 Mbps and Gigabit Ethernet networks.
Cat 6	Provides performance of up to 250 MHz, more than double of category 5 and 5e. It works up to 55 m (180 ft) for 10Gbps Ethernet.
Cat 6a	Provides performance of up to 500 MHz. It is suitable for 10GBASE-T and works up to 100 m (330 ft) for 10Gbps Ethernet. All the cables mentioned above do not have individually- shielded pairs as the picture here, including Cat 6a.
Cat 7	This standard specifies four individually-shielded pairs (STP) inside an overall shield. Designed for transmission at frequencies up to 600 MHz. It has better performance than Cat 6a.
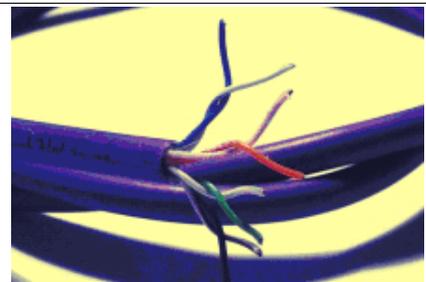
3.1.2. 10GBASE-R (Optical Fiber)

10GBASE-R is 10Gbps Ethernet connection that based on IEEE802.3ae. It uses fiber as transmission media with different specification of fiber, connector and transceiver. MCS-2160 uses two standards, 10GBASE-LR and 10GBASE-SR.

10GBASE-SR

10GBASE-SR ("Short Range") uses 64B/66B encoding and 850 nm wavelength lasers. It is designed to support short distances over deployed multi-mode fiber cabling, it has a range of between 26 meters (85 ft) and 82 meters (270 ft) depending on cable type. It also supports 300 meters (980 ft) operation over new, 50 μm 2000 MHz·km OM3 multi-mode fiber (MMF).

The transmitter can be implemented with a VCSEL (Vertical Cavity Surface Emitting Laser) which is low cost and low power. MMF has the advantage of having lower cost connectors than SMF (single-mode fiber) due to its wider core.

10GBASE-SR delivers the lowest cost, lowest power and smallest form factor optical modules.

10GBASE-LR

10GBASE-LR ("Long Range") is a Long Range Optical technology delivering serialized 10 gigabit Ethernet over a laser with 1310 nm wavelength connection on single-mode fiber via IEEE 802.3 Clause 49 64B-66B Physical Coding Sub layer (PCS) using a line rate of 10.3125.

Single-mode optical cabling is used to interconnect transceivers at a distance spaced at 10 kilometers (6.2 mi), but it can often reach distances of up to 25 kilometers (16 mi) with no data loss.

Fabry–Pérot lasers are commonly used in 10GBASE-LR optical modules. Fabry–Pérot lasers are more expensive than VCSELs (mentioned above) but their high power and focused beam allow efficient coupling into the small core of single mode fiber.

Fiber Specification

Fibers which support many propagation paths or transverse modes are called multi-mode fibers (MMF). Fibers which can only support a single mode are called single-mode fibers (SMF). Multi-mode fibers generally have a larger core diameter, and are used for short-distance communication links and for applications where high power must be transmitted. Single-mode fibers are used for most communication links longer than 200 meters.

Fiber Buffer/Jacket Color	Meaning
Yellow	Single-mode optical fiber, long distance connection
Orange	Multi-mode optical fiber, short distance connection

Optical Fiber

As mentioned above, there are Single-mode and Multi-mode optical fiber. Both of them can be used for NuStreams module's fiber port.

Fiber Connector

Optical fiber connector contains two ends of fibers and can attach to SFP+ transceivers. There are two ports for one SFP+ transceiver: one fiber is for receiving and one fiber is for transmitting. The picture here is called LC connector that can attach to SFP+ transceiver.

Transceiver (Connector)

SFP+/XFP Transceivers can be plugged into NuStreams module's SFP+/XFP Ports. SFP+/XFP Transceivers are active components that consume power from NuStreams module and are capable of converting signals between optical data flow and electronic data flow.

For different transmission purpose, the component inside SFP+ form factor can be 10BASE-LR or 10BAST-SR mode.

3.2. Hardware Installation

Please follow the steps shown below for a better understanding on how to install hardware in NuStreams-900.

3.2.1. Bracket installation

Steps for installing a Bracket in NuStreams-900	
	First of all, you must have an Empty Slot for the Installation of a Bracket.
	Attach the Bracket's screw end on the internal Chassis' screw holes, and lock the screw on the screw hole. Note: we advise to use brackets to close the unused slots of the NuStreams-900 for internal protection.

3.2.2. Module Cards Installation

| Steps for installing a module card in NuStreams-900	
	Aim the border side of a XM-RM Module Card with the NuStreams-900 internal slide road, and push this module card into the NuStreams-900.
	Please, make sure if the Module Card is well fixed into NuStreams-900 by pushing the bracket of the module card into NuStreams-900.

3.3. Software Connection

MGM-3s3A embedded the NuServer program, before connect to NuStreams-900 with any software, please check PC's IP, subnet mask, and gateway addresses according to NuStreams-900's IP address. The default IP address of NuStreams-900 is **192.168.1.8**.

When you start a software to connect to NuStreams-900, please select **Remote**, then choose or input the NuStreams-900's IP address.
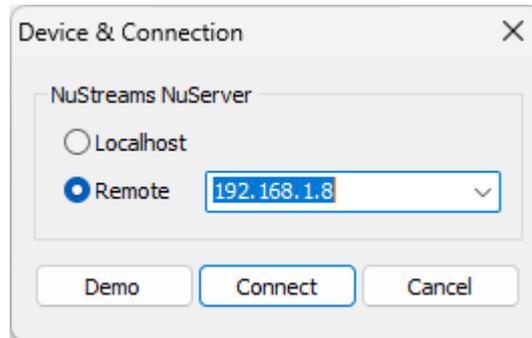
＊**Note: The IP address in the figure above is only example, and your NuStreams-900's IP address may have been**

modified.

4. Replace Fans

The fans for cooling the chassis attached to the Top & Bottom Panel are easily to replace.

4.1. Replace Top Panel Fans

Steps of replacing the top panel fans of NuStrams-900 are as follows:

1. Loosen the screws on the top cover with a cross screw driver.
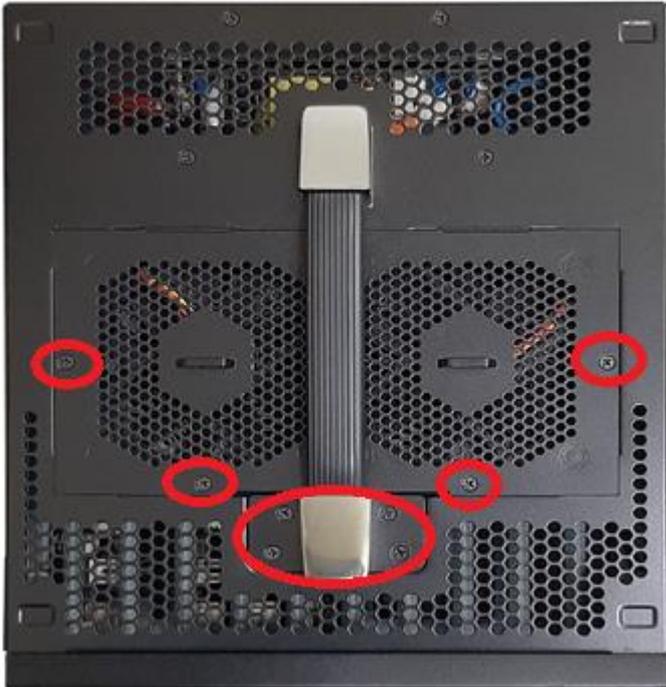

2. Open the top cover.

3. Carefully pull out the connectors of the fans.

4. Loosen the four screws of the deficient fan and replace it with a new one.
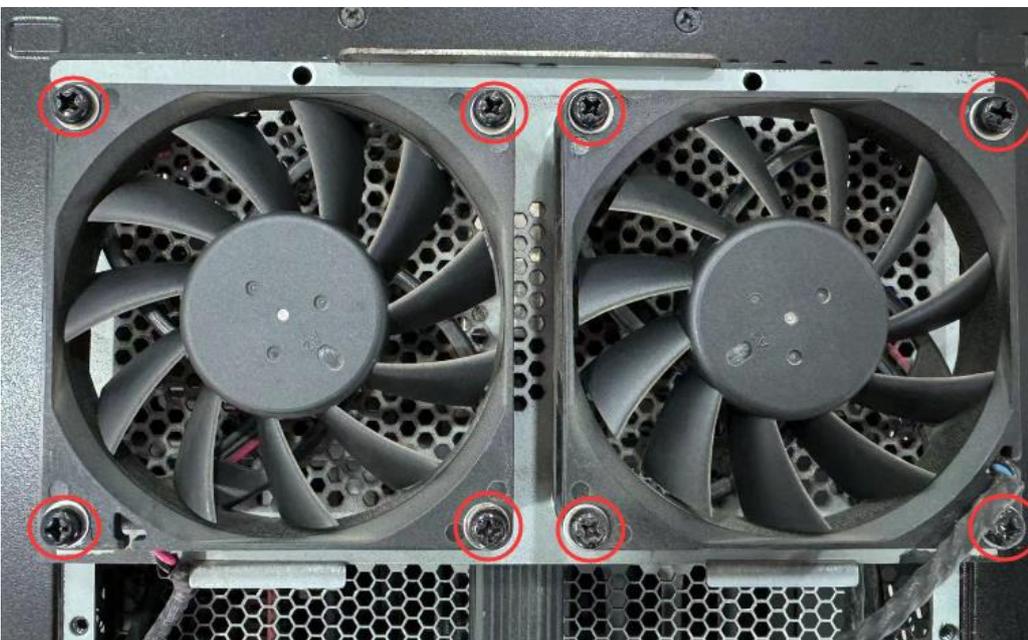
5. Plug the connectors of the fans into the jacks.

6. Fasten the screws on the top cover with a cross screw driver.

4.2. Replace Bottom Panel Fan

Steps of replacing the bottom panel fans of NuStrams-900 are as follows:

1. Loosen the screws on the bottom cover with a cross screw driver.

2. Open the Bottom Panel

3. Loosen the four screws of the deficient fan and replace it with a new one(only the 2 big fans can be replaced by user).

4. Plug the Bottom Panel back. There is a cylinder that can help user assemble.

5. Fasten the screws on the bottom cover with a cross screw driver.

5. NuStreams-900 Web Management

MGM-3s3A also embedded a configuration webpage, and can be accessed by connecting the management port to the network which your PC is connected to.

Before accessing to NuStreams-900's configuration webpage with PC's web browser, please check PC's IP, subnet mask, and gateway addresses according to NuStreams-900's IP address. The default IP address of NuStreams-900 is **192.168.1.8**.

To access NuStreams-900's configuration webpage, please open web browser, and type in NuStreams-900's IP address in web browser's URL field.
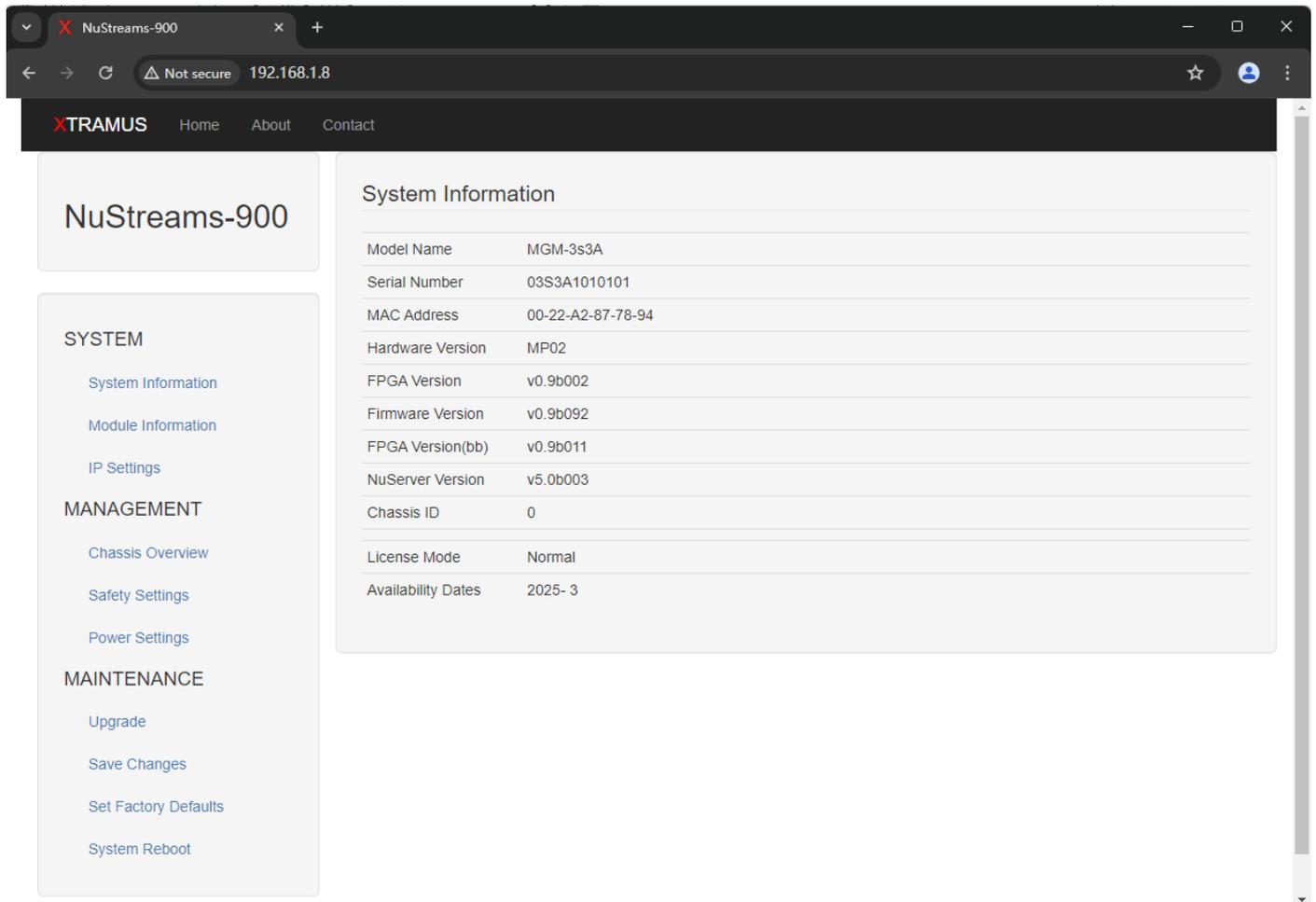
5.1. NuStreams-900 Webpage - System

5.1.1. System Information

System Information displays NuStreams-900's system information including:

System Information	
Model Name	The management module's name(MGM-3s3A).
Serial Number	MGM-3s3A's serial number.
MAC Address	MGM-3s3A's MAC address.
Hardware Version	MGM-3s3A's PCB version.
FPGA Version	MGM-3s3A's current FPGA version.
Firmware Version	MGM-3s3A's current firmware version.
FPGA Version(bb)	NuStreams-900 backboard's current FPGA version.
NuServer Version	NuServer's version.
Chassis ID	NuStreams-900's chassis ID.
License Mode	NuStreams-900' hardware license mode.
Availability Dates	NuStreams-900' hardware license availability date.

5.1.2. Module Information

NuStreams-900

SYSTEM
  System Information
  Module Information
  IP Settings

MANAGEMENT
  Chassis Overview
  Safety Settings
  Power Settings

MAINTENANCE
  Upgrade
  Save Changes
  Set Factory Defaults
  System Reboot

Module Information

Slot No.	Module Name	Firmware Version	FPGA Version	PROM Version	PCB Version	Lock Status	Serial Number	MAC Address
Slot.1	Viscount x4TB	v0.9b089	v1.0b026	v1.0b033	MP01	UnLock	0XX4TB000515	00-22-A2-09-80-20
Slot.2	XM-RM731	v1.9b030	v3.0b016	v1.6b011	MP05	UnLock	0KNSRM731122	00-22-A2-04-81-22
Slot.3	XM-RM781	v1.9b042	v4.2b000	v1.6b011	MP07	UnLock	0MNSRM783230	00-22-A2-06-94-B0
Slot.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Slot.7	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Slot.8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Slot.9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Slot.10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Module Information displays the test module's information.

Module Information	
Slot No.	The slot number of NuStreams-900.
Firmware Version	The test module's current firmware version.
FPGA Version	The test module's current FPGA version.
PROM Version	The test module's current PROM version.
PCB Version	The test module's PCB version.
Lock Status	The test module's lock status(lock or unlock).
Serial Number	The test module's S/N.
MAC Address	The test module's MAC.

＊Note: If there's no test module in the slot, all the information will be "n/a".

5.1.3. IP Settings

IP Setting allows you to set how NuStreams-900 will acquire its IP, subnet mask, and gateway addresses. Also, you could input these addresses manually here.

IP Settings	
Mode	You can choose how NuStreams-900 acquires its IP, subnet mask, and gateway addresses. There are two modes available: • **Static:** You have to input NuStreams-900's IP, subnet mask, and gateway addresses manually in the fields down below. • **DHCP:** NuStreams-900 acquires its IP, subnet mask, and gateway addresses automatically from network's DHCP server.
IP Address	You can input NuStreams-900's IP address here in this field.
Subnet Mask	You can input NuStreams-900's subnet mask here in this field.
Gateway	You can input NuStreams-900's gateway address here in this field.
Apply	Apply the changes you've made here.

＊**Note: The settings in the figure above are only examples, and might not work with your network environment.**

5.2. NuStreams-900 Webpage – Management

5.2.1. Chassis Overview

This page displays the link status and lock status of the modules installed in NuStreams-900 chassis.

The page is shown as below.

5.2.2. Safety Settings

This page is used to set a temperature threshold. If the current temperature of NuStreams-900 exceeds this value, the buzzer in the chassis will beep.

NuStreams-900

SYSTEM

System Information

Module Information

IP Settings

MANAGEMENT

Chassis Overview

Safety Settings

Power Settings

MAINTENANCE

Upgrade

Save Changes

Set Factory Defaults

System Reboot

Safety Settings

Please enter a temperature threshold for safety of the device!

Temperature Threshold (°C) 75

Apply

5.2.3. Power Settings

This page is used to control the power for each slot, swapping or changing test modules can be done easily without powering off NuStreams-900.

NuStreams-900

SYSTEM

System Information

Module Information

IP Settings

MANAGEMENT

Chassis Overview

Safety Settings

Power Settings

MAINTENANCE

Upgrade

Save Changes

Set Factory Defaults

System Reboot

Power Settings

Choose slots for power setting...

Slot	1	2	3	4	5	6	7	8	9	10
Status	Off	On	On	Off	On	On	On	On	Off	On
On/Off	☐	☑	☑	☐	☐	☐	☑	☑	☐	☑

Apply

Power Settings	
Slot	The slot number of NuStreams-900.
Status	The current status of power for each slot.
On/Off	You can set the power of the slot by click the check box.
Apply	Apply the changes you've made here.

5.3. NuStreams-900 Webpage - Maintenance

4 options are available in the **Maintenance** configuration webpage: **Upgrade**, **Save Changes**, **Set Factory Defaults**, and **System Reboot**.

5.3.1. Upgrade

NuStreams-900

SYSTEM

    System Information

    Module Information

    IP Settings

MANAGEMENT

    Chassis Overview

    Safety Settings

    Power Settings

MAINTENANCE

    Upgrade

    Save Changes

    Set Factory Defaults

    System Reboot

Upgrade

Bin Type	Firmware
Choose From	PC
Select File	File...

Apply

Management Card

Single Daughter Board

Multi Daughter Boards

Upgrade	
Bin Type	You can upgrade management module(MGM-3s3A) and test module's firmware/FPGA in this page.
Choose From	You can choose upgrade files from local PC or MGM-3s3A's external USB driver.
Select File	Click the button to choose the firmware/FPGA file you would like to upgrade. NuStreams-900's firmware/FPGA files are in the format of "**.bin**".
Apply	Click this button to start upgrading.

*Note: After upgrade the firmware, the settings will be set to factory default value.

5.3.2. Save Changes

NuStreams-900

SYSTEM

System Information

Module Information

IP Settings

MANAGEMENT

Chassis Overview

Safety Settings

Power Settings

MAINTENANCE

Upgrade

Save Changes

Set Factory Defaults

System Reboot

Save Changes

The device configuration will be saved to Non-volatile RAM !

Save

Save Changes	
Save	If you don't save the setting you've made via NuStreams-900's configuration webpage, all settings will be erased after rebooting NuStreams-900. Please click the "**Save**" button to save the settings to NuStreams-900's NV-RAM.

5.3.3. Set Factory Defaults

NuStreams-900

SYSTEM

System Information

Module Information

IP Settings

MANAGEMENT

Chassis Overview

Safety Settings

Power Settings

MAINTENANCE

Upgrade

Save Changes

Set Factory Defaults

System Reboot

Set Factory Defaults

System will restore all settings to default settings! All data
and previous settings will be lost after restore to default settings.

Restore

Set Factory Defaults	
Restore	You can set all NuStreams-900's settings to the default value by clicking the "**Restore**" button.

5.3.4. System Reboot

System Reboot	
Reboot	You can reboot NuStreams-900 by clicking the "**Reboot**" button. Please note that all unsaved settings will be lost after system reboot.