# NuTAP-311

## NuTAP-311 OVERVIEW

**NuTAP-311** is a portable network TAP device. Embedded with **2 Network Ports** and **2 Monitor Ports**, **NuTAP-311** can monitor and redirect any data streams flow through it.

Network TAP is a hardware device/software that allows monitoring data flows in a network environment dynamically without any interference.

As mentioned above, **NuTAP-311** is embedded with **2 Network Ports** and is capable of monitoring all data flows between two network points. All data traffic flows between NuTAP-311's **Network Port A0** and **A1** can be brought out for further analysis and research dynamically and without intervening network environment.

**NuTAP-311** is embedded with **4 Configuration Buttons** and **4 Operation Buttons**, allowing users to configure test criteria and make NuTAP-311 system settings. Also, the LCD screen located on NuTAP-311's front panel makes it easy to view test statistics and system information easily.

Also, you can configure test criteria and make NuTAP-311 system settings with **Web Browser** (by connecting NuTAP-311's **Management Port** to a network where a PC is located), **HyperTerminal** (by connecting NuTAP-311's **Console Port** to PC's Serial Port via a RJ45-to-USB cable), and **NuSet-MiniTAP** (by connecting NuTAP-311's **Mini-USB Port** with PC's USB Port).

**NuTAP-311** is a compact, lightweight, and highly cost-effective device that provides **3** different filters for users to choose: **Forwarding Filter**, **Re-Direct Filter**, and **Capture Criteria**. All these filters are powered by Xtramus **SDFR (Self-Discover Filtering Rules)**, which makes packet capturing/filtering over Ethernet easy and convenient.


## KEY FEATURE OF NuTAP-311

- Filter and redirect TAP streams to monitor port by **SDFR** technique which can ease the loading of monitor PC
- **SDFR (Self-Discover Filtering Rules)**, a set of filtering rules including Destination Address, Source Address, VLAN, Destination IP, Source IP, Destination Port, and Source Port
- **2 Network Ports** and **2 Monitor Ports** of **10/100/1000 Mbps** RJ45 Ethernet port
- 1 **Management Port** which allows users to make system management/test settings and view test statistics via **Web Browser**
- 1 **Console Port** which allows users to make system management/test settings and view test statistics via **HyperTerminal**
- 1 **Mini-USB Port** which allows users to configure test variables, access test results, and upgrade firmware/FPGA via **NuSet-MiniTAP**
- Both Network Ports support **Universal Stream Counter (USC)**, each USC can contain up to 256 sets of statistics (up to 48-bits) including Packets, Bytes, Packet Broadcast, CRC Error, IPCS Error, Packet Multicast, and Transferring Rate
- **NuSet-MiniTAP**, a utility software designed for NuTAP-311 and runs under Windows® environment. When connecting NuTAP-311 with your PC via a Mini USB cable, it allows users to:
  - Upgrading NuTAP-311's firmware and FPGA
  - Monitoring data flows in the network environment
  - Configuring test settings and accessing test results
  - Setting 2 sets of Session Filter including Port A → Port B and Port B → Port A
  - Setting SDFR (Self-Discover Filtering Rules). SDFR is a set of filtering rules including Packets, Bytes, Packet Broadcast, CRC Error, IPCS Error, Packet Multicast, and Transferring Rate
  - Supports multi-language User Interface including Simplified Chinese and English
- Embedded with control buttons and LCD display screen that allow users to set test criteria and view test statistics

# NuTAP-311 SPECIFICATION

| | | | | | |
|---|---|---|---|---|---|
| **Model Name** | | | | | |
| **NuTAP-311** | | | | | |
| **Ports** | | | | | |
| **Network Port** | **Network Port A0** | 10/100/1000 Mbps Full Ethernet RJ45 Port | **Network Port A1** | 10/100/1000 Mbps Full Ethernet RJ45 Port | |
| **Monitor Port** | **Monitor Port M0** | 10/100/1000 Mbps Full Ethernet RJ45 Port | **Monitor Port M1** | 10/100/1000 Mbps Full Ethernet RJ45 Port | |
| **Console Port** | 1 × 38400 bps RJ45 Port for System Management via HyperTerminal | | | | |
| **Mini-USB Port** | 1 × Mini-USB Port for System Management via NuSet-MiniTAP | | | | |
| **Management Port** | 1 × 100 Mbps RJ45 Port for System Management via Web Browser | | | | |
| **Power Jack** | 1 × 12V DC Power Jack | | | | |
| **LEDs, Button & LCD** | | | | | |
| **LEDs** | **System Status** | ➢ Power | ➢ SYS | ➢ Remote | |
| | **Network Port Utilization Status** | **A0 → A1** | Utilization Status LEDs from 0% to 100% | | |
| | | **M0 → M1** | Utilization Status LEDs from 0% to 100% | | |
| | **Monitor Port M0/M1 Status** | **Monitor Port M0** | ➢ Link/Act | ➢ Speed | |
| | | **Monitor Port M1** | ➢ Link/Act | ➢ Speed | |
| | **Network Port A0/A1 Status** | **Network Port A0** | ➢ Link/Act | ➢ Speed | |
| | | **Network Port A1** | ➢ Link/Act | ➢ Speed | |
| | **Short Cut Menu Status** | LEDs that display the current displayed menu for **Monitor Ports** and **Network Port**s | | | |
| **Buttons** | **Configuration Buttons** | ➢ | ➢ | ➢ | ➢ |
| | **Operation Buttons** | ➢ Pg Up ▲ | ➢ Pg Dn ▼ | ➢ Clear All Counters | ➢ Restore to Default |
| **LCD** | 4 x 20 characters LCD that displays test criteria, statistics, and system information | | | | |
| **Filter Description/Criteria** | | | | | |
| NuTAP-311 filter redirects only the packets that meets user-defined SDFR (Self-Discover Filtering Rules) | | | | | |
| **Forwarding Filter** | **Description** | All packets transferring between Network Port A0 and A1 that meet filter criteria will be filtered out or let through | | | |
| | **SDFR** | ➢ Destination Address | ➢ Source Address | ➢ Destination IP | ➢ Source IP |
| **Re-Direct Filter** | **Description** | All packets transferring between Network Port A0 and A1 that meet filter criteria will be re-directed to the Monitor Port(s) | | | |
| | **SDFR** | ➢ Destination Address | ➢ Source Address | ➢ VLAN ID | ➢ Destination IP |
| | | ➢ Source IP | ➢ Destination Port | ➢ Source Port | |
| **Capture Criteria** | **Description** | All packets transferring between Network Port A0 and A1 that meet filter criteria will be captured and stored in NuTAP-311's memory buffer. | | | |
| | **SDFR** | ➢ Destination Address | ➢ Source Address | ➢ Destination IP | ➢ Source IP |
| **Filter Protocol** | **MAC (Data-Link Layer)** | ➢ Broadcast | ➢ Multicast | ➢ Unicast | |
| | | ➢ VLAN | ➢ QinQ (Double VLAN TAG) | ➢ CRC Error | |
| | **Network (Network Layer)** | ➢ ARP | ➢ IPv4 | ➢ IPv6 | |
| | | ➢ ICMP | ➢ IPCS Error | ➢ Pattern Check | |
| | **Protocol (Transport Layer)** | ➢ TCP | ➢ UDP | ➢ FTP | ➢ RTP |
| **Packet Capturing Mode** | | | | | |
| **Capture-and-Stop** | All packets transferring between Network Port A0 and A1 that meet filter criteria will be filtered and stored in NuTAP-311's memory buffer. System will stop storing new data once the memory buffer is full. | | | | |
| **Real-Time** | All packets transferring between Network Port A0 and A1 that meet filter criteria will be filtered and stored in NuTAP-311's memory buffer. System will keep overwriting old data with new data. | | | | |
| **Packet Header Editing** | | | | | |
| **Header Adding** | ➢ DA/SA (Destination/Source Address) | | ➢ Time Stamp | | |
| | ➢ VLAN TAG | | ➢ IP Header: UDP Header, IP Fragment | | |
| **Hardware** | | | | | |
| **Temperature** | ➢ Operating: 0 °C~ 40 °C (32 °F~ 104 °F) | | ➢ Storage: 0 °C~ 50 °C (32 °F~ 122 °F) | | |
| **Humidity (non-condensing)** | ➢ Operating: 0% ~ 85% RH | | ➢ Storage: 0% ~ 85% RH | | |
| **Dimension** | 176 mm X 86 mm X 32.6 mm | | | | |
| **Net Weight** | Approx. 530g | | | | |

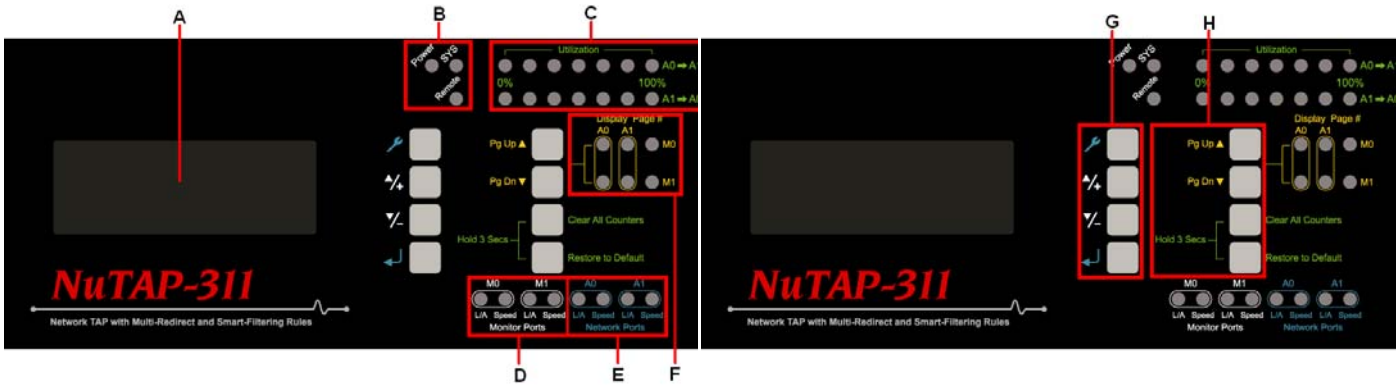
# FUNCTION DESCRIPTION OF NuTAP-311

With its intuitive control panel, LCD and LED-indicators, NuTAP-311 is easy to operate. Please refer to the pictures down below for more information.

## NuTAP-311 Ports


| Description | |
|---|---|
| **A** | 38400 bps RJ45 **Console Port** for system management via HyperTerminal |
| **B** | Mini-USB Port for system management via NuSet-MiniTAP |
| **C** | 100 Mbps RJ45 **Management Port** for system management via web browser |
| **D** | 12V DC Power Jack |
| **E** | 10/100/1000 Mbps Full Ethernet RJ45 **Network Port A0/A1** |
| **F** | 10/100/1000 Mbps Full Ethernet RJ45 **Monitor Port M0/M1** |

## NuTAP-311 Front Panel




| Description | |
|---|---|
| **A** | NuTAP-311 LCD Display Screen |
| **B** | System Status LEDs |
| **C** | **Network Port** Utilization Status LEDs |
| **D** | **Monitor Port M0/M1** Status LEDs |
| **E** | **Network Port A0/A1** Status LEDs |
| **F** | **Network/Management Port** Short Cut Menu Status LEDs |

| Description | | | |
|---|---|---|---|
| **G** | **Configuration Buttons** | | Enter the Main Menu(*) or Return to the previous Menu |
| | | | Move the select cursor up |
| | | | Move the select cursor down |
| | | | Execute the selected selection |
| **H** | **Operation Buttons** | **Pg Up ▲** | Accessing **Network/Management Port** Short Cut Menu, or move the select cursor UP |
| | | **Pg Dn ▼** | Accessing **Network/Management Port** Short Cut Menu, or move the select cursor Down |
| | | **Clear All Counters** | Press and hold this button for 3 seconds to clear all counters |
| | | **Restore to Default** | Press and hold this button for 3 seconds to set all settings to default |

***Menu will be displayed on the LCD screen.**

# TECHNICAL TERMS & APPLICATION

## SDFR

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

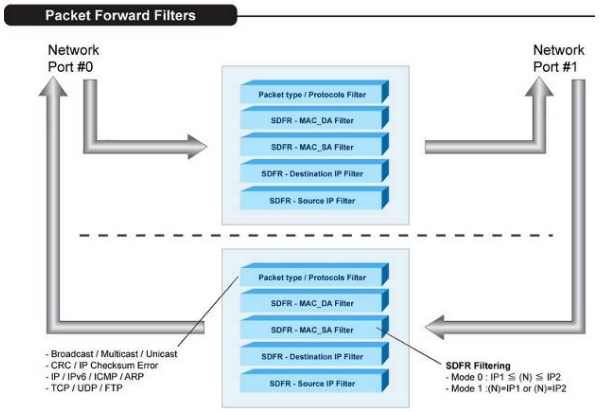
SDFR's User- friendly interface can display values such as Source IP, Destination IP and so on. All these values (one single value or a specific range of values) can be input directly without calculating mask.

All captured packets are displayed in real-time without intervening network flow, and SDFR values can be changed dynamically during capture procedure.

SDFR parameters include filter of Layer 2 Destination MAC Address, Source MAC Address, VLAN ID, Layer 3 Destination IP Address, Source IP Address, Destination Port, and Source Port. Each filter is independent and can be activated in any combinations.

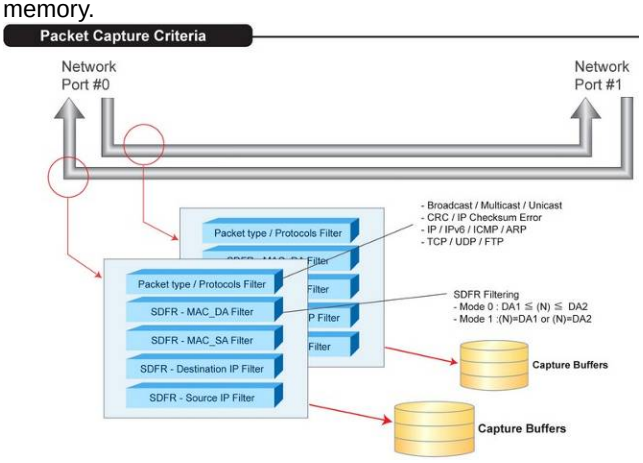
## Forwarding Filter

As shown in the figures down below, transmitted packets from Network Port A0 to A1 (or the other way around) that meet the criteria set in Forwarding Filter will be filtered out or through.



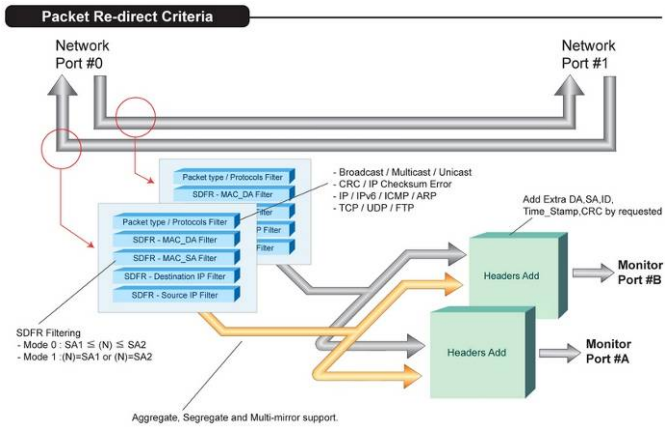

## Capture Criteria

Transmitted packets from Network Port A0 to A1 (or the other way around) that meet the criteria set in Capture Criteria will be captured and stored in NuTAP-311's buffer memory.



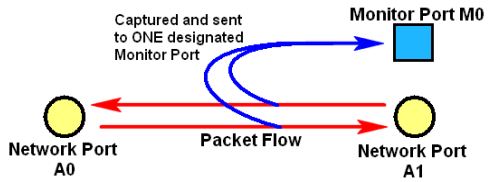

## Re-direct Filter

As shown in the figures down below, transmitted packets from Network Port A0 to A1 (or the other way around) that meet the criteria set in Re-direct Filter will be captured by NuTAP-311 and transferred to Monitor Port(s) judging by its settings (*Aggregate*, *Segregate*, or *Multi-Mirror*).



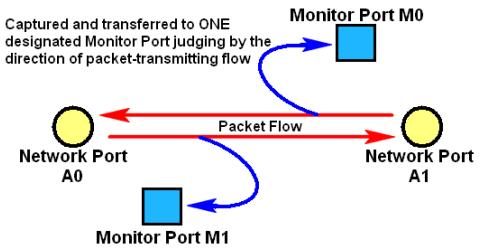

### *Aggregate*

As shown in the figures down below, transmitted packets from Network Port A0 to A1 (or the other way around) that meet the criteria set in Re-Direct Filter will be captured and transferred to ONE designated Monitor Port.



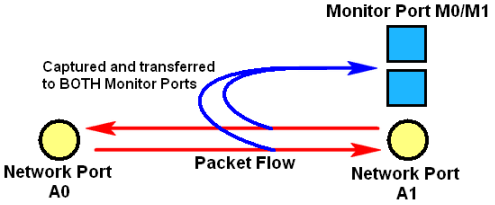

### *Segregate*

Transmitted packets between Network Port A0 and A1 that meet the criteria set in Re-Direct Filter will be captured and transferred to ONE designated Monitor Port judging by the direction of packet-transmitting flow (A0→A1 or A1→A0).

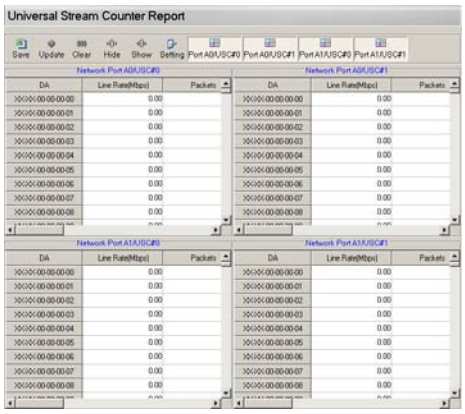



### *Multi-Mirror*

As shown in the figure down below, transmitted packets from Network Port A0 to A1 (or the other way around) that meet the criteria set in Re-Direct Filter will be captured and transferred to **BOTH** Monitor Ports.

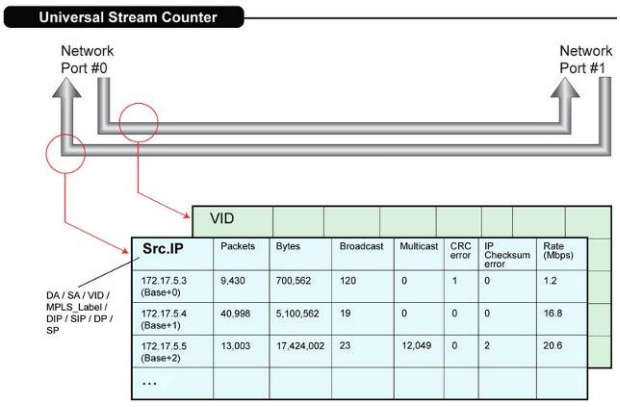


## Universal Stream Counter (USC)




When monitoring data flows in a network environment with Network TAP devices, it is common to use packet analyzers (or sniffers) for capturing and analyzing packet frames. However, information acquired this way may be too vast and complicated for pinpointing the possible cause of network/product problems.

Unlike these common packet analyzers or sniffers mentioned above, **Universal Stream Counter (USC)** offers real-time statistics of network events during packet monitoring and capturing, as shown in the figure down below:

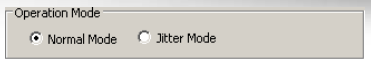



Both of NuTAP-311's Network Ports support Universal Stream Counter (USC), each Network Port contains 1 set of USC with packet filtering rules based on:

- 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)

Also, each USC can contain up to 256 sets of statistics (up to 48-bits) including:

- Line Rate (Mbps)
- Packets
- Bytes
- Broadcast
- Multicast
- IPCS Error
- CRC Error

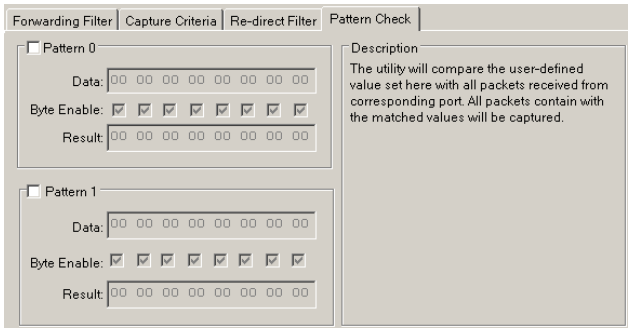



Universal Stream Counter can run under two modes: **Normal Mode** and **Jitter Mode**. Under **Normal Mode**, you can monitor/analyze statistics mentioned previously. However, when under **Jitter Mode**, additional statistics regarding to packet jitter will be displayed:

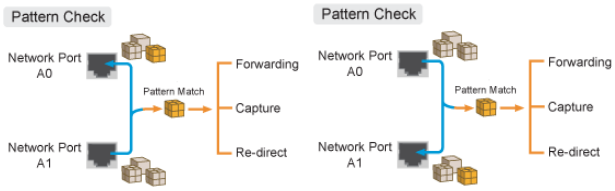
| | | |
|---|---|---|
| **Delta Time (ns*)** | **Current** | Current time interval between packets |
| | **Maximum** | Maximum time interval between packets |
| | **Minimum** | Minimum time interval between packets |
| **Jitter (ns*)** | The variance of time intervals between **Maximum Delta Time** and **Minimum Delta Time**. | |

***ns: Nanosecond**

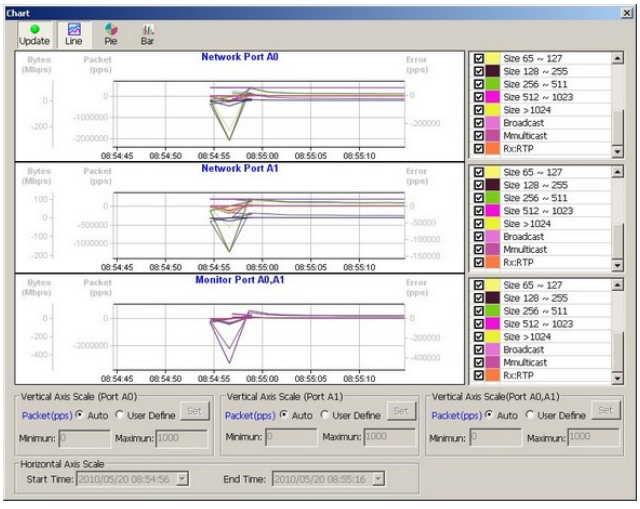
## Pattern Check




NuSet-MiniTAP can compare the user-defined value set here with all packets received from corresponding port. All packets contain with the matched values will be forwarded/captured/re-directed according to settings.



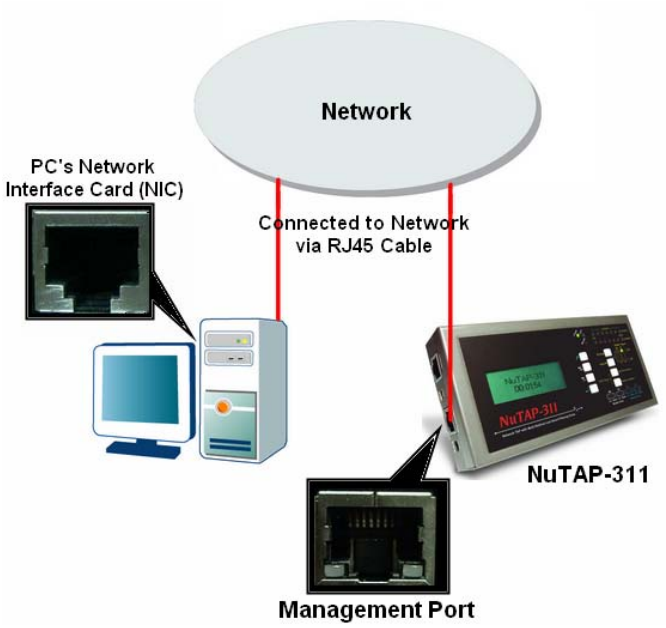

## NuSet-MiniTAP Dynamic Chart




NuSet-MiniTAP provides a graphic interface which allows you to monitor/interpret network packet streams easily. You can set the graphic display as **Line**, **Pie** or **Bar** chart.

# NuTAP-311 SYSTEM MANAGEMENT

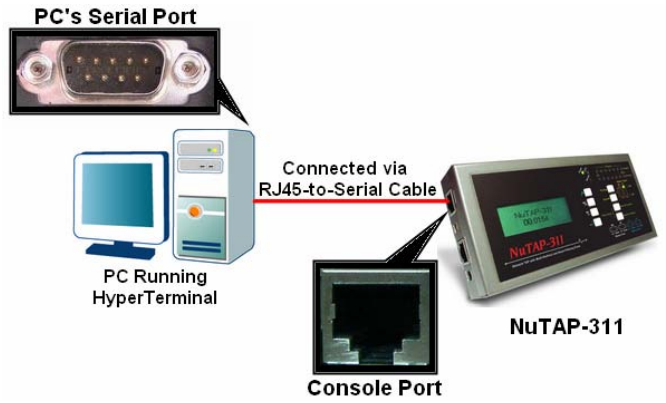
## System Management via Web Browser




By **connecting NuTAP-311 and PC to the same network**, you can configure/view NuTAP-311's settings with the web browser installed on your PC.

To access NuTAP-311's configuration webpage with your PC's web browser, please connect NuTAP-311's **Management Port** to the network which your PC is connected to as shown in the figure above.

## System Management via HyperTerminal

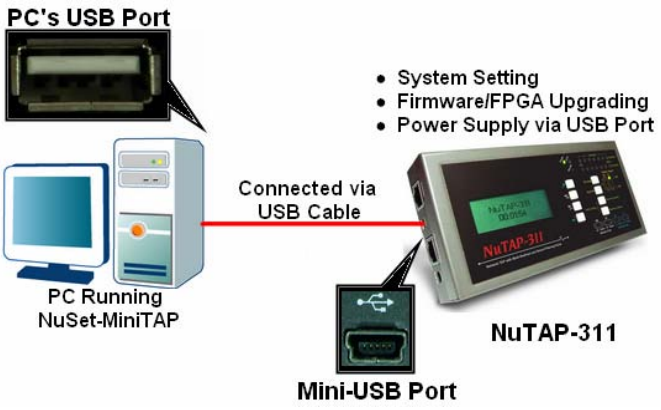


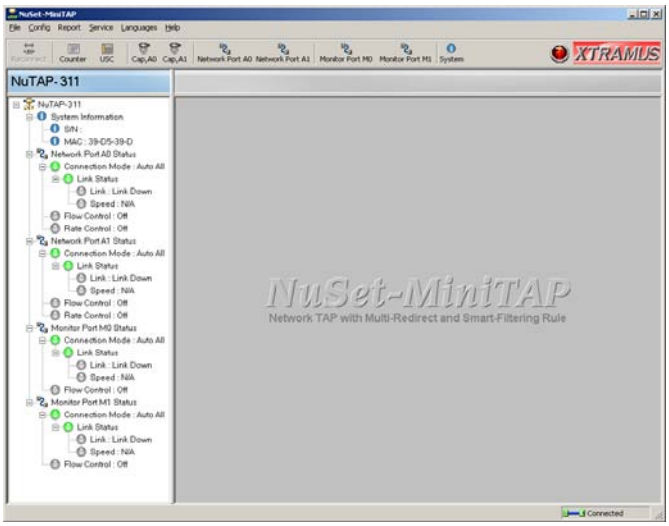

By connecting NuTAP-311's **Console Port** to **PC's Serial Port** via **RJ45-to-Serial** cable, you can configure/view NuTAP-311's settings with **HyperTerminal** softwares installed on your PC.

## System Management via NuSet-MiniTAP

**NuSet-MiniTAP** is a utility software designed for NuTAP-311 and runs under Windows® environment. With **NuSet-MiniTAP**'s GUI (Graphic User Interface), users can configure test parameters, access test data and upgrade system firmware.

To use **NuSet-MiniTAP**, you need a **USB Cable**, and connect this cable between NuTAP-311's **Mini-USB Port** and your PC's USB port as shown in the figure down below.




denk-stein:net
MEASUREMENT TECHNOLOGY
Franklinstr.13a ▪ D-10587 Berlin ▪ Germany
+49-(0)30-398981-0 +49-(0)30-398981-39
sales@denk-stein.com www.denk-stein.com
Vertrieb & Systemintegrator für Carrier + Corporate Networks

# RELATED PRODUCT

**NuTAP-S61**
Network TAP with Two 10/100 Mbps Network Port and Two 10/100 Mbps Monitor Port


denk-stein:net
MEASUREMENT TECHNOLOGY
Franklinstr.13a■ D-10587 Berlin■ Germany
+49-(0)30-398981-0 +49-(0)30-398981-39
sales@denk-stein.com www.denk-stein.com
Vertrieb & Systemintegrator für Carrier + Corporate Networks


Doc #NuTAP-311_PBF_ENG_Ver1.3_20110728