# Portable 2-Port 10 Gigabit Wirespeed Streams Generator

## NuDOG-802 OVERVIEW

NuDOG-802 is a handheld device with two 10 Gigabit SFP**+** ports for Ethernet testing. The main functions of NuDOG-802 include multi-streams generation and NIC emulation.

Connecting NuDOG-802 to its Standard-B receptacle USB port makes it possible for system configurations and managements. NuDOG-802 is an ideal device for in-field testing.

Equipped 2 10G SFP+ ports, NuDOG-802 supports either common SFP+ fiber optical transceiver or 10G /5G/2.5G/1G/100Mbps electrical port with specific NBase-T copper SFP+ transceiver .

NuDOG-802 can work along with a series of utility softwares that qualify industrial standard such as RFC 2544. With these utilities, NuDOG-802 is able to conduct throughput test, latency test, error filtering test, forwarding test, and so on. Xtramus' utility softwares provide a user-friendly interface for different test configurations when setting test parameters and criteria. More optional softwares are available for extended test requirements.

With its unique Universal Stream Counter (USC), NuDOG-802 offers real-time statistics of network events during packet monitoring and capturing.

With these advantageous features, NuDOG-802 is your best partner for LAB researching and in-field troubleshooting.

## FEATURES & ADVANTAGES

- Multi-rate(10G/5G/2.5G/1G/100Mbps) switchable with specific NBase-T copper SFP+ transceiver
- Hardware based wire speed streams generation, analysis, and NIC
- High precision performance for measuring throughput, latency, packet loss and disordered sequence
- Wirespeed traffic capturing with programmable filter and trigger criteria
- Supports Universal Stream Counter (USC) with 256 Rx streams
- RFC 2544 test suite
- High precision 1 ppm temperature-compensated oscillator provides accurate clock speed to ensure the reliability of the tests
- Adding errors in transmitted traffic to simulate and test abnormal situations
- Real-time statistics for each port, including transmitted/received frame for VLAN, IPv4, IPv4 fragment, IPv4 extension , ICMP, ARP, total bytes/packets, CRC, IPCS error and over-and-under size frames
- Supports IPv6
- Utility softwares with user-friendly interface that supports various parameter configurations and meets various test requirements
- 32 Capture Blocks for each Test Port

## APPLICATION IN DIFFERENT MODES
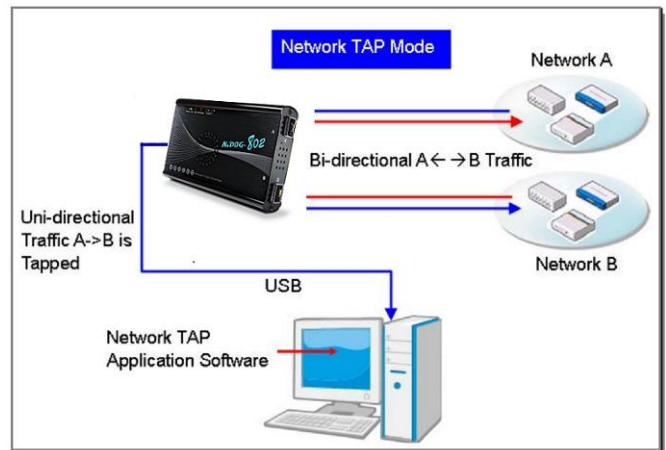
λ **Stream Generation Mode:**
In Streams Generation mode, NuDOG-802 generates bi-directional network streams for test requirements as the illustration below.

Both NuDOG-802's Port A and Port B can generate and receive test streams. The test streams are sent and returned to the same NuDOG-802 for DUT (device under test) analysis.
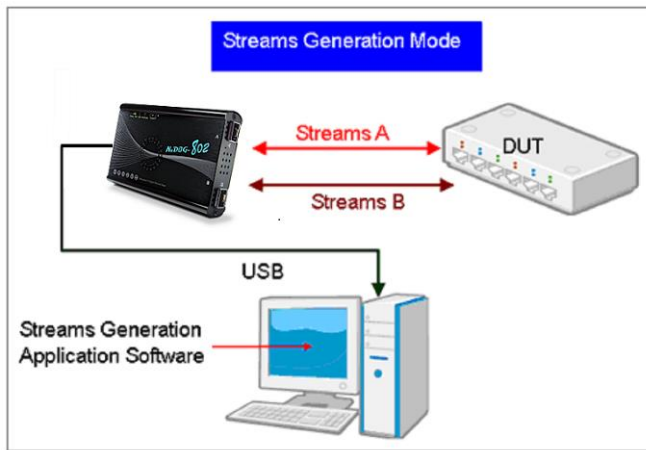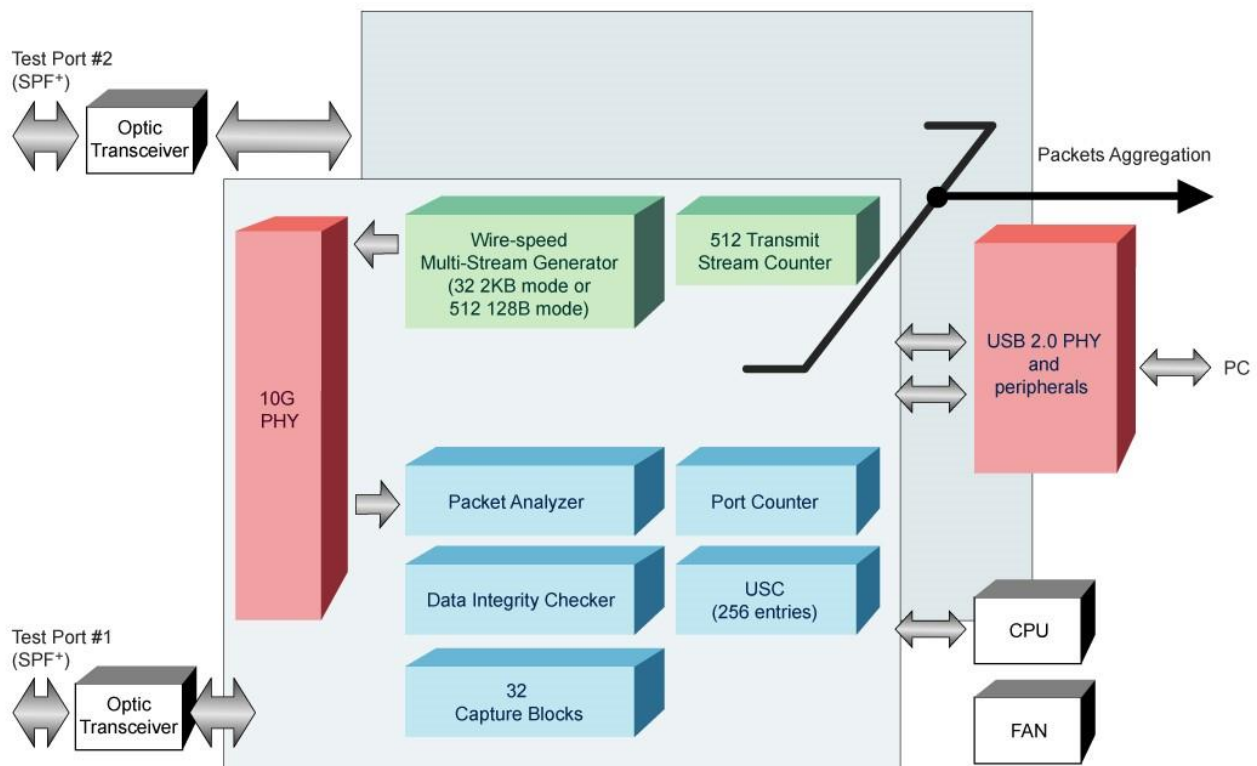
λ **TAP Mode:**
Network TAP is a way to monitor the network without interfere the running network. All data streams between point A and B can be duplicated and sent to PC for analysis. Application tool DApps-TAP and NuDOG-301C can be installed on PC for network analysis.



## NuDOG-802 BLOCK DIAGRAM

## NuDOG-802 SPECIFICATIONS

| NuDOG-802 | | |
|---|---|---|
| **Supported Frame Format** | ● Ethernet Type II frame | ● IEEE 802.3 frame |
| **Interface Ports & LEDs** | | |
| **Interface Ports** | **Test Ports** | ● 10G SFP**+** Port x 2 <br> ● 10G/5G/2.5G/1G RJ45 Port x 2 (with specific NBase-T copper SFP+ transceiver) |
| | **Other Ports** | ● Standard-B Receptacle USB　Port x 1* <br> ● 12V DC Power Jack x 1 <br> ● 8-Pin Mini-DIN Receptacle Diagnostic Port x 1 |
| **LEDs** | ● **Power/Fail:** Power Status <br> ● **USB:** USB Connection Status | ● **Error/Loss:** Error/Packet Loss Occurrences <br> ● **Link/ACT A/B:** Link Status of Test Port A/B |
| **Application Mode** | | |
| **Application Mode** | **SG Mode** | SG (Stream Generation) Mode allows NuDOG-802 to generate bi-directional network streams and transmit them to DUT |
| | **NIC Mode** | NIC (Network Interface Card) Mode allows NuDOG-802 to simulate as an NIC connecting to the PC via USB port |
| | **TAP Mode** | NuDOG-802 monitors any data that flows through it and also provides loopback and abundant packet counters. |
| **Functional Specification/Hardware Counter** | | |
| **Functional Specification** | ● Variation of DA/SA and VLAN ID in increase, decrease, or random that can test the addressing capability of the DUT <br> ● **Rapid-Matrix Mode:** Up to 32 base-streams <br> ● **Frame Length:** Fixed from 64 ~16k bytes or random <br> ● **Inter Frame Gap Count:** 96ns~1.073 Sec <br> ● **Payload in Frame:** Specific payload or random pattern <br> ● **Error Generation:** CRC, Alignment, Dribble bits, Undersize frame, Oversize frame <br> ● Capturing Network events with SDFR (Self-Discover Filtering Rules) <br> ● 2nd level CRC check and transmission sequence check <br> ● Support Jumbo Frame (up to 16K bytes) <br> ● **Two capture Buffer Mode:** 2KB packet length mode; 16KB packet length mode <br> ● DUT oscillator measuring <br> ● Support 1 USC (Universal Stream Counter) with 256 streams | | |
| **Hardware Counter** | ● **Transmitting/Receiving:** Tx/Rx Packet, Tx/Rx Byte, Tx/Rx Rate <br> ● **Collision Counter:** Tx Collision, Tx Single Collision, Tx Multi Collision, Tx Excess Collision <br> ● **Error Counter:** Dribble Error, Alignment Error, CRC Error , DI Error, IPCS Error, Error & Loss Packet <br> ● **Packet Size Statistics Counter:** Under Size, 64, 65-127, 128-255, 256-511, 512-1023, 1024-1522, Over Size <br> ● **Layer 2 and Layer 3 Packet Counter:** Broadcast, Multicast, Unicast, VLAN, IPv4, IPv4 Fragment, IPv4 Extension, ICMP, ARP, and Pause. <br> ● **SDFR (Self-Discover Filtering Rules) Trigger Counter** | | |
| **Utility Softwares (Optional)** | | |
| **Utility Softwares** | ● **DApps-NIC:** NIC simulation suite <br> ● **DApps-TAP:** Ethernet TAP suite base on TAP, Layer 1 loopback and Layer 2 loopback mode with real streams counter and streams chart <br> ● **DApps-SG:** Control suite for multiple streams generator <br> ● **DApps-2544:** Test Suites for RFC 1242 and RFC 2544 | | |
| **Main Frame Spec** | | |
| **Dimension** | 125.8mm x 85mm x 27.5mm | |
| **Net Weight** | Approx. 255 g | |
| **Temperature** | ● **Operating:** 0°C~ 40°C (32°F~ 104°F) | ● **Storage:** 0°C~ 50°C (32°F~ 122°F) |
| **Humidity** | ● **Operating:** 0% ~ 85% RH | ● **Storage:** 0% ~ 85% RH |
| **Power Source** | External Power Adapter <br> ● **Input:** AC 100 V ~ 240 V, 50 Hz ~ 60 Hz | ● **Output:** DC 12 V |

**\*Please note that when connecting NuDOG-802 with PC via its USB port, DO NOT use a USB hub**

## UTILITY SOFTWARES (OPTIONAL)

### DApps-TAP: Network TAP/Loopback Utility
All data streams between two network ports can be duplicated and sent to PC via mini USB port for monitoring and analyzing. Users can specify conditions to filter the packets wanted by *DApps-TAP* application software. It reduces USB port's network traffic and also cuts down PC resource consumption while dealing with large quantity of packets.

### DApps-SG: Control Suite for Multiple Streams Generator
DApps-SG provides a powerful and sophisticated virtual front control panel to manage this device. Two test ports can be configured independently with parameters to define multiple streams and capture capabilities. Traffic for various network protocols can be customized, transmitted, and received on each port. Comprehensive statistics give users an in-depth analysis of the DUT performance.

### DApps-NIC: Network Interface Card Simulation Suite
NuDOG-802 has a Standard-B Receptacle USB Port for PC connection, and can be used as a network interface card. With control software and NuDOG-802's hardware conversion, network data streams can flow between NuDOG-802's USB and network port.

### DApps-2544: Test Suit Based on RFC 2544
DApps-2544 is a user-friendly and automatic test suite based on industry-standard RFC 2544. It generates and analyzes packets to evaluate the Throughput performances, Latency, Packet Loss, and Back-to-Back of Ethernet switches or routers via this device. The real-time test results display and customized report provide an effective way when examining the DUT.

## TECHNICAL TERMS

NuDOG-802 is an all-purpose handheld network test device that has many innovative technologies.

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

#### Features & Advantages
Rapid-Matrix is a technology that can generate multi-stream traffic simultaneously with different kinds of frames containing almost any required protocol headers, tags and payload for each port

In traditional network test procedures, testing different functions sequentially always takes lots of time, and if the test equipment is not sufficient enough, cost of time will be high. Unlike traditional test procedures in other test equipments, Rapid-Matrix technique activates multi-task test to DUTs simultaneously. This mechanism also synchronizes the test procedure to all DUTs under test; hence, the test duration of a multi task test for all DUTs is predictable and the test duration is reduced dramatically.

#### Generate up to 32 Streams per Port
Rapid-Matrix consists of 32 individual entries for each port. Each entry has its own independent settings for a unique data stream. Multiple entries can be correlated to compose a complicated data stream.
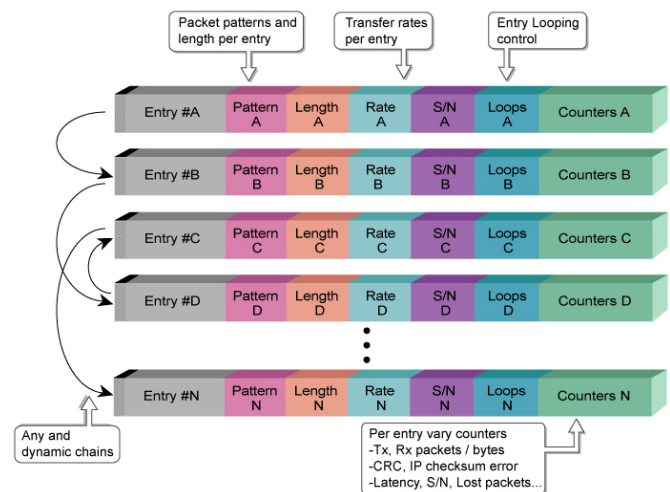
## SDFR

### Self-Discover Filtering Rules

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.

## USC

### Universal Streams Counter



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.

Both of NuDOG-802's ports support Universal Stream Counter (USC). Each port contains 1 sets of USC with packet filtering rules based on SDFR mentioned above and contains statistics including:

- Line Rate (Mbps)
- Packets
- Bytes
- Packet Loss
- S/N Miss
- IPCS Error
- Latency (µs)

### Features & Advantages of USC

- **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 Protocol Support:**
Several often-used protocols (like IPv4) 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 criteria 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.

## 2nd Level CRC (Data Integrity) Check

2nd level CRC (Cyclic Redundancy Check Code) Check, an advanced data integrity check function, is the checksum computed based 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 error data, 2nd level CRC check will serve as the checksum. Any mismatches of transmitted and received packets are recorded as error of 2nd Level CRC (Data Integrity) check.

| DA | SA | Type | Data | 2nd Level CRC | CRC |
|----|----|------|------|---------------|-----|

## NuDOG-802 HARDWARE OVERVIEW
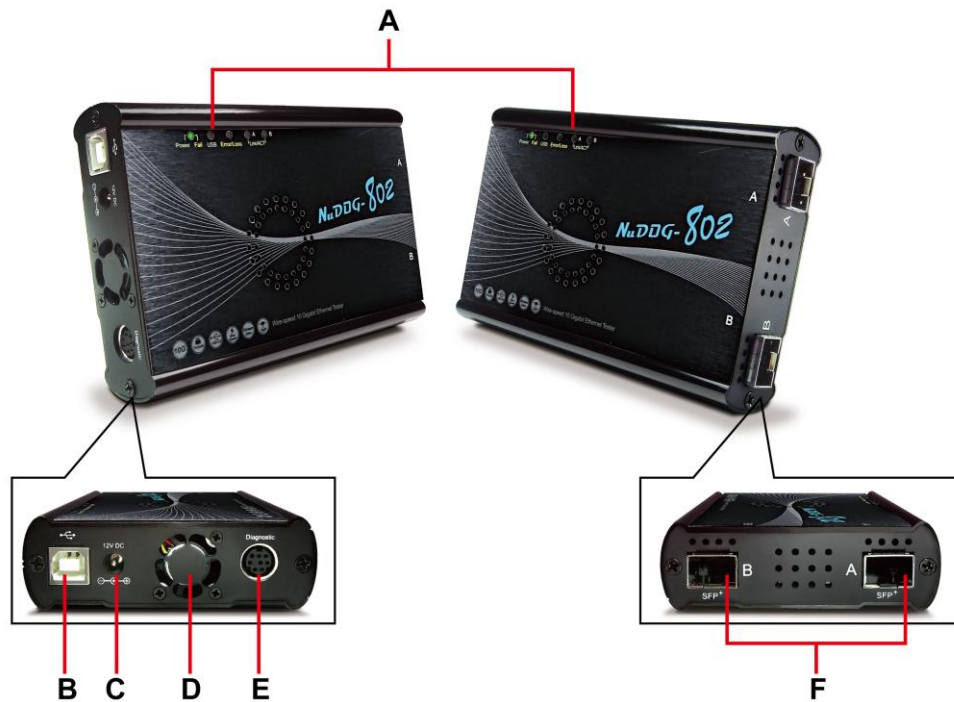


### NuDOG-802 Hardware Overview

| | | | |
|---|---|---|---|
| **A** | LED | **D** | Cooling Fan |
| **B** | Standard-B Receptacle USB Port | **E** | 8-Pin Mini-DIN Receptacle Diagnostic Port |
| **C** | 12V DC Power Jack | **F** | 10 Gigabit Wirespeed SFP+ Port |

## RELATED PRODUCTS

**NuDOG-301C**

Portable 2-Port Gigabit Wirespeed Streams Generator & Network TAP

**NuDOG-101T**

10/100Mbps Portable 2-Port Streams Generator & Network TAP



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