



Net.Storm is hardware based impairments generator, equipped with double GbE ports, battery operated, fast and full-featured, can emulate the dynamics of real Ethernet / IP networks in terms of packet impairments.

Datasheet

ALBEDO Net.Storm

ALBEDO Net.Storm generates degradations typical packet network to emulate -in a 100% controlled environment- the impairments of actual Ethernet / IP systems. Ideal to verify the tolerance and the quality of Video, Audio or Data applications either working in development laboratories or directly connected to commercial networks.

1. PORTS AND INTERFACES

- Dual RJ-45 port for electrical connection 10/100/1000BASE-T.
- Dual optical and electrical SFPs ports operating up to 1 Gb/s.
- SFP interfaces including: 10BASE-T, 100BASE-TX, 100BASE-FX, 1000BASE-T, 1000BASE-SX, 1000BASE-LX.

2. FORMATS AND PROTOCOLS

- Ethernet frame: IEEE 802.3, IEEE 802.1Q.
- IP packet: IPv4 (IETF RFC 791).
- Jumbo frames: up to 10 kB MTU (Maximum Transmission Unit).
- Throughput between measurement ports: 1 Gb/s or 1,500,000 frames/s in each direction.

3. CONFIGURATION

- Configurable MTU size.

4. RESULTS

- Auto-negotiation results including current bit rate, duplex mode, Ethernet interface.
- SFP presence, vendor, and part number.
- Separate traffic statistics for each port.
- Separate statistics for transmit and receive directions.
- Frame counts: Ethernet, and IEEE 802.1Q (VLAN), control frames.
- Frame counts: unicast, multicast and broadcast.
- Basic error analysis: FCS errors, undersized frames, oversized frames, fragments, jabbers.

- Frame size counts: 64, 65-127, 128-255, 256-511, 512-1023, and 1024-1518 bytes.
- Byte counts: Port A (Tx / Rx) and Port B (Tx / Rx).
- Traffic counters follow RFC 2819.

5. FILTERS

- One filter for background traffic processing and up to 15 fully configurable and independent filters.
- User-configurable filters defined by field contents on Ethernet, IP, UDP and TCP headers.
- Agnostic filters defined by 16-bit masks and user defined offset.

5.1 Ethernet Selection

- By *source* and *destination* MAC addresses. Selection of MAC address sets with masks.
- By *Type / Length* value with selection mask.
- By *VID* with selection mask.
- By *VLAN priority codepoint* value with selection mask.

5.2 IPv4 Selection

- Selection by *IPv4 source* or *destination* address. It is possible to select address sets by using masks.
- Selection by *protocol*.
- Selection by *DSCP* value.

5.3 TCP / UDP Selection

- Selection by *TCP* or *UDP* port. Either as a single value or a range.

5.4 Statistics

- Accepted and dropped frame counters for each configured filter.

6. EVENT INSERTION

- Events are implemented at Ethernet layer.
- Independent event insertion in every single flow identified in the main stream.
- Events: Frame loss, delay, frame duplication, errored frames.



- Maximum process time caused by event insertion: 10 μ s

6.1 Frame Delay and Jitter

- Deterministic delays: defined as a single Delay (ms).
- Random delays with uniform distribution: defined with a Minimum and a Maximum delay (ms).
- Random delays with exponential distribution: defined with a Mean (ms) and a Minimum delay (ms).
- Shaping filter for bandwidth control. Based on a token bucket algorithm is defined with two parameters (a) *sustainable rate* (frames/s), and (b) *depth* (frames) that determines the traffic allowed to pass-through when the rate is above sustainable. Not conforming frames are delayed.
- Worst case maximum delay (1 Gb/s traffic load and 64 byte frame): 20 ms

Table 1. Accepted Ranges for Delay Event Parameters

Metric	Minimum	Maximum
Delay	0 ms	60 s
Minimum Delay	0 ms	60 ms
Maximum Delay	0 ms	60 ms
Average Delay	0 ms	60 ms
Rate	0 frames/s	1,500,000 frames/s
Maximum burst size	0 frames	32767 frames

6.2 Packet Loss

- Single loss insertion.
- Constant loss defined by a probability.
- Random loss defined by a probability.
- Random loss defined by the two-state model of Gilbert-Elliot which is configured by (a) the probability of packet loss during a period of high losses, (b) probability of packet loss during a period of low losses, (c) average length of high losses (in frames), and (d) the average separation between high-loss events in frames.
- Burst loss: defined as event duration, and number of packets affected.
- Periodic burst loss: defined with a burst duration, and the separation between two consecutive bursts. Both parameters can be defined using as units either the number of frames or time duration.

Table 2. Accepted Ranges for Frame Loss Event Parameters

Metric	Minimum	Maximum
Burst length	0 minutes	30 minutes
Burst length	0 frames	32737 frames
Burst separation	0 minutes	30 minutes
Burst separation	0 minutes	30 minutes
Rate	0 frames/s	1,500,000 frames/s
Maximum burst size	0 frames	32767 frames
Loss probability	0%	99.99%
Alternative loss prob.	0%	99.99%
Mean length	1 frame	16383 frames
Mean alt. length	1 frame	16383 frames

- Policing filter for bandwidth control. Based on a token bucket which is defined with two parameters a) *sustainable rate*

(frames/s), and b) *depth* (frames) or how much traffic is allowed to pass through when the rate is above sustainable. Not conforming frames are dropped.

6.3 Frame Duplication

- Single duplication event insertion.
- Random duplication defined by a probability.

Table 3. Accepted Ranges for Duplication Event Parameters

Metric	Minimum	Maximum
Duplication prob.	0 %	99.99 %

6.4 Errored Frames

- Single errored frame event insertion.
- Random errored frames defined by a probability.

Table 4. Accepted Ranges for Frame Error Event Parameters

Metric	Minimum	Maximum
Frame error prob.	0 %	99.99 %

6.5 User Interface

- Direct configuration and management in graphical mode using the keyboard and display of the instrument.
- Remote access for configuration and management in graphical mode from remote IP site through the Ethernet interface of the control panel.

6.6 General

- Operation time with batteries: 3.5 hours (minimum, two battery packs).
- Configuration and report storage and export through attached USB port.
- TFT colour screen (480 x 272 pixels).
- Dimensions: 223 mm x 144 mm x 65 mm.
- Weight: 1.0 kg (with rubber boot, one battery pack).

