ALBEDO Telecom

the Path to Excellence

ALBEDO 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. Field Operation

1.1 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

1.2 Formats and Protocols

- Ethernet frame: IEEE 802.3, IEEE 802.1Q
- IP packet: IPv4 (IETF RFC 791)
- Jumbo frames: up to 17 kB MTU (Maximum Transmission Unit)
- Throughput between measurement ports: 1 Gb/s or 1,500,000 frames/s in each direction

2. Configuration

- Autonegotiation parameters including bit rate (10, 100, and 1000 Mb/s) and duplex mode
- Configurable MTU size

3. Results

- Autonegotiation 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
- Frame counts: unicast, multicast and broadcast
- Basic error analysis: FCS errors, undersized frames, oversized frames, fragments, jabbers, collisions
- Frame size counts: 64, 65-127, 128-255, 256-511, 512-1023, and 1024-1518 bytes
- Four byte counts: Port A (Tx / Rx) and Port B (Tx / Rx)
- All traffic counters follow RFC 2819

4. Filters

- One filter for background traffic processing
- Up to 15 fully configurable and independent filters
- Customizable filters defined by field contents on Ethernet, IP, UDP and TCP headers
- Agnostics filters defined by 16 bits masks and user defined offset

4.1 Ethernet filters

- MAC address: source, destination, and source-and-destination
- MAC address group: subset of addresses filtered by a masks
- Ethertype field with selection mask
- VLANs field
- CoS field

4.2 IP filters

- IPv4 address: source, destination, and source-and-destination
- IPv4 address group: subset of addresses filtered by masks
- Protocol encapsulated in the IP packet (TCP, UDP, Telnet, FTP, etc.)
- DSCP field
- TCP/UDP port

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4.3 Statistics

- Accepted and dropped frame counters for each configured filter

5. Event Insertion

- Events are implemented at Ethernet layer
- Independent event insertion in every single flows identified in the main stream
- Sequential application of every active filter
- Events: Packet loss, error, duplication, delay

5.1 Packet Delay and Packet Jitter

- Deterministic delays: defined as a single Latency (ms)
- Random delays over a uniform distribution: defined with a Minimum and a Maximum delay (ms)
- Random delays over an 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. Non conformance frames are delayed.
- Delay filters can be applied to a configurable percentage of the frames

5.2 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
- 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. Non conformance frames are dropped.

5.3 Packet Errors

- Error Insertion without recalculation of the Ethernet FCS field
- Single error insertion
- Statistical error: random, defined by a probability
- Statistical error: constant, defined by a probability

5.4 Packet Duplication

- Single duplication insertion
- Random duplication defined by a probability
- Constant duplication defined by a probability

6. 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 thought the Ethernet interface of the control panel
- Remote access with command line (CLI) using of either Telnet or SSH offering for configuration, management and task automation
- Remote access via SNMP for configuration, management and integration

7. General

- *Instant On* (the equipment measures immediately after power on)
- Operation time with batteries: 3.5 hours (minimum, two battery packs)
- Configuration and report storage and export through attached USB port
- TFT color screen (480 x 272 pixels)
- Dimensions: 223 mm x 144 mm x 65 mm
- Weight: 1.0 kg (with rubber boot, one battery pack)

The Gilbert-Elliott model

- The model of packet loss describes a CHANNEL made of two states of two different qualities and therefore with two different packet loss probabilities. The transition between the two states is random.

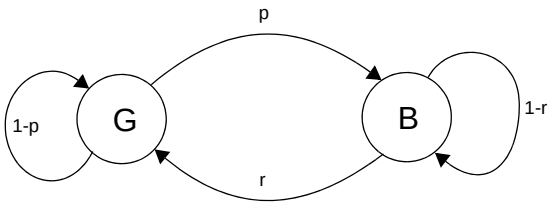

Figure 1. *Gilbert-Elliott model*