

Bus Doctor™

Gigabit Ethernet w/iSCSI

Protocol, Timing, & Statistical Analysis

Protocols & Standards:

- 802.3 (1000 Mb/s) Ethernet
- 802.2 (LLC)
- iSCSI
- ARP/RARP
- IPv4
- IPv6
- TCP
- ICMP

Speeds:

- 1.125 Gb/sec

Advanced Features:

- 12 level triggers with counters and timers
- Filtering by trigger level
- Up to 256 million events in dedicated memory
- 4 ns per 144-bit event resolution

Display Capabilities:

- Command Listing
- State Listing
- Trace Histogram for navigational aid
- Data Block
- Real-time Statistics
- Timing Waveform
- Post-capture filtering

The Bus Doctor™ family of protocol analyzers provides unprecedented Power, Ease, Depth, Breadth, and Portability for those examining and diagnosing busses and interfaces. The Bus Doctor analyzer becomes a dedicated Gigabit Ethernet protocol analyzer by connecting it to the Gigabit Ethernet bus pod. The system provides network developers the deep trace buffer and triggering to capture and work with this high-speed bus.



The Gigabit Ethernet (GBE) pod supports bi-directional transfers at full speed (1.125Gb/s). In addition to decoding Ethernet and IP protocols, the analyzer also decodes iSCSI. With the deepest memory option, the GBE pod allows the user to store over 1 Gigabyte of traffic. The analyzer displays the 10b codes as well as the 8b. It detects coding, framing, disparity and ordered set errors. The statistics display shows error rates, bus utilization, and a variety of other measurements. It maintains the features needed by hardware engineers such as multi-level triggering, filtering and state configuration of packets. For each frame, the Command Listing provides the source and destination addresses, a color-coded description of the highest level protocol, applicable additional information and the time elapsed between frames. The State display provides decoding of each double-word transfer using color to distinguish the different protocols like Ethernet Header, IP Header, etc. Extensive decoding of GBE fields makes it easy to use for both beginners and experts.

State Listing

The State Listing displays a list of all of the captured events. For each event, this display shows reference Store Number, the Timestamp (relative or absolute) and the Data, Dword Count, Protocol type and Description for each of the two traffic directions.

In this display or the Command Listing, the user may set two markers, X and O, with a mouse click. An advanced 12 level find sequencer may be used to search through the buffer to find exact event patterns or specific events.

Command Listing

All of the trace's commands are summarized in this display. It shows the store number of the first event associated with the frame, the traffic direction, highest-level protocol type, source and destination addresses, command information and timestamp. The timestamp may be displayed as either the relative elapsed time since the previous frame or the absolute time from a user-definable origin.

The screenshot displays the Bus Doctor software interface with three main panels:

- Command Listing:** A table showing command details for various store numbers.
- State Listing:** A table showing state details for various store numbers, including data and protocol information.
- Histogram:** A bar chart showing the distribution of events across the trace.

Store #	1->2	2->1	Protocol	Source	Destination	Info	Timestamp
3			ARP	00:60:08:F6:19:2D	00:00:00:00:00:00	Op Code: 1=ARP request	494.5 ms
22			ARP	00:60:08:F6:18:C1	00:60:08:F6:19:2D	Op Code: 2=ARP response	67.7 μs
41			TCP	0000:0000:0000:0000:0000:0000:C0A8:0020	0000:0000:0000:0000:0000:0000:C0A8:0062		97.36 μs
61			TCP	0000:0000:0000:0000:0000:0000:C0A8:0062	0000:0000:0000:0000:0000:0000:C0A8:0020		96.37 μs
81			TCP	0000:0000:0000:0000:0000:0000:C0A8:0020	0000:0000:0000:0000:0000:0000:C0A8:0062		115.4 μs
100			iSCSI	0000:0000:0000:0000:0000:0000:C0A8:0020	0000:0000:0000:0000:0000:0000:C0A8:0062	iSCSI Opcode: 0x03=Login Request	6.488 ms
138			iSCSI	0000:0000:0000:0000:0000:0000:C0A8:0062	0000:0000:0000:0000:0000:0000:C0A8:0020	iSCSI Opcode: 0x23=Login Response Login Status: 0x0000=Success	6.301 ms
176			iSCSI	0000:0000:0000:0000:0000:0000:C0A8:0020	0000:0000:0000:0000:0000:0000:C0A8:0062	iSCSI Opcode: 0x01=iSCSI Command	4.992 ms
206			iSCSI	0000:0000:0000:0000:0000:0000:C0A8:0062	0000:0000:0000:0000:0000:0000:C0A8:0020	iSCSI Op: 0x28=READ(10) iSCSI Opcode: 0x25=Data-in	6.214 ms

Store #	1->2 Data	Cnt	Protocol	1->2 Description	2->1 Data	Cnt	Protocol	2->1 Description	Timestamp
1,598	60000000	0	IPv6	IPv6 Header					32 ns
1,599	04002BFF	1	IPv6	Version: 6 DiffServ Codepoint: b0000000.=CS0 Flow Label: 0x000000 Payload Length: 1024 Add'l Hdr: 43=IPv6-Route(IPv6 Routing Heade					32 ns
1,600	00000000	2	IPv6						32 ns
1,601	00000000	3	IPv6						32 ns
1,602	00000000	4	IPv6						32 ns
1,603	C0A80020	5	IPv6	SrcAddr:0000:0000:0000:0000:0000:0000:C0A8:0020				32 ns	
1,604	00000000	6	IPv6						32 ns
1,605	00000000	7	IPv6						32 ns

The Histogram panel shows a bar chart with the following settings: **Commands** (checked), **Errors** (checked), **Data** (unchecked), **User Term** (checked), **1->2 TCP 0**, **z-in**, **x1**, **z-out**.

Cursor: 1608 | Trigger: 1529 | X Mark: 1529 | O Mark: 1529 | X to O Events: 0 | X to O Time: 0 ns | X to O User Terms: 0
Current Segment: 0 | Last Segment Captured: N/A | Segment Size: 1,048,575 Events | Number of Segments: 16

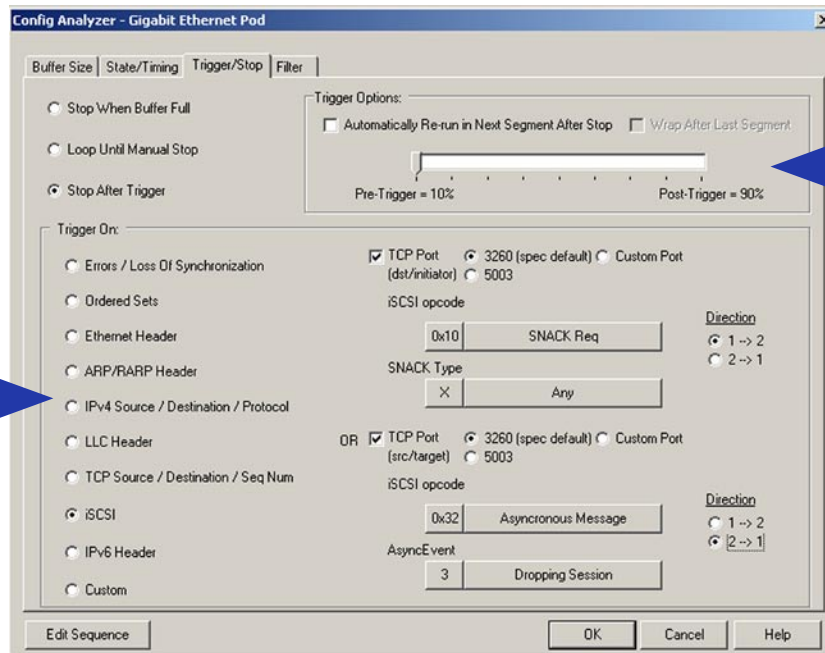
Histogram

The histogram's primary purpose is a navigation aid, showing an overall view of the entire trace. Commands, data, and errors are shown in blue, green, and red, respectively. A user term may also be defined and is shown in purple.

Clicking in this window, or in anywhere in the Command or State Listing displays will synchronize the all of the displays.

Pre-Trigger / Post-Trigger

The Pre/Post adjustment bar controls the ratio of captured data before or after the trigger position. The Auto Re-run feature makes it possible to capture multiple traces overnight or over the weekend automatically.

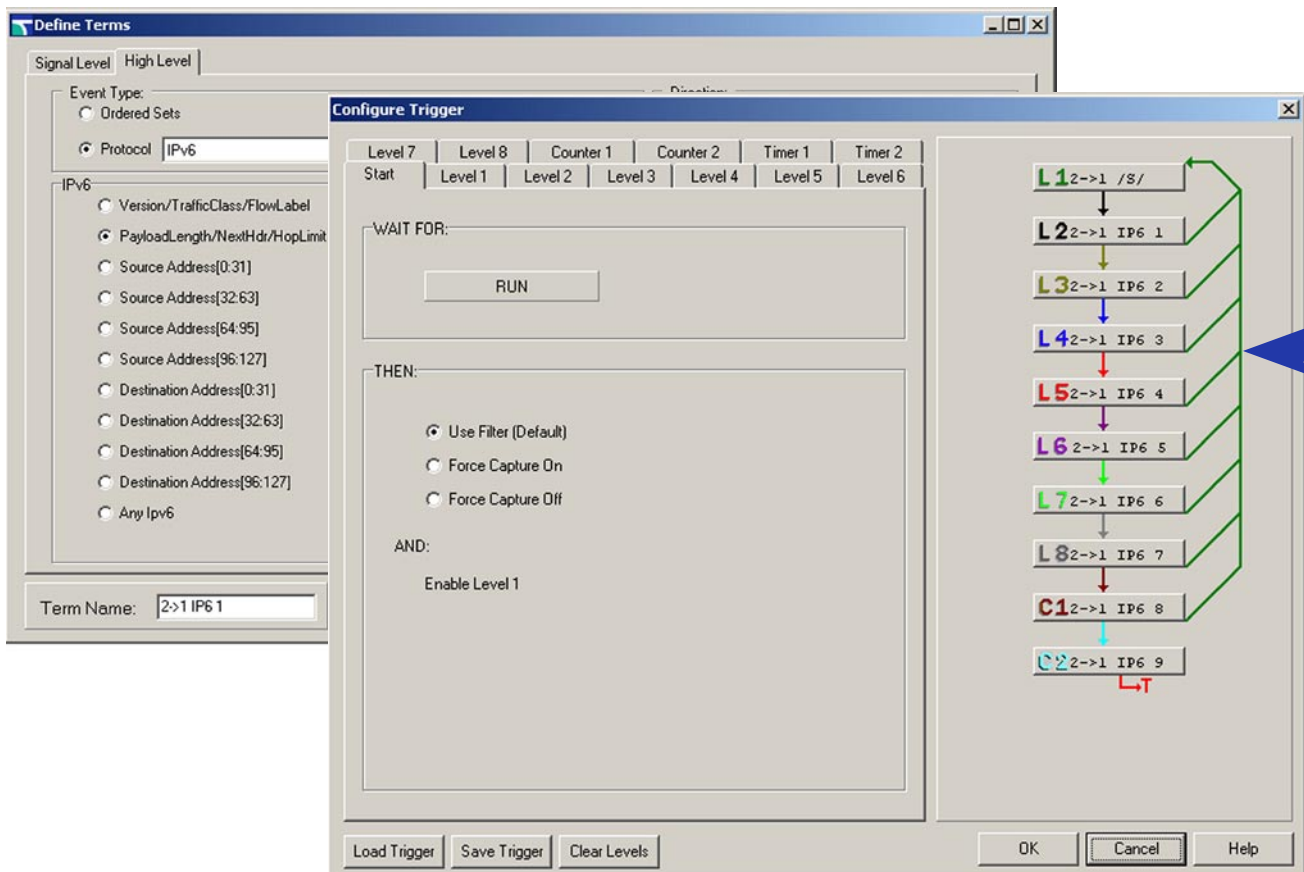


Triggering

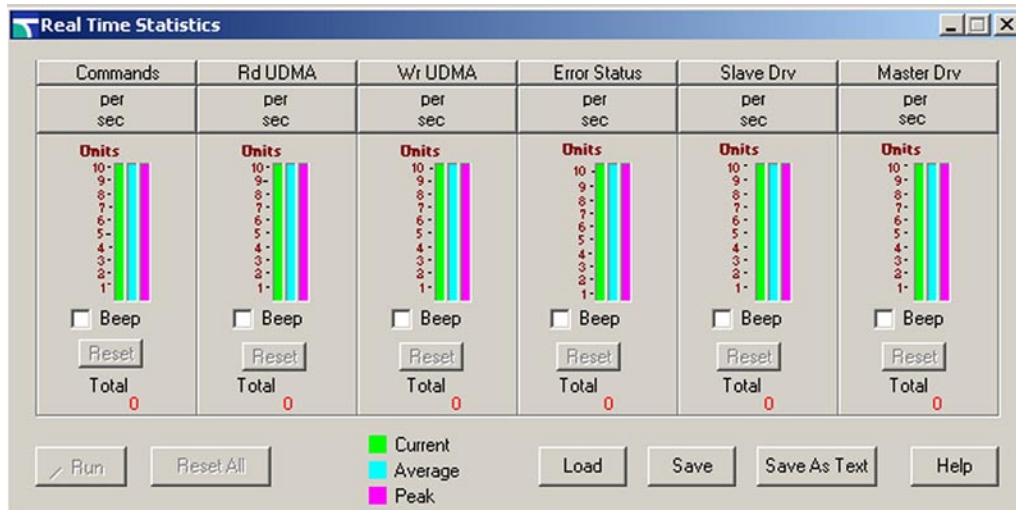
Powerful, high-level dialogs, including pull-down menus and other selection tools make it easy to set up triggers for stopping traces at a desired event or sequence of events.

Trigger Sequencer

Users may create their own trigger using the trigger sequencer which has 12 levels including 2 timers and 2 counters.



The Real-Time Statistics menu reports what the bus is doing currently, comparing each instantaneous parameter with its average, and peak performance levels. It is preconfigured for certain common statistical measurements, but can be easily reconfigured by the user for almost any type of metric desired. The configurations can be saved and loaded for future use. The results may be exported to a text format.



The Analyzer can capture in three modes: Timing, State, Custom. State Mode will capture each transfer only when the data is valid. State Mode has 8 different Checkboxes, 4 for each direction. These checkboxes enable/disable events from being captured. Users may also select specific number DWORDS of data to capture. Custom State Modes can also be created.

Analyzer Compatibility:

- All Bus Doctor 108 Channel Analyzers
- All Bus Doctor MultiPod™ Analyzers

Physical:

- Dimensions: 8.25 x 8.375 x 2.25 inches (20.2 x 20.5 x 5.5 cm)
- Weight: Pod - 2 lb. (.9 kg), Power Adapter - 1.25 lb. (.57 kg)
- Bus Connection: 2 GBICs, 5v
- Analyzer Connection: 6 Robinson-Nugent 68 pin connectors

Power Requirements:

- 100-250VAC, 50-60Hz

LED Indicators:

- Rx_LOS*
- Error*
- Frame*
- Sync Loss*
- Ordered Set*
- Idle*
- TCP/IP*
- Ch1 Link Ready
- Ch2 Link Ready
- Normal
- IDLE Generation**

* 2 indicators, one per channel

** In this mode, the pod sends IDLEs across the bus to test cabling and set up

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