SerialTek

BusXpert PRO 6G SAS/SATA Analyzer rev. B

DATA SHEET

FEATURES & BENEFITS

- Record, upload and display up to 6 Gb/s SAS and SATA traffic in seconds
- Eye-Opener front-end, Tunable RX/TX signalling, and 2 ns timestamp resolution for the industry's most accurate capture
- Available in 2 or 4 bidirectional port configurations with up to 36 GB of trace buffer
- Up to 8 simultaneous trigger sequencers

ADVANTAGES

- Upload and display traces using Gigabit Ethernet or USB 3.0
- Pre-Indexed trace for faster searching and display
- InstaSearch technology
- Tunable RX/TX signalling
- Cascade multiple units for time and event based synchronization; up to four BusXpert Pro analyzers can be connected together to capture up to 16 links simultaneously
- BusXpert API lets programmers write custom tools to control the analyzer or process trace data
- 8 Unique Status LEDs per port
- Industry leading 3 year hardware warranty, free product support and no software maintenance fees for the life of the unit

For today's SAS and SATA engineers, getting to the root of a problem can be especially difficult when there is not an obvious trigger condition. Troubleshooting is further complicated by ever-climbing storage capacities, data rates, and protocol complexity. Faster and more powerful analyzers are needed to keep up.

Traditionally, those needing to capture large amounts of traffic have been faced with competing solutions with limited trace buffers, long waits to view the data, slow searches and slow saving.

The powerful SerialTek BusXpert PRO revolutionizes the analysis of devices and systems utilizing the high speed SAS and SATA storage protocols.

The analyzer employs advanced technologies such as a PCI Express x4 uplink to the host (550 MB/s), up to 36 GBs of buffer, hardware accelerated gigabit Ethernet, pre-indexed and compressed trace data, multiple analysis processors, and instant display of the captured data. The BusXpert also features easy to use triggering, pre/post-filtering, textual search and sequence search, and many different displays of the captured traffic.

Multiple Pro units can be cascaded together to record data traffic on multiple ports, simultaneously, and view the data in one integrated display.

In addition to Microsoft Windows, the software is supported on a number of Linux distributions including Fedora, Ubuntu and RedHat/CentOS. An rich and full-feature API is also provided to allow for a programmatic method to control, manage the analyzer and process captured trace data.

The SAS/SATA BusXpert software consists of a powerful set of views (see pages 2 and 3) that allow the user, using a GUI, to select and set-up an analyzer, prepare the analyzer for taking a trace, specifying and designing triggers and monitoring the trace. Once the trace is complete, a trace viewer is used to analyze the trace.

The BusXpert provides a variety of powerful traffic displays, with some optimized for different protocol layers, some optimized for time relationships, some correlate directly with the SAS and SATA specification, and some provide just the user data. All of the views are exportable via CSV and XML. Additionally, some can be exported to HTML. Bookmarks make it easy to label and discuss specific events in the trace.

Protocol View

The *PROTOCOL view* shows the precise timing relationship of each D-Word in the trace. It is useful for tracking the handshaking between products under test.

Spreadsheet View

The *SPREADSHEET view* provides extensive decoding of frames, primitives, and Out-of-Band events, and sorts them to show the order they occurred in. The displayed columns are chosen from an extensive list of fields and events.

Histogram View

The **HISTOGRAM view** displays logic signal transitions as an event in time.
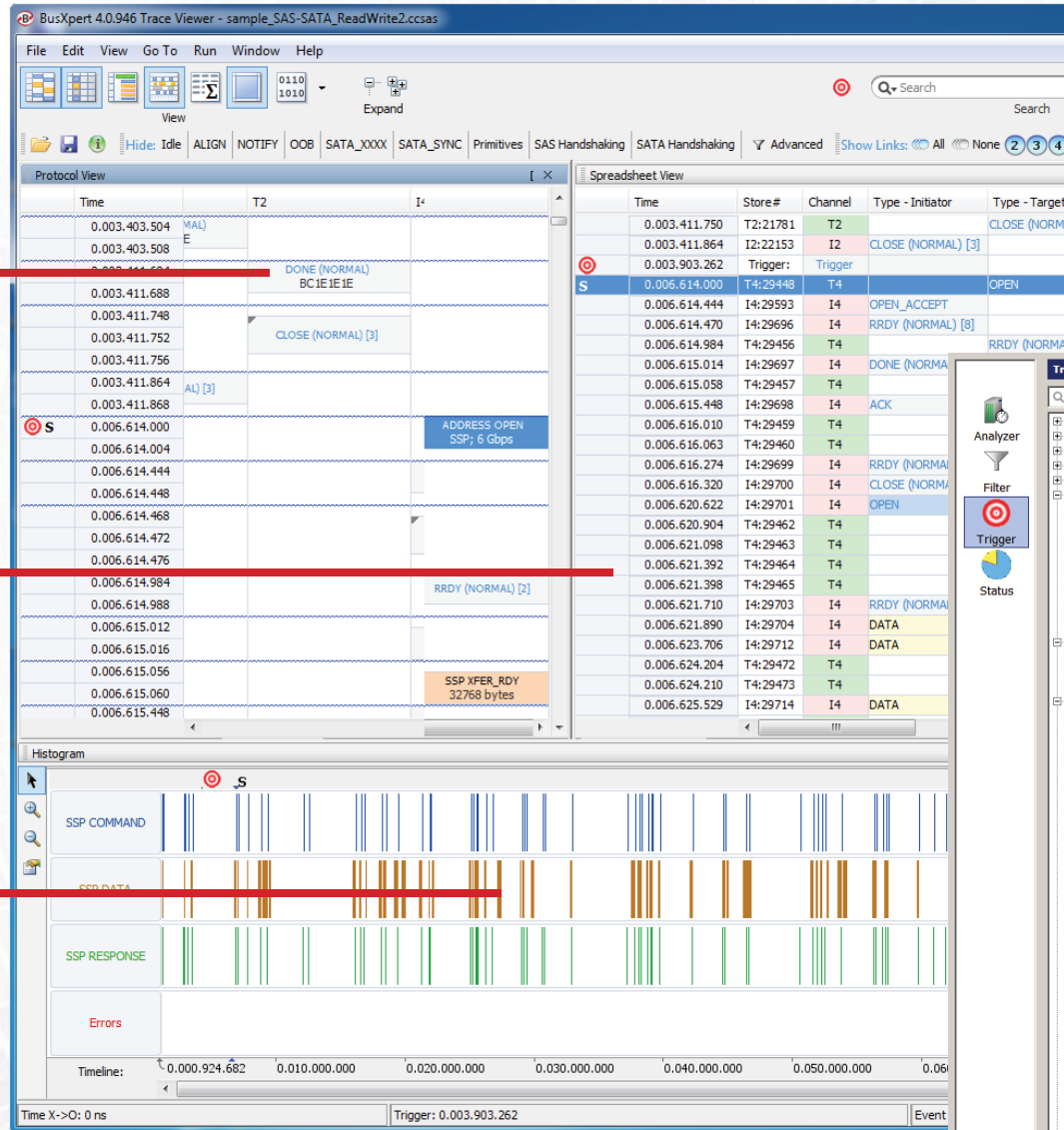
Capture Control View

The *CAPTURE CONTROL view* allows the user to set up the analyzer for trace capture. The analyzer may be stopped in one of three ways: manual stop, buffer full, and by a trigger.

Filter View

The *FILTER view* allows users to select items to be filtered from the trace. Filtered items are not part of the trace data and are not recoverable. Filtering is used to decrease unwanted items in the trace buffer allowing longer trace times to be taken. Items that are to be included in the trace are checked. Additional items can be added to the filter list through the "Options" menu.

Transaction View

Frames may actually be scattered all over the trace (in time), but this view collects all the frames involved in a command and groups them together. Transactions can be expanded or collapsed, and the "Expand All"/"Collapse All" buttons on the main toolbar work in this view too (they only change the active view).

Capture Control Start Capture Help

Details
Hex Bin Dec Display ▼ Copy ▼ Prev ▼ Next ▼

Open Address Frame:

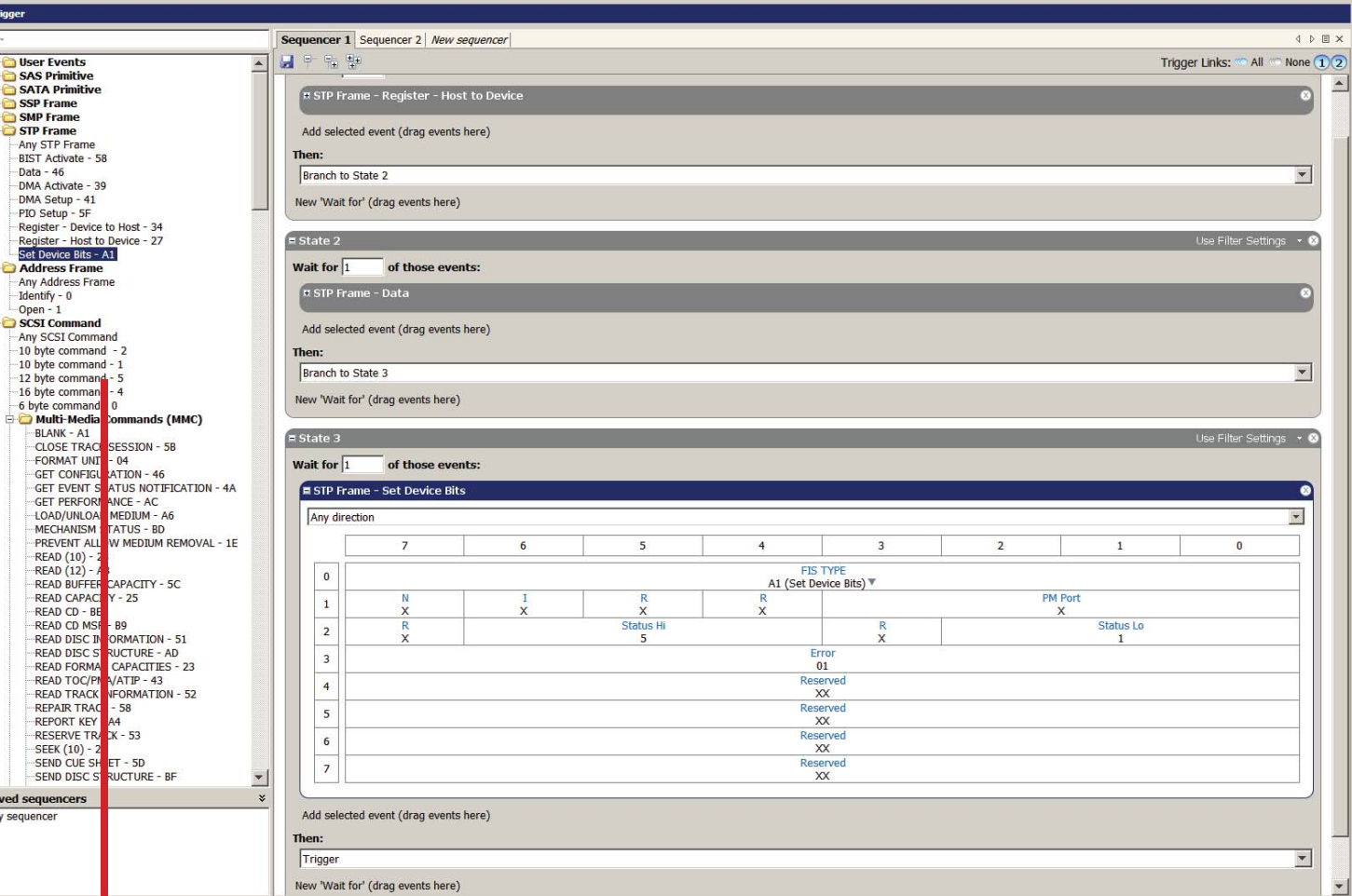|	7	6	5	4	3	2	1	0
0	INITIATOR PORT 0		PROTOCOL 1 (SSP)			ADDRESS FRAME TYPE 1 (OPEN)		
1			FEATURES 0 (No additional features)			CONNECTION RATE A (6 Gbps)		
2								

Decode
CLOSE (NORMAL) [3]
CLOSE (NORMAL) [3]
Trigger
ADDRESS OPEN; PROTOCOL:1(SSP
OPEN_ACCEPT
RRDY (NORMAL) [8]
RRDY (NORMAL) [2]
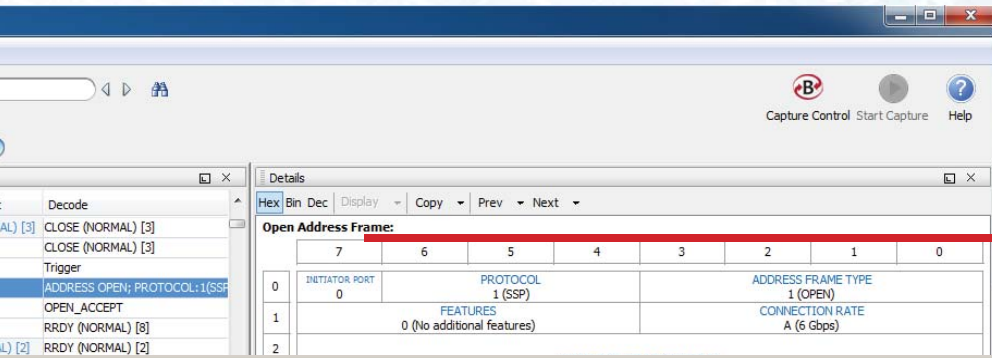
Frame Details View

The *FRAME DETAILS view* shows each frame in the format used by the SAS or SATA specification.

Sequencer 1 Sequencer 2 *New sequencer*

Trigger Links: All None ① ②

STP Frame - Register - Host to Device

Add selected event (drag events here)

Then:
Branch to State 2

New 'Wait for' (drag events here)

State 2   Use Filter Settings ▼

Wait for 1 of those events:

STP Frame - Data

Add selected event (drag events here)

Then:
Branch to State 3

New 'Wait for' (drag events here)

State 3   Use Filter Settings ▼

Wait for 1 of those events:

STP Frame - Set Device Bits

Any direction

	7	6	5	4	3	2	1	0
0				FIS TYPE A1 (Set Device Bits) ▼				
1	N X	I X	R X	R X			PM Port X	
2	R X		Status Hi 5			R X		Status Lo 1
3				Error 01				
4				Reserved XX				
5				Reserved XX				
6				Reserved XX				
7				Reserved XX				

Add selected event (drag events here)

Then:
Trigger

New 'Wait for' (drag events here)

User Events
SAS Primitive
SATA Primitive
SSP Frame
SMP Frame
STP Frame
Any STP Frame
BIST Activate - 58
Data - 46
DMA Activate - 39
DMA Setup - 41
PIO Setup - 5F
Register - Device to Host - 34
Register - Host to Device - 27
Set Device Bits - A1
Address Frame
Any Address Frame
Identify - 0
Open - 1
SCSI Command
Any SCSI Command
10 byte command - 2
10 byte command - 1
12 byte command - 5
16 byte command - 4
6 byte command - 0
Multi-Media Commands (MMC)
BLANK - A1
CLOSE TRACK SESSION - 5B
FORMAT UNIT - 04
GET CONFIGURATION - 46
GET EVENT STATUS NOTIFICATION - 4A
GET PERFORMANCE - AC
LOAD/UNLOAD MEDIUM - A6
MECHANISM STATUS - BD
PREVENT ALLOW MEDIUM REMOVAL - 1E
READ (10) - 2
READ (12) - A
READ BUFFER CAPACITY - 5C
READ CAPACITY - 25
READ CD - BE
READ CD MSF - B9
READ DISC INFORMATION - 51
READ DISC STRUCTURE - AD
READ FORMAT CAPACITIES - 23
READ TOC/PMA/ATIP - 43
READ TRACK INFORMATION - 52
REPAIR TRACK - 58
REPORT KEY - A4
RESERVE TRACK - 53
SEEK (10) - 2
SEND CUE SHEET - 5D
SEND DISC STRUCTURE - BF

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Trigger View

The *TRIGGER* view is where the user defines and builds the stop trigger. The trigger watches for a certain event (or sequence of events) and then causes the analyzer to stop after the fills according to the settings in the capture control view. Trigger sequences are defined by dragging trigger events into the sequencer menu. Events may be further edited and defined in the sequencer menu. Within the sequencer, a user can define actions based on the event result. Actions include: Trigger, External Trigger Count, Count per Second, Increment Counter, Reset Counter and Branch to a New State. New States may be defined within a trigger sequencer; many states can be defined within a trigger sequencer. Individual trigger sequencers may be defined in the trigger view. Trigger sequencers act independently and the first sequencer to trigger causes the analyzer to stop. Remaining sequencers do not cause triggers after the first sequencer triggers.

The front panel LEDs are replicated in the Status view allowing LED status to be monitored remotely through the BusXpert software

Link utilization is graphed real time in terms of reads, writes and combined. Both bar graphs and speedometers display link utilization. Performance data may be logged into a specified user file.

Data may be filtered by "clipping" or specifying the amount of data in each transfer to filter out. Buffer size can be specified as a % of the total buffer. When in trigger mode, users specify how much buffer space as a percentage is allocated to the trace before and after the trigger event. Buffer memory can be segmented into 1 to 256 segments. The trigger sequence is applied to each segment consecutively resulting in multiple captures without having to manually restart the analyzer.

A number of physical parameters in the analyzer are set in the capture control view.

Serialtek makes available the Analyzer in a variety of different configurations to meet varying corporate requirements for buffer size, protocols and budget. Contact us to schedule a demo and learn more.

All BusXpert analyzers also come with a 3 year Hardware warranty, free product support, and no software maintenance fees for the life of the analyzer. And we provide no obligation, no cost evaluation units.

Our tools are designed to accurately capture, decode and analyze high-speed storage and communication traffic. Our solutions help engineers verify, locate and resolve issues with their product designs. This shortens development and testing cycles, improves product quality and reduces time to market.

Specifications

	PRO	PRO rev. B
Data Rates Supported	SATA: 1.5, 3 and 6 Gb/s; SAS: 1.5, 3 and 6 Gb/s	
Trace Buffer	Up to 36 GB	
Front Panel Test Port Connectors	3 Configurations (Mini SAS, SATA x2 or SATA x4)	HDminiSAS
Connectors for Triggers	Trigger In, Trigger Out	
Front Panel Controls	Power ON/Off, Manual Trigger	
Front Panel Status LEDs	Mux, Speed, OOB, Link, Frame, 10b Error, Command Status, Error Status	Speed, OOB, Link, Frame, 10b Error, Command Status, Error Status
Rear Panel Connectors	Power, Ethernet, PCI Express, Logic Adapter, Cascade	Power, Ethernet, USB 3.0, Logic Adapter, Cascade
Communication Interfaces	GigaBit Ethernet, PCI Express x4	GigaBit Ethernet, USB 3.0
Dimensions	8.75 inches/22.25 cms (width) x 15 inches/38.10 cms (depth) x 3.5 inches/5.08 cms (height)	10 inches/17.78 cms (width) x 16 inches/40.64 cms (depth) x 3.5 inches/5.08 cms (height)
Weight	10 lbs; 4.5 kgs	
Power	100-240VAC 50-60Hz (Max Power: 200W)	
Environmental	Operating: 40 Degrees C Max Ambient Temperature	
Regulatory	CE/FCC Approved	

SerialTek

22 Great Oaks Blvd, Suite 150, San Jose, CA 95119

Phone 408-436-8080. Fax 408-436-8098

http://www.serialtek.com