

## FEATURES & BENEFITS

- Support for SAS and SATA 1.5, 3.0 and 6.0 Gb/s speeds
- Up to 4 ports on the PRO and 2 ports on the Micro of error injection
- Available as a stand-alone system
- License by port, speed and protocol for desired configurations
- Unparalleled Error Injection including:
  - Connect and disconnect link
  - CRC and 8b10b encoding, running Disparity and Invalid Symbol encoding error generation
  - Replace/substitute primitives
  - Replace frame values (with or without CRC regeneration)
  - Insert/Delete DWORD into from frame

## ADVANTAGES

- Simple to use BusXpert software means you spend less time on training and more time on analysis
- Easy definition of frames
- Provides random or interval error generation
- Support of logical branching and arguments

For today's SAS and SATA developers and integrators, verifying design robustness and error recovery can be a challenging task, especially when it is difficult to duplicate test cases and customer issues.

Troubleshooting is further complicated by ever-increasing storage capacities, network architectures, data rates, and protocol complexity.

The BusMod Error Injector gives designers the ability to insert a variety of errors into a live data stream to test real-time error handling, system recovery, and duplication of issues seen in the field. Used in conjunction with BusXpert SAS/SATA analyzers, users can easily verify correct and incorrect responses to issues caused by the error injector.



The screenshot shows the BusMod software interface with a sequencer configuration. The left pane shows a tree view of event types, with 'Data - 46' selected under 'STP Frame'. The main window shows 'State 1' with the event 'ATA Command - READ DMA EXT' and the action 'Branch to State 2'. 'State 2' is configured to wait for a random event (up to 3) and then perform an 'Inject CRC Error' action on a selected 'STP Frame - Data' event.

	7	6	5	4	3	2	1	0
0								
1	R	R	R	R				PM Port X
2								Reserved XX
3								Reserved XX

Figure 1: Forcing a CRC error on a random DATA FIS from the target

## BusMod Micro and PRO Error Injectors

BusMod's error injection provides the ability to create random and defined line errors such as CRC or 8b10b encoding errors, modify or replace frames, frame data and primitives. BusMod also has the capability of generating the SATA Built-In-Self-Test (BIST) frame for testing physical compliance of both hosts and devices.

Used with the Frame Error Rate Counter (FERC) capability of the BusXpert analyzers, the BusXpert Micro and Pro systems become versatile SATA compliance test tools.

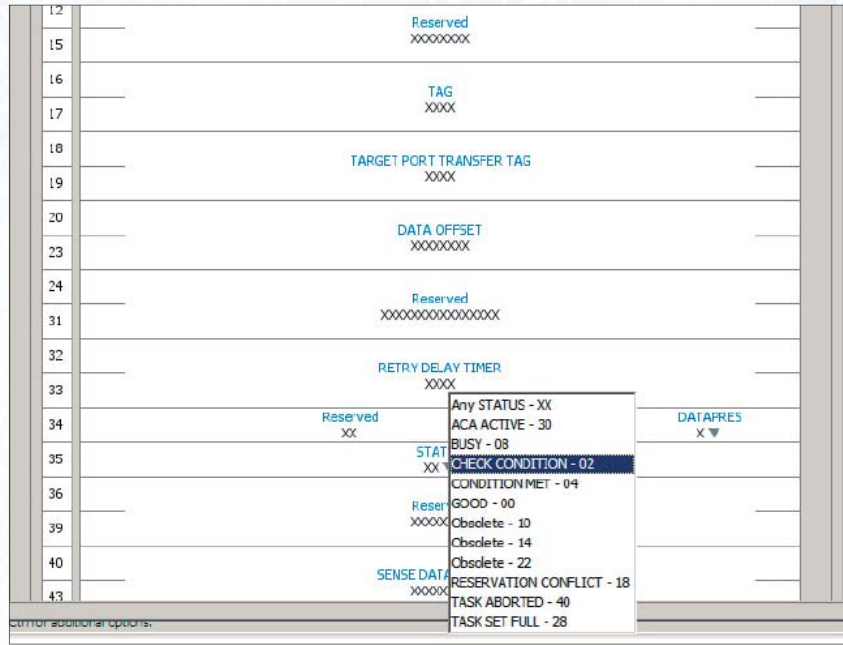


Figure 2: Modifying an SSP Response frame field to Check Condition

## Sample Configurations and Part Numbering

The BusXpert PRO and Micro series are available in several different configurations. Below is a sampling of configurations with part numbers:

Part Number	Description
MJ-1x3ST	BusMod Error Injector, 1-port, 1.5/3.0 Gbps SATA only
MJ-2x6SA	BusMod Error Injector, 2-port, 1.5/3.0/6.0 Gbps SAS/SATA
PJ-m4x6SA	BusMod Error Injector, 4-port, 1.5/3.0/6.0 Gbps SAS/SATA, MiniSAS Connectors

## Specifications

	Micro	PRO
Data Rates Supported	SAS and SATA: 1.5 Gb/s, 3 Gb/s and 6 Gb/s	
Dimensions	6 inches (width) x 9 inches (depth) x 1.75 inches (height) / 152mm x 229mm x 44mm	8.75 inches (width) x 15 inches (depth) x 3.5 inches (height) / 223mm x 387mm x 89mm
Weight	3 lbs / 1.4 kgs	10 lbs / 4.5 kgs
Power	19V-4.7A (External Switching Power Adapter provided by SerialTek)	100-240VAC 50-60Hz
Environmental	Operating: 40 Degrees C Max Ambient Temperature	
Regulatory	CE/FCC Approved	



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