

Introduction

SATA DEVSLP presents challenges to traditional SATA analysis tools as the command is now external to the serial data stream. Development using DEVSLP requires that relationships between logic signals and SATA serial data be observable and measurable.

The SerialTek BusXpert Logic Adapter overcomes these and other challenges by serializing logic signals, including DEVSLP, and transmitting the data simultaneously with captured serial data. Both logic and serial data are displayed side-by-side for further analysis using BusXpert. Using the Logic Adapter and BusXpert Analyzer enables easy and effortless development of low-power SATA devices using DEVSLP.

Setup

Analysis of a system using DEVSLP requires the use of a BusXpert Micro, Micro II or Pro Analyzer with at least two ports, a BusXpert Logic Adapter and the DEVSLP breakout Power SATA cable.

Configure the BusXpert Analyzer for data capture. For assistance with this configuration, refer to the "Getting Started with Capture Control" located in the Help section of the BusXpert software.

Connect the Logic Adapter to wall power (100-240 VAC) using the provided power cord. Connect the SATA port labeled "To Analyzer" located on the rear of the Logic Adapter to the I1 port of the BusXpert analyzer using a SATA cable.

Ensure that the host supports DEVSLP through the SATA power connector per the SATA specification. Use the DEVSLP breakout SATA power cable to connect the power of the drive under analysis to the DEVSLP enabled host SATA power connector.

Connect the grey DEVSLP wire lead of the breakout cable to pin 23, labeled DEVSLP, of the Logic Adapter. The lead may be connected either directly to the pin or can be connected to the purple wire of the 9-pin wiring harness supplied with the Logic Adapter. Connect the black ground wire lead of the breakout cable to pin 24, labeled with a ↓ symbol, of the Logic Adapter.

It is critical that the system under analysis is grounded

to the Logic Adapter to ensure proper noise immunity. Adjust the threshold setting of the input pins 16 – 23 by rotating the selector switch (located directly above pins 16-23) to the appropriate voltage setting for the input. Since DEVSLP is defined as a 2.1V active high signal, a setting of 1.4V would be appropriate.

It should be noted that pin 23 of the Logic Adapter has special circuitry to accommodate for the slow rise time of the DEVSLP signal. The DEVSLP signal may be attached to other inputs of the Logic Adapter but may produce multiple triggering due to noise through the trigger region.

Note: Additional logic signals may be connected to the remaining input pins of the Logic Adapter. Any additional signals connected to pins 16 to 22 will trigger the Logic Adapter with the same threshold voltage set for pin 23 – DEVSLP. Logic signals connected to pins 0 to 7 and 8 to 15 should have their threshold voltages set by the corresponding V threshold switches. Proper grounds should be connected to the ground pins to prevent switching from spurious noise.

Connect the SATA port of the drive under analysis to port T2 (or T3 or T4 if available) of the analyzer using a SATA cable. Connect port I2 (or I3 or I4 if used) to the SATA port of the host controller using a SATA cable.

Power Up

Power on the Logic Adapter by switching the On-Off switch located the right side of the front panel to "On". The Power LED, located directly above the On-Off switch will light green indicating the Logic Adapter is powered. Power on the BusXpert Analyzer by switching the On-Off switch located on the left side of the front panel to the "on" position.

Ensure that the drive under analysis is powered by the host system. The "Link" Leds should indicate that an error free link has been established to the drive under analysis. For additional help in establishing an error free link refer to the "Getting Started With Capture Control" and the "Troubleshooting" sections of the BusXpert Help.

Software Setup

Start the BusXpert software and select the appropriate analyzer. Note that the Logic Adapter does not show up in the Capture Control window as a separate device but is assumed to be connected to the selected analyzer. The Logic Adapter is supported by BusXpert Software release 4.0.905 or later. The release version is always displayed at the top of the window running the BusXpert software. The latest version of BusXpert software is available at the SerialTek website – www.serialtek.com.

Enable the Logic Adapter by checking the “Enable Logic Adapter” checkbox located at Edit > Options in the menu system (see figure 1). Failure to enable the Logic Adapter will result in the Logic Adapter not being recognized by the analyzer and errors will be present in the trace.

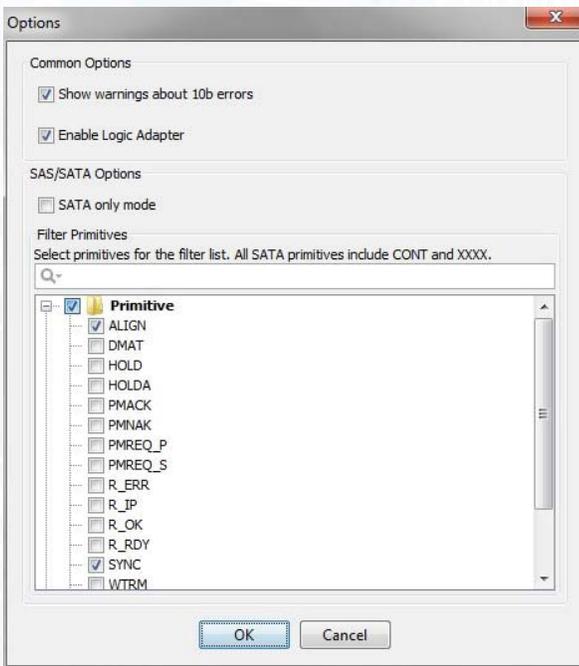


Figure 1: Enable Logic Adapter Checkbox

Depending on how the storage system is to be analyzed, the “Trigger” option may be selected in the “Stop Mode” pull-down located in the Capture Control window. If the “Trigger” option is selected, a trigger needs to be set up in the Trigger window. For additional help in setting up triggers refer to the “Getting Started with Capture Control” and the “Triggers” sections of the BusXpert Help.

The analyzer can trigger using logic signals as part of the trigger definition. Logic signals can be dragged into the appropriate sequencer like any other trigger event. Use the event labeled “Logic Signals” and drag the event into the trigger sequencer (see figure 2). The expanded event displays all 24 logic signals in hex with an initial state of “X” or don’t care. The analyzer can trigger on DEVSLP changes by setting bit 23 to a 1 or 0, depending on the whether to trigger on DEVSLP asserted or non-asserted.

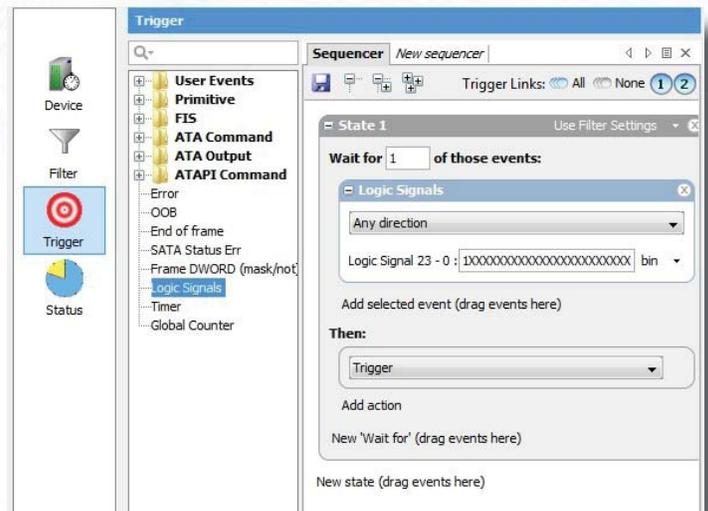


Figure 2: Putting Event into Trigger Sequencer

Trace Capture

The trace using the Logic Adapter is captured the same way as any other trace using the BusXpert analyzer. For additional help on trace capture refer to the “Getting Started with Capture Control” section of the BusXpert Help.

Trace Viewing

Trace results are displayed in the Trace Viewer window. For additional help on using the Trace Viewer, refer to “Getting Started With Trace View” and “Viewing the Trace” sections of the BusXpert Help.

Logic signals are displayed in the Protocol, Spreadsheet and Histogram views in the Trace Viewer. The signals themselves are displayed in the H1 (Host 1) column. Only transitions that occur on logic signals are displayed. NOTE: The Logic Adapter internally uses a weak pull up resistor on each input pin. Unused inputs or floating signals are displayed as a “1”.

Using the BusXpert Logic Adapter with DEVSLP

DEVSLP transitions are displayed in the Protocol and Spreadsheet views with a rising edge or falling edge display to indicate the transition (see figure 3). The values of all 24 signals are displayed along with the DEVSLP display during a DEVSLP transition. If there are other logic signals that change value and DEVSLP does not change value, the values of all 24 signals are displayed with a "Logic Signal" label (see figure 4).

Time	H1	H2
0.249.045.736		
0.249.045.744		R_OK 3535B57C
0.249.045.752		
0.249.339.896		
0.249.339.904	DEVSLP FFFFFF	
0.249.339.912		
0.250.485.776		
0.250.485.784		
0.250.485.792		X_RDY [3]
0.250.485.800		

Figure 3: DEVSLP Transition In Protocol View

Time	H1	H2
0.237.016.360		
0.237.016.368		RX Sequence [239]
0.237.016.376		
0.237.016.384		
0.237.049.856	Logic Signal DFFFFFF	
0.237.049.864		
0.237.206.072		
0.237.206.080		
0.237.206.088		
0.237.206.096		

Figure 4: DEVSLP Value Not Changing

When a logic signal change event is selected, the Display view, if enabled, displays the 24 bits of the selected logic signal change.

Logic signal transitions may be searched for using the quick search function located at the middle top of the Trace Viewer window. Begin typing "logic" into the quick search option and the quick search will complete the search term "Logic Signals=Logic Signals" (see figure 5). Select the term and quick search will navigate to the next logic signal transition in the display. Previous and subsequent transitions can be navigated to using the next and previous arrow buttons to the right of the quick search bar.

Advanced search can be used to locate specific logic signal values. Logic signal search events can be dragged into the advanced search window similar to the way logic signals were used in the trigger menu. For additional help on advanced search, refer to the "Advanced Search" section of the BusXpert Help.



Figure 5: Search For "Logic Signals=Logic Signals"

The Histogram view displays logic signal transitions as an event in time. To display logic signal events, first select the Histogram view for display. Click the "Settings" button on the far left of the Histogram view to bring up the Histogram Settings menu. Drag the "Logic Signals" event into the displayed events area on the right (see figure 6). Exit the Histogram Settings menu by clicking the "OK" button. For additional help on the Histogram View, refer to the "Histogram" section of the BusXpert Help.

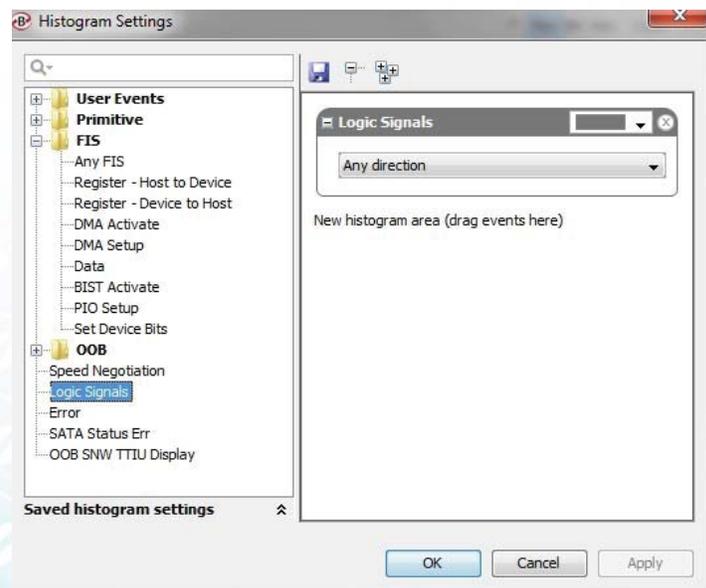


Figure 6: Viewing Logic Signal Transitions in Histogram View



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