SATA Protocol Triggering and Decode for Infiniium Series Oscilloscopes

Data sheet

This application is available in the following license variations.

- Order N8801A for a user-installed license
- Order option 038 for a factory-installed license with new 9000 Series oscilloscopes
- Order option 018 for a factory-installed license with 90000 or 90000 X Series oscilloscopes
- Order N5435A option 035 for a server-based license that works on both 9000, 90000 and 90000 X Series oscilloscopes

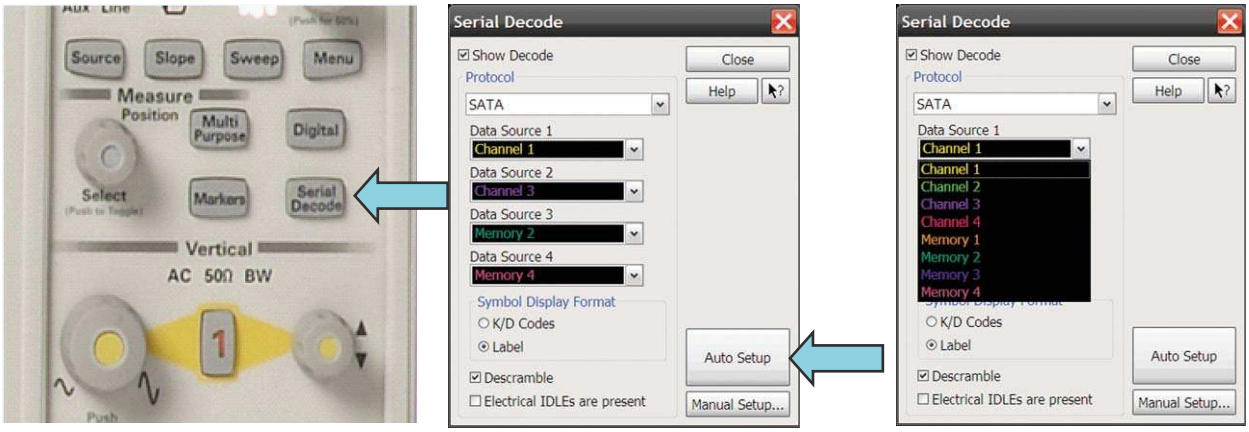
Agilent Technologies

SATA

SATA (Serial Advanced Technology Attachment) Serial bus is an interface used to connect ATA hard drives to a computer's motherboard. However, since these protocols transfer bits serially, using a traditional oscilloscope has limitations. Manually converting captured 1's and 0's to protocol requires significant effort, can't be done in real-time, and includes potential for human error. As well, traditional scope triggers are not sufficient for specifying protocol-level conditions.

Extend your scope capability with Agilent's SATA triggering and decode application. This application makes it easy to debug and test designs that include SATA buses using your Infiniium 9000 and 90000 Series oscilloscope.

- Set up your scope to show SATA protocol decode in less than 30 seconds.
- Get access to a rich set of integrated protocol-level triggers.
- Save time and eliminate errors by viewing packets at the protocol level.
- Use time-correlated views to quickly troubleshoot serial protocol problems back to their timing or signal integrity root cause.



Easy to find

Turn decode on/off via the "Serial Decode" button on the front of 9000 Series scopes or in the "Setup" menu. View decode embedded on the waveform display or in the protocol viewer listing window. (See pages 4-5.)

30 second SATA Setup

Configure your oscilloscope to display protocol decode in under 30 seconds. Use "Auto Setup" to automatically configure sample rate, memory depth, threshold and trigger levels, and clock recovery for SATA

Support for both live and saved waveforms

Perform and view decode information on both live and saved waveforms. Decode up to any combination of 4 live or saved waveforms.

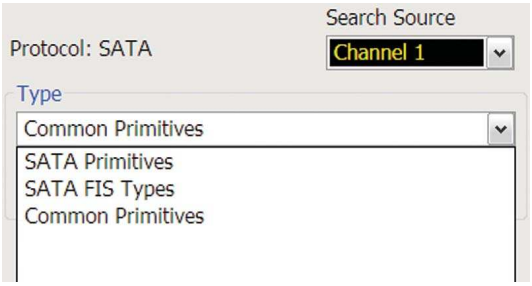
SATA setup, protocol triggering, and search capabilities

Get access to a rich set of integrated protocol-level triggers. The application includes a suite of configurable protocol-level trigger conditions specific to SATA. When serial triggering is selected, the application uses software-based triggering.

With software-based protocol triggering, the oscilloscope takes signals acquired using scope channels and reconstructs protocol frames after each acquisition. It then inspects these protocol frames against specified protocol-level trigger conditions and triggers when the condition is met.

SATA trigger and search setup

Quickly access the software-based trigger via the trigger or search menus. Software-based triggering enables quick setup of data, remote, or error frames.



Specify the type.

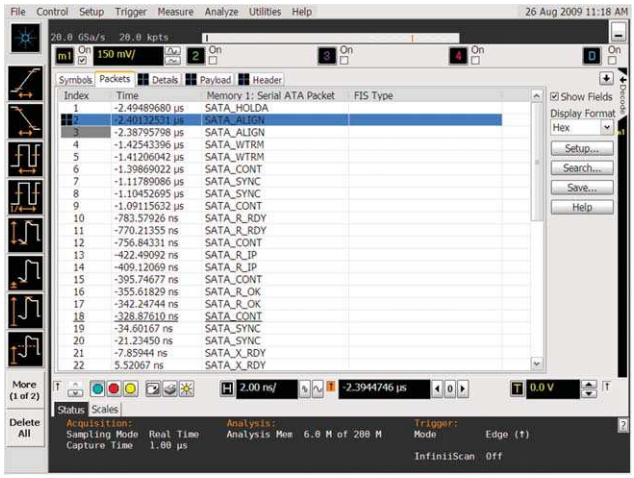
SATA primitives, SATA FIS Types and other frames can be acquired.

CAN protocol decode

Get access to a rich set of integrated protocol-level triggers. The application includes a suite of configurable protocol-level trigger conditions specific to SATA. When serial triggering is selected, the application uses software-based triggering.

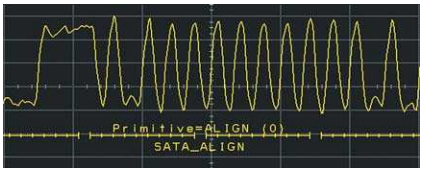
With software-based protocol triggering, the oscilloscope takes signals acquired using scope channels and reconstructs protocol frames after each acquisition. It then inspects these protocol frames against specified protocol-level trigger conditions and triggers when the condition is met.

Quickly move between physical and protocol layer information using the time-correlated tracing marker. Display protocol content using embedded decode in the waveform area, Or, see protocol events in a compact listing format. View the decode information in symbols or packets type.



Compact protocol using the full screen listing.

The protocol viewer window shows the index number, time stamp value identifier, packet type, and data values for each SATA packet. Data in the listing window can be saved to a .csv or .txt file for off-line

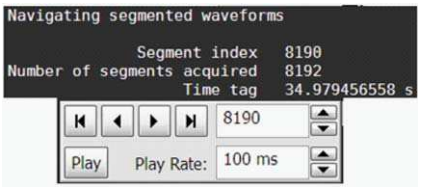


SATA decode embedded in waveform area

Utilize the oscilloscope waveform area to display decode information. Minor ticks indicate clock transitions and major ticks show segments within each SATA packet

Using multiple scopes?

Server-based licensing allows users to borrow an application for a specified period of time.



Long time captures using segmented memory

In this example, CAN traffic was captured for near 35 seconds. Segmented memory uses time tags to track time between segment acquisitions.

SATA application specifications and characteristics

SATA	
SATA sources	Analog channels 1,2, 3, or 4 Any waveform memories The application relies on probing and trigger/measurement thresholds to properly condition the signal for triggering and decode.
Data rate	1.5 Gb/s for 9000 Series scope 1.5 Gb/s, 3.0 Gb/s, 6 Gb/s for 90000 and 90000 X Series scope
Signal type	Single-ended, Differential
Auto setup	Automatically configures scope settings for proper SATA decode and SW-based protocol triggering including memory depth, edge triggering, holdoff, sample rate, and measurement thresholds
Decoded fields	All including extended frame format
Triggering (software-based)	Start of frame Data frame (frame containing node data for transmission) user specified value for data byte 0 in hex, binary, or decimal Immediately followed by data byte specified in hex, binary, or decimal Remote frame (frame requesting the transmission of a specific identifier) User specified identifier in hex, binary, or decimal Data or remote frame Error frame (frame transmitted by any node detecting an error)

Oscilloscope compatibility

The N8801A SATA protocol triggering and decode software is compatible with Agilent 9000, 90000A and 90000 X Series oscilloscopes operating software revision 2.10, or higher. For oscilloscopes with earlier revisions, free upgrade software is available at **www.agilent.com/find/scope-app-sw**

Date rate	Recommended purchase	Bandwidth of recommended oscilloscope
1.5 Gbps only	DSO9404A DSO/DSA90804A	4 GHz 8 GHz
1.5 Gbps or 3 Gbps	DSO/DSA91204A DSO/DSA91304A	12 GHz 13 GHz
6 Gbps	DSO/DSA91204A DSO/DSA91304A DSO/DSAX91604A DSO/DSAX92004A DSO/DSAX92504A DSO/DSAX92804A DSO/DSAX93204A	12 GHz 13 GHz 16 GHz 20 GHz 25 GHz 28 GHz 32 GHz

Note: While 10 GHz of bandwidth is recommended by the Serial ATA Revision 3.0 specification for testing 1.5 Gbps SATA links, the DSA90804A will provide accurate measurement results for signals with rising and falling edges of 70ps (20% - 80%) or slower. DSO9404A will have enough bandwidth for performing SATA 1.5 Gbps protocol triggering and decode.

Ordering Information and Related Literature

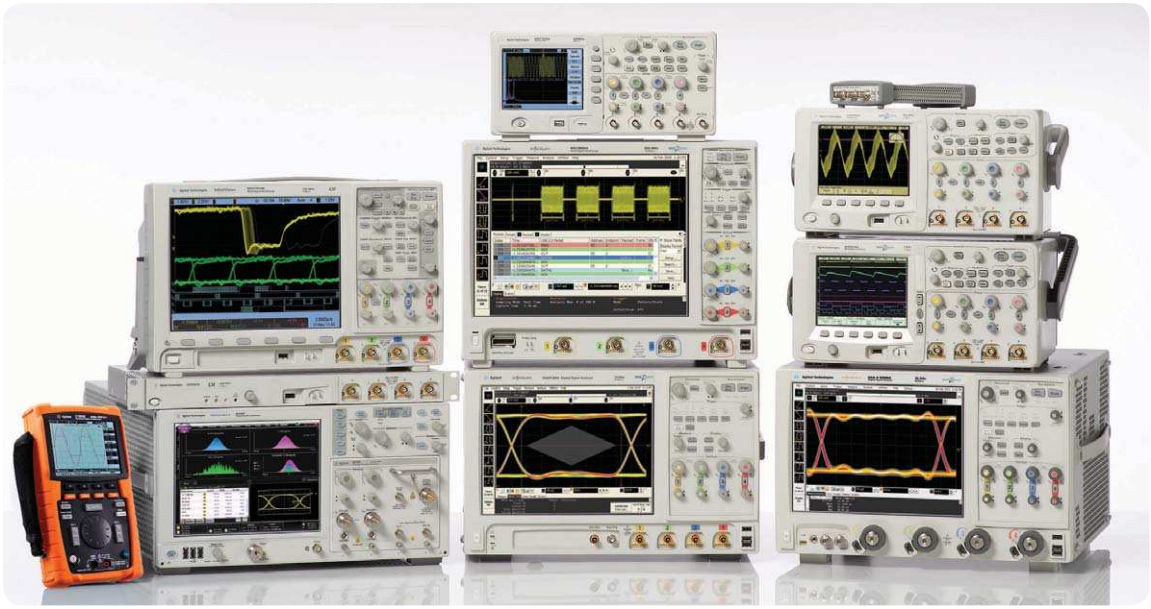
Ordering Information

This application is compatible with all 9000, 90000 and 90000 X Series oscilloscope models with version 2.1 or greater software.

Software applications	Factory-installed option for new scope purchases	User-installed stand-alone product number	Server-based license (N5435A option)
SATA triggering and decode	038 (9000 Series scope) 018 (90000 Series scope) 018 (90000 X-Series scope)	N8801A	035

Related Literature

Publication title	Publication type	Publication number
Infiniium 9000 Series Oscilloscopes	Data sheet	5990-3746EN
Infiniium 90000 Series Oscilloscopes	Data sheet	5989-7819EN
Infiniium 90000 X-Series Oscilloscopes	Data sheet	5990-5271EN
N5411B SATA 6 Gb/s Compliance Test Software	Data sheet	5990-3594EN



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