Keysight Technologies

N8805A USB 3.0 Protocol Triggering and Decode for Infiniium 90000 Series Oscilloscopes

Data Sheet



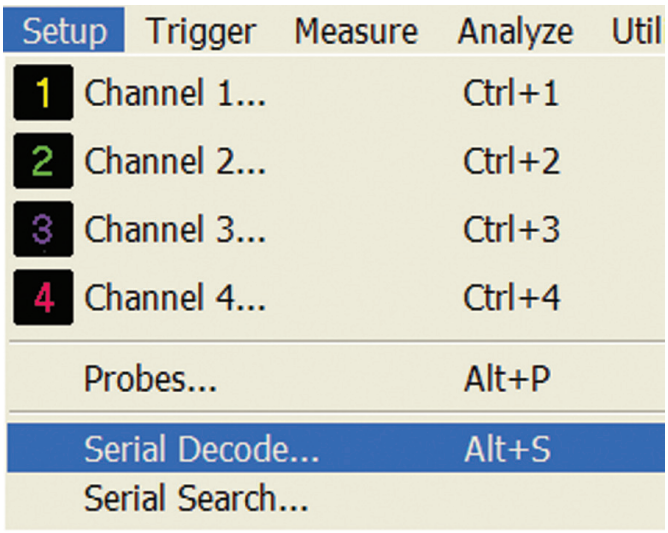
KEYSIGHT TECHNOLOGIES

Easily debug and test designs that include USB 3.0 protocols using your Infiniium 90000 scope

Serial bus interfaces such as USB (universal serial bus) interfaces are widely used today in electronic designs. In many designs, USB buses can provide a content-rich point for debug and test. However, since USB 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. In addition, traditional scope triggers are not sufficient for specifying protocol-level conditions.

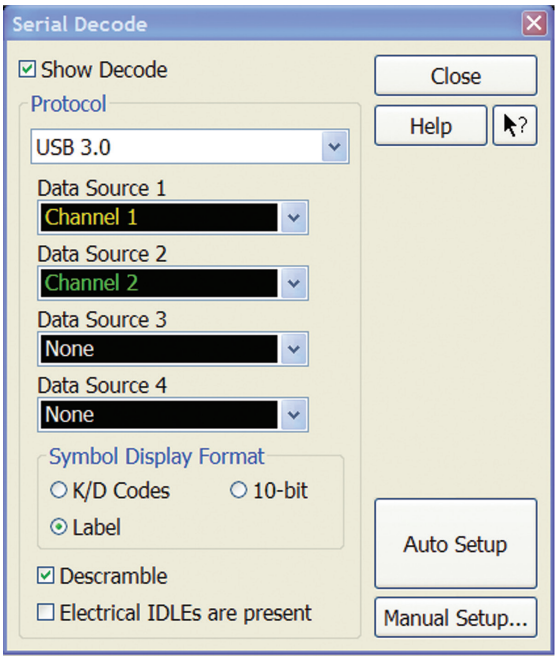
Extend your scope capability with the Keysight Technologies, Inc. USB 3.0 triggering and decode application. This application makes it easy to debug and test designs that include USB 3.0 protocols using your Infiniium 90000 scope.

- Set up your scope to show USB 3.0 protocol decode in less than 30 seconds.
- Get access to a rich set of integrated software-based protocol-level triggers.
- Save time and eliminate errors by viewing packets at the protocol level.
- 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 in the "Setup" menu. View decode embedded on the waveform display or in the protocol viewer listing window. (See pages 4-5).



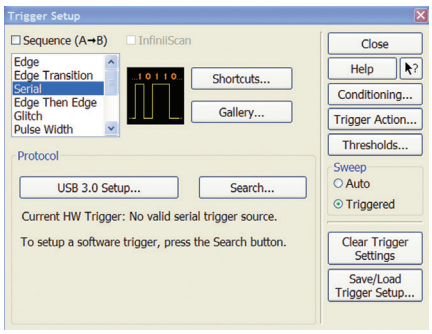
30 Second USB 3.0 Setup

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

USB 3.0 protocol triggering and searching

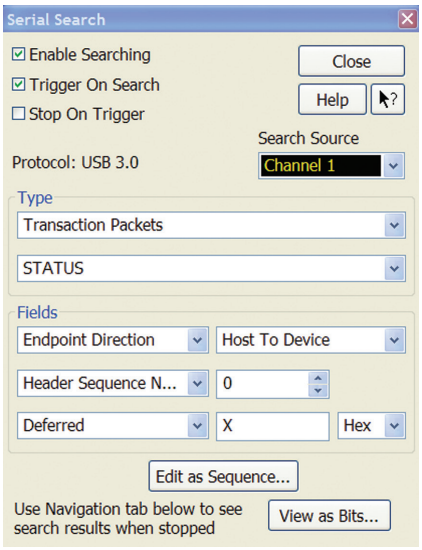
Get access to a rich set of integrated protocol level triggers. The application includes a suite of configurable protocol-level trigger conditions specific to USB 3.0. The application uses software-based search triggering when serial triggering is selected.

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.



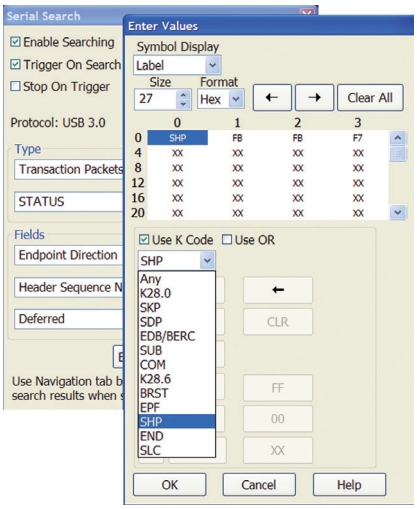
USB Trigger Setup

Quickly access protocol triggering via the scope's trigger menu.



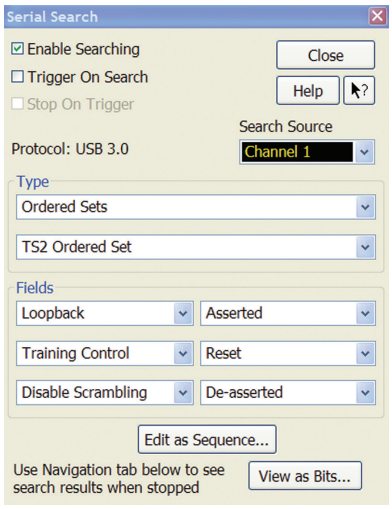
USB Trigger Setup

Choose triggers from a broad range of USB 3.0 protocol, including ordered sets, link commands, data packets, symbol sequence and errors.



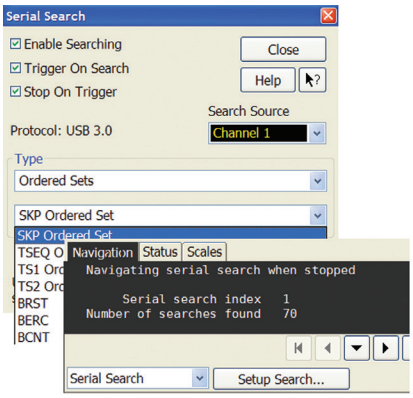
Payload editor

Use the payload editor to specify data values word by word.



Post-acquisition searching

Search acquired protocol listings using a menu that is identical to the trigger menu.



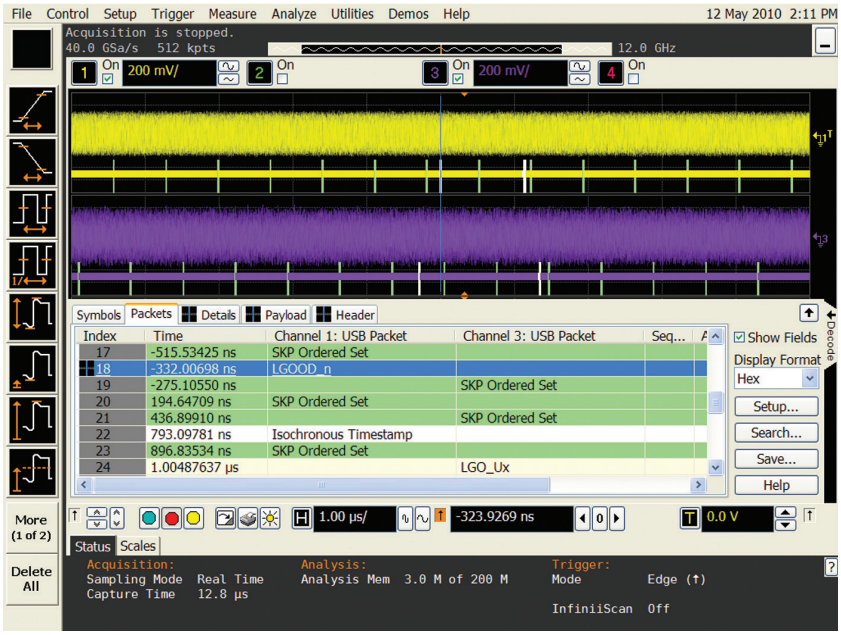
Quickly find occurrences

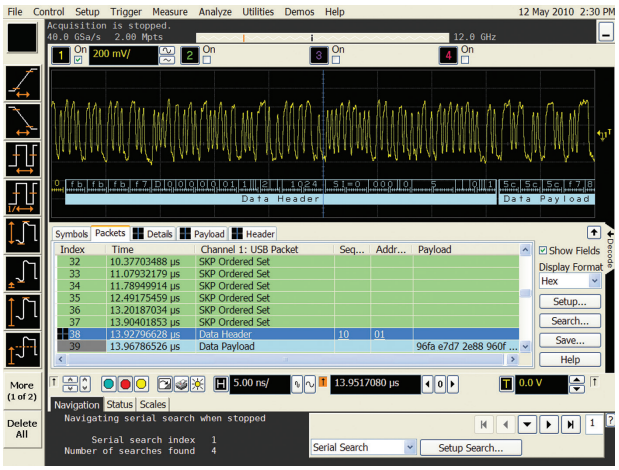
Quickly move to next occurrence of a specified event.

USB 3.0 super-speed protocol decode

USB 3.0 Super-Speed protocol decode with precise time-correlation between waveforms and listing

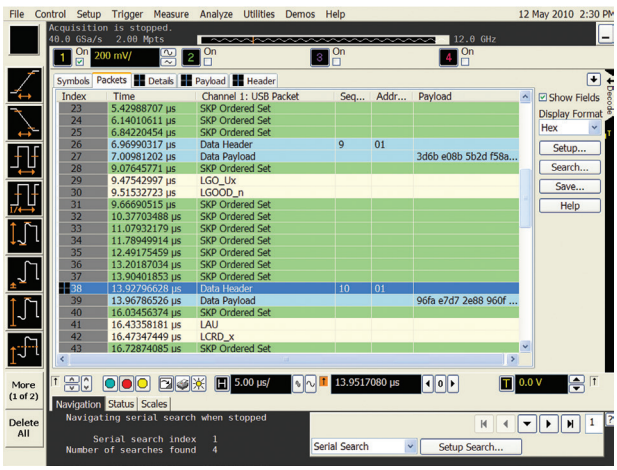
Keysight's multi-tab protocol viewer includes correlation between the waveforms and the selected packet. The selected packet, highlighted blue row in the listing, is time-correlated with the blue line in the waveform display. Move the blue tracking marker in time through waveforms and the blue bar will automatically track in the packets window. Or, scroll through the packet viewer and highlight a specific packet. The time-correlation tracking marker will move to the associated point in the waveform.





USB 3.0 decode embedded in waveform area

Utilize the oscilloscope waveform area to display decode information. For USB, minor ticks indicate clock transitions and major ticks show the beginning and end of each word in the serial packet.

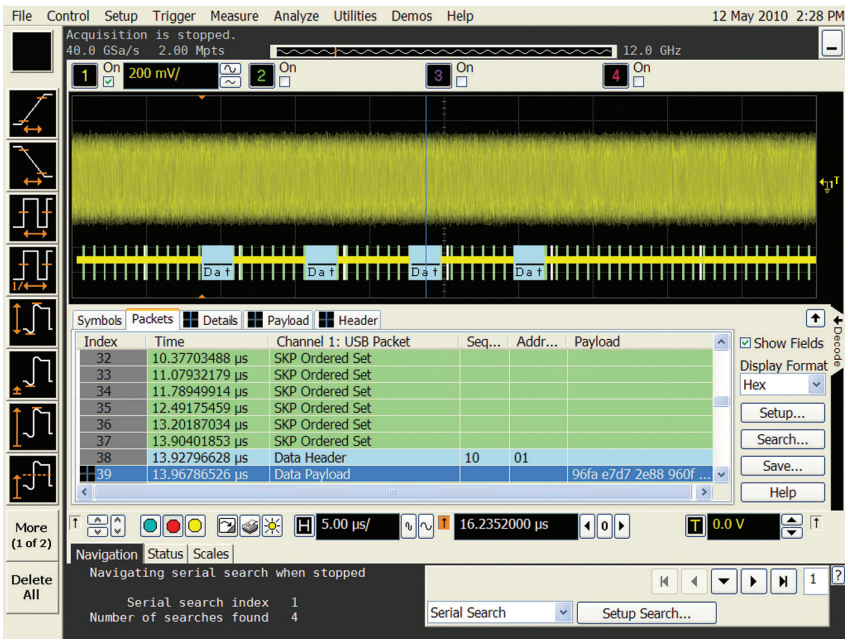


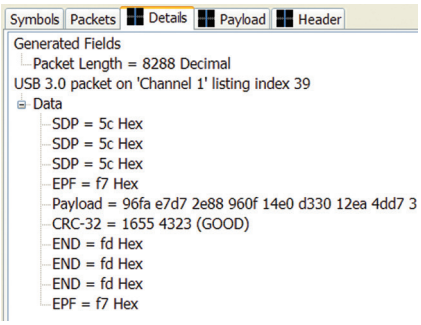
Full screen USB 3.0 listing

Fill the entire display with compact protocol information using the full screen listing. The protocol viewer window shows the index number, time stamp value, and data content for each serial packet in the list. Scroll though all decoded serial packets to find events of interest or errors in the transmission. Data in the listing window can be saved to a .csv or .txt file for off-line analysis or documentation.

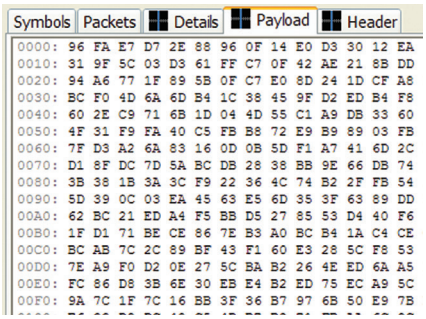
USB high-speed protocol decode

Quickly move between physical and USB 3.0 Super-Speed 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 using the industry's first scope based multi-tab protocol viewer. For minor tick marks indicate clock transitions. Major tick markets indicate sections of the USB 3.0 serial packet.

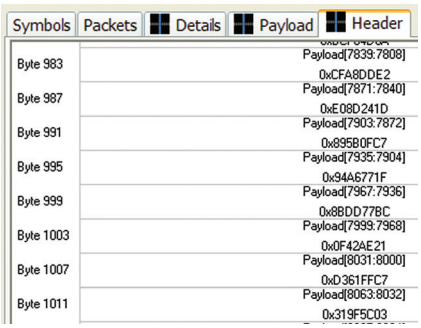




Details tab breaks the packets into easy-to- read textual fields. Hovering shows additional detail.



Payload tab shows data carried by the packet in byte-by-byte HEX and ASCII.



Header tab shows packets in a data book format. Hovering at any field reveals additional detail.

USB 3.0 specifications and characteristics

USB 3.0 supported speeds	Super-Speed (5 Gb/s)
Probing	Differential required for USB 3.0 active traffic
Auto Setup	Automatically configures trigger levels, measurement thresholds, Volts/div, vertical offset, memory depth, sample rate, trigger and holdoff for proper decode and triggering

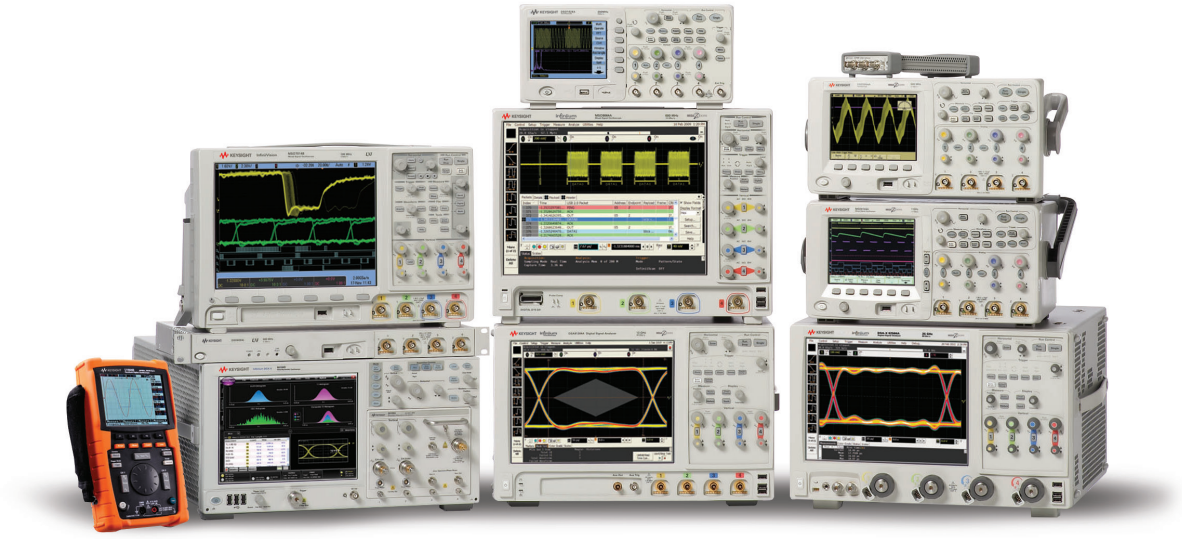
Ordering information

This application is compatible with all 90000 and 90000 X Series oscilloscope models with bandwidth of 6 GHz or more.

Software applications	**User-installed node-locked license**
USB 3.0 triggering and decode	License N8805A

Related literature

Publication title	**Publication type**	**Publication number**
Infiniium 90000 Series Oscilloscopes	Data sheet	5989-7819EN
USB 3.0 Compliance Test Software for Infiniium Oscilloscopes	Data sheet	5990-4115EN
Infiniium 9000 X-Series oscilloscope	Data sheet	5990-5271EN



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