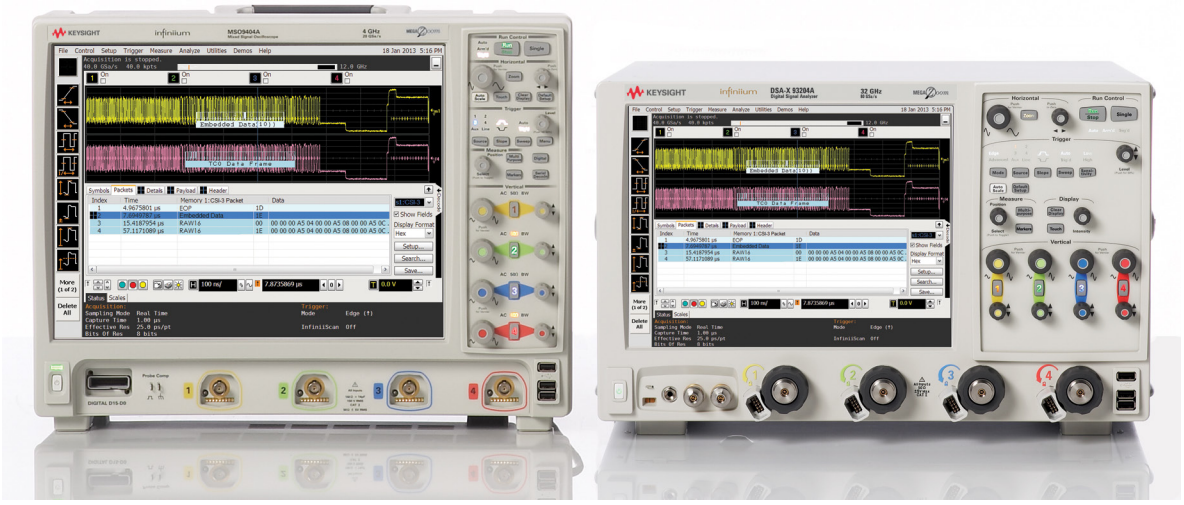
Keysight Technologies
MIPI CSI-3
Protocol Triggering and Decode
For Infiniium Series Oscilloscopes

Data Sheet



KEYSIGHT TECHNOLOGIES

This application is available in the following license variations.

- Order N8820A for a user-installed license
- Order option 068 for a factory-installed license with new 90000A, 90000 X- and 90000 Q-Series oscilloscopes
- Order N5435A option 065 for a server-based license that works on 90000A, 90000 X- and 90000 Q-Series oscilloscopes

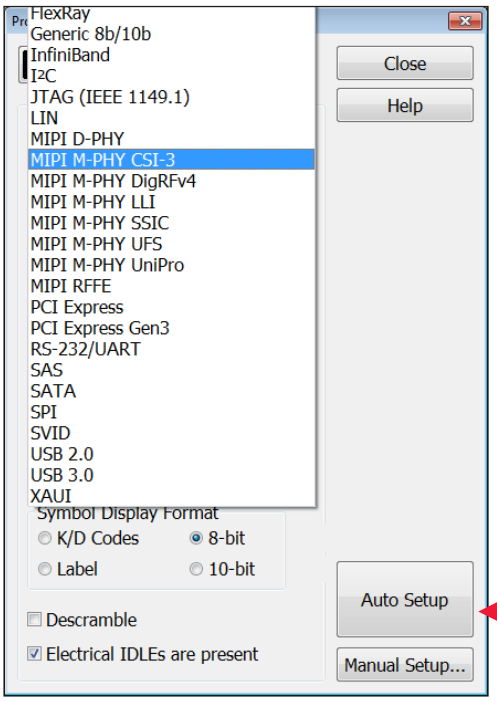
MIPI CSI-3 Description and Features

Camera Serial Interface version 3.0 (CSI-3) standard was developed by MIPI Alliance to increase performance through-put and greater feature set from CSI-2 standard. The CSI-3 interface runs on top of the MIPI M-PHY electrical layer as well as the MIPI UniPro protocol layer that is also developed by MIPI Alliance standard body. The serial bus interface provides content-rich points for debug and test. However, since this protocol transfers 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. Also, traditional scope triggers are not sufficient for specifying protocol-level conditions.

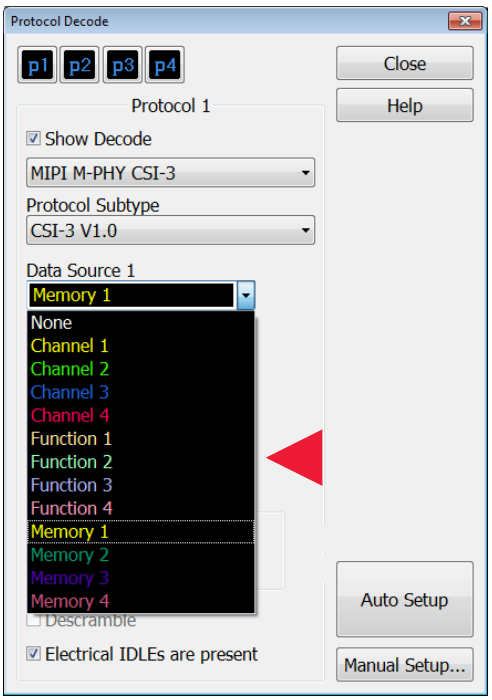
Extend your oscilloscope's capability with the Keysight Technologies, Inc. CSI-3 protocol decoder

This application makes it easy to debug and test designs that include CSI-3 buses using your Infiniium Series oscilloscope.

- Set up your scope to show CSI-3 and UniPro 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.



30-second CSI-3 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.



Support for live and saved waveforms
Perform and view decode information on both live and saved waveforms. Decode up to any combination of four live or saved waveforms or functions.

The following are the CSI-3 protocols and features that will be supported by the application.

1. Support CSI-3 v1.0 decode and triggering
2. Can be used together with the N8808A MIPI UniPro protocol decode to show both CSI-3 and UniPro packets
3. Decodes High-Speed (HS-BURST) and Low-Speed Pulse Width Modulation (PWM-BURST) modes
4. Supports search capability for Host and Device transactions as well as symbol sequence and errors.

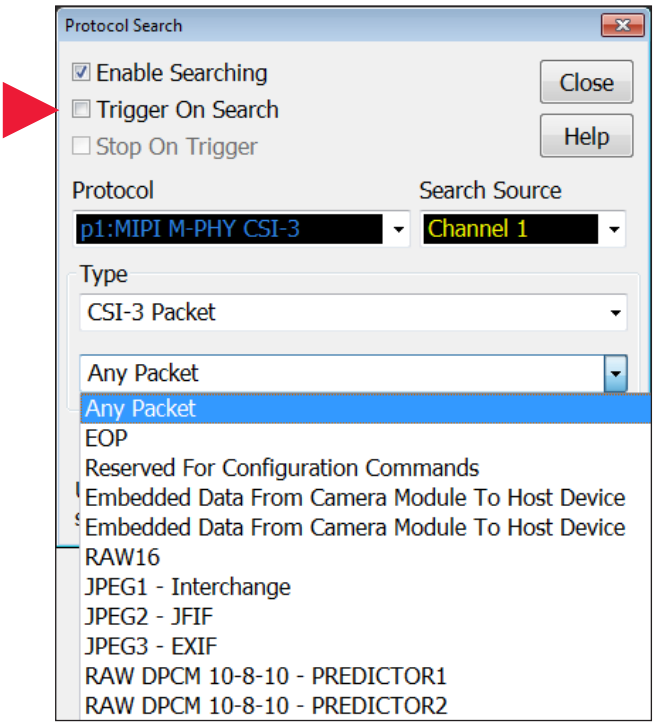
MIPI CSI-3 Setup, Protocol Triggering and Search Capabilities

Get access to a rich set of integrated protocol-level triggers.

The application includes a suite of configurable protocol-level trigger conditions specific to CSI-3. When serial triggering is selected, the application uses software-based triggering.

With software-based protocol triggering, the oscilloscope takes signals acquired using either oscilloscope or digital 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.

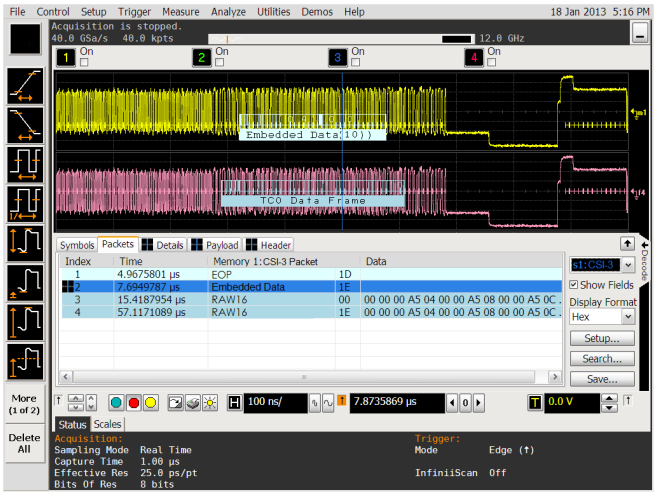


CSI-3 trigger and search setup
Quickly access the software-based trigger via the trigger or search menus. Software-based triggering enables quick setup of data, remote or error frames.

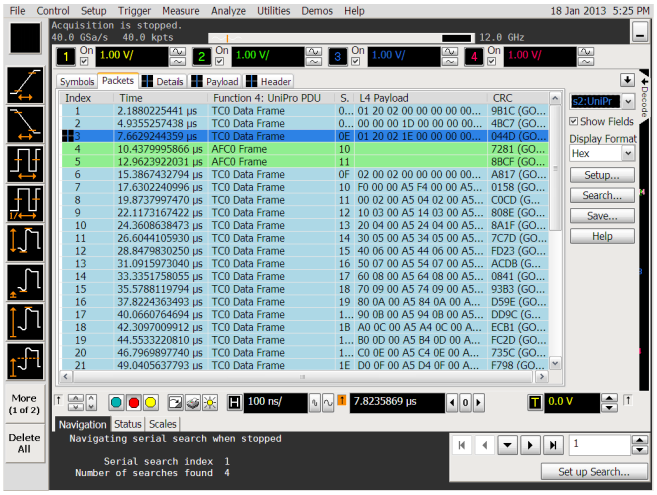
MIPI CSI-3 Protocol Decode

Get access to a rich set of integrated protocol-level triggers. The application includes a suite of configurable protocol-level trigger conditions specific to CSI-3. When serial triggering is selected, the application uses software-based triggering.

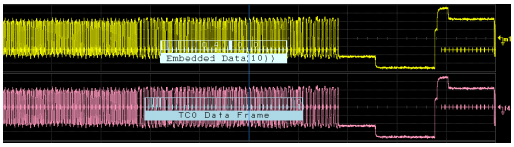
With software-based protocol triggering, the oscilloscope takes signals acquired using scope channels and reconstructs protocol frames after each acquisition. It then inspects these protocol frames against specified protocol-level trigger conditions and triggers when the condition is met.



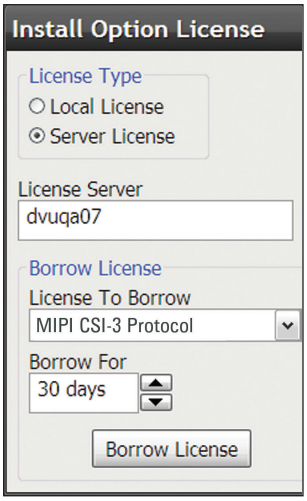
Quickly move between physical and CSI-3 protocol layer information using the time-correlated tracing marker. Display protocol content using embedded decode in the waveform area, or see protocol events in a compact listing format. Minor tick marks indicate clock transitions. Major tick marks indicate segments of the serial packet. CSI-3 measurements are automatically time-correlated with measurement on other oscilloscope channels.



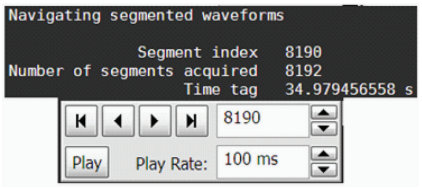
Compact protocol using the full screen listing
The protocol viewer window shows the index number, time stamp value identifier, packet type, and data values for each CSI-3 packet. Data in the listing window can be saved to a .csv or .txt file for off-line.



CSI-3 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 CSI-3 packet.



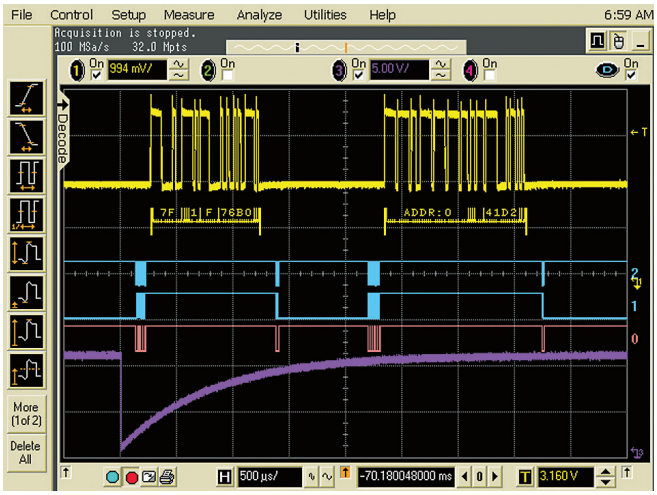
Using multiple oscilloscopes? Server-based licensing allows users to borrow an application for a specified period of time.



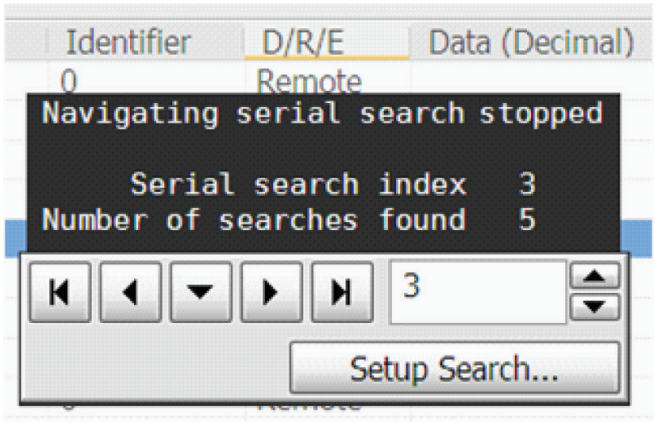
Long time captures using segmented memory
In this example, CSI-3 traffic was captured for near 35 seconds. Segmented memory uses time tags to track time between segment acquisitions.

CSI-3 Protocol Decode

Time correlation with other system activity
Protocol measurements are automatically time-correlated with measurements taken on other analog or digital (on MSO models) channels.



Precise MSO triggering and display
Mixed-signal oscilloscope measurement in a mobile system using both digital and analog acquisition channels.



Post-acquisition searching
Search acquired protocol listings using a menu that is identical to the trigger menu. Quickly move to next occurrence of a specified event.

MIPI CSI-3 Application Specifications and Characteristics

MIPI CSI-3 decode specifications	
CSI-3 sources	Analog channels 1, 2, 3, or 4 Any function and waveform memories
Data rate	The application relies on probing and trigger/measurement thresholds to properly condition the signal for triggering and decode. Differential probing may be required. Up to 6 Gbps
Protocol type	Camera Serial Interface version 3.0 (CSI-3)
Auto setup	Automatically configures oscilloscope settings for proper CSI-3 decode and software-based protocol search including memory depth, edge triggering, holdoff, sample rate and measurement thresholds
Decoded fields	All including extended frame format
Triggering (software-based)	Host to target transactions Target to host transactions Symbol sequence Errors

Ordering Information

This application is compatible with all 90000A, 90000 X- and 90000 Q-Series oscilloscope models with version 4.60 or greater software. It also requires Windows 7 operating system installed on the oscilloscope.

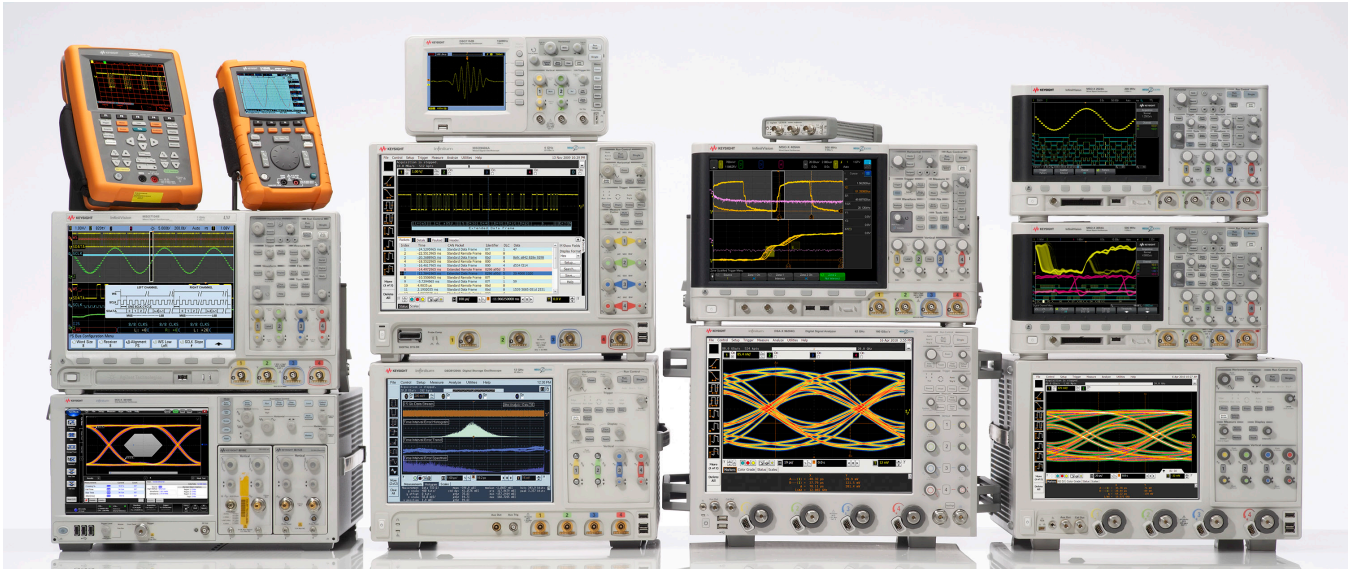
Software applications	Factory-installed option for new scope purchases	User-installed stand-alone product number	Server-based license (N5435A option)
UFS (M-PHY) protocol triggering and decode	068	N8820A	065
UniPro (M-PHY) protocol triggering and decode	052	N8808A	048
High-speed serial data analysis with clock recovery	003	E2688A	003
For non-Windows 7 OS oscilloscope: Infiniium Windows XP to 7 OS upgrade kit (scope already has M890 motherboard) or Infiniium Windows XP to 7 OS and M890 motherboard upgrade kit	— —	N2753A N2754A	— —

To purchase the protocol triggering and decode features on existing Keysight Infiniium Series oscilloscopes, order the model number shown:

Model number	Description	Quantity
DSO/DSAX91604A or DSO/DSA90604A	Infiniium Series oscilloscope	1
1134A	InfiniiMax 7-GHz differential probe amplifier	2
E2669A	Differential probe connectivity kit (contains needed probe heads)	2

Related Literature

Publication title	Publication type	Publication number
Infiniium 9000 Series Oscilloscopes	Data sheet	5990-3746EN
Infiniium 90000 X-Series Oscilloscopes	Data sheet	5990-5271EN
Infiniium 90000A Series Oscilloscopes	Data sheet	5989-7819EN
Infiniium 90000 Q-Series Oscilloscopes	Data sheet	5990-9712EN
U7249B MIPI M-PHY Compliance Test Software for Infiniium Oscilloscopes	Data sheet	5991-2401EN
N8808A UniPro (M-PHY) Protocol Triggering and Decode	Data sheet	5991-1595EN



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