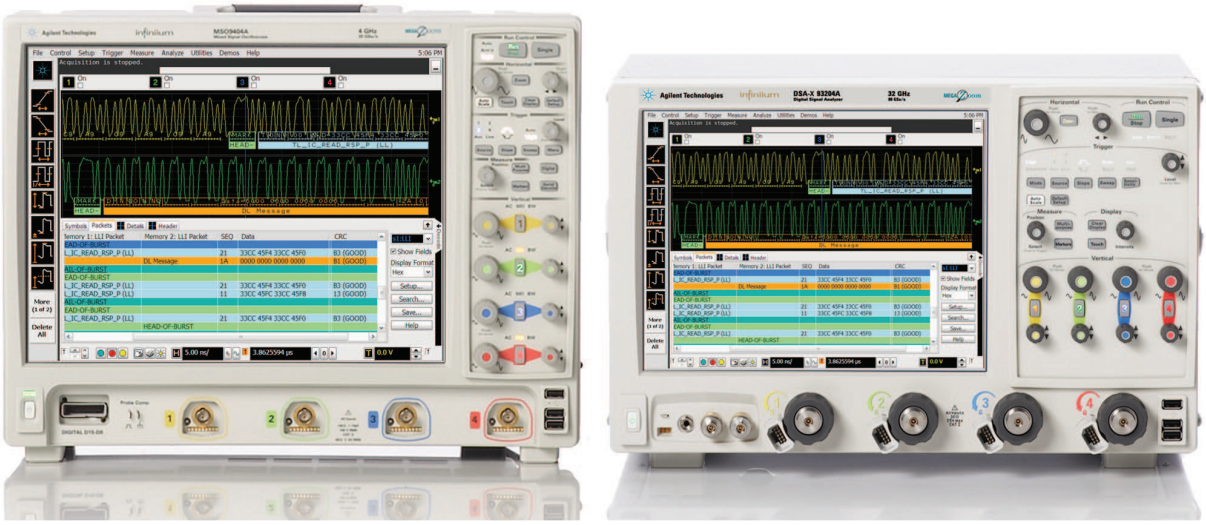
MIPI LLI (M-PHY) Protocol Triggering and Decode for Infiniium Series Oscilloscopes

Data Sheet



This application is available in the following license variations.

- Order N8809A for a user-installed license
- Order Option 053 for a factory-installed license with new 90000 Series oscilloscopes
- Order N5435A Option 049 for a server-based license that works on 90000 Series oscilloscopes

MIPI LLI (M-PHY)

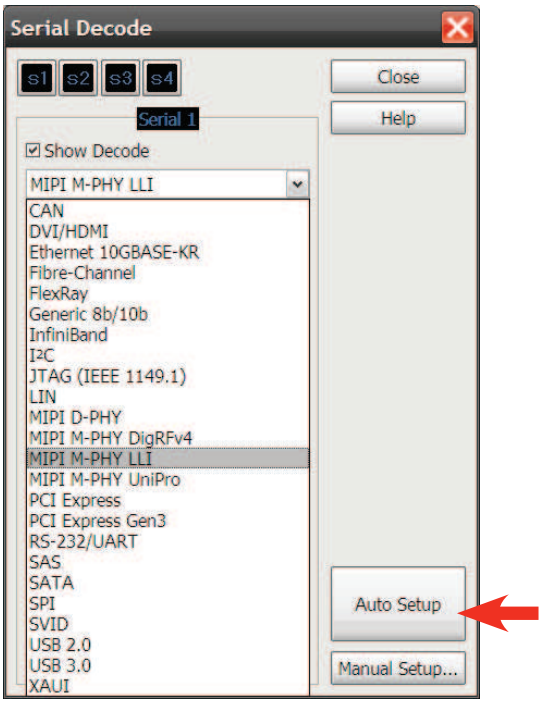
MIPI (Mobile Industry Processor Interface) serial buses are the backbone for communication in mobile products. The serial bus interface provides content-rich points for debug and test. However, since these protocols transfer bits serially, using a traditional oscilloscope has limitations. Manually converting captured 1's and 0's to protocol requires significant effort, can't be done in real-time, and includes potential for human error. In addition, traditional scope triggers are not sufficient for specifying protocol-level conditions.

Extend your scope capability with Agilent's MIPI Low Latency Interface (LLI) triggering and decode application. This application makes it easy to debug and test designs that include MIPI LLI buses using your Infiniium Series oscilloscope.

- Set up your scope to show MIPI LLI 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

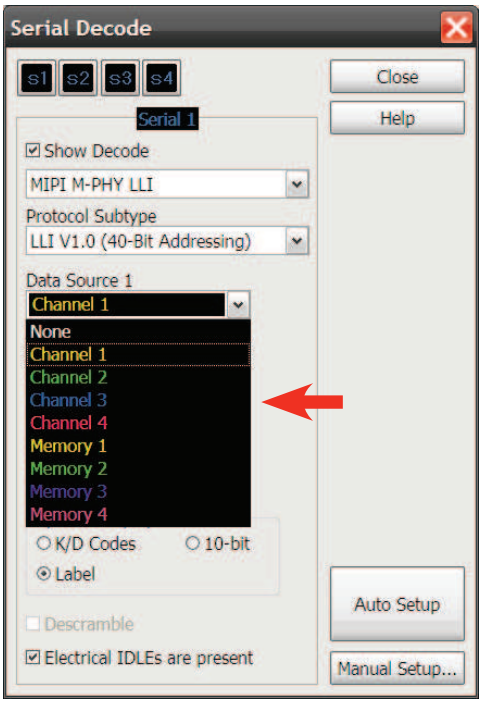
The following are the MIPI LLI protocols and features that will be supported by the application.

1. Supports LLI v1.0 decode and triggering
2. Decodes high-speed (HS-BURST) and low-speed Pulse Width Modulation (PWM-BURST) modes
3. Decodes with cyclical redundancy check (CRC) support
4. Supports decode on Tx and Rx traffics
5. Supports search capability for various frames, sequences and errors



30-second MIPI 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.



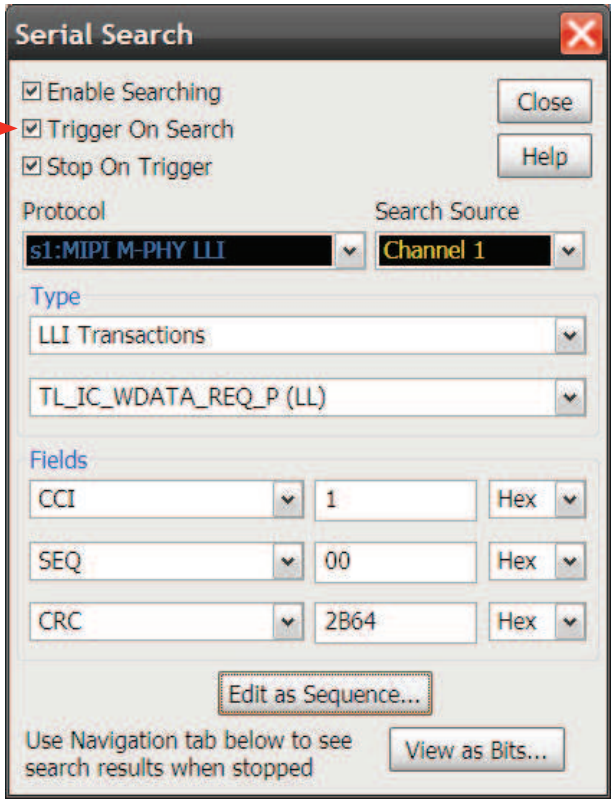
Support for live and saved waveforms

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

MIPI LLI (M-PHY) 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 MIPI LLI. When serial triggering is selected, the application uses software-based triggering.

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



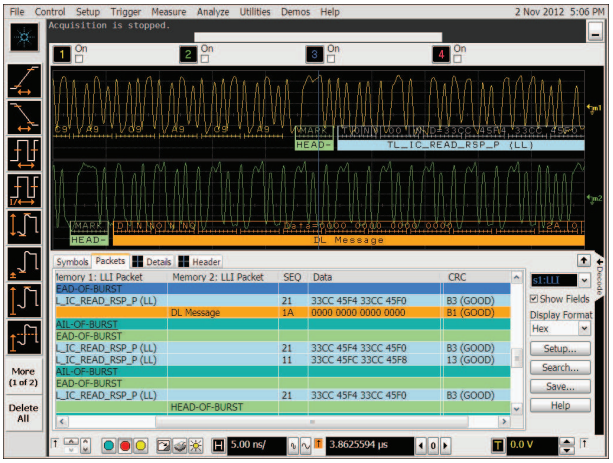
MIPI trigger and search setup

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

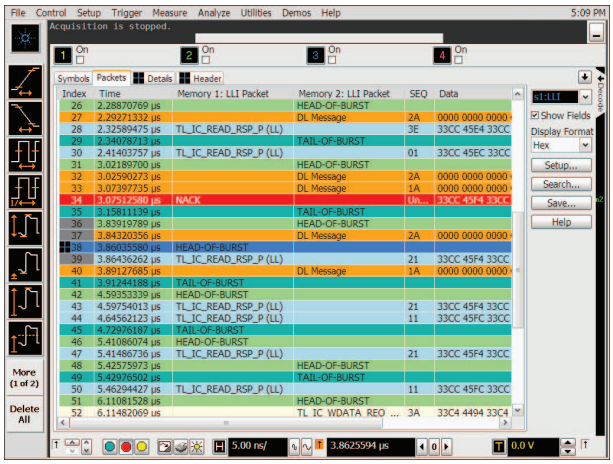
MIPI LLI (M-PHY) Protocol Decode

Get access to a rich set of integrated protocol-level triggers. The application includes a suite of configurable protocol-level trigger conditions specific to MIPI LLI. 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.

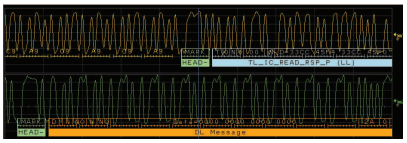


Quickly move between physical and MIPI LLI protocol layer information using the time-correlated tracing marker. Display protocol content using embedded decode in the waveform area, or see protocol events in a compact listing format. Minor tick marks indicate clock transitions. Major tick marks indicate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



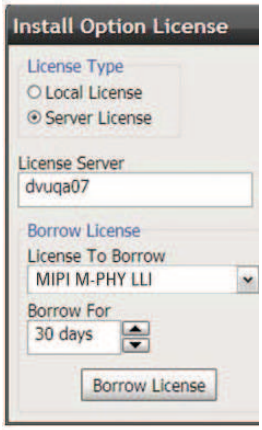
Compact protocol using the full screen listing

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



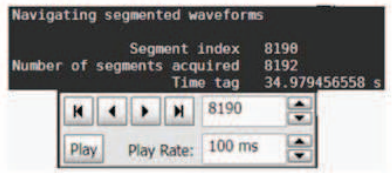
MIPI LLI decode embedded in waveform area

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



Using multiple scopes?

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



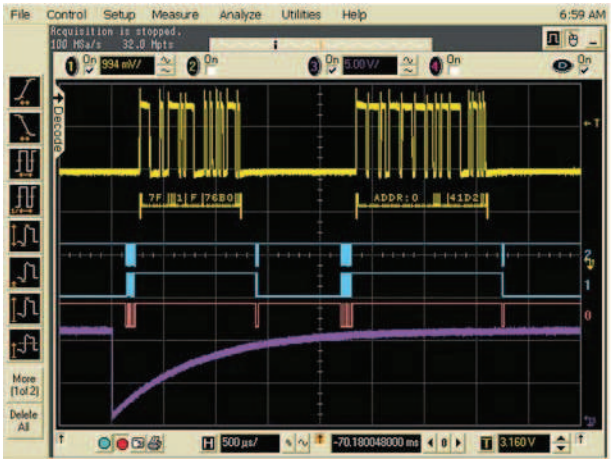
Long time captures using segmented memory

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

MIPI LLI (M-PHY) Protocol Decode *Continued*

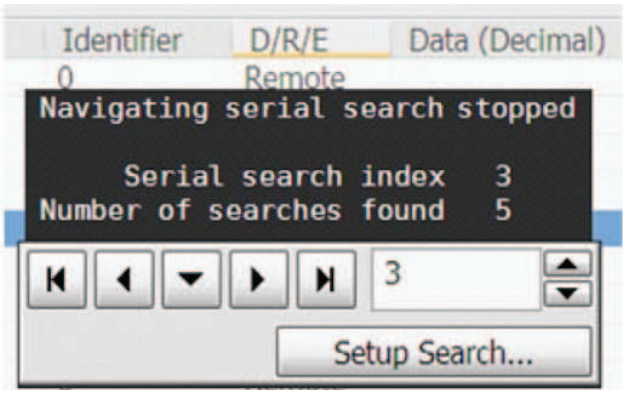
Time correlation with other system activity

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 LLI (M-PHY) Application Specifications and Characteristics

MIPI	
MIPI 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. Differential probing may be required
Data rate	Up to 6 Gbps
Protocol type	LLI v1.0
Auto setup	Automatically configures oscilloscope settings for proper MIPI LLI 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)	PA message Service transactions DL message LLI transactions Head-of-burst Tail-of-burst NACK Symbol sequence Error

Ordering Information

This application is compatible with all 90000 Series oscilloscope models with version 4.10 or greater software.

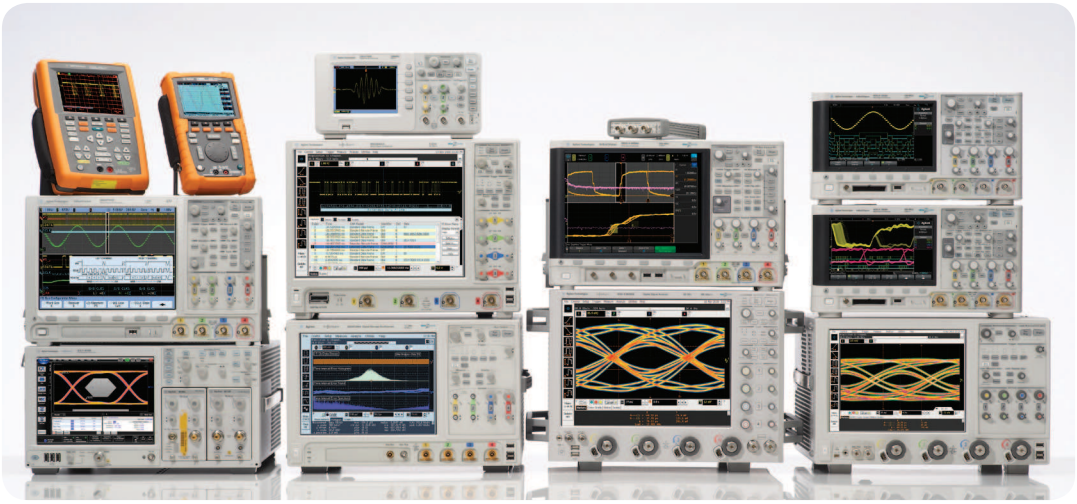
Software applications	Factory-installed option for new scope purchases	User-installed standalone product number	Server-based license (N5435A option)
MIPI LLI (M-PHY) protocol triggering and decode	053	N8809A	049

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

Model	Description	Quantity
DSOX/DSAX91604A or DSO/DSA90604A	Infiniium Series oscilloscope	1
E2688A	High-speed SDA software (Option 003 on new 90000 Series oscilloscope or Option N5435A-003 for application server license)	1
1134A	InfiniiMax 7-GHz differential probe amplifier decode	2
E2669A	Differential probe connectivity kit (contains needed probe heads)	1

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 90000 Series Oscilloscopes	Data sheet	5989-7819EN
U7249A MIPI M-PHY Compliance Test Software for Infiniium Oscilloscopes	Data sheet	5990-8933EN



Agilent Technologies Oscilloscopes

Multiple form factors from 20 MHz to > 90 GHz | Industry leading specs | Powerful applications

www.agilent.com
www.agilent.com/find/N8809A

myAgilent

www.agilent.com/find/myagilent

A personalized view into the information most relevant to you.

www.axiestandard.org

AdvancedTCA® Extensions for Instrumentation and Test (AXIe) is an open standard that extends the AdvancedTCA for general purpose and semiconductor test. Agilent is a founding member of the AXIe consortium.

www.lxistandard.org

LAN eXtensions for Instruments puts the power of Ethernet and the Web inside your test systems. Agilent is a founding member of the LXI consortium.

www.pxisa.org

PCI eXtensions for Instrumentation (PXI) modular instrumentation delivers a rugged, PC-based high-performance measurement and automation system.

Agilent Channel Partners

www.agilent.com/find/channelpartners

Get the best of both worlds: Agilent's measurement expertise and product breadth, combined with channel partner convenience.

Windows® is a U.S. registered trademark of Microsoft Corporation.

Agilent Advantage Services

Agilent Advantage Services is committed to your success throughout your equipment's lifetime. To keep you competitive, we continually invest in tools and processes that speed up calibration and repair and reduce your cost of ownership. You can also use Infoline Web Services to manage equipment and services more effectively. By sharing our measurement and service expertise, we help you create the products that change our world.

www.agilent.com/find/advantageservices

Agilent Electronic Measurement Group
DEKRA Certified
ISO 9001:2008
Quality Management System

www.agilent.com/quality

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at:

www.agilent.com/find/contactus

Americas

Canada	(877) 894 4414
Brazil	(11) 4197 3600
Mexico	01800 5064 800
United States	(800) 829 4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 375 8100

Europe & Middle East

Belgium	32 (0) 2 404 93 40
Denmark	45 45 80 12 15
Finland	358 (0) 10 855 2100
France	0825 010 700*
	*0.125 €/minute
Germany	49 (0) 7031 464 6333
Ireland	1890 924 204
Israel	972-3-9288-504/544
Italy	39 02 92 60 8484
Netherlands	31 (0) 20 547 2111
Spain	34 (91) 631 3300
Sweden	0200-88 22 55
United Kingdom	44 (0) 118 927 6201

For other unlisted countries:
www.agilent.com/find/contactus

Revised: October 11, 2012

Product specifications and descriptions in this document subject to change without notice.

Published in USA, November 26, 2012
5991-1533EN

Agilent Technologies