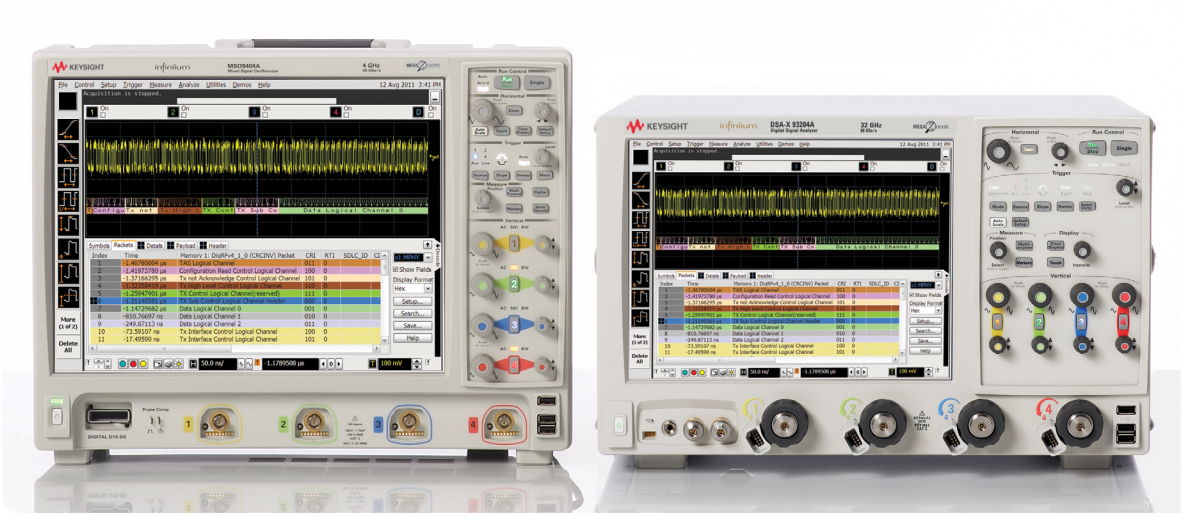
Keysight Technologies
MIPI DigRF v4 (M-PHY) Protocol Triggering and Decode for Infiniium Series Oscilloscopes

Data Sheet



KEYSIGHT TECHNOLOGIES

MIPI DigRF v4 (M-PHY)

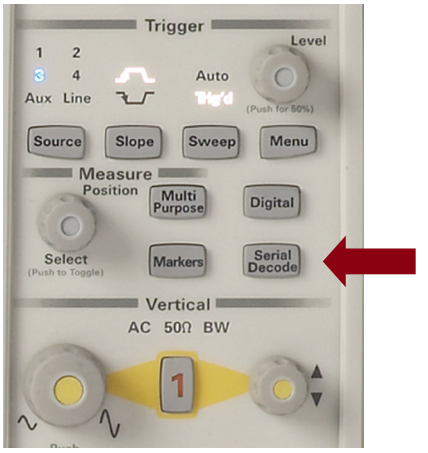
MIPI (Mobile Industry Processor Interface) serial buses are the backbone for communication in mobile products. The serial bus interface provides content-rich points for debug and test. However, since these protocols transfer bits serially, using a traditional oscilloscope has limitations. Manually converting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

Extend your scope capability with the Keysight Technologies, Inc. MIPI DigRF v4 (M-PHY) triggering and decode application. This application makes it easy to debug and test designs that include MIPI DigRF v4 buses using your Infiniium Series oscilloscope.

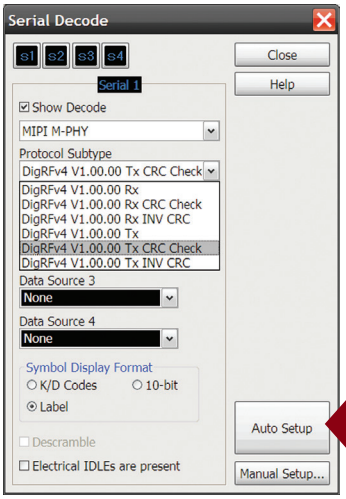
- Set up your scope to show MIPI DigRF v4 protocol decode in less than 30 seconds.
- Get access to a rich set of integrated protocol-level triggers.
- Save time and eliminate errors by viewing packets at the protocol level.
- Use time-correlated views to quickly troubleshoot serial protocol problems back to their timing or signal integrity root cause.

The following are the MIPI DigRF v4 protocols and features that will be supported by the application.

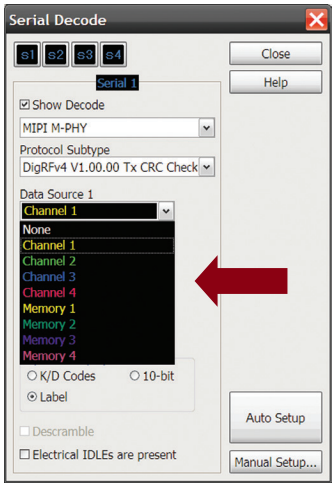
1. Supports DigRF v4 v1.00.00 decode and triggering
2. Decodes high-speed (HS-BURST) and low-speed (SYS-BURST) modes
3. Decodes with and without cyclical redundancy check (CRC) support
4. Supports decode on Tx and Rx packets
5. Supports search capability for various frames, sequence and errors



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 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.

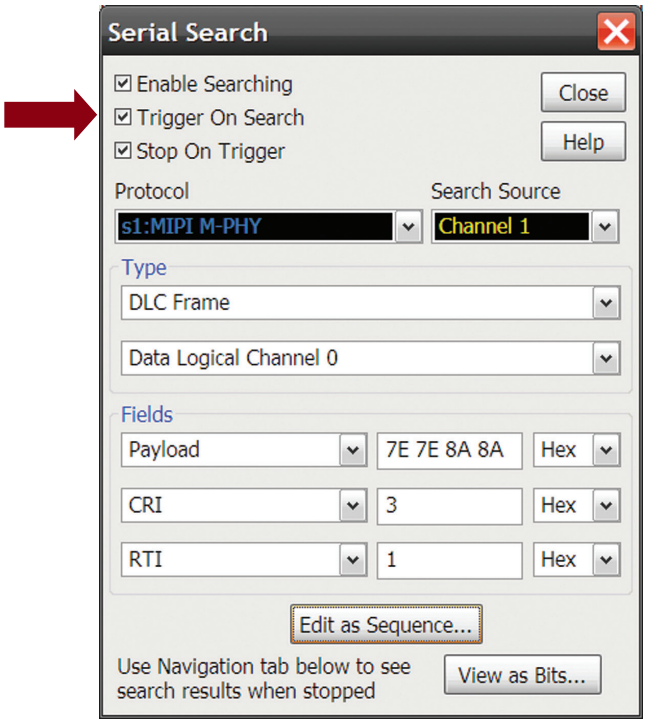


Support for live and saved waveforms
Perform and view decode information on both live and saved waveforms. Decode up to any combination of 4 live or saved waveforms.

MIPI DigRF v4 (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 DigRF v4. When serial triggering is selected, the application uses software-based triggering.

With software-based protocol triggering, the oscilloscope takes signals acquired using either 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 DigRF v4 (M-PHY) protocol decode

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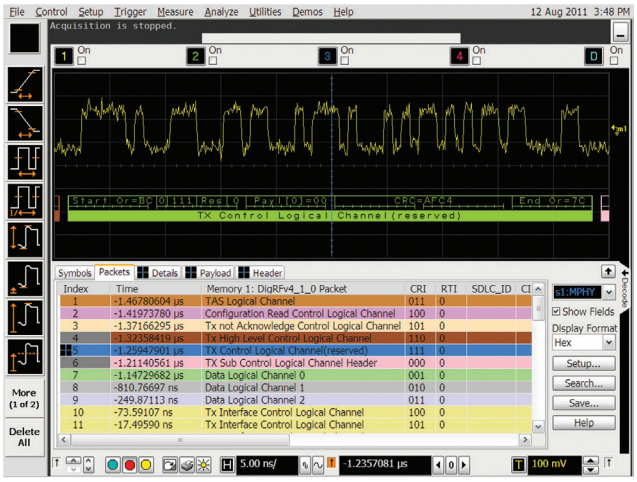
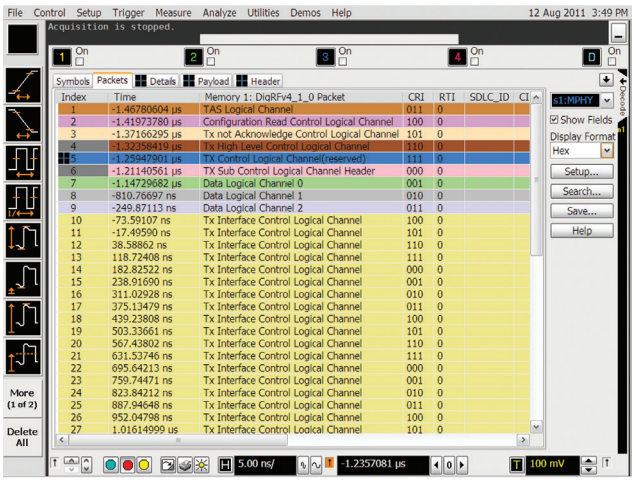
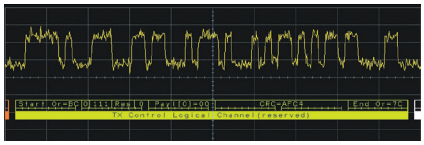


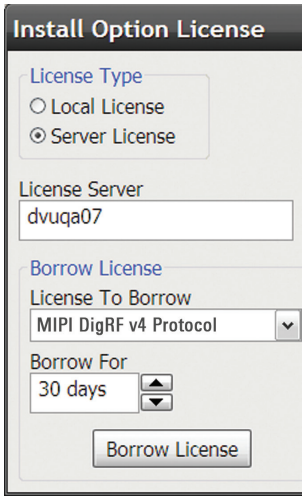
Quickly move between physical and MIPI DigRF v4 protocol layer information using the time-correlated tracing marker. Display protocol content using embedded decode in the waveform area, Or, see protocol events in a compact listing format. Minor tick marks indicate clock transitions. Major tick marks indicate segments of the serial packet MIPI DigRF v4 measurements are automatically time-correlated with measurement on other scope channels.



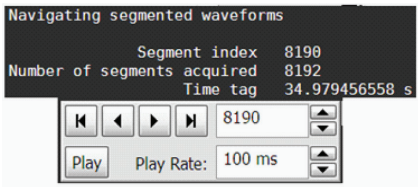
Compact protocol using the full screen listing
The protocol viewer window shows the index number, time stamp value identifier, packet type, and data values for each MIPI DigRF v4 packet. Data in the listing window can be saved to a .csv or .txt file for off-line.



MIPI DigRF v4 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 DigRF v4 packet.



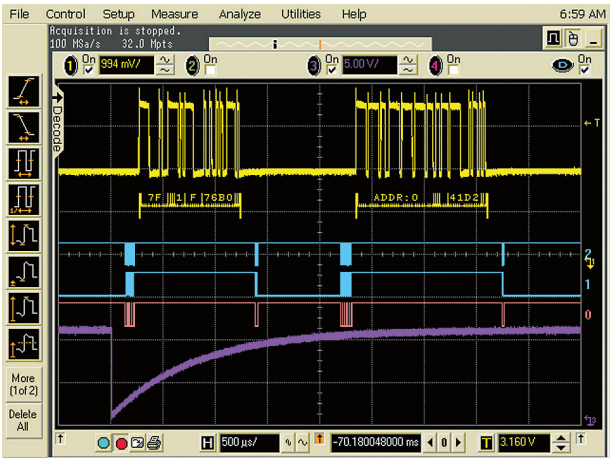
Using multiple scopes?
Server-based licensing allows users to borrow an application for a specified period of time.



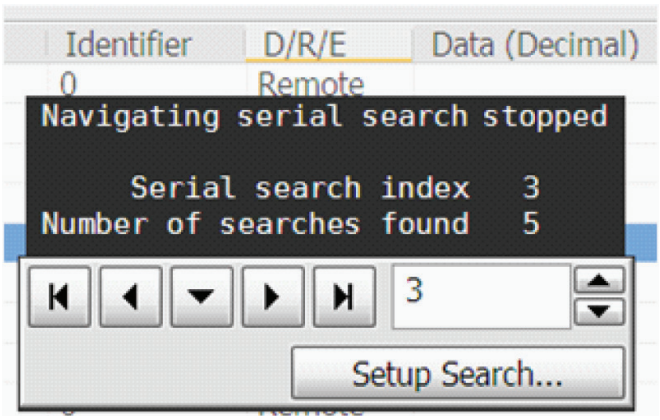
Long time captures using segmented memory
In this example, MIPI DigRF v4 traffic was captured for near 35 seconds. Segmented memory uses time tags to track time between segment acquisitions.

MIPI DigRF v4 (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 DigRF v4 (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 5.83 Gbps
Protocol type	DigRF v4 v1.00.00
Auto setup	Automatically configures scope settings for proper MIPI DigRF v4 decode and SW-based protocol search including memory depth, edge triggering, holdoff, sample rate, and measurement thresholds
Decoded fields	All including extended frame format
Triggering (software-based)	DLC frame SDLC frame Tx frames Rx frames Symbol sequence Error

Recommended oscilloscopes

The DigRF v4 protocol decoder is compatible with Keysight Infiniium Series oscilloscopes with operating software revision 4.20 or higher. For oscilloscopes with earlier revisions, free upgrade software is available here: www.keysight.com/find/scope-apps-sw.

Data rate	Minimum bandwidth	Minimum channels	Compatible oscilloscopes
Gear 1 (Up to 1.46 Gbps)	6 GHz	2	Infiniium 9000, S-Series, 90000 and Z-Series
Gear 2 (Up to 2.92 Gbps)	12 GHz	2	Infiniium 90000 and Z-Series
Gear 3 (Up to 5.83 Gbps)	20 GHz	2	Infiniium 90000 and Z-Series

Ordering information

To purchase the DigRF v4 protocol decoder with a new or existing Infiniium Series oscilloscope, order the following options.

Software options

Application	License type		Infiniium Z-Series	Infiniium S-Series	Infiniium 90000 Series	Infiniium 9000 Series
DigRF v4 protocol decoder	Fixed	Factory-installed	N8807A-1FP	N8807B-1FP	Option 051	Option 045
		User-installed	N8807A-1FP	N8807B-1FP	N8807A-1NL	N8807B-1NL
	Floating	Transportable	N8807A-1TP	N8807B-1TP	N8807A-1TP[1,2]	N8807B-1TP[1,2]
		Server-based	N5435A-047	N5435A-047	N5435A-047	N5435A-047
Serial data analysis with clock recovery (included in DSA model)	Fixed	Factory-installed	E2688A-1FP	N5384A-1FP	Option 003	Option 003
		User-installed	E2688A-1FP	N5384A-1FP	E2688A-1NL	N5384A-1NL
	Floating	Transportable	E2688A-1TP	N5384A-1TP	E2688A-1TP[1,2]	N5384A-1TP[1,2]
		Server-based	N5435A-003	N5435A-003	N5435A-003	N5435A-003

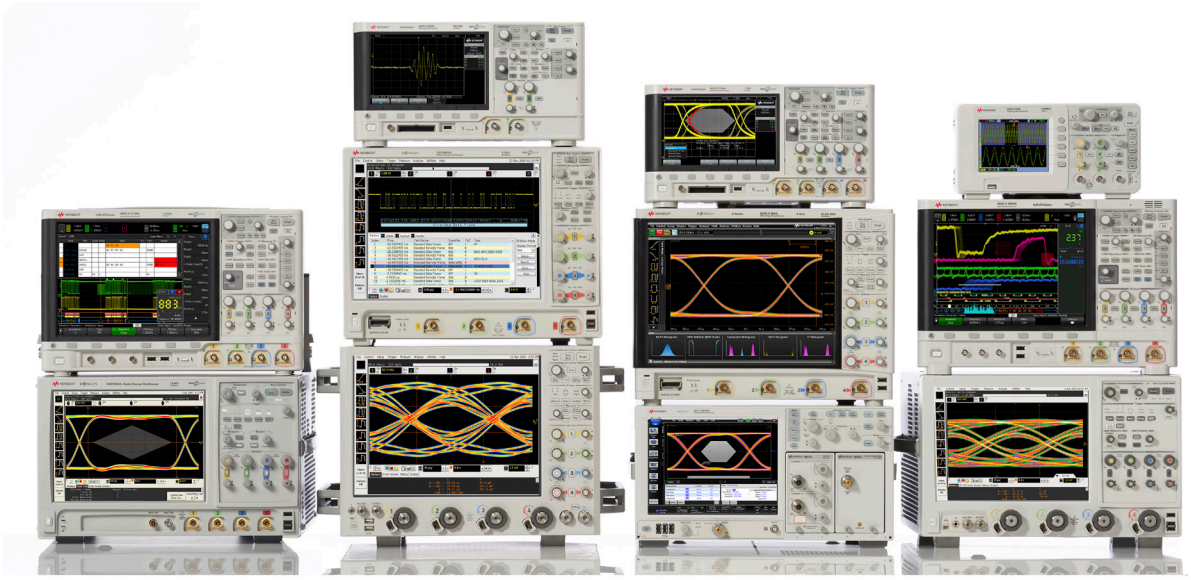
1. Requires software 5.00 and above.
2. Software 4.30 or above requires Windows 7. N2753A Infiniium Windows XP to 7 OS upgrade kit (oscilloscope already has M890 motherboard).
3. N2754A Infiniium Windows XP to 7 OS and M890 motherboard upgrade kit (oscilloscope without M890 motherboard). Verify the M890 motherboard using the procedure found in the Windows 7 upgrade kit data sheet with the publication number 5990-8569EN.

Other hardware, probes and accessories

Model number	Description	Quantity
1169A	InfiniiMax II 12-GHz differential probe amplifier	2
N5380B	InfiniiMax II SMA probe adapter	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
U7238A MIPI D-PHY Compliance Test Software for Infiniium Oscilloscopes	Data sheet	5990-9337EN
Infiniium S-Series Oscilloscope	Data sheet	5991-3904EN
Infiniium Z-Series Oscilloscope	Data sheet	5991-3868EN



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