

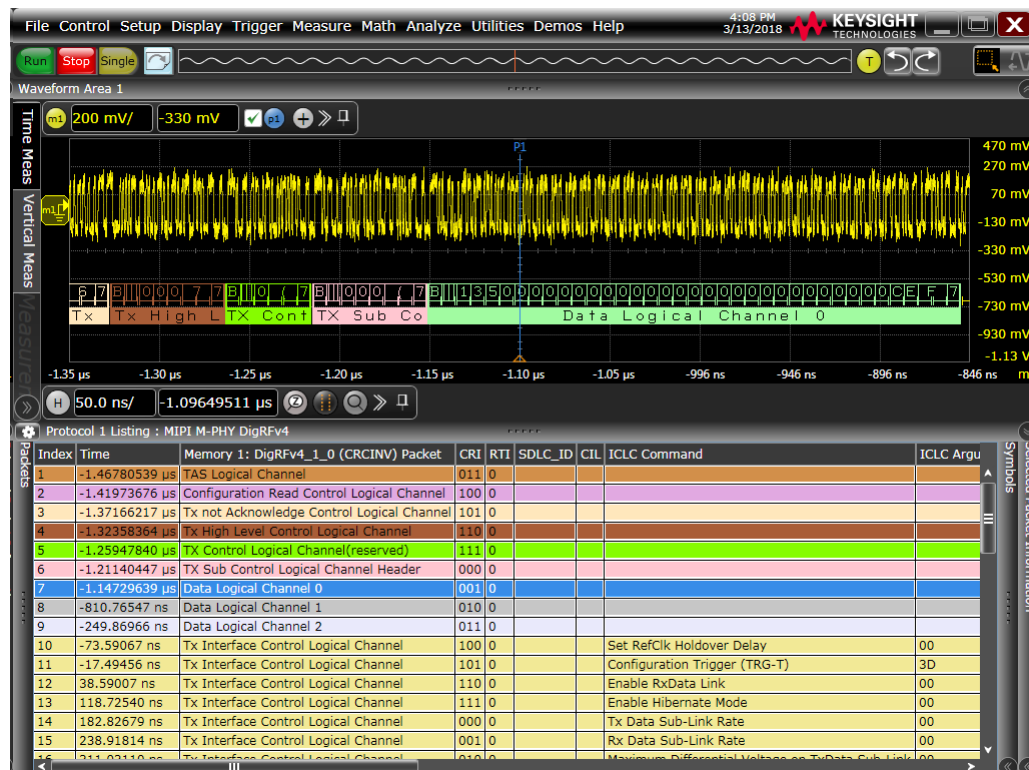
Keysight Technologies

MIPI® DigRFSM v4 (M-PHY®)

Protocol Triggering and Decode

For Infiniium Series Oscilloscope

Technical overview

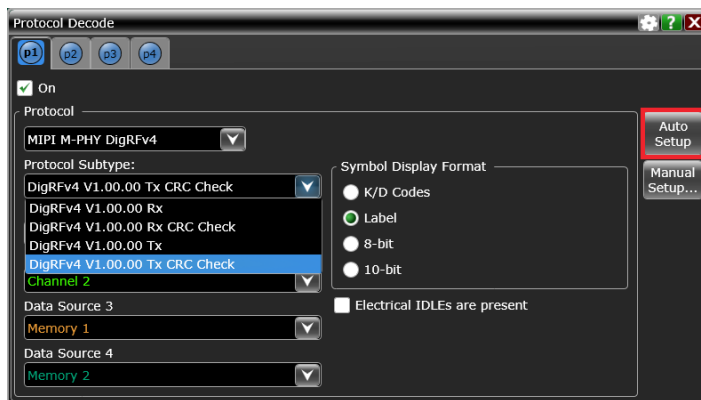


MIPI® DigRFSM v4 (M-PHY®)

MIPI 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.

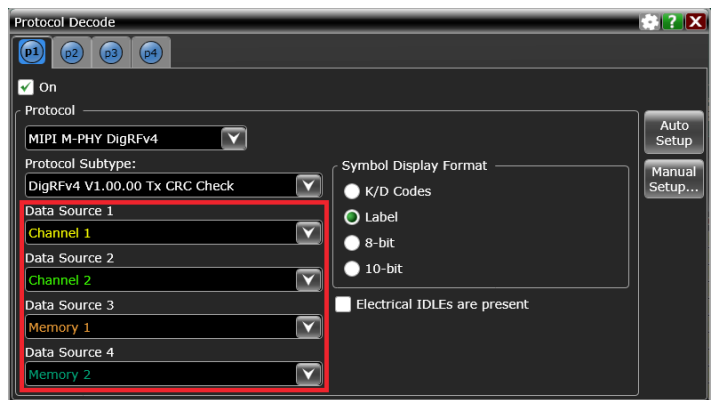
Extend your scope capability with the Keysight Technologies, Inc. MIPI DigRF v4 (M-PHY) triggering and decode application. This application makes it easy to debug and test designs that include MIPI DigRF v4 buses using your Infiniium Series oscilloscope.

- Set up your scope to show MIPI DigRFv4 protocol decode in less than 1 minute.
- 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.



1 Minute DigRF v4 decode setup

Configure your oscilloscope to display decode in under 1 minute. 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 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 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.



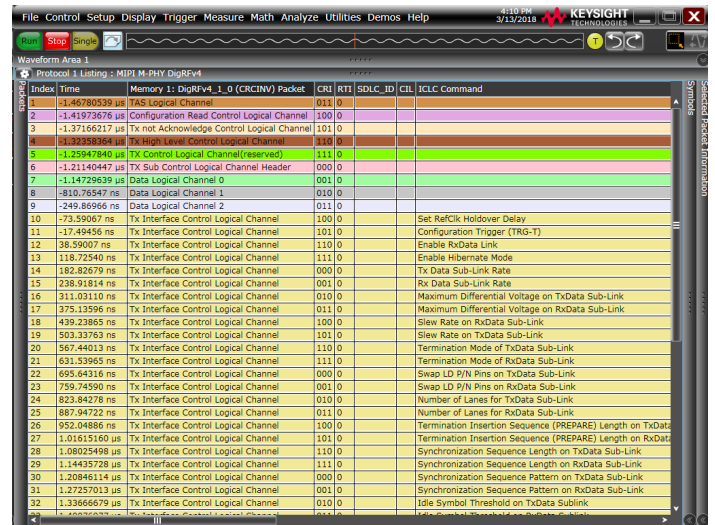
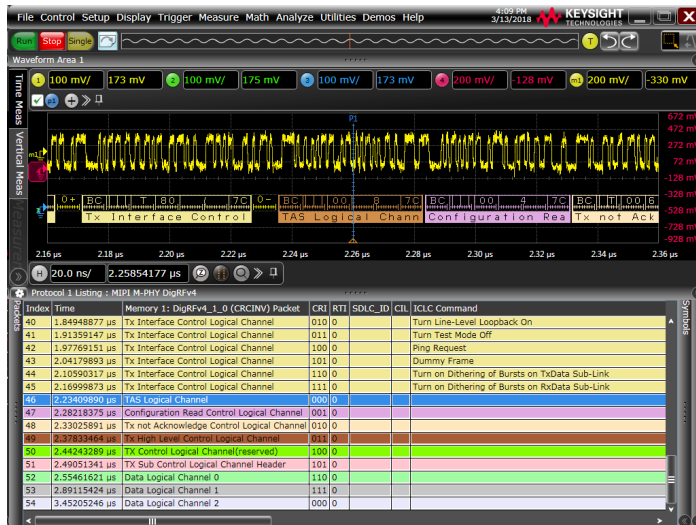
MIPI DigRF v4 trigger and search setup

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

Keysight MIPI DigRF v4 (M-PHY) protocol decoder software supports both high speed (HS-BURST) and low speed (SYS-BURST) modes on Tx and Rx packets. Also, decodes with or without cyclical redundancy check (CRC) support.

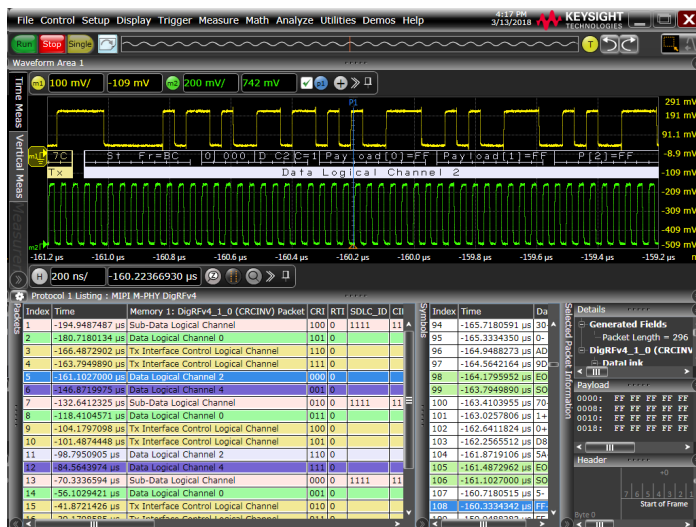


Time correlation between signal and decoded data

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.



SYS-BURST (Low speed) mode

With reference clock probing, Keysight MIPI DigRF v4 (M-PHY) protocol decode software support SYS-BURST mode decode along with HS-BURST (High speed) mode.



Performance Characteristics

	Description
DigRF v4 protocol supported	DigRF v4 1.00.00
DigRF v4 data source	Analog channels 1, 2, 3, or 4
	Waveform memories
	The application relies on probing and measurement thresholds to properly condition the signal for decode.
	Supports single Tx and Rx lane data only
Data rate	Up to 5.83 Gb/s
Auto setup	Automatically configures scope settings for proper MIPI DigRF v4 decode and software based protocol search including memory depth, sample rate and measurement thresholds
Search/Triggering (software based)	DLC frame
	SDLC frame
	Tx frames
	Rx frames
	Symbol sequence
	Errors

Recommended Oscilloscopes

The DigRF v4 protocol decode 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	Recommended oscilloscopes
Gear1 (Up to 1.46 Gbps)	6 GHz	2	9000 ¹ , S-series, 90000
Gear2 (Up to 2.92 Gbps)	12 GHz	2	90000, V-series and Z-series
Gear3 (Up to 5.83 Gbps)	20 GHz	2	V-series and Z-series

1. Decode might be limited due to bandwidth limitation, recommended to decode for SYS-BURST signal only.

Standard configuration

	Description
S-Series oscilloscope	Oscilloscope + 2 x Active probes (1 TX, 1 RX)
90000A series oscilloscope	Oscilloscope + 2 x Active probes (recommend using 1169B)
V-Series and Z-Series oscilloscope	Oscilloscope + 2 x Active probes (recommend using 1169B with N5442A)



Ordering Information

This application is compatible with Infiniium Oscilloscope models below.

Application software			9000 Series	S-Series	90000 Series	V-Series	Z-Series
MIPI DigRF v4 (M-PHY) protocol decode software ¹	Fixed	Factory Installed	–	N8807B-1FP	Option 051	N8807A-1FP	N8807A-1FP
		User Installed	N8807B-1NL	N8807B-1FP	N8807A-1NL	N8807A-1FP	N8807A-1FP
	Floating	Transportable	N8807B-1TP	N8807B-1TP	N8807A-1TP	N8807A-1TP	N8807A-1TP
		Server-based	N5435A-047	N5435A-047	N5435A-047	N5435A-047	N5435A-047
Serial data analysis with clock recovery (included in DSA model)	Fixed	Factory Installed	Option 003	N5384A-1FP	Option 003	E2688A-1FP	E2688A-1FP
		User Installed	N5384A-1NL	N5384A-1FP	E2688A-1NL	E2688A-1FP	E2688A-1FP
	Floating	Transportable	N5384A-1TP	N5384A-1TP	E2688A-1TP	E2688A-1TP	E2688A-1TP
		Server-based	N5436A-003	N5436A-003	N5436A-003	N5436A-003	N5436A-003

1. Require Infiniium 4.30 or above.

Related Literature

Publication title	Publication number
<i>Infiniium S-Series High-Definition Oscilloscopes - Data Sheet</i>	5991-3904EN
<i>Infiniium 9000 Series Oscilloscopes - Data Sheet</i>	5990-3746EN
<i>Infiniium V-Series Oscilloscopes - Data Sheet</i>	5992-0425EN
<i>Infiniium 90000 Series Oscilloscopes - Data Sheet</i>	5989-7819EN
<i>Infiniium Z-Series Oscilloscopes - Data Sheet</i>	5991-3868EN



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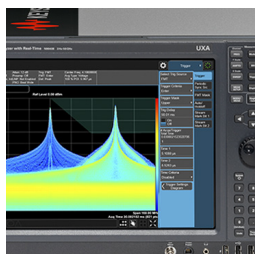
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