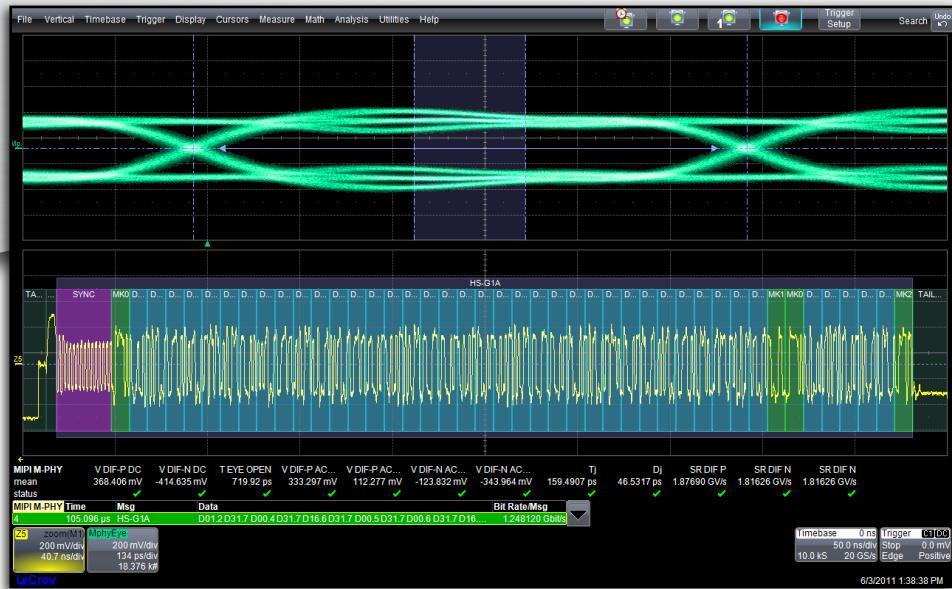


## MIPI M-PHY And D-PHY Decode And Physical Layer Test

### Key Features

- Decodes MIPI D-PHY, CSI-2, and DSI signals
- Complete decode and physical layer test for MIPI D-PHY and M-PHY in one instrument.
- Correlate analog waveforms with protocol decode on one screen
- Eye diagram mask testing
- Decode up to 4 differential data lanes using the CDR feature
- View decoded data in hexadecimal format
- Decode information expands as the time base is adjusted or zoomed
- Convenient table display with quick “Zoom to byte” capability
- Quick search capability for specific message packets
- Supports decode for LP & HS, HS only and LP only
- Supports single-ended and differential probing for Data and Clock



Perform eye diagram mask testing and make physical layer measurements on MIPI D-PHY and M-PHY signals.

The MIPI D-PHY and M-PHY decode and physical layer test package provides the most complete set of conformance tests available to simplify MIPI design and debug of the physical and protocol layers. The one touch eye diagram creation and integrated 110 conformance measurements makes this the only package for MIPI D-PHY and M-PHY testing.

### The Most Intuitive Decode

MIPI D-PHY and M-PHY decode uses color-coded overlays on various sections of the protocol for an easy-to-understand visual display. Depending on the time base or the amount of zoom, the decode information is condensed or expanded to better assist in understanding events during short or long acquisitions.

### Powerful Physical Layer Test

Quickly locate physical layer problems using powerful eye diagram mask tests. Additional analysis tools

are available, providing two different jitter breakdown methodologies and the deepest jitter analysis toolbox for correctly identifying sources of jitter. The physical layer package has unique eye diagram analysis tools, such as IsoBER, for providing even deeper insight into eye diagrams. A full suite of amplitude and timing measurements can be applied to debug physical layer issues that may not be apparent in a protocol view.

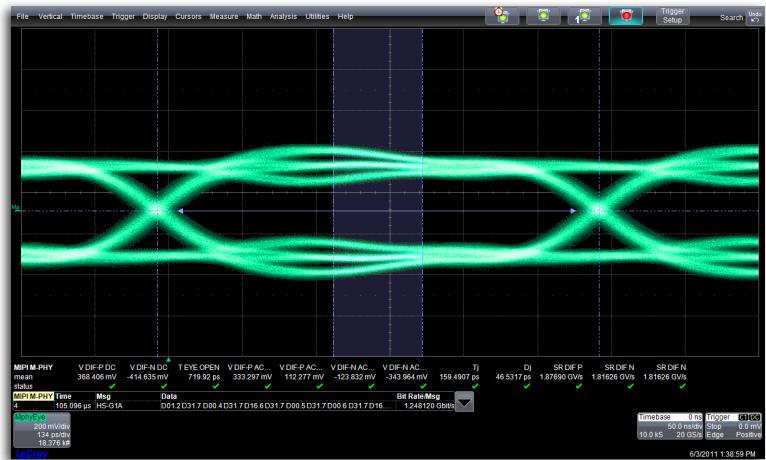
### Complete Compliance and Debug

For a complete MIPI toolset, LeCroy offers a D-PHY compliance package as well as a decode package for DigRF 3G and v4 signals. QPHY-MIPI-DPHY provides automated compliance testing to the MIPI Alliance specification for D-PHY version 1.00.00. The DigRF 3G and v4 decode packages offer a quick and powerful way to debug DigRF design challenges.

# QUICK SETUP, INTUITIVE VIEW AND SEARCH

## Eye Diagram Testing

Eye Diagrams are an important part of testing many serial data standards. Eye diagrams can be easily created for MIPI D-PHY and M-PHY signals with the touch of a button.



The eye diagram of an M-PHY signal illustrates portions of the eye that pertain to a specific measurement.

## Physical Layer Measurements

Seeing the eye diagram gives good insight into the MIPI D-PHY and M-PHY system but measuring key timing parameters like Eye Opening, Skew, rise/fall time, and TJ/DJ help validate the conformance of the signal to the specification. Over 70 measurements are available for D-PHY and over 100 are available for M-PHY.

MIPI M-PHY	V DIF-P DC	V DIF-N DC	T EYE OPEN
value	364.9 mV	-414.7 mV	720 ps
mean	368.406 mV	-414.635 mV	719.92 ps
min	359.4 mV	-414.7 mV	720 ps
max	374.1 mV	-414.5 mV	720 ps
sdev	3.580 mV	54 $\mu$ V	—
num	47	47	1
status	✓	✓	✓

Individually configure measurements with statistics for conformance verification. Up to 12 measurements can be configured and displayed at a time.

## Search and Zoom

Search through a long record of decoded data by entering any of 28 available search criteria by entering a value or simply finding the next occurrence.



Quickly and easily search for a signal type of interest. Choose from 28 criteria to quickly pinpoint an area of interest, zoom in, and analyze. Use previous and next controls to find the next instance for quick and easy debug.

MIPI D-PHY Search Options		
IDX	TLPX-CLK	DT
Time	TLP01-CLK	WC
TLPX-DATA	TCLK-PREPARE	ECC
TPL01-DATA	TCLK-ZERO	Msg
THS-Prepare	TCLK-HS	Data
THS-ZERO	TCLK-TRAIL	HS0
THS-SYNC	TCLK-REOT	HS1
THS-TRAIL	DI	Bitrate/Byte
TREOT	VC	Status
Attributes		

MIPI M-PHY Search Options		
Time	Msg	Prepare
Sync	Controls	Payload
Data	Tail of Burst	Bit Rate/Msg
Status	Attributes	

## Convenient Table Display Summarizes Results

Turn your oscilloscope into a protocol analyzer with the table display of protocol information. Custom configure the table to display the information you want, and export table data into an Excel file. Touch the message in the table and automatically zoom for detail. In all cases, the table never obscures your waveform.

Idx	Time	VC	DT	WC	ECC	Msg
1	-199.998 $\mu$ s	0	0x2b	4368	0x12	partial HS burst
2	-186.775 $\mu$ s	0	0x2b	4880	0x13	RAW Data
3	-159.935 $\mu$ s	0	0x2b	4368	0x13	RAW Data
4	-133.096 $\mu$ s	0	0x2b	4368	0x13	RAW Data
5	-106.268 $\mu$ s	0	0x2b	4880	0x13	RAW Data
6	-79.4291 $\mu$ s	0	0x2b	4368	0x12	RAW Data
7	-52.5887 $\mu$ s	0	0x2b	4880	0x12	RAW Data
8	-25.7490 $\mu$ s	0	0x2b	4368	0x12	RAW Data

The table view arranges all of the data in a easy to understand format. The Table allows custom configuration to show the Time stamp, Virtual channel (VC), Data Type (DT), Word Count (WC), Error Correction Code (ECC), Message and data values for each packet.

## SPECIFICATIONS

	MIPI D-PHY Decode	MIPI M-PHY Decode
<b>Definition</b>		
Protocol Setup	Select Data source Select Clock source	Select Data source
<b>Decode Capability</b>		
Format	Hexadecimal	Hexadecimal, Binary, Symbolic, Symbolic 10b
Decode Setup	Threshold definition required. Default is to Percent amplitude. Select Signal Type (LP & HS, HS only, LP only). Select data source (Supports Dp & Dn, Dp only, Dn only, or differential probing configurations). Select clock source (Supports CLKp & CLKn, CLKp only, CLKn only, differential clock, or Clock Data recovery (CDR) probing configurations).	Select probing (Ddiff, dp & Dn) Select Level. Default is 0 mV. Select Hysteresis (Default is 100 mV).
Decode Input	Any analog Channel, Memory or Math trace.	
# of Decode Waveforms	Up to 4 buses may be decoded at one time. In addition, zooms can be displayed (with decoded information).	
Location	Overlaid over DATA waveform, on Grid. (Note: Use multi-grid if there is more than one decoder ON)	
Visual Aid	Color Coding for Frame, Break, Sync, ID, ID Parity, Data, CRC. Decode information is intelligently annotated based on time base setting.	
<b>Search Capability</b>		
Pattern Search	Idx, Time, TLPX-DATA, TLP01-DATA, THS-PREPARE, THS-ZERO, THS-SYNC, THS-TRAIL, TREAT, TLPX-CLK, TLP01-CLK, TCLK-PREPARE, TCLK-ZERO, TCLK-HS, TCLK-TRAIL, TCLK-REOT, DI, VC, DT, WC, ECC, Msg, Data, HS0, HS1, Bitrate/Byte, Status, Attributes	Time, Msg, PREPARE, SYNC, CONTROLS, Payload, Data, TAIL-OF-BURST, Bit Rate/Msg, Status, Attributes

# ORDERING INFORMATION

Product Description	Product Code	Product Description	Product Code		
<b>D-PHY Decode Options</b>					
D-PHY Decode Option for WavePro 7 Zi-A	WPZi-PHYbusD	M-PHY Decode Option for WavePro 7 Zi-A	WPZi-MPHYbusD		
D-PHY Decode Option for WaveMaster 8 Zi/Zi-A	WM8Zi-DPHYbus D	M-PHY Decode Option for WaveMaster 8 Zi-A	WM8Zi-MPHYbus D		
D-PHY Decode Option for WaveSurfer Xs/Xs-A	WSXs-DPHYbus D	M-PHY Decode Option for WaveRunner 6Zi	WR6Zi-MPHYbus D		
D-PHY Decode Option for WaveRunner Xi/Xi-A	WRXi-DPHYbus D				
<b>D-PHY Decode and Physical Layer Options</b>					
D-PHY Decode and Physical Layer option for WaveRunner 6Zi	WR6Zi-DPHYbus DP	M-PHY Decode and Physical Layer Option for WaveRunner 6Zi	WR6Zi-MPHYbus DP		
D-PHY Decode and Physical Layer option for WavePro 7Zi-A	WPZi-DPHYbus DP	M-PHY Decode and Physical Layer Option for WavePro 7Zi-A	WPZi-MPHYbus DP		
D-PHY Decode and Physical Layer option for WaveMaster 8Zi-A	WM8Zi-DPHYbus DP	M-PHY Decode and Physical Layer Option for WaveMaster 8Zi-A	WM8Zi-MPHYbus DP		
<b>D-PHY and MPHY Additional Products</b>					
QPHY Enabled MIPI D-PHY Software Option	QPHY-MIPI-DPHY	SDA 760Zi-A Oscilloscope	SDA 760Zi-A		
DigRF 3G Decode Option for WaveSurfer Xs/Xs-B	WSXs-DigRF3Gbus D	6 GHz, 20 GS/s, 4 Ch, 20 Mpts/Ch (40 GS/s and 40 Mpts/Ch in interleaved mode) with 50 Ω and 1 M Ω Input			
DigRF 3G Decode Option for WaveRunner Xi/Xi-A	WRXi-DigRF3Gbus D	SDA 806Zi-A Oscilloscope	SDA 806Zi-A		
DigRF 3G Decode Option for WaveRunner 6Zi	WR6Zi-DigRF3Gbus D	6 GHz, 40 GS/s, 4 Ch, 32 Mpts/Ch Serial Data Analyzer with 15.3" WXGA Color Display. 50 Ω and 1 M Ω Input			
DigRF 3G Decode Option for WavePro 7 Zi/Zi-A	WPZi-DigRF3Gbus D	Probes			
DigRF 3G Decode Option for WaveMaster 8 Zi/Zi-A	WM8Zi-DigRF3Gbus D	WaveLink ProLink Platform/Cable Assembly (4 – 6 GHz)	WL-PLink		
DigRF v4 Decode Option for WaveSurfer Xs/Xs-B	WSXs-DigRFv4bus D	Wavelink 6 GHz, 5 Vp-p Differential Amplifier	D620		
DigRF v4 Decode Option for WaveRunner Xi/Xi-A	WRXi-DigRFv4bus D	Small Tip Module			
DigRF v4 Decode Option for WaveRunner 6Zi	WR6Zi-DigRFv4bus D	SDA 813Zi-A Oscilloscope	SDA 813Zi-A		
DigRF v4 Decode Option for WavePro 7Zi/Zi-A	WPZi-DigRFv4bus D	13 GHz, 40 GS/s, 4 Ch, 32 Mpts/Ch Serial Data Analyzer with 15.3" WXGA Color Display. 50 Ω and 1 M Ω Input			
DigRF v4 Decode Option for WaveMaster 8Zi/Zi-A	WM8Zi-DigRFv4bus D	Probes			
<b>D-PHY Recommended Oscilloscopes</b>					
3.5 GHz, 20 GS/s, 4 Ch, 10 Mpts/Ch (40 GS/s and 20 Mpts/Ch in interleaved mode) with 50 Ω and 1 M Ω input	WavePro 735Zi	WaveLink 13 GHz, 1.6 Vp-p Differential Probe System	D1305-PS		
4 GHz, 40 GS/s, 4 Ch, 10 Mpts/Ch WaveMaster with 15.3 WXGA Color Display, 50 Ω and 1 M Ω input	WaveMaster 804Zi/Zi-A*	SDA 825Zi-A Oscilloscope	SDA 825Zi-A		
*SDA and DDA 7 Zi and 8 Zi/Zi-A oscilloscopes are also supported. Fully compatible with WP7Zi, WM8Zi/Zi-A, WRX/Xi-A, WSXs/Xs-A, WP7000, WM8000, and WaveRunner 6000 oscilloscopes and analyzers based on these platforms. Bandwidth recommended to be equal to or greater than the D-PHY data rate, with a minimum oscilloscope sample rate requirement of 4x the data rate.					
<b>D-PHY Recommended Accessories</b>					
WaveLink ProLink Platform/Cable Assembly (4 – 6 GHz) (WavePro (4 GHz bandwidth or greater) or WaveMaster only	WL-PLink	Wavelink 25 GHz, 1.6 Vp-p Differential Probe System	D2505-PS		
WaveLink ProBus Platform/Cable Assembly (4 GHz)	WL-PBus				
WaveLink 4 GHz 2.5 Vp-p Differential Amplifier	D410*	<b>M-PHY Recommended Software</b>			
Small Tip Module		MIPI M-PHY Decode Annotation Software	WM8Zi-MPHYbus D		
WaveLink 4 GHz 5 Vp-p Differential Amplifier	D420*	MIPI M-PHY Decode Annotation Software with Amplitude, Timing and Jitter Measurements with Eye Diagram Analysis	WM8Zi-MPHYbus DP		
Small Tip Module		MIPI DigRF v4 Decode Option	WM8Zi-DigRFv4bus D		
WaveLink 6 GHz 2.5 Vp-p Differential Amplifier	D610*	<b>M-PHY Recommended Accessories</b>			
Small Tip Module		Pair of ±1 ps Matched SMA-SMA Cables 12 Inches	Matched-SMA-Cables-12inch-Pair		
WaveLink 6 GHz 5 Vp-p Differential Amplifier	D620*	Pair of ±1 ps Matched SMA-SMA Cables 18 Inches	Matched-SMA-Cables-18inch-Pair		
Small Tip Module		<b>Customer Service</b>			
*For a complete probe, order a WL-PLink or WL-PBus Platform/Cable Assembly with the Probe Tip Module					
LeCroy oscilloscopes and probes are designed, built, and tested to ensure high reliability. In the unlikely event you experience difficulties, our digital oscilloscopes are fully warranted for three years and our probes are warranted for one year.					
This warranty includes:					
<ul style="list-style-type: none"> <li>• No charge for return shipping</li> <li>• Long-term 7-year support</li> <li>• Upgrade to latest software at no charge</li> </ul>					

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