

HDMXpress 2.1 Printable Application Help





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Welcome

The HDMXpress 2.1 is a HDMI pattern generation and calibration software that runs on the Arbitrary Waveform Generator. HDMXpress 2.1 supports different FRL electrical patterns LTP and RXSB33PAT at different FRL rates. It also supports closed loop calibration for differential amplitude, inter-pair skew, intrapair skew, FRL rate and jitter tolerance tests. Once the calibration is completed, the application automatically transfers the waveforms across all the AWGs.

MDMX	(press 2.1 - Untitled	i										-	×
File Ed	lit View Patter	n Help											
🖻 🔳	🗙 📑 AWG HD D	eskew 🛛 👯 Calit	rate 😹 Stop										
Configure	ation List					Configura	ation						^
Configuration List Label Mode Test ID Description Selected Data Rates				Label: HDMI 2.1 Data Rate 3.6 - 6.6 - 1.0 6.6 - 1.1 1.0 0.0 1.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	es for Calibration 3 Lane 4 Lane 4 Lane 4 Lane 4 Lane 4 Lane te waveforms te the waveform ed Filter Path figuration	Version: CTS 2.1 ×	Test ID: HFR2-1	✓ ≱hev	v Add To List				
						Comp	liance 🔘 User	Defined					~
<	opt Control				,	•			Outout			-	,
- Master A IP Addres Lane:	WG ss: GPIB8::1::I Lane0 Lane0+	NSTR	Slave AWG1 IP Address: Lane:	Lane1	▼ ane 1-	Slave AWG2 IP Address: Lane:	Lane2	Lane2-	oacput				^
Scope CH * These of	H: CH1 •	CH2 •	Scope CH: skew.	CH3 •	CH4 •	Scope CH:*	CH1 •	CH2 V	<				>

Key Features

- Supports 3 and 4 Lane.
- Synchronizes the patterns created in the HDMXpress to the TekExpress FRL solution.
- Supports closed loop calibration and creates patterns for electrical testing.
- Supports differential amplitude Swing, Intra-pair skew, Inter-pair skew, Minimum Link rate and Jitter Calibration.
- Supports multilane calibration for HFR2-5 measurement.

Introduction

Conventions

The online help uses the following conventions:

- When steps require a sequence of selections using the software interface, the ">" delimiter marks each transition between a menu and an option. For example, File > Save.
- DUT refers to the Device Under Test.
- The terms "waveform" and "signal" are used interchangeably.
- The term AWG refers to a Tektronix Arbitrary Waveform Generator.

Getting started

Minimum system requirements

The minimum requirements of the HDMXpress 2.1 application are listed in the following table:

Table 1: Minimum system requirements

Component	Description
Supported OS	Windows 10 Professional
Minimum Requirements	More than 8 GB free disk space .Net 4.0 Matlab [®] Compiler Runtime version 8.0

Prerequisites TekVisa is required to establish the communication with the signal generators (or other test instruments), over a LAN. You can download and install the software from *www.tek.com*.

Installing the software

An installation wizard installs HDMXpress 2.1. If you have not installed MATLAB Runtime and .NET 4.0, the installer will detect and install it.

Complete the following steps to download and install the latest HDMXpress 2.1 application. See *Minimum system requirements* for compatibility.

- 1. Go to www.tek.com.
- 2. Click Downloads. In the **Downloads** menu, select DOWNLOAD TYPE as Software and enter HDMXpress 2.1 in the MODEL OR KEYWORD field and click **SEARCH**.

heets, Software and more:	
MODEL OR KEYWORD	
HDMXpress 2.1	SEARCH
	wheets, Software and more: MODEL OR KEYWORD HDMXpress 2.1

- **3.** Select the latest version of software and follow the instructions to download. Copy the executable file to the oscilloscope.
- **4.** Double-click the executable and follow the on-screen instructions. The software is installed at C:\Program Files\Tektronix\HDMXpress2.1\.

Activate the license

NOTE. You must enable option HD21DSM in the oscilloscope to connect to the AWG where HDMXpress 2.1 is installed.

Activate the license using the option installation wizard on the oscilloscope. Follow these steps to activate the HDMXpress 2.1 license:

1. From the oscilloscope menu bar, click Utilities > Option Installation.

The TekScope Option Installation wizard opens.

 Instructions for using the Options Installation window to activate licenses for installed applications is provided in the oscilloscope online help. Press the F1 key on the oscilloscope keyboard to open the Option Installation help topic. Follow the directions in the topic to activate the license.

View version and license information

To view version information, Click Help > About HDMXpress 2.1.

Help	
?	Help Topics
	About HDMXpress 2.1

Option Information

From the oscilloscope Help menu, select About TekScope.

The Options section in the dialog box displays a list of installed options, including HDMXpress 2.1 (option HD21DSM).

NOTE. Option HD21DSM must be installed on the oscilloscope. The oscilloscope is connected to the AWG (where HDMXpress 2.1 is installed) through LAN network.

Additional Information

For HDMXpress 2.1 to be activated on the AWG, the AWG where the HDMXpress 2.1 software installed must be connected via the network to an oscilloscope with option HD21DSM installed.

Connection setup

NOTE. For HDMXpress to run, the AWG (where the HDMXpress software is installed) must be connected to an oscilloscope on the network were option HD21DSM enabled.

Following are the list of tests and setup information for calibrating the waveform:

- Test ID HFR 2-1: Max Differential Swing Tolerance
- Test ID HFR 2-2: Intra-Pair Skew
- Test ID HFR 2-3: Inter-Pair Skew
- Test ID HFR 2-4: Minimum Link Rate Tolerance
- Test ID HFR 2-5: Jitter Tolerance



Figure 1: Connection diagram for Calibrating the AWG waveform (Lane0 to D0 and Lane 1 to D1)



Figure 2: Connection diagram for Calibrating the AWG waveform (Lane2 to D2 and Lane 3 to D3)



Figure 3: Sink Hub configuration setup

Operating basics

Starting the software

From the Start menu, click **All Programs > HDMXpress 2.1**. You can also double-click the **HDMXpress 2.1** shortcut on the desktop.

HDMXpress	s 2.1 - Untitled											-	×
File Edit \	View Pattern	Help											
2 🗖 🗶	🖶 AWG-HD De	skew 🛛 👯 Calib	rate 😹 Stop										
Configuration	List					Configura	ation						^
Label Mod	ie	Test ID	Description	Selected Data	a Rates	Label: HOMI 2.1 Data Rab 3 3 - 1 6 6 9 66 9 86 1 126 - 1 26 - 9 126 - 1 26 - 9 20 - 9	es for Calibration 3 Lane 4 Lane 4 Lane • 4 Lane • 4 Lane • 4 Lane • 4 Lane • 4 Lane te waveforms te the waveforms	Version: CTS 2.1 ~	Test ID: HFR2-1	New	Add To List		
¢		_				Test Con Omp Comp	figuration liance OUser	Defined					~
Instrument Co	ontrol								Output				
Master AWG IP Address: Lane: Scope CH:	GPIB8::1::IN Lane0 Lane0+ CH1 •	STR v Lane0- CH2 v	Slave AWG1 IP Address: Lane: Scope CH:	Lane1 Lane1+ L CH3 •	▼ ane1- CH4 ▼	Slave AWG2 IP Address: Lane: Scope CH:*	Lane2 Lane2+ CH1 ▼	Lane2- CH2 V					
* These config <	uration required	l for AWG-HD de	skew.					>	<				~

Exiting the software

Select **File > Exit** to exit the application.

File name extensions

The application uses the following file name extensions:

Table 2: File name extensions

File name extension	Description
.wfm	Binary file containing an AWG waveform record in a recallable proprietary format.
.flt	Embed/De-Embed filter coefficient.
.png	Schematics and images.

Menus and toolbars

Menu bar The HDMXpress 2.1 has the following menus:

File Menu

File	Edit View Pattern He	elp
B	Restore Default Configuration	Ctrl+N
2	Open Setup	Ctrl+O
H	Save Setup	Ctrl+S
	Save Setup As	
	Exit	

The File menu has the following items:

- Restore Default Configuration: Restores the default configuration.
- **Open Setup**: Opens a saved setup file.
- Save Setup: Saves the setup file in the .setup format in a folder in your C drive.
- Save Setup As: Saves the setup under another name in the .setup format.
- **Exit**: Exits the application.

Edit Menu

Edit	View Pattern	Help
	Delete	
	Select All	

The edit menu has the following items:

- **Delete**: Deletes the selected configurations.
- Select All: Selects all the configurations.

View Menu

View	Pattern	Help
S	Standard To	olbar
S	Status Bar	

The view menu has the following items:

Standard Toolbar:

Select to view or hide the toolbar. The Standard toolbar uses icons that provide a quick access to many frequently used functions. If the toolbar is hidden before closing the application, it remains hidden when the application is opened again.

📄 📰 📕 AWG-HDMI Deskew 🛛 👯 Calibrate 🐰 Stop

The Standard toolbar has the following options:

- New Configuration: Creates a new empty template based on the current settings.
- Add To Configuration List: The configured pattern is added to the Configuration list.
- Delete Configuration: Deletes the selected Pattern from the Configuration list.
- AWG-HD Deskew: Click to perform deskew operation of AWG-HD.
 (Follow the instructions mentioned in *AWG-HD Deskew Using HDMXpress* on page 20 to perform the deskew of all channels of AWG-HD box)
- Calibrate: The patterns are calibrated for Lane0 (D0) and the calibrated parameters are applied across all lanes (AWGs).

NOTE. When multilane calibrate checkbox is enabled, all the AWG's are calibrated independently.

Stop: Stops generating the pattern.

Status Bar:

Select to view or hide the status bar. The status bar displays the AWG name on which the HDMXpress 2.1 is installed. The status bar is displayed by default. If the status bar is hidden before closing the application, it remains hidden when the application is opened again.

Pattern Menu

Pattern		Help		
2	New			
	Add	To Configuration List		
畿	Calibrate			
*	Stop	0		

The pattern menu has the following items:

- New: Creates a new empty template file based on current settings.
- Add to Configuration List: Adds a pattern to the configuration list.
- **Calibrate**: The patterns are calibrated for Lane0 (D0) and the calibrated parameters are applied across all lanes (AWGs).
- **Stop**: Stops generating the pattern.

Help Menu

Help)
0	Help Topics
	About HDMXpress 2.1

The help menu has the following items:

- **Help Topics**: Opens the online help.
- **About HDMXpress 2.1**: Displays information about the application, such as the version number.

Configuration The configuration window allows you to select the test measurement settings for the device under test (DUT) for the calibration of patterns.

Confi	guration								^
Label:			Ver	rsion: Te	est ID:				
HDMI	2.1		CT	rs 2.1 ∨ +	IFR2-5	~ 📝 Ne	w 📃 Add To List		
Data	Rates for Calibra	tion]		
⊻ :	3G - 3 Lane								
<u> </u>	6G - 3 Lane								
⊘ €	5G - 4 Lane								
ک ا	3G - 4 Lane								
2	10G - 4 Lane								
2	12G - 4 Lane								
🗹 Ge	nerate waveform	s							
🗌 Mu	Ilti-Lane Calibrate								
🗌 De	embed Filter Path								
Test	Configuration —								
•	Compliance 📃 l	Jser	Define	d					
Nomir	nal Voltage Swing:		1000	0.00	mV				
Rand	om Jitter:		0.20	\$	UI				
	S1Erequency			S1 Amplitude					
\checkmark	0.10	*	fc	1.00	*	TBit			
	0.20	:	fc	0.51	<u>^</u>	TBit			
	0.50		fc	0.22	•	TBit			
	4.00	~	fr	0.11	×	TBit			
$\mathbf{\nabla}$	1.00	¥	ic.	0.14	¥	TOIL .			
\checkmark	2.00	*	fc	0.11	*	TBit			
	5.00	*	fc	0.10	*	TBit			
	10.00	*	fc	0.10	*	TBit			
<									>

Label: Displays the defined test name as HDMI 2.1.

Version: Selects the required CTS Version from the drop-down list. The available option is 2.1.

Test ID: Selects the test measurement from the drop-down. By default HFR2-1 is selected.

New: Click to create a new pattern based on the current settings.

Add to list: Click to add pattern to the configuration list.

Data rates for calibration: Selects the data rates from 3 G to 12 G.

Generate waveforms: Generates the new waveforms pattern. The pattern will be created in all AWGs (master and slave).

Multi-Lane Calibrate: Provides an option to Calibrate for all 4 AWGs used in FRL Sink tests and generates FRL Patterns in all the 4 AWGs independently. At a time, two AWGs (Either Lane 0 - Lane 1/ Lane 2 - Lane 3) are calibrated one after the other without changing the connections of the Oscilloscope.

Lane0 should be connected to channel1 & channel2 of the scope and Lane2 should be connected to channel3 & channel4 of the scope.

NOTE. *Multi-Lane Calibrate option is applicable only for HFR2-5 Jitter Tolerance measurement.*

Steps to be followed to calibrate waveforms using Multi-Lane Calibrate option:

- 1. Select the appropriate Data Rates, Test ID, SJ Frequencies.
- 2. Select the Multi-Lane Calibrate checkbox.
- 3. Click Add To List; The respective tests are added into the Configuration List.
- 4. Click Calibrate checkbox to calibrate the waveforms.

During the calibration, dialog box appears to Connect Lane 0 and Lane 1 AWGs to the oscilloscope. Refer *Figure 1: Connection diagram for Calibrating the AWG waveform (Lane0 to D0 and Lane 1 to D1)* on page 6



Once Lane 0 and Lane 1 AWGs are calibrated, additional dialog box appears to calibrate Lane 2 and Lane 3 AWG respectively. Refer *Figure 2: Connection diagram for Calibrating the AWG waveform (Lane2 to D2 and Lane 3 to D3)* on page 7



Calibrate the waveforms: Performs the closed loop calibration on the generated waveforms.

Deembed filter path: Selects the filter file which deembeds the receptacle.

Test configuration:

Compliance: Sets default values for electrical configurations as defined by the CTS specification.

- Nominal Voltage Swing: Displays output signal amplitude. By default 1000 mV is selected.
- Maximum Voltage Swing: Displays output signal amplitude. By default 1200 mV is selected.
- Percentage deviation: Displays percentage of variation in the calibrated values.

User defined: select to specify the user defined values for electrical configurations. By default, this option is disabled.

Configuration list Configuration list displays a list of all the patterns. By default it is displayed and opens in the leftmost area of the display window.

After you configure the pattern in the **Configuration** -> **New** window, select **Add To List**. The configured pattern data will be saved and displayed in the **Configuration List** window. The Configuration list displays Label, Test ID, Mode, Description, Selected Data Rates, Generate Pattern and Calibrate Waveform.

Configura	ation List					
Label	Mode	Test ID	Description	Selected Data Rates	Generate Pattern	Calibrate Waveform
HDMI 2.1	Compliance	HFR2-1	Amplitude Calibration	3G-3Lane,6G-3Lane,6G-4Lane,8G-4Lane,10G-4Lane,12G-4Lane	False	True
HDMI 2.1	Compliance	HFR2-2	Intra Pair Skew	3G-3Lane,6G-3Lane,6G-4Lane,8G-4Lane,10G-4Lane,12G-4Lane	False	True
HDMI 2.1	Compliance	HFR2-3	Inter Pair Skew	3G-3Lane,6G-3Lane,6G-4Lane,8G-4Lane,10G-4Lane,12G-4Lane	False	True
HDMI 2.1	Compliance	HFR2-4	LinkRate Calibration	3G-3Lane,6G-3Lane,6G-4Lane,8G-4Lane,10G-4Lane,12G-4Lane	False	True
HDMI 2.1	Compliance	HFR2-5	Jitter Calibration	3G-3Lane,6G-3Lane,6G-4Lane,8G-4Lane,10G-4Lane,12G-4Lane	True	True
<						>

NOTE. You can configure any number of patterns and add them to the configuration list.

After you select a pattern to generate, you must compile it to create the data. Once you generate a pattern (using **Pattern > Generate** from the menu bar), a pattern is created.

	To save a configured pattern that is available in the list, select the pattern and select File > Save Setup As . The configured pattern is saved as a (.setup) file in the specified location.
	After you select a waveform to calibrate, you must compile it to calibrate. Once you calibrate a waveform (using Calibrate from the toolbar), a waveform is calibrated.
	To save a calibrated waveform that is available in the list, select the waveform and select File > Save Setup As . The calibrated waveform is saved as a (.setup) file in the specified location.
	NOTE. If you close the application without saving the configured pattern or Calibrated waveform, the pattern or waveform data is lost. You can compile the pattern or calibrate the waveform again from the setup, if you have saved the setup using File > Save Setup or Save Setup As.
	You can select multiple contiguous and non-contiguous patterns or waveforms using the Shift and Ctrl keys, respectively. Selecting multiple configured patterns or waveforms and selecting the Delete option deletes all the selected patterns or waveforms. Selecting multiple configured patterns and selecting the Generate option generates all the patterns for the selected pattern configurations.
Instrument Control	The instrument control window allows you to select and configure the instruments used in the application.
	HDMXpress 2.1 application works with the following arbitrary waveform generators.
	AWG70001A
	AWG70001B
	HDMXpress 2.1 creates patterns on Master and Slave AWG. The Clock and Data0 patterns are created on the Master AWG. Data1, Data2 and Data3 patterns are created on the Slave AWG. Configure the Slave AWG and Oscilloscope IP address.
	Instrument Control Master AWG Slave AWG1 Slave AWG2 Slave AWG3 Scope IP Address: IP Address:

Instrument Co	ontrol													
Master AWG			Slave AWG1			Slave AWG2				Slave AWG3			Scope	
IP Address:	GPIB8::1::INS	STR	IP Address:			IP Address:				IP Address:			IP Address:	
Lane:	Lane0	-	Lane:	Lane1	•	Lane:	Lane2	-	•	Lane:	Lane3	-		
	Lane0+	Lane0-		Lane1+	Lane 1-		Lane2+	Lane2-			Lane3+	Lane3-	AWG-HD MAC/IP Address	
Scope CH:	CH1 🔹	CH2 🔻	Scope CH:	СН3 🔹	CH4 •	Scope CH:*	CH1 🔹	CH2 -		Scope CH:*	СН3 🔹	CH4 🔹	Port:	4000
* These configu	uration required	for AWG-HD de	skew.											

Master AWG	
Address	Enter the Master AWG IP address or GPIB address. GPIB8::1::INSTR is the default address.
Lane	Select the Lane. By default Lane0 is selected for the Master AWG.
Scope Channel	Selects the oscilloscope channel connected to 'Lane0+' and 'Lane0-' of AWG.
Slave AWG	
Address	Enter the IP address of the slave AWG. TCPIP::XXX.XX.XXX.XXX::INSTR is the default address.
Lane	Select the slave AWG Lane. By default Lane1, Lane2, and Lane3 are selected for Slave AWG1, Slave AWG2 and Slave AWG3 respectively.
Scope Channel	Configure the oscilloscope channel for which 'Lane+' and 'Lane-' are connected.
Scope	· ·
IP Address	Enter the oscillocope IP address. GPIB8::1::INSTR is the default address.
AWG/HD	
MAC/IP Address	Enter the MAC/IP address. TCPIP::XXX.XXX.XXX.XXX:INSTR is the default address.
Port	By default 4000 is selected.

Table 3: Instrumental control window settings

Output Output window displays all the log messages.



AWG-HD Deskew

AWG-HD Deskew Using HDMXpress

Steps to deskew AWG-HD using HDMXpress application:

- **1.** For AWG-HD Deskew refer *Figure 1: Connection diagram for Calibrating the AWG waveform (Lane0 to D0 and Lane 1 to D1)* on page 6
- 2. Enable Sync manually in all the AWGs.
- 3. Install the HDMXpress application on the Master AWG.
- **4.** Launch the application and check the connections of all 4 AWGs through TekVisa.
- **5.** Enter the valid IP addresses in the **Instrument Control** section of the HDMXpress application.

HDMXpress 2.1 - Untitled			- 🗆 ×
File Edit View Pattern Help			
📄 💌 🚔 AWG+HD Deskew 🛛 👯 Calibrate 🐰 S	top		
Configuration List		Configuration	^
Label Mode Test ID Description	n Selected Data Rates	Ladel: Version: Test D: PERF 2.1 Version: HPR2-1 Version: Add T 21 Sat-States for Calibration 21 Sat-States 21 Ge - Stane 21 Ge - Stane	o List
Instrument Control Master AWG Save JP Adress: ØPIBS: II:IPASTR Lane: Lane0 Lane0+ Lane0+ Scope GH: CH1 CH2 * These configurates are sing for AWC Hill dedemu	WG1 Slave ress: PA Lane1 • Lane1+ Lane1- CH: CH3 OH4 Sca	Output ve AWG2	
<		>	> *

- 6. Click AWG-HD Deskew option in the Toolbar.
- 7. Once the AWG-HD channel 1 is connected to scope then Click **Ok**. The value is updated in the "FRLSinkCommonSettingsXML" file. If CH1 Deskew is not required, click **Cancel**.



8. Repeat the step 6 and 7 for the AWG-HD Deskew operation for CH2, CH3 and CH4.

9. Check the Deskew values are updated in the location C:\Users\Public \Tektronix\HDMI21\Compliance and the timestamp of the file should be updated.

le Edit Format View Help	
<pre>/Xml Version= 1.0 encoding= utr-8 standalone= yes /> aws-HDMT-Deskew></pre>	
<ch1>341.87524498431</ch1>	
<ch2>353.96889919435</ch2>	
<ch4>0</ch4>	
/AWG-HDMI-Deskew>	

Manual Steps to Deskew AWG-HD:

- 1. Connect the output lanes of AWGs as the input to AWG-HD.
- **2.** For Master AWG(CH1) deskew, connect AWG-HD CH1 output to scope channel.
- **3.** Load any superblock pattern from "Compliance\HFR2-1" folder in the respective AWG.

👎 AWG70001				_ 0 X
	Stopped	I		
Home Setup Wavefor Sequenc Ca	oture/ Utilities	Waveforms Seque	ences	7
rig A Force Trig B All Outputs Off	WG Functions	Dpen Wavefor	m	
① Channel 1 RXSB 🗸 🔆 Amplitu	de 500.0 mVpp	Name	Length	Date
Run Continuous 🔻		RXSB33PAT1	3.236 M	8/12/2019 8:58:23 PM
250 mV				
-250 mV 0 1M 2M	3 М			

- 4. Set the sample rate manually in the AWG according to the loaded pattern.
 - For eg: To load superblock pattern, Data Rate with Sample Rates are listed below:

Data Rate	Sample Rates
3 G	24 GS/s
6 G	24 GS/s
8 G	48 GS/s
10 G	40 GS/s

Data Rate	Sample Rates
12 G	48 GS/s



5. Login to oscilloscope, launch TekVisa and add AWG-HD IP address. "DEL 0 CH:1" command sets the deskew of AWG-HD's CH1 to 0.

OpenChoice Talker Listener		- 🗆 X
File Edit Tools Help		
Instruments	Enter Command or Script	
GPIB GPIB <th< td=""><td>DEL 0 CH:1 Write Read Query H</td><td>lex Entry Enabled</td></th<>	DEL 0 CH:1 Write Read Query H	lex Entry Enabled
LAN TCPIP::134.64.245.80::INSTR	Command / Script History	
	DEL 0 CH:1	
< >		
Last Updated 8/12/2019 9:41 PM	AutoQuery - False ; Term Char - LF ;	
Update Reset Communications	Run Single Step Loop	
Talker Listener Readout:	Display As: 💿 ASCII Only 🌍	Hex and ASCII
Date / Time Duration Source	Command / Data	Command Type
8/12/2019 9:41 0.0397s VISA 8/12/2019 9:41 0.0025s TEKSC	TCPIP::134.64.244.206::4000::SOCKET DEL 0 CH:1	Open Session Write
Operation Successful		1

- 6. Launch **DPOJET** in the oscilloscope.
- 7. From Select panel->Standard tab->Select HDM21_Inter PairSkew option.



8. Select connected channels in the **Source configuration** window. And set the **Record Length** to 10 M.

Select Meas HDM21_InterPair	urement Skew1 ▼			
Char Math Ref	nels	Ch Math Ref	2 4	ply to all two e measurements
	Source Vert Scale Horiz F	ee Autoset Res Vert & Un Horiz Un	do	Ref Levels
Source Level Type				
Ch1 Percentage	Rise	e Fall		Advanced
Ch2 Percentage	High 90%	90%		20% - 80%
	TBD(Last:1	V) TBD(Last:1V)		(10% - 90%)
	Mid 50%	50%		
	TBD(Last:0	V) TBD(Last:0V)	Hysteresis	Autoset
	Low 10%	100 TRD/(ant 1)0	3%	
	Low 10% TBD(Last:- Base top m	10% 1V) TBD(Last:-1V) ethod Auto	3% TBD(Last:30mV)	

9. Run and check the deskew value.

Jitter, Noi	se and Eye Diagram Ana	lysis Tools							Options 💽	Clear	8
Select							View Deta	ils 🔻	Expand	Recalc	
	Description	Mean	Std Dev	Max	Min	р-р	Population	Max-cc	Min-cc		
Configure	🕨 🗉 Skew1, Math1, Mat	9.2424fs	1.8038ps	6.1563ps	-6.0285ps	12.185ps	331276	10.121ps	-10.276ps	Single	
Coninguite										Single	
Results										Run	
Plots											
Reporte											
Keports											

10. Enter the value DEL 345 CH:1 in TekVisa.



11. Clear the measurement in the DPOJET. Go to **Select** panel, Click **Time** tab and add the skew measurement for the select channels.

Jitter, Noise and Eye D	Diagram Analysis Tools				Preferences 💽	Clear	8
Select Period/ Freq Configure Jitter Results Eye Piots Ampl Reports Standard	Heasi Rise Time Fall Time Migh Time Low Time Rise Stew Fall Stew Rate	Skew SSC Profile Setup SSC Mod Rate Hold More	Clear Selected	Measurement Skew2	Source(s) Ch1,Ch2	Recalc Single Run	$\forall \forall$

12. Go to **Configure** panel and click **Opposite as From** option to get both negative and positive signals.

Jitter, Noi	se and Eye Diagran	n Analysis Tools				Clear (X
Select Configure	Measurement Skew2	Source(s)	Edges Filters	From Edge	To Edge Same as From	Recalc
Results			General Global	Fall	Opposite as From	Run
Plots Reports						

13. Run and check the value. If the value is more than 1 ps then modify the deskew value in the TekVisa.

"	Jitter, Nois	se and Eye Diagram An	alysis Tools							Options 💽	Clear	8
	Select							View Deta	ils 🔻	Expand	Recalc	\triangleleft
		Description	Mean	Std Dev	Max	Min	р-р	Population	Max-cc	Min-cc		
	Configure	▶ 🗉 Skew2, Ch1, Ch2	-102.22fs	2.0504ps	5.8217ps	-6.2335ps	12.055ps	331396	9.5164ps	-9.9750ps	Single	
	Beaulte										Run	
	Results											
	Plots											
	Reports											

eg: If the entered deskew value is 345 and the skew value is -3 ps then enter the value in the commnad "DEL 342 CH:1" in the TekVisa. Continue till we get the skew value is Less than 1 ps

14. Follow step-1 to step 13 for all the channels deskew.

Reference

Shortcut keys

Table 4: Shortcut keys

Menu/Menu item	Shortcut key
File	Alt+F
File > Open Setup	Ctrl+O
File > Save Setup	Ctrl+S
View	Alt+V
Pattern	Alt+P
Help	Alt+H

Parameters values

Table 5: Parameters values and selection

Settings	Values	Default value/selection
Configuration		
Label	-	HDMI 2.1
Version	-	CTS 2.1
Test ID	= HFR2_1	HFR2_1
	HFR2_2	
	HFR2_3	
	HFR2_4	
	■ HFR2_5	
Data Rates for Calibration	= 3G - 3 Lane	All are selected
	6G - 3 Lane	
	6G - 4 Lane	
	8G - 4 Lane	
	10G - 4 Lane	
	12G - 4 Lane	
Test Configuration		
Compliance	Select/Unselect	Selected by default

Settings	Values	Default value/selection
User Defined	NA	NA
Nominal Voltage Swing	-	1000 mV
Maximum Voltage Swing	-	1200 mV
Percentage Deviation	-	5.00 %
Instrument Control		
Address	-	
Clock	-	Channel 1: Analog
Data0		Channel 2: Analog
Data1		Channel 1: Analog
Data2		Channel 2: Analog

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