GRL HDMI 1.4/2.0 Protocol Compliance and Decode Software GRL-HDMI-DEC

Installation and Quick Start Guide



HDMI 1.4/2.0 Protocol Compliance and Decode Software Installation and Quick Start Guide



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1. Introduction

This Installation and Quick Start Guide provides procedures for installing, configuring, and verifying the operation of the GRL HDMI 1.4/2.0 Protocol Decode Software. It also will help you familiarize yourself with the basic operation of the analyzer.

2. Pre-requisite

Following are pre-requisites for using the software:

- 1. Agilent Technologies 90000 X-Series, 9000, 90000, or 90000Q Series model oscilloscope
- 2. Agilent IO software (Pre-installed on the Oscilloscope)
- 3. Microsoft .NET 4.5 (If not available, please download and install from www.microsoft.com)
- 4. Differential probes and probe heads
- 5. Keyboard and Mouse

3. Installing the software

Download the latest software from www.graniteriverlabs.com. If you have received a product CD carefully open the CD and note the media serial number printed on the CD; you may require this information to obtain the activation key for this software.

Locate the installer file named "GRL Automated Test Solutions - Installer.exe". Open the application by double clicking the installer file. The install wizard will install the software

Install the software as follows

Step 1: Double click Installer.exe.

Step 2: Click "Next" in the welcome screen



B	Installing GRL Automated Test Solutions	×
Installing GRL Automated Test Sol	utions	
	Installing GRL Automated Test Solutions 🚽 🗆 🗮	
	Welcome to the GRL Automated Test Solutions Installation! The data program will easily download test doubtion on exceeding encodered with the solution of the solution association. Clock Herlto controls the installation. Welcome the solution of advisition of the snoppen to any partice of the solution of definition and experiment of any partice of the maximum wheel of the law.	
GRL-Automated	Test Solutions	
		Granite River Labs Asia Pacific Pie. Ltd., All rights reserved

Step 3: Read and agree the license agreement and click "Next"



Step 4: Review the install folders and click "Next"

🔤 Installing GRL Automated Test Solutions – 🗆 🗙
Installation folder Select a destination folder where GRL Automated Test Solutions will be installed.
Setup will install files in the following folder. If you would like to install GRL Automated Test Solutions into a different folder, click Browse and select another folder.
Destination folder
C:\Program Files (x86)\GRL growse
Space required: 33.93 MB
Space available: 183.89 GB
GRL Automated Test Solutions GRL Automated Test Solutions
< <u>Back</u> <u>Next</u> > <u>Cancel</u>

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Step 5: Click "Install" and the Install wizard installs all required files.

Installing GRL Automated Test Solutions	×
Installing Files Copying GRL Automated Test Solutions files to your computer.	
To stop or pause the installation process, click Cancel.	
Directory: C:\GRL\GRL-UHS-II\SampleFiles File: Lane0.bin	
- GRL Automated Test Solutions	<u>Cancel</u>

Step 6: Click "Finish" to complete the installation

Installing GRL Automated Test Solutions	- 🗆 🗙
Finish GRL Automated Test Solutions has been successfully installed!	
Click Finish to complete the installation.	
- GRL Automated Test Solutions	Einish



4. Running the Software

The software installer automatically creates short cuts in the Desktop and Start Menu.

To open the application follow the below procedure:

Step 1: Navigate to Start Menu > All Programs > GRL > GRL Automated Test Solutions



Step 2: Click "GRL- Automated Test Solutions" to open the application.

G HDMI Protocol Decode Softwa	ve (Version: 0.9.0.0)	
Application Options Lice	se Windows Hep	0
	Gait Star Star Gait Star Star <	3
(Sectual.coger)		

Step 3: Click the Application Menu, and open "HDMI Protocol Decode Software"

G HDMI Proto	col Decode	Software (Version: 0.9.0	.0)	
Application	Options	License	Windows	Help	
DisplayP					
DisplayP					
HDMI Protocol Decode Software					
UHS-II Protocol Decode Software				terface	
GRL USB 3.0 Performance_Protocol Stress Test Suite					
GRL USB 3.0 Performance_Protocol Stress Test Suite					

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Step 4: HDMI Protocol Decode Application is ready to use.

G HDMI Protocol Decode Softw	are (Version: 0.9.0.0)	_ _ x
Application Options Lice	nse Windows Help	
Quick Start	Solution (1) Solution (2) So	?
	Quick Start Quick Start Steps Use Interface Clack to configure Oxolloscope Output the GPIB Address of Oxolloscope Oxolloscope Oxolloscope Oxolloscope <	3

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5. Introduction to Software User Interface

The software user interface includes a Menu, Action Item Bar, and Action Window as shown in the below image. The Action Window changes according to the selection of Action Item Bar.

love To Previous Action Item Menu Bar		Action Item Bar	Help	Minimize / N Action Pane Button	laximize e Button Move to Next Action Item
G HDMI Protocol De code Softwar	e (Version: 0.9.0.0)				
Application Options Licens	e Help				
Quick Start		🗾 🦸 🧃 💷 🍥 🗕 🕨	> → 📄		
	Start Steps User Interface	Quick Start			
StatusLogger					Ŧ×

The Action Item Bar provides access to all functionalities of the software. When an action item is selected, the Action Window is loaded with the Action Item. You can navigate to various Action Items using the arrow bars located in the left and right side of the window. The Minimize/Maximize action button minimizes and maximizes the Action Window. Help button will open the instruction manual for using the software.



6. Activating the Application

Application by default is provided with 10 days of activation. Without any activation key the application can be used for 10 days for evaluation.

After the purchase, if you received a CD of the software, you can find the Media number. You may need to use this media number for any further communications.

Below are the steps to activate the application license:

Step 1: Open the application (For more information, see <u>Running the application</u>) Step 2: In the application menu, Click License > License Details

G				Dis
Application	Options	License	Help	
Connection	n Setup	Lice	nse Details	n (5)
connection	· ootap			<u> </u>

Step 3: Review the installed applications

GRL Framework License	E
Granite River Labs	
Framework License Details	
Installed Products:	
GRL-DP Protocol Decode Solution - Permanent GRL-UHS-II Protocol Decode Software - Permanent GRL DisplayPort Sink Test Solution - Permanent HDMI Protocol Decode Software - Permanent DisplayPort Protocol Decode Software - Permanent UHS-II Protocol Decode Software - Permanent UHSII-PT-DEV - Permanent	* III +
Host ID (For enquiries or license request please send this information):	
i5bWmmb2UHcich732PZUd&t1hsFUKXbC6LCFwfdknVVqKLMhm8 D+avojeDTvRdCyoFyqGTT+en0 +ullt9umswkXMMZ17cMm6mM5Jzrd7GthtHAWW5QOf1LJfKA9vZ0 muR9iqGTT+en0	Copy to Clipboard
For license enquiries send the Host ID to <u>support@GraniteRiverLabs</u> .	com
Activation Key Received:	
Activation License File Received: Browse	Activate
Close	

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Step 4: Copy the Host ID by clicking "Copy to Clipboard"

GRL Framework License				
Granite River Labs				
Framework License Details				
Installed Products:				
GRL-DP Protocol Decode Solution - Permanent GRL-UHS-II Protocol Decode Software - Permanent GRL DisplayPort Sink Test Solution - Permanent HDMI Protocol Decode Software - Permanent DisplayPort Protocol Decode Software - Permanent UHS-II Protocol Decode Software - Permanent UHSII-PT-DEV - Permanent				
Host ID (For enquiries or license request please send this information):				
i5bWmmb2UHcich732PZUd&t1hsFUKXbC6LCFwfdknVVqKLMhm8 D+avojeDTvRdCyoFyqGTT+en0 +ullt9umswkXMMZ17cMm6mM5Jzrd7GthtHAWW5Q0f1LJfKA9vZ0 muR9iqGTT+en0				
For license enquiries send the Host ID to <u>support@GraniteRiverLabs.com</u>				
Activation Key Received:				
Activation License File Received: Browse Activate				
Close				

Step 5: Send the following details to info@graniteriverlabs.com:

Media Number / Order Number: Company Name: Contact person:

Note: Media number will be written on the CD case. If you would have ordered online and received an application installer, use the Order Number specified in the confirmation e-mail.

Step 6: Paste the activation key received from info@graniteriverlabs.com in the Activation Key Received text box provided in the License Dialog



GRL Framework License
Granite River Labs
Framework License Details
Installed Products:
GRL-DP Protocol Decode Solution - Permanent GRL-UHS-II Protocol Decode Software - Permanent GRL DisplayPort Sink Test Solution - Permanent HDMI Protocol Decode Software - Permanent DisplayPort Protocol Decode Software - Permanent UHS-II Protocol Decode Software - Permanent UHSII-PT-DEV - Permanent
Host ID (For enquiries or license request please send this information):
QqEx06bSTAEVLR0FwFsURSQxMBAEWyluP+F6x+jJvNFgJ4gFZY XSBCPaJw39EyuAdXlGyn5ybPxfj+SubHnfDiYYpjaUrimKTcnfV9l9eC tZvYfkbedhZnu1gWkx08z3hw990ardNrSSKHGpoIQSwrPPcDJuR4 LTt6u97qVrOQY5JXuhF03eo/FVGoApKr0L2M5Z0WK18R+HTB95j1 +
For license enquiries send the Host ID to support@GraniteRiverLabs.com
Activation Key Received:
1ZEmWd7kNKuk3MGgNWVJqm0vA2gw6wdHvBzs0yesusY3Hc3t19EPCq3Kw0 Ux/s3 +bPYNDTfDpW8HOzTJ6y6xijufPu4zYgSKgMv0yF+b/EvAUQhq0ydYunV6fIK3jl1 vlq0MH9QH6EdJlocamghBLubfynrbwx3
Activation License File Received: Browse Activate
Close

Step 7: Click on "Activate" button.

Activation Key Received:	
QqEx06bSTAEVLR0FwFsURSQxMBAEWyluP+F6x EyuAdXlGyn5ybPxfj+SubHnfDiYYpjaUrimKTcnfV919 3hw990ardNrSSKHGpoIQSwrPPcDJuR4LTt6u97q r0L2M5Z0WK18R+HTB95jli5bWmmb2UHcich732P	+jJvNFgJ4gFZYXSBCPaJw39 eCtZvYfkbedhZnu1gWkx08z /rOQY5JXuhF03eo/FVGoApK ZUd&t1hsFUKXbC6LCFwfdk 👻
Activation License File Received: Browse	Activate
Close	

Step 8: The following Confirmation message will be shown, Click on OK button.



Granite River Labs License
GRL-DP Protocol Decode Solution: Updated to Permanent GRL-UHS-II Protocol Decode Software: Updated to Permanent GRL DisplayPort Sink Test Solution: Updated to Permanent HDMI Protocol Decode Software: Updated to Permanent DisplayPort Protocol Decode Software: Updated to Permanent UHS-II Protocol Decode Software: Updated to Permanent UHSI-PT-DEV: Updated to Permanent UHSII-DT: Updated to Permanent GRL USB 3.0 Performance & Protocol Stress Test Suite: Updated to Permanent UHSII-HT: Updated to Permanent Soft USB 3.0 Performance & Protocol Stress Test Suite: Updated to Permanent UHSII-HT: Updated to Permanent
ОК

Step 9: Review the license, and click close button in the License Dialog window.

GRL Framework License
Granite River Labs
Framework License Details
Installed Products:
GRL-DP Protocol Decode Solution - Permanent GRL-UHS-II Protocol Decode Software - Permanent GRL DisplayPort Sink Test Solution - Permanent HDMI Protocol Decode Software - Permanent DisplayPort Protocol Decode Software - Permanent UHS-II Protocol Decode Software - Permanent UHSII-PT-DEV - Permanent
Host ID (For enquiries or license request please send this information):
QqEx06bSTAEVLR0FwFsURSQxMBAEWyluP+F6x+jJvNFgJ4gFZY XSBCPaJw39EyuAdXlGyn5ybPxfj+SubHnfDiYYpjaUrimKTcnfV9l9eC tZvYfkbedhZnu1gWkx08z3hw990ardNrSSKHGpolQSwrPPcDJuR4 LTt6u97qVrOQY5JXuhF03eo/FVGoApKr0L2M5Z0WK18R+HTB95jI +
For license enquiries send the Host ID to <u>support@GraniteRiverLabs.com</u>
Activation Key Received:
1ZEmWd7kNKuk3MGgNWVJqm0vA2gw6wdHvBzs0yesusY3Hc3t19EPCq3Kw0 Ux/s3 +bPYNDTfDpW8HOzTJ6y6xjjufPu4zYgSKgMv0yF+b/EvAUQhq0ydYunV6fIK3jl1 vlq0MH9QH6EdJlocamghBLubfynrbwx3
Activation License File Received: Browse Activate
Close

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7. Instrument/Oscilloscope Configuration

To operate GRL Automated Test Solutions may require configuring the VISA aliasing to make the software communicate with the Oscilloscope.

Click "Oscilloscope Configuration" in the Action Bar button. The following action window appears:

Application	Options	License	Windows	Help		
Oscilloscop	oe Config	uration			🎁 🗊 🗊 🍥 → 🕨 → 📓	2
				VISAAlias Name:	Oscilloscope Connection Setup TCPIP0::localhost::inst0::INSTR Click here to know how to configure VISA Alias Name	3

Pre-requisite

The following are the pre-requisite for following this step by step procedure

- 1. Agilent Technologies 90000 X-Series, 9000, 90000, or 90000Q Series model oscilloscope
- 2. Key board and Mouse
- 3. GRL Automated Test Solutions Software

Step 1: Open the Agilent IO Control

Find the Agilent IO icon on the system tray as shown below and **right click** the Agilent IO control.



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Step 2: Open Agilent Connection Expert

Click "Agilent Connection Expert" and open the application



This opens the Agilent Connection Expert as shown below



Step 3: Select LAN instrument In Agilent Connection Expert Select the LAN instrument

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Eile Edit View I/O Configuration Tools	Help			A			
Properties All Condo Properties	Interactive IO	NG Add In:	strument 🛃 Add Interface	Opdate Drivers	X Delete		
Instrument I/O on this PC	LAN Interface - LAN						Â
	This is the default LA	N I/O or	n this computer				
Refresh All							
	📀 This item has been	verified					
- 💯 COM1 (ASRL 1)	-					Change Properties	
COM2 (ASRL2)							
COM4 (ASRL4)	VISA interface	TCPIPO					
	Protocol type:	Autom	atic			Less <<	
PXIO	Connect	5000	Milliseconds				
🖶 🎒 USB/GPIB (GPIB2)	LAN maximum	120	Seconds				
HP81130A (GPIB2::9::INSTR)	Client delta	5	Seconds				-
USBU USBU USBU USBU USBU USBU USBU USBU	SICL interface ID:	lan					
USBInstrument1	Logical unit:	30					
- 9- VXI-11.2 Server (GPIB28)	Log connect errors:	Yes					
Server (GPIB27)	Auto-discover:	No					
<	3						
16.3.16603.3				64	bit: 1 provider; 32 bit	: Agilent VISA is primary	

Step 4: Add Instrument

Right click the LAN as shown below and click "Add Instrument" or click "Add Instrument" in the ribbon bar.



Step 5: Configure the LAN instrument

Click "Add Address" in the "Add LAN Instrument" dialog as shown below:



rer of locate LAN institument	s. Select any numbe	er of them to add to ti	ne configuration.		
Auto Find Discover local instruments	Add Address Manually add a nown IP address r hostname Configure ar	Displayer a network address range	Add Other Other instruments reachable through the LAN	Connect	
Enter Instrument Addre ✓ Use Hostname or Use IP Address	Examples: IPv4	:192.168.0.100 IPv	6: fe80::218:e77f	Connect to an instr an address or host already know. This advantage of being connect devices the discovered.	rument by usin name you has the able to at are not auto
Optional Connection Int O Default instrumen HiSLIP O Socket	formation t Device name: Port number:	inst0 5025			
Test Connection	n recommended)				
Identify Instrume	nt			Add to configure	/eb Page ation

Step 6: Configure the IP address of LAN Instrument

In Add Address page, select "Use Hostname" and type "localhost" in the text box provided for local host.



Step 7: Test the connection

Click "Test Connection" to make sure that the Agilent IO configuration is correct. After this you should be able to see "The instrument is present"

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er or locate LAN Instrument	s. Select any number	r of them to add to the config	iration.	
scover local instruments	Add Address	Search Explore a network address range network	Add Other Other instruments reachable through the LAN retwork	
Enter Instrument Addre Use Hostname or Use IP Address	Iocalhost Examples: IPv4:	192.168.0.100 IPv6: fe80:	218:e77f	Connect to an instrument by usin an address or hostname you already know. This has the advantage of being able to connect devices that are not auto discovered.
- Optional Connection Inf Default instrumen HiSLIP Socket	ormation t Device name: Port number:	inst0 5025		
Test Connection	The ins	trument is present		
Identify Instrume	nt			Add to configuration

Step 8: Check the Instrument Identification

In the instrument identification, select "*IDN Query" and click "Identify Instrument". If the instrument is configured correctly you should be able to see the instrument name next to the "Identify Instrument" button as shown below:

Auto Find Discover local instruments	Add Address Mouse data throat back throat	
Enter Instrument Add Use Hostname or Use IP Address Optional Connection II o Default instrume	localhost Examples: IPv4: 192.168.0.100 IPv6: fe80::218:e77f Information rt	Connect to an instrument by using an address or hostname you already know. This has the advantage of being able to connect devices that are not auto discovered.
	Device sector intt0	
HiSLIP Socket Test Connection	Port number: 5025	

Step 9: Complete Add LAN Instrument

Click "OK" to complete Add LAN Instrument

Step 10: Copy VISA alias name

At the end of Step 9, you should be able to see your Oscilloscope in the LAN instrument. Copy or note the VISA address:

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Agilent Connection Expert	on Analyse UNITS	a Damos Help		
<u>File Edit View I/O Configuration Tools I</u>	<u>H</u> elp			
🤔 Refresh All 🧭 Undo 📝 Properties	🔤 Interactive IO 🛛 🖉	Add Instrument 📜 Add Interface	👋 Update Drivers 🗙 Delete	
Instrument I/O on this PC	LAN Instrument - MSO94	104A		<u>^</u>
	An instrument connecte	ed to the LAN		
Refresh All				
	📀 Both the address che	ck and the identification were don	e	
COM1 (ASRL1)				Change Properties
COM2 (ASRL2)	Instrument Properties			
GPTB1	Instrument Properties Inst	alled Software		
E AN (TCPIP0)	VISA address:	TCPIP0::localhost::inst0::INSTR		
MSO9404A (localhost)				Instrument Web Interface
			$-\kappa$	
HP81130A (GPIB2::9::INSTR)	IDN string:	Agilent Technologies,MSO94	04A,MY52250155,04.50.0003	-
E SBO	Manufacturer:	Agilent Technologies		
81134A (USB0::0x0957::0x4008::M)	Model code:	M5O9404A		
USBInstrument1	Serial number:	MY52250155		
	Firmware:	04.50.0003		
	SICL address:	lan[localhost]:inst0		
	Address check:	Yes		
	Auto-identify:	Yes		
۲				-
16.3.16603.3			64 bit: 1 provide	er; 32 bit: Agilent VISA is primary

Step 11: Configure the GRL Automated Test Solution Copy the VISA name provided in the Step 10 and type the same in the GRL Automated Software "VISA Alias Name":

Application Options License Windows Help	
Oscilloscope Configuration ⁵ [] () () () → → → =	?
Oscilloscope Connection Setup VISA Alias Name: TCPIP0::localhost::inst0::INSTR Click here to know how to configure VISA Alias Name	3



8. Test Setup Connection

Click "Test Setup Connection" action bar button to view the test setup required to efficiently run the GRL HDMI Protocol Decode tool. In both recommended test setups active differential probes are required to connect Clock, Data0, Data1 and Data2 lanes to oscilloscope.



If you would like to view live traffic in the HDMI main link, you can use pass through test fixtures and probes. If you have a HDMI Controller which enables the Source device to transmit the line traffic you can use a test fixture and controller configuration.

Note: The GRL HDMI Protocol Decode software is not designed to communicate with the HDMI EDID Controller. You may require a separate software program to control the HDMI EDID Controller.

9. Test Selection

Click "Select Tests" action bar button to view the selected tests for HDMI 1.4b/2.0. If you want to run HDMI 1.4b tests then click on HDMI 1.4 button, resultant test cases will be populated in the tree view adjacent to it. Select HDMI 2.0 to select/unselect HDMI 2.0 test cases. One can select/ deselect the test cases using their respective checkboxes.



Select "Perform on ALL Frames" to run the selected tests on all the frames. Select "Skip First and Last Frame" to run the tests on all the frames except 1st and last frame as they are incomplete frames.

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10. Decoder Configuration

To configure the decoder, click "Decoder Configuration" button in the Action Bar. It is essential to review this configuration before running the software.

Application Options License	Windows Help			
Decoder Configuration		🧃 🔲 🔯 🔸 🕨	→ <u> </u>	2
	Signal Source		Source Capabilities Declaration	0
	Source Type: O Live O Offline	Bits Per Pixel:	24 bpp 🔹	*
	Clock: itter 480p 1.25Gs\110120_214129_Ch1.wfm	Source_CN:	Not Specified	
	Data 0: itter 480p 1.25Gs\110120_214129_Ch2.wfm	Format Structure:	Default	=
	Data 1: E:\Data\HDMI\HDMI_Wfms\8-22 Audio Jitter	Video Formats:	[2] 720 x 480p @ 60 Hz 🔹	
	Data 2: E:\Data\HDMI\HDMI_Wfms\8-22 Audio Jitter	Audio Frequency:	32 KHz 🔹	
		DVI Interoperability:	HDMI -	
			Video	
		Source_AVI_Supp	orted	
		Source_Video_Fo	rmats	-

Signal Configuration:

Depending on the HDMI Source you may be required to input the Configuration:

Select CH1 if your HDMI Source is configured for Clock Select CH2 if your HDMI Source is configured for Data0 Select CH3 if your HDMI Source is configured for Data1 Select CH4 if your HDMI Source is configured for Data2

Signal Source:

If you want to analyze the signal using a live waveform captured using Oscilloscope select "Live" If you want to analyze a waveform stored already, select "Offline".

Note: Refer to the datasheet for list of Oscilloscope and waveform formats supported.

For Live Signal Capture, connect the signals as shown in the Test Setup Connection and select the appropriate channels in the software.

To analyze previously stored waveforms, select "Offline Mode" and input the appropriate files in using the "File Browse" button.

Currently the software supports Agilent's BIN file format.

Source Capabilities declaration:

Select the appropriate Source Capabilities declaration as per your requirement.

Pixel Format Selection:

Select RGB in the pixel format if the source DUT transmits the video stream in RGB.

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Select YCbCr 4:4:4 in the pixel format if the source DUT transmits the video stream in 4:4:4

Select YCbCr 4:2:2 in the pixel format if the source DUT transmits the video stream in 4:2:2

Select YCbCr 4:2:0 in the pixel format if the source DUT transmits the video stream in 4:2:0

Bits Per Pixel Selection:

Select 24, 30, 36, 48 bits per pixel depending on your HDMI Source DUT's transmission.

Source_CN Selection:

Select Photo if the SORUCE_CN is photo. Select Game if the SORUCE_CN is game. Select Cinema if the SORUCE_CN is cinema.

Format Structure Selection:

Select Default if the video format structure is not 3D not 4K*2k Select 3D Frame Packing/ 3D Side-By-Side/ 3D Top-Bottom for 3D Video Format Select 4K*2K for 4k*2k Video formats.

Video format Selection:

When Format Structure is selected, its relevant video formats will be populated. Identify the VIC Code and select the proper video format.

Audio Frequency Selection:

Select the appropriate audio frequency selection.

DVI Interoperability Selection:

Select the appropriate selection.

Video Selections:

Select/deselect the SOURCE video related CDF based on the requirement. Make sure you select the one which is required for the tests selected. Else the test cases may FAIL based on the selection.

Audio Selections:

Select/deselect the SOURCE audio related CDF based on the requirement. Make sure you select the one which is required for the tests selected. Else the test cases may FAIL based on the selection.



11. Run / Start the Decoder

Before Run / Start the Decoder, ensure that:

- 1. The <u>Oscilloscope configuration</u> is appropriate if you are using live signal mode capture
- 2. Connect all the probes as per the recommended <u>Test Setup</u> if you are using live signal mode in the decoder configuration
- 3. Ensure that you have <u>selected the required tests</u> you would like to perform. (Note, this feature will be supported in a future software version)
- 4. Based on the HDMI Source device configuration you have <u>Configured the Decoder</u> software and connected the appropriate signals to the Oscilloscope if you are using Live signal source. Or you have selected the appropriate offline signal files.
- 5. Make horizontal and vertical oscilloscope setup by following the instructions given in Test Setup Connection window

Make sure that you have completed all the above required steps before Run/Start the decoder software. Any inappropriate inputs will lead to un-determined output of the decode application.

Click the "Run/Start" button in the Action Bar to start the application:

Application Options License Help	
Decoder Configuration	🏹 🛟 🛊 🖬 🔯 + 💽 + 🗲 🗖
Signal Source	Run/Start Source Capabilities Declaration

Once you click Run, the decode software takes the inputs from the configuration and decodes the signal. The inbuilt de-serializer creates a stream of data and decodes all the HDMI micro packets.

The status bar displays the progress and shows the activities being carried out. To stop the Decode/Analysis operation, click the "Stop" button as shown below:



G HDMI Protocol Decode Software (Version: 0.9.0.0)	- • X
Application Options License Help	
Decoder Configuration 🌾 🤃 🛊 🗰 🔯 + 🚍 + 📄	? 🔺
GRL	0
Processed 7% : Reading Data2 waveform for processing	
StatusLogger	
[7/25/2014 8:16:08 PM 608ms] Currently processing Frame1 and line 120 [7/25/2014 8:16:09 PM 301ms] Currently processing Frame1 and line 246 [7/25/2014 8:16:12 PM 900ms] Currently processing Frame1 and line 246 [7/25/2014 8:16:13 PM 859ms] Currently processing Frame2 and line 61	E
[//25/2014 8:16:14 PM 64/ms] Currently processing Frame2 and line 124 [7/25/2014 8:16:15 PM 341ms] Currently processing Frame2 and line 187	

After completing the analysis, the software minimizes the action window and displays the decode results.

12. Analyzing the Results

After completing the decode process, the GRL HDMI Protocol Decode software displays comprehensive test results.

Note: If the test results do not meet your expectations, first review the test setup, decoder configuration. Any inappropriate inputs in the decoder configuration may result in incorrect test results.

The software provides a list of frames, frame packets, description of each Data Island packet, K codes, D codes, transmitted image with horizontal and vertical blanking periods, active video periods, secondary data packets, bus diagram, and physical layer waveforms. All these items can be cross-correlated with the physical layer waveforms.



G HDMI Protocol Decode Software (Version: 0.9.0.0)				
Application Options License Windows He	elp			
Decoder Configuration		<u> </u>		🕐 💌
Frame 4 D × HDMI Fra	me Period 4 D ×	Symbols 4 0 3	Test Results 4 D	× Description 4 b ×
Frames: Periods (I	Frame # 2): View All 🔹	Symbol Info:	Test Result: Frame2	Details:
Frame Test Result TimeSta	Description	Lane0 Lane1 Lane2	T Test Name Result	
3.43508	Data Island Guard Ban	0x3 (0x3 0x1 (0x3 0x0 (0x0	7-16 Legal Codes PASS	
3.43515	Control Period - Video	0x0CD (0 0x332 (0 0x0CD (0	7-17 Basic Protocol PASS	
3.43604	Video Guard Band	0x0CD (0 0x332 (0 0x0CD (0	7-18 Extended Control Period PASS	
3.43611.	Active Video Period	0xEB (0x 0xEB (0x 0xEB (0x	7-13 Packet Types PASS 7-21 Minimum Format Support PASS	
3.46275	Control Period	0xEB (0x 0xEB (0x 0xEB (0x	7-22 Additional Format Support NA	
83	Control Period - Data P	0xEB (0x 0xEB (0x 0xEB (0x	7-23 Pixel Encoding - RGB to R PASS	
3.46554	Data Island [Audio Sa V	0xEB (0x 0xEB (0x 0xEB (0x 0xEB (0x -	7-24 Pixel Encoding - YCbCr to NA	-
Signal/Bus Diagram		↓ ▷ × Frame Image		4 Þ X
Solit Analysis V Sign	al 🔽 Bus Diagram 🕅 Marker	Line: 98, Control F	Period[D0 = 10b:0xAA / 2b:0x2, D1 = 10	b:0xAB / 2b:0x0, D2 = 10b:0xAB / 2b:0x0]
				<u></u>
D0 Vm.x: 628.00 mV				
- Vmin892.00 mV 2.464000 mC	فيستشلي يستحمن انتقبيهم	3.4689 mS		
D1 Vmax 624-00 mV Vmm, -865-00 mV				
2.4640.00 mc		3.4689 mS	•	
D2 Vmax. 616.00 mV				
Vmin896.00 mV 2.464000 mC	فستثبيه وسعا سيناده	3.4689 mS		
Control Period Contro Data Island [Audio S	Sampk Control Perio Contro Activ	re Video Period		
D3 Vmax 620.00 mV Vmm, -892.00 mV				
		3.4689 mS		4
StatusLogger				

Frame List:

Frame List provide the list of frames in the Oscilloscope acquisition. This gives indication of how many frames are present for the analysis.

Frame	×
Frames:	
Frame	Test Result 📥
₽2	

By clicking the frame, all other windows such as frame packets, symbols, frame image and bus and signal diagrams will get updated to the selected frame's details.

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HDMI Frame Period

Frame packet list provide the list of packets for the selected frames with the time stamp. By clicking the packet list the Symbol list and Packet Details, Bus Diagrams will get the corresponding Packet information.

HDMI Frame Period		×
Periods (Frame # 2):	View All	
TimeStamp	Description	
-947.423509 µS	Control Period - Data Preamble	
-947.126910 µS	Data Island Guard Band - Leading	
-947.053088 µS	Data Island [Audio Sample (L-PCM and IEC 61937 compressed formats) Packet]	
-945.869070 μS	Data Island Guard Band - Trailing	
-945.795203 μS	Control Period	
-915.677112 μS	Control Period - Data Preamble	
-915.381296 µS	Data Island Guard Band - Leading	
-915.307178 μS	Data Island [Audio Sample (L-PCM and IEC 61937 compressed formats) Packet]	
-914.123195 μS	Data Island Guard Band - Trailing	
-914.048803 µS	Control Period	
-883.931204 µS	Control Period - Data Preamble	-

HDMI Frame description

Frame description provides the details of the selected Data Island Packet as per the HDMI Specification.

Description	×
Details: Packet Type: Audio Sample (L-PCM and IEC 61937 compressed formats) Packet Secondary-data Packet ID (HB0): 0x02 Layout :0 (Maximum 2 Channels) sample_present.sp3 : False sample_present.sp2 : False sample_present.sp1 : False sample_flat.sp3 : False sample_flat.sp1 : False sample_flat.sp1 : False Sample_flat.sp1 : False B.X : 0x0 L11 - L04 : 0x00 L12 - L19 : 0x3A L20 - L27 : 0xFA LP.LC.LU.LV : 0x0 R11 - R04 : 0x00 R12 - R19 : 0xCF R20 - R27 : 0x09 RP.RC.RU.RV : 0x0	

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Signal Plot and Bus Diagram

Signal Plot and Bus Diagram provides details of the bus diagram and associated physical layer waveforms.

Color coded bus diagram provides information on the Control period, Video guard band, Active video period, Data Island guard band, Data Island, Control period Data preamble, Control period Video preamble, etc

Signal plot consists of Pan, Zoom, Un-Zoom, Undo, Fit to screen options which helps to analyze the HDMI protocol data.

Pan			
Un-Zoom			
Un-Do Fit Screen		Marker Read Out	
Signal Bus Diagram		×	
💾 🔍 🔍 🤝 🐹 🔲 Sr	olit Analysis 🛛 👽 Signal 📝 Bus Diagram	m 📝 Marker M1 : -947.13 μS	
0x 0x2 (0x0AA) 0x2 (0x0AA)	0x31A (0x31A) 0x31A (0x31A) 0x1	9 (0x11D) 0xBA (0x30D) 0xB5 (0x18D	8b/10b decode
			linemateri
-947 2060 uS	-947.10 uS	-946 9508 115	Marker Location
0x 0x1 (0x354) 0x1 (0x354)	0x332 (0x332) 0x332 (0x332) 0x8	B (0x0E5) 0x5B (0x0E5) 0x5B (0x0E5	
Vmax: 624.00 mV			PHY Layer Signal
-947 2060 uS	-947.10 uS	-946 9508	
0x 0x1 (0x354) 0x1 (0x354)	0x332 (0x332) 0x332 (0x332) 0x4	B (0x0E5) 0x5B (0x0E5) 0x5B (0x0E5	
			Cursor time
D2 ∇inax 616,00 mV		ח את רה תחורה ח	
Vmin: -896.00 mV			Time scale
Control Decircle Data Deter			Time scale
Control Period - Data Preamble	Data Island Guard Band - Leading Data	Island [Audio Sample (L-PCM and IEC 61	Frame packet
D3 Vmax: 620,00 mV			Description
Vmin: -892.00 mV	Land Land La	ليسبب ليسبسا السبسا	
_947 2060 US	-947.10 uS	_946 9508 IIS	

Frame Image:

HDMI Protocol Decode software's Frame Image provide the complete Frame grab of the transmitted video stream. This frame image also can show the details of Horizontal and vertical blanking periods.

During Horizontal and vertical blanking period, Control period, Data Island guard band, Data Island, etc are color coded and displayed in the image.



Frame Image			×
Line: 120, Active Video Perio	od[D0 = 10b:0x3E / 8b:0x	10, D1 = 10b:0x3E / 8b:0x	10, D2 = 10b:0xC1 / 8b:0xEB]
			=
	O		

You can also move the mouse over the image and find the respective information on the top of the image.

13. Test Report

HDMI protocol decode software's automated report generation capability provides ability to generate the report to share the test results.

Report Generation Image Image </th <th></th> <th></th>		
Select Report Content DUT Information Report Generation Environment Information Manufacturer: OUT MANUFACTURER> Choose Report Format: Frame Image Model number: OUT MODEL NUMBER> CsV (.csv) Frast Results Serial Number: OUT SERIAL NUMBER> PDF (.pdf)	2	Report Generation
Individual FrameTest Results Frame Range Start Index: Test Engineer: CTEST ENGINEER>	Report Generation se Report Format: SV (.csv) DF (.pdf) nt Folder Location: RL\GRL-HDMI\Report	Select Report Content Select Report Content Frame Image Frame Info Test Results Frame Range Start Index: 1 Test Em

You can also customize the test report with the details of the "Device Under Test Information", you can specify the Manufacturer information, model number, serial number and other test related information.

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You can also choose the environment variables such as decoder configuration details, frame image and frame information in the test report.

14. Feedback and Suggestion

Granite River Labs values your feedback on our products. To help us serve you better, please send us your suggestions, ideas, or comments on the HDMI Protocol Decode software. Direct your feedback via e-mail to info@graniteriverlabs.com and include the following information:

General Information

- Instrument model number and hardware options, if any
- Probes used
- Your name, company, mailing address, phone number, FAX number, e-mail id
- Please indicate if you would like to be contacted by Granite River Labs about your suggestions or comments

Program-Specific Information

- Software version number
- Description of the problem such that technical support can duplicate the problem
- The instrument setup files
- Configuration used in the application.
- If possible, save the waveform on which you are performing the test

Once you have gathered this information, you can contact technical support by e-mail. When you use e-mail, be sure to type in the subject line "HDMI Protocol Decode Software Problem/Feedback/Suggestion,"