Application Note How to Configure the DS320PR410 Using SigCon Architect



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ABSTRACT

This document explains how to configure your DS320PR410 four-channel PCI-Express Gen 5.0 redriver using the user-friendly Texas Instruments SigCon Architect GUI. The intended audience includes hardware or system engineers working with the DS320PR410-RSC-EVM or with the DS320PR410 in SMBus modes.

TI recommends that the reader be familiar with the *DS320PR410 Four-Channel Linear Redriver for PCIe 5.0, CXL 2.0* data sheet. This document and all other collateral data related to the DS320PR410 redriver (application notes, models, and so forth) are available for download from the TI website on the DS320PR410 product page. Alternatively, contact your local Texas Instruments field sales representative for assistance.

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1 Getting Started and GUI Overview

The following section describes the steps needed to install the Texas Instruments SigCon Architect GUI and the DS320PR410 SigCon Architect GUI profile.

- 1. Download and install the Texas Instruments SigCon Architect GUI EVM v3 program. Follow the steps in the *SigCon Architect: Installation and Starter's Guide* for detailed instructions.
- 2. Download and install the DS320PR410 SigCon Architect GUI Profile Updater from the TI website or secure resource folder.
- 3. Connect a USB2ANY Interface Adapter or Aardvark I²C Host Adapter to the desired DS320PR410 and PC.
- 4. Launch the SigCon Architect EVM GUI v3 program and make sure that the DS320PR410 profile has been installed. When successfully installed, the program is shown as an instance of the DS320PR410 device below the **Selection** column of the SigCon Architect GUI.

Descriptions of each DS320PR410 SigCon Architect GUI page are listed in the following:

 Configuration Page: Used to configure device SMBus/I²C Addresses, device EVM model, number of devices (in DS320PR410EVM-CUSTOM mode only), and interface adapter.

Note

The Configuration Page page must be configured before accessing any of the additional GUI pages.

- 2. *Low Level Page*: Individual register access to each device. This page can be used to change specific register settings or to verify that changes from the *High Level Page* have taken effect.
- 3. *EEPROM Page*: Used to create, read, and write EEPROM Hex files (following Intel[™] Hex format). When the DS320PR410 is configured in SMBus/I²C primary mode (MODE = L1), the redriver loads the settings stored in an external EEPROM upon power-up. The user can configure these settings using this page.
- 4. *High Level Page*: Main page used to change EQ settings (EQ Index/CTLE, DC Gain) of the device and to monitor the active status of each channel.
- 5. *Eye Height Page*: Used to perform an *EyeScan* of selected channels and display the *EyeScan* result plot in graphical form. This can assist in tuning the DS320PR410 and choosing an EQ Index for your system. Please refer to the *Eye Scan with TI PCI-Express Gen5.0 Redrivers* application note for further details.

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Demo Mode

Pull-ups? Apply
Edit Device Address

Online Documentation
Profile Version : 1.2.0.0

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2 Configuration Page

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The following section describes features of the *Configuration Page* in the DS320PR410 GUI and configuration of the GUI to program the DS320PR410.. This page is used to set up the GUI for correct device communication over SMBus/I²C.

- 1. Launch the SigCon Architect EVM GUI v3 application.
- 2. Click the Configuration tab below the DS320PR410 profile on the left side of the GUI, as shown in Figure

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Figure 2-1. DS320PR410 Configuration Page

 Click the Auto Detect button to detect the connected device's SMBus/l²C addresses as shown in Figure 2-2. As needed, select the Edit Device Address button to manually edit the assigned Downstream and Upstream device addresses.



Figure 2-2. SMBus Address Auto Detect



4. Select the correct interface adapter below the *Interface* drop-down menu (USB2ANY or Aardvark). After selecting the correct interface adapter, click *Apply* to connect to the selected DS320PR410 devices. As shown in Figure 2-3, if the correct interface adapter is selected and the SMBus addresses are configured correctly, the status indicator in the bottom-left corner of the GUI shows a green LED and the text *Connected*. After successful connection, the other tabs under the DS320PR410 profile become available for selection. Click the desired tab on the left side of the GUI to begin programming the device / devices.

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Selection ◆ ○ DS320PR410 ◆ Configuration Configuration Configuration Configuration Configuration ExpRoMPage High Level Page Eye Height Page	Interface Details Device Model EVM Model Interface Details D320PR410 D320PR410EVM-RSC Auto Detect UsB224NY 0 Toggle LED 100 HH Downstream Device Upstream Devices Upstream Devices UsB224NY 0 Toggle LED 100 HH Downstream Device Upstream Devices Us1 (0x20), US2 (0x22), US3 (0x24), US4 (0x26) US1 (0x20), US2 (0x22), US3 (0x24), US4 (0x26) DST (0x18), DS2 (0x12), DS3 (0x12), DS4 (0x16) DST (0x18), DS2 (0x12), DS4 (0x16) Dystream Devices DS1 (0x18), DS2 (0x12), DS4 (0x16) Dystream Devices DS1 (0x18), DS2 (0x12), DS4 (0x16) Dystream Devices DS1 (0x18), DS2 (0x12), DS4 (0x16) DS320PR410 Four-Channel Linear Redriver for PCle 5.0, DS320PR410 Four-Channel Linear Redriver for PCle 5.0, Eatures • Four-channel linear redriver supporting PCle 5.0, CXL 2.0, UPI 2.0 up to 32-Gbps • Supports most AC Coupled interfaces including DP, SAS, SATA, XFI • CTL boosts up to 22 dB at 16 GHz • Ultra-low latency of 100 ps • Low additive random jitter of 75 fs for PRBS data	uency z Pull-ups? Edit Device Address , CXL 2.0
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Figure 2-3. Interface Adapter Select and Apply Settings

5. By default, the GUI is configured to communicate with the DS320PR410-RSC-EVM evaluation module, which contains 8 DS320PR410 devices (4 facing Downstream, 4 facing Upstream). However, the DS320PR410 GUI also allows for support of between 1 and 16 DS320PR410 devices using the *EVM Model* drop-down menu to select the *DS320PR410EVM-CUSTOM* model, shown in Figure 2-4.

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tection DS200PR410 ↓ Confloration ↓ Low Level Page ↓ EEPROM Page ↓ High Level Page ↓ Eye Height Page	Interface Details Device Model EVM Model DS320PR410 DS320PR410EVM-CUSTOM Downstream Device USB2ANY 0 Downstream Devices Upstream Devices US1 (0x18), DS2 (0x1A), DS3 (0x1C), DS4 (0x1E) US1 (0x20), US2 (0x22), US3 (0x24), US4 (0x26)
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Using the *Edit Device Address* button, the desired number of Downstream and Upstream DS320PR410 devices for GUI configuration can be selected, as shown in Figure 2-5. After selecting the desired device counts and the SMBus addresses, press the *OK* button. Then, click *Apply* to apply the edited configuration to the GUI.



Figure 2-5. DS320PR410EVM-CUSTOM Edit Device Address

Note

Downstream and Upstream device addresses are assigned in *increasing sequenial numeric order* and can be manually edited to reflect orientation of the redrivers in the system.



Optionally, general GUI functionality can be explored in *Demo Mode*, which can be selected using the check-box in the upper-right corner of the GUI. When in *Demo Mode*, the GUI does not attempt to communicate to any device over an interface adapter. Figure 2-6 shows an example of the DS320PR410 GUI in *Demo Mode*. where the status indicator in the bottom right corner indicates a red LED and the text *Demo Mode*. To access all pages of the GUI in *Demo Mode*, click the *Apply* button.

	"When in Demo Mode, click Apply on the profile Configuration	Demo Mo Page to enable access to other part								
Interface Details										
Device Model EVM Model DS320PR410 DS320PR410EVM-RSC V Auto Detect	Interface Alias Name I2C Frequency US82ANY US82ANY 0 V Toggle LED 100 KHz © P	ull-ups? 🗌 Apply								
Downstream Device DS1 (0x18), DS2 (0x1A), DS3 (0x1C), DS4 (0x1E)	Upstream Devices US1 (0x20), US2 (0x22), US3 (0x24), US4 (0x26)	Edit Device Address								
TEXAS INSTRUMENTS DS320PR410 Four-Channel Linear Redriver for PCIe 5.0, CXL 2.0										
Features										
Features • Four-channel linear redriver supporting PCIe 5.0, • Supports most AC Coupled interfaces including DF • CTLE boosts up to 22 dB at 16 GHz • Ultra-low latency of 100 ps • Low additive random jitter of 75 fs for PRBS data • Excellent return loss of -10 dB at 16 GHz	CXL 2.0, UPI 2.0 up to 32-Gbps P, SAS, SATA, XFI									
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Figure 2-6. DS320PR410 GUI Demo Mode



3 Low Level Page

The following section describes features of the *Low Level Page* in DS320PR410 GUI. This page can be used to access individual registers of each DS320PR410 device, change specific device settings, verify current device status, and to verify changes from the GUI *High Level Page*. For further information on DS320PR410 registers, please refer to the *DS320PR410 Programming Guide*.

1. Use the *Device Select* drop-down menu shown in Figure 3-1 to select which device is desired to read or write to. The DS320PR410-RSC-EVM includes four downstream and four upstream devices.

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	x 0 x FF	x 0	Read Register Write Regi	ster	
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Figure 3-1. Low Level Page: Device Select Drop-Down

 Once the desired device is selected using the *Device Select* drop-down, the complete register map appears in the GUI *Register Map* table. Use the *Block Select* drop-down menu shown in Figure 3-2 to jump to the desired section of the table to view device *Bank Shared* registers, device *Channel* registers, and device *Bank* registers. The register *Bank* includes all device channels 0-3.

			Si	gCo	on /	Arch	nitect 3.2			Der	no Moc
Selection				-				when in Demo mode, click Apply of	the prome configuration	on Page to enable access to ou	iei page
> DS320PR410	Device Select Block Se	lect	100								
 Configuration 	DSI V	ank Shared	~								
- <> EEPROM Page	Register Map			Expand A	All I	Collapse A					
♦ High Level Page	Block / Register Name	Address	Default	Mode	Size	Data	•	Mask Register Data		Mask Value	
Eye Height Page	Bank Shared						Current Address			× FF	
	General_1	0xE1	0x00	R	8	0x00	× 0				
	General_2	0xE2	0x00	R/W	8	0x00					
	EE_Status	0xE3	0x00	R	8	0x80	Data				
	EVERCAN HO TIME	UXF1	0x29	R	8	0x29	× 0				
	EYESCAN	OVEQ	0x40	RM	8	OVEE					
	Channel 0	04.0	0.010		ľ	0.01	Write Register				
	RX_DET_STS	0x00	0x00	R	8	0xC9					
	EQ_CTL	0x01	0x00	R/W	8	0x98	Read Register				
	EQ_CTL2	0x02	0x00	R/W	8	0x00		Field Description	10. • March 10. 1		1000
	GAIN_CTRL	0x03	0x05	R/W	8	0x05	Read All	Field Name	Access	Description	^
	RX_DET_CIRL	0x04	0x00	R/W	8	0000					
	EVERCAN DERLIT	OVOE	0x20	P	ŝ	0x3E	(particular and part	1			
	HIT COUNT2	0x10	0x00	R	8	0x20	Reset Device				
	E Channel 1				-		Land Carlin				
	RX_DET_STS	0x20	0x00	R	8	0xC9	Load Config				
	EQ_CTL	0x21	0x00	R/W	8	0x98	Save Config				
	EQ_CTL2	0x22	0x00	R/W	8	0x00	cure comp				
	GAIN_CTRL	0x23	0x05	R/W	8	0x05					
	BIAS CTRL	0x26	0x20	DAM	8	0x62					
	EVEROAN DEGINT	0,20	020	D	0	0402	¥				~
	Generic Register Operation										
	Register Address Mask	D	ta								
	incigater Address imask										
	× U × FF	×	0		Read Rea	gister W	nte Register				
	Note : The Device and Block for G	eneric Read	Write will	ha takan i	from De	vice Select	and Block Select				

Figure 3-2. Low Level Page: Block Select Drop-Down Menu



Click the *Real All* button to read the configuration registers of the entire device into the GUI. Alternately, click
a specific register, and click the *Read Register* device to update the selected target register in the GUI. The *Current Address* field automatically updates with the selected (highlighted) register. This field and associated
buttons are shown in Figure 3-3.



Figure 3-3. Low Level Page: Read Register Buttons

4. To write to the selected register, select or deselect the boxes in the *Register Data* fields or manually enter a hex value into the *Data* field. Then, click the *Write Register* button to write the specified data into the highlighted device register. To verify the change was made, click the *Read Register* button. Note the *Field Description* table describes the function of each bit in the highlighted register. This field and associated buttons or check buttons are highlighted in Figure 3-4.

election	Device Selec	ct Block Se	lect										
DS320PR410	DS1		Channel 0	~									
Low Level Page EEPROM Page	Register M	ap			Expand /	AII 🔤	Collapse Al						
High Level Page	Block / Re	oister Name	Address	Default	Mode	Size	Data	•	Mack	Register Data		Mask Value	
> Eye Height Page	E Ban	k Shared	Thursdo	Dordan	meas	Cinco	Data	Current Address	7 2	FIED Bunase(0)		× FF	
	G	eneral_1	0xE1	0x00	R	8	0x00	× 1	6 7	EQ Boost 1[3]		<u> </u>	
	G	eneral_2	0xE2	0x00	R/W	8	0x00		50	EQ Boost 1[2]			
	E	E_Status	0xE3	0x00	R	8	0x80	Data		EQ Boost 1[2]			
	D	EVICE_ID	0xF1	0x29	R	8	0x29	x 98	* 🗹	EQ Boost 1[1]			
	E	YESCAN_HC_TIME	0xF8	0x0F	R/W	8	0x3F			EQ BOOST ([0]			
	E	YESCAN	0xF9	0xA0	R/W	8	0xFF	Write Register					
	🖃 Cha	nnel 0						Withe Register					
	R	X_DET_STS	0x00	0x00	R	8	0xC9		١M				
	E	Q_CTL	0x01	0x00	R/W	8	0x98	Read Register	Field Dec	cription			
	E	Q_CTL2	0x02	0x00	R/W	8	0x00		Field Des	cripuon			_
	G	AIN_CTRL	0x03	0x05	R/W	8	0x05	Read All		Field Name	ACCESS	Description	
	R	X_DET_CTRL	0x04	0x00	R/W	8	0x00		EQ Bypa	ass[7:7]	R/W	Enable CTLE Stage 1 Bypass:	
	B	IAS_CTRL	0x06	0x20	R/W	8	0x62	in the second	1				
	E	YESCAN_RESULT	0x0E	0x20	R	8	0x3F	Reset Device				0: Bypass disabled	
	H	II_COUNT2	0010	0000	R	8	0x20			1 412 01		1. Bypass enabled	
		nnel 1	0.00	0.00			0.00	Load Config	EC BOOS	st 1[6:3]	R/W	CILE Boost Stage 1 Control.	
		DEL SIS	0.20	0000	DAM	8	0x09		EQ Boos	st 2[2:0]	R/W	CTLE Boost Stage 2 Control.	
			0.21	0x00	DAM	°	0x90	Save Config					
			0x22	0x05	RAN	ŝ	0x05	Luna and a second second second	3				
		Y DET CTRI	0x24	0x00	RAM		0x00						
		IAS CTRI	0x26	0x20	RM	8	0x62						
		VEOCANI DEOLII T	0-25	020	D	0	0.02	~					
	Generic Re	egister Operation											
	Register A	ddress Mask	Da	ta									

Figure 3-4. Low Level Page: Data Field and Write Register Button



5. Use the Save Config button to save the current register configuration in a .cfg file and the Load Config button to load a device .cfg file. Click the *Reset Device* button to reset every device register to the *Default* register value specified in the *Register Map*. Each of these buttons are outlined in Figure 3-5.



Figure 3-5. Low Level Page: Reset, Load, and Save Device Configuration Buttons

 If desired, the *Generic Register Operation* portion of the page can be used to read and write generic device registers with a custom mask. This can be found at the bottom of the *Low Level Page*, as indicated by Figure 3-6.

			Si	gCo	on .	Arc	hitect 3.2	When in Demo I	Mode, click Apply on th	e profile Con	Der figuration Page to enable access to oth	mo I ner p
ction ^	Device Select Block Se	lect										
Configuration	DS1 🗸	Channel 0	~									ik Value FF Bypass:
Low Level Page EEPROM Page	Register Map			Expand A		Collapse	All					
High Level Page	Block / Register Name	Address	Default	Mode	Size	Data	^	Mask	Register Data		Mask Value	
Lye neighti age	Bank Shared						Current Address	7 🗹	EQ Bypass[0]		× FF	
	General_1	0xE1	0x00	R	8	0x00	× 1	6 🗹	EQ Boost 1[3]			
	EF Status	0xE2	0x00	R	8	0x80	Data	5 🗹	EQ Boost 1[2]			
	DEVICE ID	0xF1	0x29	R	8	0x29	x 98	4	EQ Boost 1[1]			
	EYESCAN_HC_TIME	0xF8	0x0F	R/W	8	0x3F		3 2 7	EQ Boost 7[0]			
	EYESCAN	0xF9	0xA0	R/W	8	0xFF	Write Register	1	EQ Boost 2[1]			
	Channel 0	0×00	0×00	B		0×00	[minimum control of minimum control of the second control of the	0	EQ Boost 2[0]			
	FO CTI	0x01	0x00	RM	8	0x98	Read Register					
	EQ_CTL2	0x02	0x00	R/W	8	0x00		Field Desc	ription			
	GAIN_CTRL	0x03	0x05	R/W	8	0x05	Read All		Field Name	Access	Description	
	RX_DET_CTRL	0x04	0x00	R/W	8	0x00		EQ Bypas	ss[7:7]	R/W	Enable CTLE Stage 1 Bypass:	ion 1 Bypass:
	EVESCAN DESHIT	0x06	0x20	RIW	8	0x02		T			0: Buoses disabled	
	HIT COUNT2	0x10	0x00	R	8	0x20	Reset Device				1: Bypass enabled	
	E Channel 1						Load Config	EQ Boost	1[6:3]	R/W	CTLE Boost Stage 1 Control.	sk Value FF Bypass: Control.
	RX_DET_STS	0x20	0x00	R	8	0xC9	Load Conny	EQ Boost	2[2:0]	R/W	CTLE Boost Stage 2 Control.	
	EQ_CTL	0x21	0x00	R/W	8	0x98	Save Config					
	GAIN CTRL	0x23	0x05	RM	8	0x05	Laurent erste service and the service of the servic	1				
	RX_DET_CTRL	0x24	0x00	R/W	8	0x00						
	BIAS_CTRL	0x26	0x20	R/W	8	0x62						
	EVECOMI DECINT	10405	1.0200	10	10	10435	1.					-
	Generic Register Operation											
	Register Address Mask	Da	ta									
	× 0 × FF	×	0	F	Read Re	gister V	Vrite Register					

Figure 3-6. Low Level Page: Generic Register Operation



4 EEPROM Page

The SigCon Architect GUI's DS320PR410 profile can be used to generate an EEPROM file in Intel[™] Hex format for a single redriver or multiple DS320PR410 redrivers. When the DS320PR410 is configured in SMBus/I²C primary mode (MODE = L1), the redriver loads the settings stored in an external EEPROM upon power-up. The user can configure those settings using the *EEPROM Page*. The following section provides an example of how to navigate the DS320PR410 GUI *EEPROM Page* and create an EEPROM hex file.

In this example, eight DS320PR410 redrivers are present. EQ Index 2 is selected for devices at addresses 0x18, 0x1A, 0x1C, 0x1E and EQ Index 5 is selected for devices at addresses 0x20, 0x22, 0x24, 0x26) For each device, the same value is used for every channel. For programming fewer or additional devices, decrease or increase the number of devices (*No. of Devices*) and configurations (*No. of Configs*) as needed.

1. Multiple devices can be programmed at once. Select the number of devices and the number of configurations using the menus shown in Figure 4-1. Up to 32 different configurations can be created and assigned to each device and channel, if desired.

		SigCo	n Archi	tect 3.2	in Demo Mode, click Apply	on the profile Configurati	Di on Page to enable access to d		
Iection ∧ DS320PR410 ◇ Configuration ◇ Low Level Page ◆ EEPROM Page	Base Header Details CRC Speed Select U 400 KHz	t Burst Select 4 Bytes v	Ę	Load From EEPROM	Write to EEPROM	Load From Hex File	Write to EEPROM Hex		
 ♦ High Level Page ♦ Eye Height Page 	Device Configuration Details			EEPROM Data Table					
	No. of Devices	No. of Configs Data Byte	1	Config Assignment Tree	Apply				
	8 🖨	8 🖨 EQ Bor	ost 1	Device	Config ^	Address	EEPROM Data A		
	Config Select C	hannel Select	0 ~	Device 0	0x18	0x00	0x22		
	0 ~	All Channels V EQ Bo	ost 2	Channel 0	0	0x01	0x00		
	Device Select N	Assk Select	0 ~	Channel 2	0	0x02	0x00		
	Device Select	ask select	0	Channel 3	ő	0x03	0x04		
	0 🗸	U 📼 Data Byte	2	Device 1	0x1A	0x04	0x30		
	Data Length EC	Q Index Mut	e EQ	Channel 0	1	0x05	0x01		
	3 🖨	Default V Data Pate	2	Channel 1	1	0x06	0x81		
		Data Byte	Calle	Channel 2	1	0x07	0x00		
	Load From	Write to EQ DC	0 dP	Device 2	0~10	0x08	0x00		
	Device	Device	U UB	Channel 0	2	0x09	0x05		
	Config Data	EQ Bo	ost 1 (2nd Order)	Channel 1	2	0x0A	0x30		
	× 30 × 1 × 81 ×	0 × 0 × 5	0	Channel 2	2 *	0x0B	0x11 🗸		
	Major Channel Settings : De	evice 0 🗸							
	Parameters	Channel 0		Channel 1	Channel 2		Channel 3		
	EQ Index	Default		Default	Default	Î	Default		
	EQ Boost 1	0x00		0x00	0x00		0x00		
	EQ Boost 2	0x00		0x00	0x00		0x00		
	Mute EQ	Unmute		Unmute	Unmute		Unmute		
	EQ Boost 1(2nd Order)	0x00		0x00	0x00		0x00		
	EQ DC Gain	0 dB		0 dB	0 dB		0 dB		

Figure 4-1. EEPROM Page: Number of Configs and Number of Devices

2. To program the first device, select Configuration 0 and Device 0 from the respective drop-down menus, *Config Select* and *Device Select*. Note the *Config Assignment Tree* shows the hex address of each device (0x18 for Device 0). Verify that the *Data Length* is set to 3, as 3 bytes of data are needed to program the DS320PR410. Each of these menus are shown in Figure 4-2.

		Sig	gCon Arch	itect 3.2	in Demo Mode, click Apply o	n the profile Configuratio	n Page to enable acces	Demo s to other p	
ection ∧ DS320PR410 ♦ Configuration ♦ Low Level Page ♦ EEPROM Page	Base Header Details CRC Speed Sel 400 KH	ect Burst Se z v 4 By	elect /tes	Load From EEPROM	Write to EEPROM	Load From Hex File	Vrite EEPROM	to Hex	
 Aligh Level Page Eye Height Page 	Device Configuration Deta	ils			E	EEPROM Data Table			
	No. of Devices	No. of Configs	Data Byte 1	Config Assignment Tree	Apply				
	8 🖨	8 单	EQ Boost 1	Device	Config A	Address	EEPROM Data	^	
	Config Select	Channel Select	0 ~	Device 0	0x18	0x00	0x22	i	
	0	All Channels	EQ Boost 2	Channel 0	0	0x01	0x00		
			0 ~	Channel 1	0	0x02	0x00		
	Device Select	Mask Select		Channel 2	0	0x03	0x04		
	0 🗸	0 👻	Data Byte 2	Device 1	0x1A	0x04	0x30		
	Data Length	EQ Index	Mute EQ	Channel 0	1	0x05	0x01	1	
	3 🖨	Default 🗸		Channel 1	1	0x06	0x81		
			Data Byte 3	Channel 2	1	0x07	0x00		
	Load From	Write to	EQ DC Gain	Channel 3	1	0x08	0x00	1	
	Device	Device	0 dB	Device 2 Channel 0	2	0x09	0x05		
	Config Data		EQ Boost 1 (2nd Order)	Channel 1	2	0x0A	0x30		
	× 30 × 1 × 81	× 0 × 0 × 5	0 🗸	Channel 2	2 *	0x0B	0x11	~	
	Major Channel Settings :	Device 0 🗸							
	Parameters	Channe	10	Channel 1	Channel 2		Channel 3		
	EQIndex	Defaul	t	Default	Default		Default		
	EQ Boost 1	0x00		0x00	0x00		0x00		
	EQ Boost 2	0x00		0x00	0x00		0x00		
	Mute EQ	Unmut	e	Unmute	Unmute		Unmute		
	EQ Boost 1(2nd Order)	0x00		0x00	0x00		0x00		
	EQ DC Gain	0 dB		0 dB	0 dB		0 dB		

Figure 4-2. EEPROM Page: Config Select, Device Select, and Configuration Assignment Tree

3. To select the desired channel or channels, choose an *EQ Index* from the drop-down menu. The *EQ Index* drop-down automatically adjusts the *EQ Boost 1*, *EQ Boost 2*, and *EQ Boost 1 (2nd Order)* fields. Select the desired *EQ DC Gain*. Note in the *Config Assignment Tree* that the channels of Device 0 selected using the *Channel Select* drop-down menu are configured using Configuration 0. Continue this process for each *Device* and *Configuration*, selecting the appropriate *EQ Index* and *EQ DC Gain* for each. Each of these drop-down menus are shown in Figure 4-3.

		SigCo	on Arch	nitec	t 3.2	in Demo Mode,	click Apply of	in the profile Configuration	on Page to enable acc	Demo ess to other
DS320PR410	Base Header Details									
S320PR410 Configuration Low Level Page EEPROM Page	CRC Speed Select 400 KHz	Burst Select	~		ad From EPROM	/ Write EEPRC	to M	Load From Hex File	J EEPRO	e to M Hex
High Level Page Eye Height Page	Device Configuration Details		EEPROM D							
	No. of Devices	lo. of Configs Data I	Byte 1	Config	Assignment Tree	Apply				
	8 🖨	8 🌲 EQ	Boost 1		Device	Config	<u>^</u>	Address	EEPROM Data	
	Config Select	hannel Select	0 ~	=	Device 0	0x18		0x00	0x22	-
	0	All Channels EQ	Boost 2		Channel 0	0		0x01	0x00	
			0 ~		Channel 1	0		0x02	0x00	- 1
	Device Select N	lask Select			Channel 2	0		0x03	0x04	
	0 ~	0 🕀 Data I	Byte 2		Device 1	0x1A		0x04	0x30	
	Data Length E0	Q Index	lute EQ	Channel 0	Channel 0	1	0x05	0x01		
	3 🗘	Default 🗸			Channel 1	1		0x06	0x81	
		Data	syte 3	1	Channel 2	1		0x07	0x00	
	Load From	Write to EQ	DC Gain		Channel 3	1		0x08	0x00	
	Device	Device	0 dB		Channel 0	2		0x09	0x05	
	Config Data	EQ	Boost 1 (2nd Order)	Channel 1			0x0A	0x30	
	× 30 × 1 × 81 ×	0 × 0 × 5	0 🗸		Channel 2		~	0x0B	0x11	~
	Major Channel Settings : De	evice 0 🔽								
	Parameters	Channel 0		Chan	nel 1		Channel 2		Channel 3	
	EQ Index	Default		Defa	ault		Default		Default	
	EQ Boost 1	0x00		0x0	00		0x00		0x00	
	EQ Boost 2	0x00		0x0	00		0x00		0x00	
	Mute EQ	Unmute		Unm	ute		Unmute		Unmute	
	EQ Boost 1(2nd Order)	0x00		0x0	00		0x00		0x00	
	EQ DC Gain	0 dB		0 0	IB		UdB		U dB	

Figure 4-3. EEPROM Page: Channel Select, EQ Index, and EQ DC Gain



Optionally, the *Major Channel Settings* table can be used to check each device's EQ settings. The device drop-down menu can be used to select the desired device for viewing as shown in Figure 4-4.

		Sig	Con Arch	nitect 3.2	'When in D	Demo Mode,	click Appl	ly on the profile Configurati	on Page to enable acce	Demo Mess to other p
lection A	Base Header Details									
DS320PR410 • Configuration • Configuration • EEPROVIE • EEPROVIE • High Level Page • Eye Height Page	CRC Speed Select Burst Select Coad From Virite to Load From 400 KHz 4 Bytes 4 Hext File Hext File							See PRO	e to M Hex	
	Device Configuration Details EEPROM Data Table									
	No. of Devices	No. of Configs	Data Byte 1	Config Assignment	Tree	Appl				
	8	8 🗢 EQ Boost 1		Device		Config A		Address	EEPROM Data	
	Config Select	Chappel Select	0 🗸	Device 0		0x18		0x00	0x22	- 1
		All Channels	EQ Boost 2	Channe	10	0	0x01	0x00		
		All channels [*]	0 ~	Channe	11			0x02	0x00	
	Device Select	Mask Select		Channe	12	0	1	0x03	0x04	
	0 ~	0 🕀	Data Byte 2	Device 1 Channel 0	15	0x1A 1 1 1 1 0x1C 2		0x04	0x30	
	Data Length E	EQ Index	Mute EQ		10			0x05	0x01	
	3 🖨	Default 🗸		Channe	nnel 1		F	0x06	0x81	
		Land Land	Data Byte 3	Channe	12			0x07	0x00	
	Load From	Write to	EQ DC Gain	Channel 3	13			0x08	0x00	
	Device	Device	0 dB	Device 2 Channel	10			0x09	0x05	
	Config Data		EQ Boost 1 (2nd Order) Channe	11	2		0x0A	0x30	
	× 30 × 1 × 81	0 ~	Channe	12	2	~	0x0B	0x11	~	
	Major Channel Settings : D	Device 0 🔽								
	Parameters	Channel	0	Channel 1	1.0	i	Channel	2	Channel 3	
	EQ Index	Default	t İ	Default	1		Default	Î	Default	
	EQ Boost 1	0x00		0x00		0x00			0x00	
	EQ Boost 2	0x00		0x00			0x00		0x00	
	Mute EQ	Unmut	e	Unmute			Unmute	6	Unmute	
	EQ Boost 1(2nd Order)	0x00		0x00			0x00		0x00	
	EQ DC Gain	0 dB		0 dB			0 dB		0 dB	

Figure 4-4. EEPROM Page: Major Channel Settings

4. After all devices have been configured, click the *Write to EEPROM* button to write the external EEPROM with the new settings. The button indicator turns green when the write is completed, as shown in Figure 4-5.

		Sig	Con Arch	itect 3.2	in Demo Mode, click A	pply on the profile Configuration	Demo on Page to enable access to other p							
Selection	Base Header Details	Base Header Details												
	CRC Speed Sel	ect Burst Sel	ect I	👌 Load From	Write to	👸 Load From 🥜 Write to								
	400 KH	łz 🗸 4 Byte	es 🗸	EEPROM	W Hex File	EEPROM Hex								
				Write Successful										
> Eye Height Page	Device Configuration Deta	ils		EEPROM Data Table										
	No. of Devices	No. of Configs	Data Byte 1	Config Assignment Tree	Apply									
	8 🗘	🗢 8 🗢 EC	EQ Boost 1	Device	Config ^	Address	EEPROM Data A							
	Config Select	Channel Select	3 🗸	Device 0	0x18 0 0	0x00	0x22							
	0 🗸	All Channels	EQ Boost 2	Channel 0		0x01	0x00							
	Device Select	Marels Calant	0 ~	Channel 2		0x02	0x00							
	O Verice Select		ate Date 0	Channel 3	ő	0x03	0x04							
	0	V V	Jala Byle 2	Device 1 Channel 0 Channel 2 Channel 2	0x1A 1 1 1	0x04	0x30							
	Data Length	EQ Index	Mute EQ			0x05	0x01							
	3 🗘	2 V	ata Ryte 3			0x06	0x81							
	Land From		FO DC Gain			0x07	0x98							
	Device	Device	0 dB	Device 2	0x1C	0x08	0x00							
	Config Data		FO Prost 1 (Prot Order)	Channel 0	2	0x09	0x05							
			EQ Boost T (2nd Order)	Channel 1	2	0x0A	0x30							
	× 30 × 1 × 81	x 98 x 0 x 5	Ed Dypass	Channel 2	2 *	UX0B	0011							
	Major Channel Settings :	Device 0 🖂												
	Parameters	Channel (Channel 1	Chann	el 2	Channel 3							
	EQ Index	2		2	2		2							
	EQ Boost 1	0x03		0x03	0x0	3	0x03							
	EQ Boost 2	0x00		0x00	0x0	0	0x00							
	Mute EQ	Unmute		Unmute	Unmi	ite	Unmute							
	EQ Boost 1(2nd Order)	EQ Bypas	5	EQ Bypass	EQ Byr	ass	EQ Bypass							
	EQ DC Gain	0 dB		0 dB	0 d	B	0 dB							

Figure 4-5. EEPROM Page: Write to EEPROM

- 5. To save the current EEPROM settings configured using the GUI into a hex file, click the *Write to EEPROM Hex* button shown in Figure 4-6 to write a hex file with these settings. Save the hex file to any desired location using the File Explorer.
- 6. To load EEPROM settings back into the GUI from a hex file, click the *Load from Hex File* button. Select the desired hex file to load from the File Explorer. If the user desires to write these settings to an external

EEPROM connected to the accessed SMBus lines, click the *Write to EEPROM* button and wait for the green *Write Successful* indicator to appear to indicate a successful EEPROM write.

7. To load EEPROM settings into the GUI from an external EEPROM connected to the accessed SMBus lines, click the *Load from EEPROM* button.

		Sig	gCon Arch	itect 3.2	n Demo Mode, click Apply on	the profile Configural	Demotion Page to enable access to othe	
ection ^	Base Header Details				_			
 > DS320PR410 → Configuration → Low Level Page ◆ EEPROM Page 	CRC Speed Sel	lect Burst S Hz v 4 B	elect ytes 🗸	Load From EEPROM	Write to EEPROM	Load From Hex File	Write to EEPROM Hex	
♦ High Level Page ♦ Eye Height Page	Device Configuration Deta	ills		EEPROM Data Table				
	No. of Devices	No. of Configs	Data Byte 1	Config Assignment Tree	Apply			
	8 🖨	8	EQ Boost 1	Device	Config A	Address	EEPROM Data	
	Config Select	Channel Select	0 🗸	Device 0	0x18	0x00	0x22	
	0	All Channels	EQ Boost 2 0 v	Channel 0	0	0x01 0x02	0x00	
		Par channels [1]		Channel 1	0		0x00	
	Device Select	Mask Select		Channel 2	0	0x03	0x04	
	0 ~	0 🕀	Data Byte 2	Device 1	0x1A	0x04	0x30	
	Data Length	EQ Index	Mute EQ	Channel 0	1	0x05	0x01	
	3 🕀	Default V Data 5	Data Data D	Channel 1	1	0x06	0x81	
			Data Byte 3	Channel 2	1	0x07	0x00	
	Load From	Write to	EQ DC Gain	Channel 3	1	0x08	0x00	
	Device	Device	0 dB	Device 2 Changel 0	UXIC I	0x09	0x05	
	Config Data		EQ Boost 1 (2nd Order)	Channel 1	2	0x0A	0x30	
	× 30 × 1 × 81	× 0 × 0 × 5	0 ~	Channel 2	2 ~	0x0B	0x11 v	
	Major Channel Settings :	Device 0 🗸						
	Parameters	Channe	10	Channel 1	Channel 2		Channel 3	
	EQ Index	Defau	It	Default	Default	Default		
	EQ Boost 1	0x00	(0x00	0x00		0x00	
	EQ Boost 2	0x00		0x00	0x00		0x00	
	Mute EQ	Unmut	e	Unmute	Unmute		Unmute	
	EQ Boost 1(2nd Order)	0x00	6	0x00	0x00		0x00	
	EQ DC Gain	0 dB		0 dB	0 dB		0 dB	

Figure 4-6. EEPROM Page: Load from EEPROM, Load from Hex File, Write to EEPROM Hex



5 High Level Page

The DS320PR410 redriver features a continuous-time linear equalizer (CTLE) that applies high-frequency boost and low-frequency attenuation to help equalize the frequency-dependent insertion loss effects of a passive channel. CTLE settings are referred to as EQ settings in this section for clarity and brevity.

The *High Level Page* is used to quickly and easily adjust the EQ settings as needed for your specific application. A further description of the EQ settings can be found in the *DS320PR410 Four-Channel Linear Redriver for* $PCle^{TM}$ 5.0, *CXL 2.0*, data sheet. The page contains a *Device Status* tab to monitor each connected device's channel status and a *Block Diagram* tab to adjust the EQ settings of each connected device. The following steps walk through the features of the detailed features of the *High Level Page*.

1. After clicking on the *High Level Page* tab on the left side of the GUI, the *Device Status* tab is shown, such as in Figure 5-1. Each channel status is updated sequentially, showing each connected device's channel RX Detect and EEPROM Bank Load status, along with the channel's current EQ settings. The RX Detect status bar appears green if proper receiver impedance detection is found and red if proper receiver impedance detection is not found. EEPROM Load status bars appear green if the device's register bank has properly loaded EEPROM data and red if EEPROM data has failed to load. Note that the EEPROM Load status always indicates a failed (red) load status when the device is operating in SMBus/l²C secondary mode (MODE = L2). The current EQ settings are shown to the right of each channel's status indicators.

										HILO MODE
				"When in Demo	Mode, click	Apply on the pro	file Configuration Page to	enable	access to o	ther pages
Device Select All Devices	~						G Load Fro	m File	Save	e To File
Channel Select Channel 0	Update Time(in_ms)					Reset I	evice	🛸 Refr	esh Fror Device
	Device St	atus				Block	k Diagram			
Continuous St	atus Update						Updated US	4 Chanr	iel 3.	
DS1	Rx P Detected	EEPROM Load Complete	2	EQ Index	3	EQ Boost 1	EQ Bypass EQ Boo	ost 1 (2n	d Order)	^
Channel 0	Rx N Detected		0 dB	EQ DC Gain	0	EQ Boost 2	Mute EQ			
DS1	Rx P Detected	EEPROM Load Complete	2	EQ Index	3	EQ Boost 1	EQ Bypass EQ Boo	ost 1 (2n	d Order)	
Channel 1	Rx N Detected		0 dB	EQ DC Gain	0	EQ Boost 2	Mute EQ			
DS1	Rx P Detected	EEPROM Load Complete	2	EQ Index	3	EQ Boost 1	EQ Bypass EQ Boo	ost 1 (2n	d Order)	
Channel 2	Rx N Detected		0 dB	EQ DC Gain	0	EQ Boost 2	Mute EQ			
DS1	Rx P Detected	EEPROM Load Complete	2	EQ Index	3	EQ Boost 1	EQ Bypass EQ Boo	ost 1 (2n	d Order)	
Channel 3	Rx N Detected		0 dB	EQ DC Gain	0	EQ Boost 2	Mute EQ			
	Device Select All Devices Channel Select Channel 0 Continuous St DS1 Channel 0 DS1 Channel 1 DS1 Channel 2 DS1 Channel 2	Device Select All Devices Update Time(in_ms Channel 2 Update Time(in_ms Device St Devi	Device Select All Devices Update Time(in_ms) Channel 0 V 5000 2 Device Status D	Device Select All Devices Update Time(in_ms) Channel 0 v 5000 2 Device Status evice Status Device Status Device Status Device Status Device Status Device Status Device Status Device Status Device Status Device Sta	Device Select All Devices Update Time(in_ms) Channel 0 ♥ 5000 ♥ Device Status Device Status Device Status Device Status Device Status Device Status Device Status DS1 Rx P Detected EEPROM Load Complete 2 EQ Index Channel 0 Rx N Detected EEPROM Load Complete 2 EQ Index Channel 1 Rx N Detected EEPROM Load Complete 2 EQ Index DS1 Rx P Detected EEPROM Load Complete 2 EQ Index DS1 Rx P Detected EEPROM Load Complete 2 EQ Index DS1 Rx P Detected EEPROM Load Complete 2 EQ Index DS1 Rx P Detected EEPROM Load Complete 2 EQ Index DS1 Rx P Detected EEPROM Load Complete 2 EQ Index DS1 Rx P Detected EEPROM Load Complete 2 EQ Index DS1 Rx P Detected EEPROM Load Complete 2 EQ Index	Device Select All Devices Channel 2 Update Time(in_ms) Channel 0 ♥ 5000 ♥ Device Status Device Status Device Status Device Status Device Status Device Status Device Status Device Status Device Status Device Status DS1 Rx P Detected EEPROM Load Complete 2 EQ Index 3 OdB EQ DC Gain 0 DS1 Rx P Detected EEPROM Load Complete 2 EQ Index 3 OdB EQ DC Gain 0 DS1 Rx P Detected EEPROM Load Complete 2 EQ Index 3 OdB EQ DC Gain 0 DS1 Rx P Detected EEPROM Load Complete 2 EQ Index 3 OdB EQ DC Gain 0 DS1 Rx P Detected EEPROM Load Complete 2 EQ Index 3 OdB EQ DC Gain 0 DS1 Rx P Detected EEPROM Load Complete 2 EQ Index 3 OdB EQ DC Gain 0 DS1 Rx P Detected EEPROM Load Complete 2 EQ Index 3 OdB EQ DC Gain 0	Device Select All Devices Update Time(in_ms) Channel Select Update Time(in_ms) Channel O 5000 Device Status Block DS1 Rx P Detected EEPROM Load Complete 2 DS1 Rx P Detected DS1	Device Select All Devices Update Time(in_ms) Status Update Us- Status Us- Status Us- Status Us- Status Status <td>Device Select All Devices Update Time(m_ms) Channel Select Update Time(m_ms) Channel Select Device Status Device Status Device Status Block Diagram Update UV Device Status Update UV Device Status Block Diagram /td> <td>Device Select All Devices Update Time(in_ms) Channel Select Update Time(in_ms) Channel Select Block Diagram Device Status Block Diagram Continuous Status Update Updated US4 Channel 3. DS1 Rx P Detected EEPROM Lead Complete 2 EQ Index 3 EQ Boost 1 EQ Bypass EQ Boost 1 (2nd Order) DS1 Rx P Detected EEPROM Lead Complete 2 EQ Index 3 EQ Boost 1 EQ Bypass EQ Boost 1 (2nd Order) DS1 Rx P Detected EEPROM Lead Complete 2 EQ Index 3 EQ Boost 1 EQ Bypass EQ Boost 1 (2nd Order) DS1 Rx P Detected EEPROM Lead Complete 2 EQ Index 3 EQ Boost 1 EQ Bypass EQ Boost 1 (2nd Order) DS1 Rx P Detected EEPROM Lead Complete 2 EQ Index 3 EQ Boost 1 EQ Bypass EQ Boost 1 (2nd Order) DS1 Rx P Detected EEPROM Lead Complete 2 EQ Index 3 EQ Boost 1 EQ Bypass EQ Boost 1 (2nd Order) DS1 Rx P Detected EEPROM Lead Complete 2 EQ Index 3 EQ Boost 1 EQ Bypass EQ Boost 1 (2nd Order) DS1 Rx P Detected <t< td=""></t<></td>	Device Select All Devices Update Time(m_ms) Channel Select Update Time(m_ms) Channel Select Device Status Device Status Device Status Block Diagram Update UV Device Status Update UV Device Status Block Diagram	Device Select All Devices Update Time(in_ms) Channel Select Update Time(in_ms) Channel Select Block Diagram Device Status Block Diagram Continuous Status Update Updated US4 Channel 3. DS1 Rx P Detected EEPROM Lead Complete 2 EQ Index 3 EQ Boost 1 EQ Bypass EQ Boost 1 (2nd Order) DS1 Rx P Detected EEPROM Lead Complete 2 EQ Index 3 EQ Boost 1 EQ Bypass EQ Boost 1 (2nd Order) DS1 Rx P Detected EEPROM Lead Complete 2 EQ Index 3 EQ Boost 1 EQ Bypass EQ Boost 1 (2nd Order) DS1 Rx P Detected EEPROM Lead Complete 2 EQ Index 3 EQ Boost 1 EQ Bypass EQ Boost 1 (2nd Order) DS1 Rx P Detected EEPROM Lead Complete 2 EQ Index 3 EQ Boost 1 EQ Bypass EQ Boost 1 (2nd Order) DS1 Rx P Detected EEPROM Lead Complete 2 EQ Index 3 EQ Boost 1 EQ Bypass EQ Boost 1 (2nd Order) DS1 Rx P Detected EEPROM Lead Complete 2 EQ Index 3 EQ Boost 1 EQ Bypass EQ Boost 1 (2nd Order) DS1 Rx P Detected <t< td=""></t<>

Figure 5-1. High Level Page: Device Status Tab

Click the *Block Diagram* tab to show the screen highlighted in Figure 5-2. Here, the EQ settings (EQ Index, EQ Boosts, EQ DC Gain) for each channel can be adjusted. To program the settings for a specific device or channel, select a device and channel from the respective *Device Select* and *Channel Select* drop-down menus.



Figure 5-2. High Level Page: Block Diagram Tab, Device and Channel Select

3. Select the desired EQ Index / EQ Boost settings and EQ DC Gain. The EQ Index drop-down menu is the easiest way to quickly adjust the amount of redriver equalization boost applied. After selecting an EQ Index value, the EQ Boost 1, EQ Boost 2, and EQ Boost 1 (2nd order) fields are automatically populated. The user can adjust each boost value for finer tuning as needed. Refer to the device data sheet for more information regarding EQ Index boost values. These options are highlighted in Figure 5-3.



Figure 5-3. High Level Page: EQ Index and EQ Boost Select



The *EQ DC Gain* drop-down menu highlighted in Figure 5-4 can be used to adjust channel DC Gain (Flat Gain). Further information regarding DC Gain can be found in the device data sheet. The *EQ DC Gain* value of 0dB is recommended for most applications.



Figure 5-4. High Level Page: EQ DC Gain Select

Click the *Apply to Channel* button to apply the selected EQ settings to the selected Device and selected Channel (indicated by the *Device Select* and *Channel Select* drop-down menus, respectively). Click the *Apply to All Channel* button to apply selected EQ settings to all channels of the device or devices selected using the *Device Select* drop-down menu. These options are highlighted in Figure 5-5.



Figure 5-5. High Level Page: Apply to Channel and Apply to All Channels



6 Eye Height Page

The *Eye Height Page* can assist the user in observing the effects of the redriver EQ settings in their system. The page can be used to display the *EyeScan* plot of the signal passing through the redriver for each active channel of the connected devices. Further information regarding *EyeScan* can be found in the *Eye Scan with TI PCI-Express Gen5.0 Redrivers*, application note. TI recommends the use other lane margining tools to monitor signal quality at each end of the PCIe link to determine best system performance. This tool can be used as a reference and cannot provide best system performance based on *EyeScan* results alone.

1. Select the desired *Scale Per Step* as shown in Figure 6-1 for the *EyeScan* capture. This parameter determines the captured voltage range of the *EyeScan* operation, providing four options for added granularity if desired. By default, this parameter is set to ±400mV (12.5mV Step).



Figure 6-1. Eye Height Page: Scale Per Step



2. Select the channels for the desired *EyeScan* capture using the *DSx/USx CHx* check boxes or the *Select All* check boxes for each *Downstream* and *Upstream* device. These options are highlighted in Figure 6-2.



Figure 6-2. Eye Height Page: Select EyeScan Channels

3. Click the *Start Sweep* button to begin the *EyeScan* plot capture. The redriver automatically captures the *EyeScan* for each selected channel using the programmed redriver EQ settings and displays the result in the *Downstream* and *Upstream* plots. The scanning status can be found in the red and green status indicator box on the page, shown in Figure 6-4. Click the *Stop Sweep* button to cancel the current *EyeScan* sweep. Please note that clicking the *Stop Sweep* button ends the capture and plots all channel *EyeScan* results captured up to the point of cancellation. These buttons are highlighted in Figure 6-3.



Figure 6-3. Eye Height Page: Start Sweep and Stop Sweep



			Sig	Con Arch	itect 3.2	2 "When in De	mo Mode, click App	ly on the profi	le Configuration Page to	Demo Mo enable access to other page
Selection	Scale Per Step Start Sweep Stop Sweep Scanning DS1 Channel 0 Export Processed Data ±400mV> 12.5mV Step Start Sweep Stop Sweep Scanning DS1 Channel 0								🚭 Load From File	
 Eye Height Page 	Downstream DS1-Channel 0 v US1-Channel 0 v									
	EQ Index 2	EQ DC Gain 0 dB	1		E	Q Index 5	EQ DC Gain 0 dB			
	EQ Boost 1 3	EQ Boost 2 0	2nd Order EQ Bypass		E	Q Boost 1 0	EQ Boost 2 0	2nd Order 1	r	
	1200 1000 800 EBO EBO EBO EBO EBO EBO EBO EBO EBO EBO	10 15 20 25	Downstream 5 30 35 40 45 5 DAC Step	Selection Y	H Control H Con	1400 1200 800 600 400 200 0 5	10 15 20 25	Upstr 30 35 DAC Step	eam 40 45 50 55 60	Select All US1 CH0 US1 CH1 US1 CH1 US1 CH1 US1 CH2 US1 CH2 US2 CH1 US2 CH2 US2 CH2

Figure 6-4. Eye Height Page: EyeScan Sweep in Progress

4. After completion of the sweep, the plots display the *EyeScan* sweep results. An example result plot is shown in Figure 6-5. The *Downstream* and *Upstream* plot channel selectors highlighted in Figure 6-6 can be used to emphasize a desired channel on each plot and view the channel's EQ settings. Note that this plot displays the hit counts at varying voltage levels for the selected channels captured directly at the transmitter output pins of the redriver. TI recommends the use other lane margining tools to monitor signal quality at each end of the PCIe link. This tool can be used as a reference and cannot provide best system performance based on this plot alone.



Figure 6-5. Eye Height Page: EyeScan Results



SigCon Architect 3.2 File Script Device Help Ma	lacro	- 🗆 X
	SigCon Arch	nitect 3.2 Demo Mode "When in Demo Mode, click Apply on the profile Configuration Page to enable access to other pages
Selection ♦ DS320PR410 - ♦ Configuration - ♦ Low Level Page - ♦ EEPROM Page - ♦ High Level Page	Scale Per Step ±400mV> 12.5mV Step V Start Sweep Stop Sweep	Acquisition OFF Export Processed Data
└	Downstream DS1 - Channel 0 v EQ Index EQ DC Gain 2 0 dB EQ Boost 1 EQ Boost 2 2nd Order 2 EQ Boost 2 EQ Boost 2	Upstream US1 - Channel 0 v EQ Index EQ DC Gain 5 0 dB EQ Boost 1 EQ Boost 2 2nd Order
	Downstream Sec 1600 0 S 1400 0 S 1200 0 S 1000 0 S 1000 0 S 0 5 10 15 20 25 30 35 40 45 50 55 60 65 DAC Step DAC Step	Incertain Upstream Select All 11792 Upstream Us1 CH0 1100 Us1 CH0 Us1 CH0 1100 Us1 CH1 Us1 CH1 1100 Us2 CH1 Us2 CH1 1100 Us2 CH1 Us2 CH1 1100 Us2 CH1 Us2 CH2 1100 Us2 CH1 Us3 CH2 111 Us3 CH1 Us3 CH1 111 Us3 CH1 Us3 CH1 111 Us3 CH2 Us3 CH1 111 Us3 CH1 Us3 CH1 111 Us3 CH1 Us3 CH1 111 Us3 CH1 Us3 CH1
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Figure 6-6. Eye Height Page: Plot Channel Selectors

5. To export the selected channel's raw *EyeScan* data, click the *Export Processed Data* button highlighted in Figure 6-7. Save the raw data file using the prompted File Explorer.



Figure 6-7. Eye Height Page: Export Processed Data



6. Additionally, the plots can be customized by clicking the plot icon next to each channel. An example customization menu is shown in Figure 6-8.



Figure 6-8. Eye Height Page: Customize Plot

7 Summary

The DS320PR410 SigCon Architect GUI profile allows for simple device access and configuration to help with EVM bring-up and device diagnostics. Please contact your Texas Instruments field sales representative if you have further questions or need assistance.

8 References

- Texas Instruments, DS320PR410 Four-Channel Linear Redriver for PCIe™ 5.0, CXL 2.0 data sheet.
- Texas Instruments, DS320PR410 Programming Guide programming guide.
- Texas Instruments, *Eye Scan with TI PCI-Express Gen5.0 Redrivers* application note.
- Texas Instruments, SigCon Architect: Installation and Starter's Guide user's guide.
- Texas Instruments, USB2ANY Interface Adapter tool page.

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