Application Note How to Configure the DS320PR810 Using SigCon Architect



ABSTRACT

Welcome to the Falcon SigCon Architect User's Guide. This document explains how to configure your DS320PR810 redriver using the user-friendly GUI.

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1 Getting Started

- 1. Download and install SigCon Architect. Follow the steps in the SigCon Architect: Installation and Starter's Guide for detailed instructions.
- 2. Download and install the DS320PR810 Profile Updater.
- 3. Connect a USB2ANY Interface Adapter or Aardvark I2C Host Adapter to the desired DS320PR810 and PC.
- 4. Open SigCon Architect and click the *Configuration* tab below the DS320PR8xx profile on the left, as shown below.

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410	Interface Details	
vel Page	Device Model EVM Model Interface Alias Name 12C Frequency	
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301	Downstream Devices Upstream Devices	1 Exercises to the second
vel Page	DS1 (0x18,0x19), DS2 (0x1A,0x1B) US1 (0x1C,0x1D), US2 (0x1E,0x1F)	Edit Device Addres
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5. Click the Auto Detect button to detect the device and SMbus addresses.



 Ensure the correct interface adapter is selected below the interface drop-down menu (USB2ANY or Aardvark). Then click *Apply*. The user will see the other tabs under the DS320PR8xx profile become un-greyed. Click the desired tab to begin programming the device.

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	□ □er "When in Demo Mode, cick Apply on the profile Configuration Page to enable access to oth
n ^	
0PR410	Interface Details
/Level Page	Device Model EVM Model Interface Alias Name I2C Frequency
ROM Page Level Page	DS320PR810 V DS320PR810EVM-RSC V Auto Detern USB2ANY V USB2ANY 0 V Toggle LED 100 KHz 🔅 Pull-ups? 🚺 Apply
em Page	Aardvark
figuration	Downsidealin Devices / USBANY incess
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PROM Page	
PROM Page h Level Page Height Page	DS320PR810 Eight-Channel Linear Redriver for PCIe 5.0, CXL 1.1
PROM Page h Level Page Height Page tem Page PR1691	DS320PR810 Eight-Channel Linear Redriver for PCIe 5.0, CXL 1.1
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ROM Page In Level Page Height Page em Page PR1sof figuration Level Page ROM Page	DS320PR810 Eight-Channel Linear Redriver for PCIe 5.0, CXL 1.1 Features
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- 7. Descriptions of each tab is listed below:
 - a. Low Level Page: Individual register access to the lowest level of the device. Can be used to change specific settings, or to verify changes from the high-level page have taken effect.

Texas



- b. EEPROM Page: When in I2C primary mode, upon boot up the redriver will load the settings stored in its EEPROM. The user can configure those settings here.
- c. High Level Page: Main page used to change EQ settings of the device and to see the active status of each channel
- d. Eye Height Page: Performs a sweep of all CTLE settings for the desired channel and displays eye height for each settings. This can assist in choosing an optimal CTLE setting for your system.
- e. System Page: Allows the user to input pre and post channel losses of their system, and provides a recommended CTLE index value for each PCIe transmitter preset.



2 Low Level Page

1. Use the *Device Select* drop-down menu to select which device you want to read or write to. The DS320PR810EVM includes two upstream and two downstream devices.

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			51	gua	on /	Arcr	IIT	ect 3.2	iter in Denne Hade, alleb Annehu e	the sector for formation	D	emo l
11								,	viten in Demo mode, click Apply of	n me prome comgarat	un rage to enable access to i	otner h
n Devic	e Select Block Sel	ect										
opEquivation	DS1 🔍 🔿	channel 0	V									
w Level Page	SI CONTRACTOR		1									
PROM Page	Switch Derice		1	xpand A	an s	Collapse A	u					
gh Level Page	a sine	Address	Default	Mode	Size	Data	~		Mask Redister Data		Mask Value	
stem Page	d							Current Address	music register Data		Y FF	
opfiguration U	S2 1	0xE1	0x00	R	8	0x00		× 0			A 11	-
w Level Page	General 2	0xE2	0x00	RAW	8	0x00						
PROM Page	EE_Status	0xE3	0x00	R	8	0x80		Data				
gh Level Page	DEVICE_ID	0xF1	0x28	R	8	0x28		x 0				
agnostic Page	EYESCAN_HC_TIME	0xF8	0x0F	R/W	8	0x0F						
e Monitor Page	EYESCAN	0xF9	0xA0	R/W	8	0xA0		Milito Domintor				
of suration	Bank1 Shared		19 March 19 C					witte negister				
w Level Page	General_1	0xE1	0x00	R	8	0x00						
PROM Page	General_2	0xE2	0x00	R/W	8	0x00		Read Register	Field Description			
gh Level Page	EE_Status	0xE3	0x00	R	8	0x80			Field Description			
e Height Page	DEVICE_ID	0xF1	0x28	R	8	0x28		Read All	Field Name	Access	Description	
stem Page	EYESCAN_HC_TIME	0xF8	0x0F	R/W	8	0x0F						
CUPRODUT	EYESCAN	0xF9	0xA0	R/W	8	0xA0						
w Level Page	Channel 0							Parat Davisa				
PROM Page	RX_DET_STS	0x00	0x00	R	8	0xC9		Reset Device				
gh Level Page	EQ_CTL	0x01	0x00	R/W	8	0x00		Load Config				
e Height Page	EQ_CTL2	0x02	0x00	R/W	8	0x00		road coming				
stem Page	GAIN_CTRL	0x03	0x05	R/W	8	0x05		Save Confin				
OMB810	RX_DET_CTRL	0x04	0x00	R/W	8	0x00		sure comy				
ch Level Page	BIAS_CTRL	0x06	0x20	R/W	8	0x20						
w Level Page	EYESCAN_RESULT	0x0E	0x20	R	8	0x3F						
PROM Page	HIT_COUNT2	0x10	0x00	R	8	0x00						
e Height Page	Channel 1	2020	1211212	1.22	2	10723						
0PR412-421	RX_DET_STS	0x20	0x00	R	8	0xC9						
onfiguration	EQ_CTL	0x21	0x00	R/W	8	0x00						
w Level Page	EQ_CTL2	0x22	0x00	R/W	8	0x00						
e Heinht Pane	GAIN_CTRL	0x23	0x05	R/W	8	0x05						
a construct and a	RX_DET_CTRL	0x24	0x00	RAW	8	0x00						
stem Made												

2. Once the device is selected, the complete register map appears in the table below. Use the *Block Select* drop-down menu to jump to the desired part of the table to view specific channels. Bank 0 includes channels 0-3 and Bank 1 includes channels 4-7.

	1		SI	gCo	on /	Arch	itect 3.2	When in Demo Mode, click Apply on	the profile Configuration	Den Den Page to enable access to ot	hei
00PR410	Device Select	Block Select		>							
onfiguration	DS1	Channel 1	V								
W Level Page PROM Page	Register Map	Banku Shared		Expand A	H (Collapse Al					
gh Level Page	Block / Register Name	Channel O		Mode	Size	Data	•	Mack Pagistor Data		Mask Value	
stem Page	Bank0 Shared	Channel 0			-		Current Address	Indon Register Data		Y FF	
oP1801	General_1	U Channel 1		R	8	0x00	× 0			A FF	
w Level Page	General_2	Channel 2		R/W	8	0x00					
PROM Page	EE_Status	Channel 3		R	8	0x80	Data				
h Level Page	DEVICE_ID	Channel 4		R	8	0x28	× 0				
Monitor Page	EYESCAN_HO	Channel 5		R/W	8	0x0F					
0PR8xx	EYESCAN	Channel 6		R/W	8	0xA0	Write Register				
nfiguration	Bank1 Shared	Channel 7			0	0.00	Treasure and the second				
w Level Page	General 2	Bank 0		RAN	8	0x00	Read Register				
PROM Page	FE Status	Bank 1		R	8	0x80		Field Description			
e Height Page	DEVICE ID	Channel 0-1		R	8	0x28	Read All	Field Name	Access	Description	
stem Page	EYESCAN_H	Channel 2-3		R/W	8	0x0F					
0PR1601	EYESCAN	Channel 4-5		R/W	8	0xA0					
w Level Page	E Channel 0	Channel 6-7		1.22	12.1	1000000	Reset Device				
PROM Page	RX_DET_STS	Channel 0-7	0.00	R	8	0xC9	The out out the o				
gh Level Page	EQ_CIL	0x01	0x00	R/W	8	0x00	Load Config				
s Height Mage	CAIN CTRI	0x02	0x05	DAM	0	0x05					
0MB810	RX DET CTE	0x04	0x00	RW	8	0x00	Save Config				
nfiguration	BIAS_CTRL	0x06	0x20	R/W	8	0x20	1.5				
th Level Page	EYESCAN_RE	ESULT 0x0E	0x20	R	8	0x3F					
PROM Page	HIT_COUNT2	0x10	0x00	R	8	0x00					
e Height Page	Channel 1		Laborer								
0PR412-421	RX_DET_STS	0x20	0x00	R	8	0xC9					
w1 evel Page	EQ_CIL	0x21	0000	DAM	8	0x00					
h Level Page	GAIN CTRI	0x22	0x05	RM	8	0x05					
e Height Page	BX DET CTE	0x24	0x00	RAV	8	0x00					
stem Page		0.24	0.00	DAN	0	0.00					

3. Click the *Read All* button to read the configuration of the entire device. Alternately, click on a specific register, and click the *Read Register* device to update the target register quicker. The current address field will automatically update with the highlighted register.



			S	igCo	on /	Archit	ect 3.2	/hen in Demo Mode, click Apply on	the profile Cont	Der figuration Page to enable access to oth
P410	Device Select	Block Select								
guration	DS1 🗸	Channel 1	~							
Level Page ROM Page	Register Map			Expand A	H (Collapse All				
Level Page	Block / Register Name	Address	Default	Mode	Size	Data	-	Mack Register Data		Mask Value
m Page	Bank0 Shared					(Current Address	7 CH DEC Bynass(0)		x FF
ouration	General_1	0xE1	0x00	R	8	0x00	x 21	ACR DEC Boost 13		
evel Page	General_2	0xE2	0x00	R/W	8	0x00	\sim	5 G DE0 Boost 12		
ROM Page	EE_Status	0xE3	0x00	R	8	0x80	Data	4 77 DE0 Boost 1[1]		
Level Page	DEVICE_ID	0xF1	0x28	R	8	0x28	× 0			
hostic Page	EYESCAN_HC	_TIME 0xF8	0x0F	R/W	8	0x0F				
R8xx	EYESCAN	0xF9	0xA0	R/W	8	0xA0	Write Register	1 0 E0 Boost 2(1)		
ouration	Bank1 Shared	1000000	100000		100					
evel Page	General_1	0xE1	0x00	R	8	0x00	Dood Dopistor			
ROM Page	General_2	0xE2	0x00	R/W	8	0x00	Reau Register	Held Description		
Level Page	EE_Status	0xE3	0x00	R	8	0x80	L	Field Name	Access	Description
m Page	DEVICE_ID	UXF1	0%28	R	8	0x28	Read All	FO D ANNO 177	Date	Eachie OTLE Object 1 Descent
R1601	EYESCAN_HC	_TIME 0XF8	OXOF	DAA	8	0x0F	\sim	EQ Bypass[/:/]	HOW	Enable CILE Stage 1 Bypass:
guration	Channel 0	UXP 9	UXAU	POVV	0	0,040	-			0: Bypass disabled
Level Page	BY DET STO	0,00	0.00	D	0	0.00	Reset Device			1: Bypass enabled
ROM Page	FO CTI	0x01	0x00	RAV	8	0x00		EQ Boost 1(6-3)	RM	CTLE Boost Stage 1 Control
Level Page	FO CTL2	0x02	0x00	R/W	8	0x00	Load Config	EQ Boost 2(2:0)	RAV	CTLE Boost Stage 2 Control
m Page	GAIN CTRI	0x03	0x05	RM	8	0x05		La Doost L(L.o)		once boost dage 2 donabl.
B810	RX DET CTR	0x04	0x00	R/W	8	0x00	Save Config			
guration	BIAS CTRL	0x06	0x20	R/W	8	0x20				
Level Page	EYESCAN_RE	SULT 0x0E	0x20	R	8	0x3F				
Level mage COM Page	HIT_COUNT2	0x10	0x00	R	8	0x00				
leight Page	Channel 1				1					
R412-421	RX_DET_STS	0x20	0x00	R	8	0xC9				
guration	EQ_CTL	0x21	0x00	R/W	8	0x00				
evel Page	EQ_CTL2	0x22	0x00	R/W	8	0x00				
Level Mage	GAIN_CTRL	0x23	0x05	R/W	8	0x05				
m Page	RX_DET_CTR	0x24	0x00	R/W	8	0x00				
ID410	BIAS_CTRL	0x26	0x20	R/W	8	0x20 v				

4. To write to the selected register, check or deselect the boxes in the *Register Data* field, or manually enter a hex value into the *Data* field. Then, click the *Write Register* button. 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.

File Script Device Help	Macro									7 4	×
			Si	gCo	n /	Arcl	nitect 3.2	/hen in Demo Mode, click Apply on t	he profile Cont	Den	mo Mode
Selection ^	Device Select Block Se	elect									
DS160PR410	DS1 V	Channel 1	~								
- ♦ Low Level Page - ♦ EEPROM Page	Register Map			Expand A		Collapse	All	\sim			
- O High Level Page	Block / Register Name	Address	Default	Mode	Size	Data	A	Mask Register Data		Mask Value	
	Bank0 Shared General_1 General_2 EE_Status DEVICE_ID EYESCAN_HC_TIME EYESCAN Bank1 Shared General_1	0xE1 0xE2 0xE3 0xF1 0xF8 0xF9 0xE1	0x00 0x00 0x00 0x28 0x0F 0xA0 0x00	R R/W R R R/W R/W R	8 8 8 8 8 8 8 8	0x00 0x00 0x80 0x28 0x0F 0xA0 0x00	Current Address x 21 Data x 8 Write Register	Image Control Control 7 C EQ Bypass[0] 6 EQ Boost 1[3] EQ Boost 1[3] 5 EQ Boost 1[1] S 4 EQ Boost 1[1] S 3 EQ Boost 1[1] S 2 EQ Boost 1[1] S 1 EQ Boost 2[1] S 0 EQ Boost 2[1] S)	x FF	
- EEPROM Page	General_2	0xE2	0x00	R/W	8	0x00	Read Register	Field Description			
- High Level Page	EE_Status	0xE3	0x00	R	8	0x80		Field Description		-	
-	DEVICE_ID	0xF1	0x28	R	8	0x28	Read All	Field Name	Access	Description	^
System Page DS220PD1601	EYESCAN_HC_TIME	0xF8	0x0F	R/W	8	0x0F		EQ Bypass[7:7]	R/W	Enable CTLE Stage 1 Bypass:	
- Configuration - Low Level Page FEPRON Page	EYESCAN Channel 0 RX_DET_STS	0xF9 0x00	0xA0 0x00	R/W	8	0xA0 0xC9	Reset Device			0: Bypass disabled 1: Bypass enabled	
- O High Level Page	EQ_CTL	0x01	0x00	R/W	8	0x00	Lord Config	EQ Boost 1[6:3]	R/W	CTLE Boost Stage 1 Control.	
- 💠 Eye Height Page	EQ_CTL2	0x02	0x00	R/W	8	0x00	Load Conny	EQ Boost 2[2:0]	R/W	CTLE Boost Stage 2 Control.	
	GAIN_CTRL RX_DET_CTRL BIAS_CTRL EYESCAN_RESULT HIT_COUNT2	0x03 0x04 0x06 0x0E 0x10	0x05 0x00 0x20 0x20 0x20 0x00	R/W R/W R/W R R	8 8 8 8	0x05 0x00 0x20 0x3F 0x00	Save Config				
← ♦ Eye Height Page	BY DET STO	0-20	0-00	D		0.00					_
○ DS320PR412-421	EQ. CT	0x20	0x00	RM/	0	0x00					_
- O Low Level Page	EQ_CTL2	0x22	0x00	RW	8	0x00					_
High Level Page Eve Height Page System Page DS560MB410	GAIN_CTRL RX_DET_CTRL BIAS_CTRL	0x23 0x24 0x26	0x05 0x00 0x20	R/W R/W R/W	8 8	0x05 0x00 0x20	~				~

5. Use the *Save Config* and *Load Config* buttons to save the current configuration in a .cfg file, and load it back as needed. Click the *Reset Device* button to reset every setting to the default.



Low	Level	Page
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			Si	gCo	on	Arch	itect 3.2	When in Demo I	lode, click Apply on th	e profile Cont	Der	mo her
^	Device Select Block S	elect										
ouration	DS1 🔍	Channel 1	~									
Level Page ROM Page	Register Map			Expand A	u I	Collapse A						
Level Page	Block / Register Name	Address	Default	Mode	Size	Data	•	Mask	Register Data		Mask Value	
m Page	Bank0 Shared						Current Address	7 27	EQ Bypassi01		× FF	
guration	General_1	0xE1	0x00	R	8	0x00	x 21	6.12	EQ Boost 1[3]			
evel Page	General_2	0xE2	0x00	R/W	8	0x00		5 2	EQ Boost 1/21			
ROM Page	EE_Status	0xE3	0x00	R	8	0x80	Data	4 2	E FO Boost 1[1]			
Level Page	DEVICE_ID	0xF1	0x28	R	8	0x28	× 8	317	EQ Boost 10			
onitor Page	EYESCAN_HC_TIME	0xF8	OXOF	R/W	8	0x0F		2 2	EQ Boost 2121			
R8xx	EYESCAN	OxF-9	0XA0	R/W	8	UXAU	Write Register	127	EQ Boost 2[1]			
guration	Bankt Shared	0.54	0.00		0	0.00		0.27	EQ Boost 2001			
Level Page	General_1	OXE 1	0x00	RAM	0	0x00	Read Register	- 64	L			
COM Page	EE Statue	OVE2	0x00	R	8	0100	a contract of the second	Field Desc	ription			
leight Page	DEVICE ID	0xE1	0x28	R	8	0x28	Road All		Field Name	Access	Description	
m Page	EYESCAN HC TIME	0xF8	0x0F	R/W	8	0x0F	Nedd Mil	EQ Bypas	IS[7:7]	R/W	Enable CTLE Stage 1 Bypass:	
R1601	EYESCAN	0xF9	0xA0	R/W	8	0xA0	\sim					
guration	E Channel 0	and a second second	Che Stores			1001000					0: Bypass disabled	
OM Page	RX_DET_STS	0x00	0x00	R	8	0xC9	Reset Device	N			1: Bypass enabled	
evel Page	EQ_CTL	0x01	0x00	R/W	8	0x00	Load Config	EQ Boost	1[6:3]	R/W	CTLE Boost Stage 1 Control.	
eight Page	EQ_CTL2	0x02	0x00	R/W	8	0x00	Load Comy	EQ Boost	2[2:0]	R/W	CTLE Boost Stage 2 Control.	
n Page	GAIN_CTRL	0x03	0x05	R/W	8	0x05	Save Config	/				
uration	RX_DET_CTRL	0x04	0x00	R/W	8	0x00	Sure comp	/				
evel Page	BIAS_CTRL	0x06	0x20	R/W	8	0x20		2				
el Page	EYESCAN_RESULT	OXUE	0x20	R	8	0X3F						
Page	HII_COUNI2	UX10	0000	R	8	0000						
ight Page	BY DET OTO	0.20	0,00	0		0×00						
412-421 Instion	FO_DET_STS	0x21	0x00	RAM	0	0x00						
evel Page	EQ CTL2	0x22	0x00	RAW	8	0x00						
evel Page	GAIN CTRI	0x23	0x05	RM	8	0x05						
eight Page	RX DET CTRI	0x24	0x00	RAW	8	0x00						
m Page	BIAS CTRL	0x26	0x20	R/W	8	0x20						

7



3 EEPROM Programming Page

SigCon Architect can be used to generate an EEPROM file for a single redriver or multiple DS320PR810 redrivers. The below images provide an example.

In this example, two redrivers are present with different EQ index values (CTLE index 3 for device at address 0x18, 0x19 and CTLE index 7 for device at address 0x1A, 0x1B), for each device, the same value is used for every channel. For programming additional devices, increase the number of devices and configs as needed.

1. Multiple devices can be programmed at once. Select the number of devices and the number of configurations. Up to 16 different configurations can be created and assigned to each device and channel as needed.

PR410						"When in Demo Mod	le, click Apply on	the profile Configuration	Page to enable acces	ss to oth
PR410	Base Header Details									
nfiguration w Level Page PROM Page	CRC Speed Select 400 KHz		Surst Select 4 Bytes 🗸	M Write to EEPROM Load From Hex File						
h Level Page tem Page	Device Configuration Details						EE	PROM Data Table		
PT801	No of Devices	lo of Confins	Data Byte	e 1	Config Assignme	ant Tree	unnly			
figuration	2	2	EO Bor	ost 1	Device	Config	499	Addrose	EEDROM Data	
PROM Page				7 ~	Device	e 0 0x18.0x1	19	Auuress	EEPROW Data	- <u>^</u>
h Level Page	Coning select	hannel Select	EQ Bo	ost 2	Char	nnel 0 0		0x00	0x22	
gnostic Page	0 ~	All Channels	~	0 ~	Chan	nnel 1 0		0x01	0000	-
PR8xx	Device Select N	Aask Select			Chan	nnel 2 0		0x02	UXUU	-
figuration	0 🗸	0	Data Byte	e 2	Chan	nnel 3 0		Ux03	Ux04	- 1
Level Page				50	Chan	nnel 4 0		0x04	0x30	_
ROM Page	Data Length E	Q Index	IMut	e cu	Chan	inel 5 0		0x05	0x03	_
Height Page	3 🗘	3	Data Byte	e 3	Chan	inel 6 0		0x06	0x81	
tem Page	Landform	187-The Av	EODO	Gain	Chan	iner / 0	10	0x07	0xB8	
PR1601	Load From	Write to	EQDC	0 dP	E Devic	ci UXIA,UXI	10	0x08	0x00	
figuration	Device	Device		VUD V	Char	nnel 1 1		0x09	0x05	
Level Page ROM Page	Config Data		EQ Bo	ost 1 (2nd Order)	Char	nnel 2 1		0x0A	0x10	
Level Page	× 30 × 3 × 81 ×	< B8 × 0 ×	5 EQ	Bypass 🗸	Chan	nnel 3 1	~	0x0B	0x13	*
tem Page)MB810	Major Channel Settings : D	Device 0 🗸								
h Level Page	Parameters	Channel 0	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Channel	7
v Level Page	EQ Index	3	3	3	3	3	3	3	3	
Height Page	EQ Boost 1	0x07	0x07	0x07	0x07	0x07	0x07	0x07	0x07	
PR412-421	EQ Boost 2	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	
figuration	Mute EQ	Unmute	Unmute	Unmute	Unmute	Unmute	Unmute	Unmute	Unmute	8
Level Page	EQ Boost 1(2nd Order)	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypas	ss
Level Mage	EQ DC Gain	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	

2. To program the first device, select configuration 0 and device 0 from the drop-down menu. Note the Config Assignment Tree shows the hex address of each device (0x18, 0x19 for device 0). Set the data length to 3 since 3 bytes are needed to program the DS320PR810.



		S	igCor	Archi	tect 3.2	"When in Demo Mo	de, click Apply on the	profile Configuration	Page to enable acces	Demo I as to other p
n ^	Base Header Details									
50PR410 onfiguration ow Level Page EPROM Page	CRC Speed Select 400 KHz	Load From Hex File	Write to EEPROM Hex							
gh Level Page	Device Configuration Details						EEP	ROM Data Table		
50PT801	No. of Devices	lo. of Configs	Data Byt	e 1	Config Assignme	ent Tree	Apply			
onfiguration	2	2	EQ Bo	ost 1	Device	Conf		Address	EEPROM Data	
PROM Page	Config Select	hannel Select		7 ~	Devic	e 0 0x18,0	x19	0x00	0x22	-
gh Level Page	0 2	All Channels	EQ Bo	ost 2	Char	nnei U U	-	0x01	0x00	-
ve Monitor Page		All Channels	<u>.</u>	0 ~	Char	nnel 1 0		0x02	0x00	-
20PR8xx	Device Select	Aask Select	Data Byte 2 Mute EQ		Char	nnel 2 0		0x03	0x04	-
onfiguration	0 🗸	0			Char	nels U		0x04	0x30	-
EPROM Page	Data Length E	O Index			Char	nel 5 0		0x05	0x03	-
gh Level Page	3 🖨	3	/		Char	nnel 6 0		0x06	0x81	-
e Height Page		- 10	Data Byte	e 3	Char	nel 7 0		0x07	0xB8	-
Stem Page 20PR1601	Load From	Write to	EQ DO	Gain	Devic	e 1 0x1A,0	x1B	0x08	0x00	-
onfiguration	Device	Device		0 dB 🗸	Char	nnel 0 1		0x09	0x05	-
w Level Page	Config Data		EQ Bo	ost 1 (2nd Order)	Char	nnel 1 1		0x0A	0x10	-
EPROM Page	× 30 × 3 × 81	< B8 × 0 ×	5 EQ	Bypass 🗸	Char	nel 3 1	~	0x0B	0x13	~
e Height Page stem Page	Major Channel Settings :	Device 0								
onfiguration	Parameters	Channel 0	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Channel	7
ow Level Page	Foliadox	chantler 0	3	chaillier z	chantlet 3	3	challier 5	Cirialitiei 0	Chaimer	
PROM Page	EQ Index	0x07	0×07	0x07	0x07	0×07	0x07	0x07	0x07	_
e Height Page	EQ Boost 2	0x00	0x00	0x00	0x00	0x00	0x00	0x07	0x07	_
onfiguration	Mute FO	Unmute	Unmute	Unmute	Unmute	Unmute	Unmute	Unmute	Unmute	_
w Level Page	FO Boost 1(2nd Order)	FO Bypase	FO Bypase	FO Bypase	FO Bypase	FO Bypase	FO Bynase	FO Bypase	FO Bynae	
gh Level Page	EQ DOOR ((EIG OIGE))	0 dD	0.40	0.40	0 dD	0 dD	0 dB	0 dp	0 dB	<u> </u>

3. Select the desired channel, then choose an *EQ Index* from the drop-down menu. This will automatically adjust 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 desired channel of device 0 will be applied with configuration 0.

		5	SigCor	h Arch	tect 3.2	When in Demo M	lode, click Apply	y on the profile Configuration	n Page to enable acce	De ess to ot	
^	Base Header Details										
PR410 figuration Level Page ROM Page	CRC Speed Select 400 KHz		Burst Select 4 Bytes 🗸		Load From Virite to EEPROM Hex File EEPROM						
Level Page em Page	Device Configuration Details							EEPROM Data Table			
PT801	No. of Devices	lo. of Configs	Data Byte	e 1	Config Assignme	ent Tree	Apply				
Iguration	2	2	÷ EQ Bo	ost 1	Device	Con	ifia o	Address	EEPROM Data		
ROM Page	Config Select	hannel Select		7 🗸	Devia	e 0 0x18,	0x19	0x00	0x22	-11	
Level Page	0 in Contract	Mil Channels	EQ Bo	ost 2	Cha	nnel 0 0)	0x00	0x00	-11	
Monitor Page		All Channels	~	0 ~	Cha	nnel 1 0)	0x07	0x00	-11	
PR8xx	Device Select N	lask Select	_		Chai	nnel 2 0)	0x02	0x04	-	
figuration	0 ~	0	Data Byte	e 2	Char	nnel 3 0		0x03	0x30	-11	
Level Page	Data Length	Oladau		e EQ	Char	nnel 4 U		0x04	0x00	-11	
Level Page	2	2			Char	nnel 6 0		0x05	0x03	-	
Height Page		3	Data Byte	e 3	Cha	nnel 7 0)	0x00	0,01	-11	
em Page	Load From	Write to	EQDO	Gain	Devic	e 1 0x1A,	0x1B	0x09	0x00	-11	
PR1601	Device	Device		0 dB 🗸	Cha	nnel 0 1		0x00	0x05	-11	
Level Page	Config Data		FO Bo	ost 1 (2nd Order)	Char	nnel 1 1		0x05	0x10	-	
ROM Page	n 20 m 2 m 01 m		E EQ	Bypass V	Chai	nnel 2 1		0x08	0x10		
Level Page Height Page	x 30 x 3 x 81 5	88 × 0 >		- Sipaso	Cha	nnel 3 1	Ŷ	UXUB	0215	×.	
em Page MB810	Major Channel Settings :	Device 0 🗸									
figuration Level Page	Parameters	Channel 0	Channel 1	Channel 2	Channel 3	Channel 4	Channe	el 5 Channel 6	Channel	7	
Level Page	EQ Index	3	3	3	3	3	3	3	3		
KOM Page	EQ Boost 1	0x07	0x07	0x07	0x07	0x07	0x07	0x07	0x07		
PR412-421	EQ Boost 2	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00		
iguration	Mute EQ	Unmute	Unmute	Unmute	Unmute	Unmute	Unmu	te Unmute	Unmute	e	
Level Page	EQ Boost 1(2nd Order)	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypa	ass EQ Bypass	EQ Bypa	SS	
Lever Fage	EQ DC Gain	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB		

4. Switch to configuration 1 and device 1 in the drop-down menu, set the data length back to 3, and select the new EQ index, and DC gain. Notice the config assignment tree will update the device 1 channels as config 1.

SigCon Architect 3.2 File Script Device Help Macro

DS160PT801
 Onfiguration
 Low Level Page

Configuration
 Low Level Page
 EEPROM Page
 High Level Page
 Eye Height Page
 System Page
 S320PR1601
 Configuration
 Low Level Page
 EEPROM Page
 EEPROM Page

00

^

								Ĭ	NSTR
								-	
	Si	gCon Arc	hited	t 3.2	n in Dama Mada, click	Applu	on the profile Configuration	Dage to enable access	Demo Mod
Header Details				VVIIC	IT IT Delito mode, cilca	Apply	on the prome configuration	rage to enable acces	ss to other pages
C Speed Sel	ect Burst Hz V 4	Select Bytes 🗸	🤤 L	oad From EEPROM	Write to EEPROM		Load From Hex File	Writ EEPRO	e to M Hex
e Configuration Deta	ils						EEPROM Data Table		
of Devices	No. of Configs	Data Byte 1	Confi	g Assignment Tro	ee Apply				
2	2 🗘	EQ Boost 1		Device	Config	^	Address	EEPROM Data	~
ig Select	Channel Select	2	× 🗉	Device 0	0x18,0x19		0x00	0x22	
1 🗸	All Channels	EQ Boost 2	-	Channel 0	0		0x01	0x00	
Colort	March Calant	0	~	Channel 1 Channel 2	0		0x02	0x00	
te select	Mask Select	Data Data 0		Channel 3	ő		0x03	0x04	
1	v	Data Byte 2		Channel 4	0		0x04	0x30	
Length	EQ Index	Mute EQ		Channel 5	0		0x05	0x03	
3 🔹	7 🗸	Data Buta 2		Channel 6	0		0x06	0x81	
		LODG Coin		Channel 7	0		0x07	0xB8	
Load From	Write to	D dR	-	Chappel 0	0x1A,0x1B		0x08	0x00	
Device	Device	0 ub		Channel 1	1		0x09	0x05	
C D .		EQ Boost 1 (2nd O	rder)	Channel 2	1		0x0A	0x30	
onfig Data			and the second sec				0x0P	0x12	

ge -	Parameters	Channel 0	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Channel
e	EQ Index	3	3	3	3	3	3	3	3
ie.	EQ Boost 1	0x07							
	EQ Boost 2	0x00							
	Mute EQ	Unmute							
	EQ Boost 1(2nd Order)	EQ Bypass							
	EQ DC Gain	0 dB							

5. Once all devices have been configured, click the *Write to EEPROM* button to load the EEPROM with the new settings. The button will turn green when the write is completed.

		Sig	gCon	Archi	itect 3.2	en in Demo Mode	, click Apply o	on the profile Configuration	Page to enable accer	Demo	
	Base Header Details										
> DS160PR410 ◇ Configuration ◇ Low Level Page ◇ EEPROM Page ◇ System Page ◇ System Page > DS160PT801 ~ ◇ Configuration < △ configuration 	CRC Speed Selection Speed Sele	t Select Load From EEPROM			Write Succ	ROM	Load From Hex File	Write EEPRO	e to M Hex		
	Device Configuration Detai	Is							EEPROM Data Table		
	No. of Devices	No. of Configs Data Byte 1			Config Assignment Tr	Apply					
	2	2	EQ Boost	1	Device	Confin	A .	Address	EEDROM Data		
PROM Page	Confin Salart	Changel Salast	2	~	Device 0	0x18,0x19	- ^	Address	CLFROM Data		
h Level Page	coning select	Channel Select	EQ Boost	2	Channel 0	0		0x00	0x22	-81	
agnostic Page	· · ·	All Channels	0	~	Channel 1	0		0x01	0x00	- 11	
0PR8xx	Device Select	Mask Select			Channel 2	0		0x02	0x00		
nfiguration	1 🗸	0 🗘	Data Byte 2		Channel 3			0x03	0x04		
Low Level Page EEPROM Page High Level Page Eye Height Page	Data Length	EQ Index	Mute E	0	Channel 4			0x04	0x30		
	3 1 7				Channel 6	0		0x05	0x03	-	
		/ ~	Data Byte 3		Channel 7	7 0 0x1A,0x1B		0x00	0x81	-111	
tem Page	Load From	Write to	EQ DC Ga	ain	Device 1		в	0x08	0x00	- 1	
ofiguration	Device	Device	0 0	iB 🗸	Channel 0 2nd Order) Channel 1			0x00	0x05		
/ Level Page	Config Data		EO Boost	1 (2nd Order)				0x04	0x30		
EEPROM Page High Level Page	× 30 × 13 × 81	× 10 × 0 × D	1	~	Channel 2 Channel 3	1	~	0x0B	0x13	~	
Height Page											
0MB810	Major Channel Settings :	Device 0									
ph Level Page	Parameters	Channel 0 C	hannel 1	Channel 2	Channel 3 C	hannel 4	Channel	5 Channel 6	Channel	7	
/ Level Page	EQ Index	3	3	3	3	3	3	3	3		
Height Page	EQ Boost 1	0x07	0x07	0x07	0x07	0x07	0x07	0x07	0x07		
0PR412-421	EQ Boost 2	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00		
nfiguration	Mute EQ	Unmute	Unmute	Unmute	Unmute	Unmute	Unmute	Unmute	Unmute	,	
v Level Mage	EQ Boost 1(2nd Order)	EQ Bypass E	Bypass	EQ Bypass	EQ Bypass EC	Bypass	EQ Bypas	ss EQ Bypass	EQ Bypas	is	
Height Page	EQ DC Gain	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB		

6. To save these current EEPROM settings for later, click the *Write to EEPROM Hex* button to create a hex file with these settings. Save the hex file to the desired location.



		S	igCor	Archi	tect 3.2	When in Demo Moo	le, click Apply on th	ne profile Configuration	Der Page to enable access to oth		
•	Base Header Details										
DS160PR410 ◆ Configuration 	CRC Speed Select 400 KHz		Load From EEPROM	/ Wi	rite to PROM	Load From Hex File	Write to EEPROM Hex				
	Device Configuration Details										
	No. of Devices	lo, of Configs	Data Byte 1		Config Assignment Tree Appl		Apply				
Level Page	2	2	EQ Bo	ost 1	Device	Confi		Address	FEPROM Data		
♦ EEPROM Page	Config Select	Theoremal Coloret	-	2 ~	Device	Device 0 0x18,0x19		0x00	0x22		
h Level Page	1 I	All Channels	EQ Bo	ost 2	Chann	el 0 0		0x01	0x00		
Monitor Page	All Channels		0		Channel 1 0			0x02	0x00		
PR8xx	Device Select	Aask Select			Channel 2 0 Channel 3 0			0x02	0x04		
figuration	1 🗸 0		Data Byte	2				0x04	0x20		
Level Page	Data Length E	Olodex	Mut	e EQ	Chann	15 0		0x04	0x03		
h Level Page	3	7			Channel 6 0			0x06	0x81		
Height Page		, .	Data Byte	3	Chann	innel 7 0		0x07	0xB8		
tem Page	Load From	Write to	EQ DC	Gain	Device	1 0x1A,0x	1B	0x08	0x00		
figuration	Device	Device		0 dB 🗸	Chann	el 0 1	-	0x00	0x05		
/ Level Page	Config Data		EQ Boost 1 (2nd Order)		Chann	nel 1 1		0x04	0x30		
ROMPage	× 20 × 12 × 01	x 30 x 13 x 81 x 10 x 0 x 1		1	Chann	el 2 1		0x08	0x13		
Height Page Item Page	A 30 A 13 A 01 A 10 A 0 A 0 Channel 3 1 V OKOB OKIS V										
MB810 figuration	Major Channel Settings :	Device 0						1			
h Level Page	Parameters	Channel 0	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Channel 7		
ROM Pade	EQ Index	3	3	3	3	3	3	3	3		
Height Page	EQ Boost 1	0x07	0x07	0x07	0x07	0x07	0x07	0x07	0x07		
PR412-421	EQ Boost 2	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00		
figuration	Mute EQ	Unmute	Unmute	Unmute	Unmute	Unmute	Unmute	Unmute	Unmute		
Level Page	EQ Boost 1(2nd Order)	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypass		
Height Page	EQ DC Gain	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB		

7. To load the EEPROM settings back from the hex file, click the *Load from Hex File* button, select the hex file you saved, then click the *Write to EEPROM* button and wait for the green dot.

		S	igCor	Archi	tect 3.2	*When in Demo Mod	e, click Apply o	the profile Configuration	Der Page to enable access to ot
tion ^	Base Header Details								
160PR410 Configuration Low Level Page	CRC Speed Sele 400 KH	4 Bytes 🗸		Load From EEPROM	e Wr	ROM	Load From Hex File	Write to EEPROM Hex	
EEPROM Page High Level Page						Write Suc			
System Page	Device Configuration Deta	ils				EPROM Data Table			
160PT801	No. of Devices	No. of Configs	Data Byte	e 1	Config Assignme	nt Tree A	pply		
Low Level Page	2 🔹	2	EQ Bo	ost 1	Device	Config	~	Address	EEPROM Data
EEPROM Page High Level Page Diagnostic Page	Config Select	Channel Select		2 ~	Device	0 0x18,0x1	9	0x00	0x22
	1 All Channels		EQ Bo	ost 2	Chan	nel 0 0		0x01	0x00
Eve Monitor Page				0 ~	Chan	nel 1 0		0x02	0x00
320PR8xx	Device Select	Mask Select	-		Channel 3	nel 2 U		0x03	0x04
Configuration	1 🗸	0	Data Byte	e 2	Channel 4 Channel 5 Channel 5 Channel 6 Channel 7 Device 1			0x04	0x30
EPROM Page	Data Length	EQ Index	Mut	e EQ				0x05	0x03
High Level Page	3 🖨	7	-					0x06	0x81
ye Height Page			Data Byt	e 3				0x07	0xB8
System Page	Load From	Write to	EQ DO	Gain			IB	0x08	0x00
Configuration	Device	Device		0 dB	Chan	Channel 0 1		0x09	0x05
ow Level Page	Config Data		EQ Bo	ost 1 (2nd Order)	Chan	el 1 1		0x0A	0x30
High Level Page	× 30 × 13 × 81	× 10 × 0 ×	D	1 🗸	Chan	nel 3 1	~	0x0B	0x13 ¥
ye Height Page System Page 560MB810	Major Channel Settings :	Device 0 🗸							
Configuration High Level Page	Parameters	Channel 0	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Channel 7
ow Level Page	EQ Index	3	3	3	3	3	3	3	3
EPROM Page	EQ Boost 1	0x07	0x07	0x07	0x07	0x07	0x07	0x07	0x07
20PR412-421	EQ Boost 2	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00
Configuration	Mute EQ	Unmute	Unmute	Unmute	Unmute	Unmute	Unmute	Unmute	Unmute
low Level Page	EQ Boost 1(2nd Order)	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypass	EQ Bypas	s EQ Bypass	EQ Bypass
ye Height Page	EQ DC Gain	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB



4 High Level Page

The DS320PR810 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.

This page is used to quickly and easily adjust the CTLE settings as needed for your specific application. A further description of this feature is described in Section 7.3 of the DS320PR810 data sheet.

The high level page also contains a device status page which shows which channels are detecting a signal.

1. After clicking on the high level tab, the device status page will be shown. Each channel status will be updated sequentially, and appear green if a signal is detected and red if a signal is not detected. The current EQ settings will also be shown next to each channel.

	SigCon Archi	itect 3.2 Demo "When in Demo Mode, click Apply on the profile Configuration Page to enable access to other
on ^	Device Select	😅 Load From File 🛛 🕁 Save To F
ow Level Page EPROM Page ligh Level Page	Channel Select Update Time(in_ms) Channel 0 5000	Reset Device Series Device
stem Page 60PT801 onfiguration	Device Status	Block Diagram
ow Level Page EPROM Page igh Level Page	Continuous Status Update	Updated DS1 Channel 3.
ye Monitor Page 20PR8xx configuration ow Level Page EPROM Page igh Level Page	DS1 Rx P Detected EEPROM Load Complete Channel 0 Rx N Detected	Default EQ Index 0 EQ Boost 1 0 EQ Boost 1 (2nd Order) 0 dB EQ DC Gain 0 EQ Boost 2 Mute EQ
ve Height Page stem Page 20PR1601 onfiguration ow Level Page EPROM Page ich Level Page	DS1 Rx P Detected EEPROM Load Complete Channel 1 Rx N Detected	Default EQ Index 0 EQ Boost 1 0 EQ Boost 1 (2nd Order) 0 dB EQ DC Gain 0 EQ Boost 2 Mute EQ
ye Height Page Sistem Page 50MB810 onfiguration Igh Level Page w Level Page	DS1 Rx P Detected EEPROM Load Complete Channel 2 Rx N Detected	Default EQ Index 0 EQ Boost 1 0 EQ Boost 1 (2nd Order) 0 dB EQ DC Gain 0 EQ Boost 2 Mute EQ
PROM Page e Height Page 20PR412-421 onfiguration w Level Page gh Level Page	DS1 Rx P Detected EEPROM Load Complete Channel 3 Rx N Detected	Default EQ Index 0 EQ Boost 1 0 EQ Boost 1 (2nd Order) 0 dB EQ DC Gain 0 EQ Boost 2 Mute EQ

2. Click on the *Block Diagram* tab to show the following screen. Here, we can adjust the EQ values for each channel. Select a device and channel from the drop-down menu.





3. Select the desired EQ settings and DC gain. The *EQ Index* drop-down menu is the easiest way to quickly adjust the amount of equalization applied. After selecting an Index value, the Boost 1, Boost2, and Boost 1 (second order) fields will automatically populate. The user can adjust each boost value for finer tuning as needed. Refer to table 7-1 of the DS320PR810 data sheet for more information. Click the *Apply to Channel* or *Apply to All Channels* button to apply the changes.





5 Eye Height Page

Note

This page is currently under development and the provided results might not be accurate

This page can assist the user in tuning the CTLE settings to best match their system. Use it to display the eye height of the signal passing through the redriver, for all 20 CTLE index settings. Select the channel you would like to test, and click the *Sweep CTLE* button. The redriver will automatically detect the eye height with each index setting and display it in the plot below.

Note that this plot displays the eye heights directly at the output pins of the redriver. It is recommended to also use other lane margining tools to monitor signal quality at each end of the link. This tool should only be used as a reference and cannot guarantee optimal system performance based on this plot alone.





6 System Page

This page allows users to estimate optimal CTLE settings for their application, based on known pre and post channel losses. This feature is also available in Demo Mode.

1. Enter the known Pre and Post-channel losses into each of the boxes. The GUI will show whether the losses are within the limit of the redriver or not.



2. Click the calculator button next to the transmission lines to calculate loss for PCB traces. Enter the trace material, width, length, and so on, and then click the *Apply* button.



😨 SiaCon Archi File Script Device Help Macro SigCon Architect 3.2 Demo Mode en in Demo Mode, click Apply on the profile Configuration Page to enable access to other pages Transport Layer Loss Calculator Selection ♦ DS160PR410 Downstream ở[‡] Configure Limits Estimate Loss: Configuration Transport Laver 0 **PCIe Endpoint** PCIe Root Complex Typical FR4 Material ~ Pre-channel loss is t-channel loss is within limit ♦ DS160PT801 0.02 Configuration df dk 4 6.51 dE 2 dB 0 dB 5 dB 5 dB Frequency 8 GHz ♦ DS320PR8xx Pre-channel Loss 17.51 dl 7 dB US320PR8xx Configuration Low Level Page EEPROM Page High Level Page Eye Height Page System Page channel Loss Width 5 mils Select Boost: Constant 2.3 13 14 15 17 18 ♦ DS320PR1601 PCIe Tx 12 16 Loss per inch 1.3 dB/in PCle Tx Tx EQ 0.0 1.2 2.4 3.6 9.4 10.0 10.8 11.2 12.0 12.8 13.2 14.0 Configuration 0 Presets Boost (dB) 0 P4 0.00 1.20 2,40 3.60 9,40 10.00 10.80 11.20 12.00 12.80 13.20 14.00 0.00 P5 1.90 1.90 3.10 4.30 5.50 Length 5 inch 11.30 11.90 12.70 13.10 13.90 14.70 15.10 15.90 P3,P6 2.50 2.50 3.70 4.90 6.10 11.90 12.50 13.30 13.70 14.50 15.30 15.70 16.50 ♦ DS560MB810 7.10 Total Loss P1.P9 3.50 3.50 4.70 5.90 6.51 dB 12.90 13.50 14.30 14.70 15.50 16.30 16.70 ♦ Configuration P2 4.40 8.00 16.40 17.20 17.60 18.40 4.40 5.60 6.80 13.80 14.40 15.20 15.60 16.00 16.80 17.20 18.00 P0.P8 6.00 6.00 7.20 8.40 9.60 15.40 18.80 19.20 20.00 P7 8.00 8.00 9.20 10.40 11.60 17.40 18.00 18.80 19.20 20.00 20.80 21.20 22.00 $Atten \left[\frac{dB}{in}\right] \sim \frac{1}{Width[mils]} * \sqrt{Freq[GHz]} + Constant * Freq[GHz] * df * \sqrt{dk}$ P10 9.50 10.70 11.90 13.10 20.30 20.70 21.50 22.30 9.50 22.70 23.50 18.90 19.50 ♦ DS320PR412-421 Configuration **CTLE Index** ~ EQ Settings: 17 EQ Boost 1(2nd Order) 15 ~ C Apply Close Apply Settings: Device Select Apply to Channel Apply to All Channels D ♦ DS560MB410 C, Idle CONNECTED TEXAS INSTRUMENTS

3. The table will highlight suggested CTLE values for each PCIe Tx Preset, based on the losses you entered. You can use the lowest part of the screen to apply these CTLE settings, or do it from the high-level page. Note that these are only estimated values and are not guaranteed to be the best settings. Further IBIS model simulation, or bit error rate testing can be used to further determine the optimal redriver settings.



System Page



7 References

• Texas Instruments, DS320PR810 Eight-Channel Linear Redriver for PCIe 5.0, CXL 1.1 data sheet.

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