multiLane

Data Center Test Solutions



User Guide

Benefits and Applications:

- System and host port characterization: I2C and low-speed signals.
- 800G capable SI traces
- Ecosystem interoperability testing: I2C sniffer between host and module
- Validates CMIS implementation on module in seconds.
- Voltage noise measurements
- Platform for active modules with module state machine, data path state machine tests and MBM validation tools





Key Features	3
Ordering Options	Error! Bookmark not defined.
Nexus Hardware	4
Nexus GUI Installation *	Error! Bookmark not defined.
Step 1: USB Driver	5
Step 2: Download Software	5
Step 3: Connection & Initialization	5
Nexus GUI	6
Nexus GUI Features	7
Monitor Tab:	7
FEC Tab	8
Common Data Block	8
Commong Data Management (CDB) Tab	9
Control Signals	
I2C Read/Write Operations	14
MSA Table Tab	14
MSA Validation Tab	15
Module Emulation	16
Graph timeline: VCC Measurements Tab:	19
Current Measurements	21
I2C Packet Analysis	23
Scope Mode Tab:	27
State Machine Test:	28
Revision History	29
Annex	29



Key Features

Dip switch to choose low-speed signal source: internal/external

Pin headers serve as:

- Probing interface for lowspeed signals
- Connecting to external driver in the case of external signal mode

USB port for PC connection to use GUI or API features LEDs for low-speed signal status

Adapter

800G Adapter Key Features:

- SI traces and connector support 112G rates
- Support up to 30W modules
- Current and temperature sensor
- Module power ripples and inrush current measurement
- Detection of power spikes during module state transitions
- Probing interface for Vcc and GND pins
- External I2C
- Dip switch to choose low-speed signal source: internal/external
- Available in all SFF/CMIS form factors

Analyzer

800G Analyzer Key Features:

- Voltage sensor
- ePPS signal validation
- 1 MHz I2C
- Probing interface for low-speed signals
- External control for any low-speed signal:
 - INT/RST
 - LPW/PRS
 - o SDA
 - o SCL
- LEDs for control/alarm signal status
- USB port for PC connection to use GUI or API features
- Available in all SFF/CMIS form factors



Measured Insertion Loss data of 800G Adapter:



Nexus Hardware

Nexus includes an adapter with 800G traces, which supports 30W modules. Through a set of low-speed pin headers, the adapter mates with the analyzer which gives the user access to the Nexus Software.

The hardware also includes a dip switch, and a front probing interface for low-speed signals access and control:



A: Signals from host side at OSFP800 plug

B: Signals to OSFP800 connector inside Nexus, going to module

Low-speed	D	Dip switch										
signals	ON	OFF	DIP SWITCH ON	DIP SWITCH OFF								
SCL	Plug connected to connector	Front pin headers to connector, plug side disconnected	Probing interface	External driver								
SDA	Plug connected to connector	Front pin headers to connector, plug side disconnected	Probing interface	External driver								
INT/RSTn	Plug connected to connector	Front pin headers to connector, plug side disconnected	Probing interface	External driver								
LPWn/PRSn	Plug connected to connector	Front pin headers to connector, plug side disconnected	Probing interface	External driver								

Nexus GUI Installation*

Step 1: USB Driver

- Download USB Driver <u>https://multilaneinc.com/wp-</u> <u>content/uploads/2023/06/ML4066 ANA V2 USB Driver Signed V0.1.zip</u>
- Power up Nexus by plugging it into host
- Connect Nexus to the PC through USB cable
- Download the USB driver file
- Go to "Device Manager"
- Find the target device that need to install the driver
- Right-click on the device and select Update Driver Software
- Select Browse my computer for driver software
- Browse you PC and select the driver file
- Click Next and wait until the driver is installed

Step 2: Download Software

https://www.multilaneinc.com/wp-content/uploads/2023/10/Setup Nexus-

Analyzer v0.5.9.5 2023-10-30.zip

Step 3: Connection & Initialization

Once the software was downloaded, you can access it and the below screen should appear:

Connect	-	×
NEXUS ANALYZER		
Device: OSFP Connect Device detected		
Firmware revision: 0.4 Device PN: ML4066-OSFP-ANA-V2		

Choose the device form factor accordingly and press "Connect".

Press "Simulation" for a GUI test run without hardware: Simulation mode is also accessed through a simulation license provided by MultiLane.

*GUI installation is only accessible to users with ML4066-NX-Pro. This does not apply and is inaccessible to users with ML4066-NX-HW



Nexus GUI

Nexus GUI Features	Description
Monitor Tab	Diagnostic and Versatile Diagnostic Monitoring
FEC Tab	Monitor FEC status on their module.
Common Data Block (CDB) Tab	Update their module firmware.
Control Signals	Access to low-speed signals in three different modes
R/W Functions Tab	I2C read/write operations
MSA Table Tab	Gives the user acccess to their module memory.
MSA Validation Tab	Full CMIS/SFF register sweep.
VCC Tab	Continuous VCC Supply measurements.
Current Tab	Continuous and in-rush current measurements.
I2C Tab	I2C packets capturing and packet details analysis.
Scope Mode Tab (any 2 signals at realtime ideal to detect root cause of issues)	SCL, SDA, VCC and Current measurements.
State Machine Analysis Tab	State Machine, Data Path State Machine, and Module State Behavior tests available.

Nexus operates in three modes:

- Target mode: the analyzer acts as a module for a host DUT
- Initiator mode: the analyzer acts as a host for a module DUT
- Bypass mode: the analyzer monitors exchange between host and module.

											A	Access three	
											m	odes through	
												this button	
Analyzer							multiLar	-/w					- @ ×
Settings He Monitori	elp na											Config tration	
Adapter	Temperatu	re 48 Analyzer Te	emperature 57									OSFF inalyzer O BYPASS Mode	Disconnect
Monitor	FEC CDB	Control Signals R/	W Functions MS	SA Table	MSA Validation	Module Emul	ation VCC Cu	rrent I2C S	cope State Machi	ne Analysis ePPS			
Pause M				Leg	The Anal	yzer acts as a	Initiator mod host and have	de. e control o	ver the module.		Changed		
Module					Target	Bypass	Initiat	or			-		
Temper										Host			
TX Mor										$\widehat{\mathbf{h}}$			
CH 1								a deserved a		Analyzer	ר		
CH 2											-		
CH 3						4	T	1000					
CH 4										Module			
CH 5											-		
СН 6				mA	I2C Transaction	State	cite	- Power	1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -	105 101			
CH 7													
CH 8													



Nexus GUI Features

Monitor Tab:

Analyzer	mu	tiLanew	– ø ×
iettings Help Monitoring Adapter Temperature 39 Analyzer Temperature 32			Configuration OSFP Analyzer INITIATOR Mode Disconnect
Monitor FEC CDB Control Signals R/W Functions M	SA Table MSA Validation Module Emulation	/CC Current I2C Scope State Machine Analysis ePPS	
Pause Monitor Monitor Refres 500 ms (Press enter to Set Value)	Legend	Alarm (HA) High Alarem (H) Loss of Signal (H) Loss of Lock 📧 State Changed	
Module Sensors Temperature 49.80078 VCC Supply 2.9804	AUX1 O AUX2 O	AUX3 • State Changed	
TX Monitor		RX Monitor	
CH 1 Power 0.0001 mW V 🚺 Bias 0	mA LOS LOL Fault State	CH 1 Power 0.0002 mW V 🔼 LOS LOS	
CH 2 Power 0.0001 mw ~ 🚺 Bias 0	mA LOS LOL Fault State	CH 2 Power 0.0001 mW Y LA LOS 101	
CH 3 Power 0.0001 mW V 🚺 Bias 0	mA LOS LOL Fault State	CH 3 Power 0.0001 mW V LA LOS LOL	
CH 4 Power 0.0001 mW V 🚺 Bias 0	mA LOS LOL Fault State	CH 4 Power 0.0001 mW V LA LOS LOS	
CH 5 Power 0 mW V Bias 0	mA 🚺 105 101. Fault State	CH 5 Power e mw v blos LOS LOL	
CH 6 Power 0 mW 🗸 📄 Bias 0	mA LOS LOL Fault State	CH 6 Power e mw v 🚺 LOS LOL	
CH 7 Power 0 mW Y Bias 0	mA LOS LOL Fault State	CH 7 Power C mw V LOS LOS	
CH 8 Power 0 mW V Bias 0	mA 105 101. Fault State	CH 8 Power 0 mW v C LOS LOL	

Digital Monitoring

- Operates in initiator mode
- Module monitoring interface
- Color coded high alarms/ high warnings.
- Color coded low alarms/ low warnings.

Analyzer						unicane								- 0	
Settings Help Monitoring Adapter Ter	Adapter Temperature 40 Configuration OSIP Assigner Temperature 40 OSIP Assigner														
Monitor FEG	tor FEC CDB Control Signals R/W Functions MSA Table MSA Validation Module Emulation VCC Current I2C Scope State Machine Analysis ePPS														
Pause Moni	itor Monitor R	efres 500 ms	Legend												
DM VDM			Low Wa	rning 🔣 Hi	igh Warning 🔼 I	Low Alarm HA	High Alaram	LOS: Loss of Sig	anal LOL: Loss o	f Lock SC State	Changed				
Group 1 G	roup 2 Group 3														
Descriptor/	Samples Mask I	Flag And Threshold													
Descriptor/	Samples														
Sample 1	6425	Descriptor	Sample 17	13364	Descriptor	•	Sample 33	8224	Descrip	tor 🛄	Sample 49	•	Descriptor	•	
Sample 2	29298	Descriptor	Sample 18	8224	Descriptor	•	Sample 34	8224	Descrip	tor 0	Sample 50		Descriptor	0	
Sample 3	29555	Descriptor	Sample 19	13364	Descriptor		Sample 35	8224	Descrip	tor o	Sample 51	•	Descriptor		
Sample 4	24929	Descriptor •	Sample 20	22616	Descriptor		Sample 36	8224	🗌 Descrip		Sample 52	•	Descriptor		
Sample 5	20046	Descriptor •	Sample 21	21588	Descriptor		Sample 37	32896	Descrip	tor 🔍	Sample 53	•	Descriptor		
Sample 6	29812	Descriptor •	Sample 22	12336	Descriptor		Sample 38		Descrip	tor o	Sample 54	•	Descriptor		
Sample 7	28527	Descriptor •	Sample 23	12593	Descriptor		Sample 39		Descrip		Sample 55		Descriptor		
Sample 8	27499	Descriptor	Sample 24	12336	Descriptor		Sample 40		Descrip	tor 🔍	Sample 56		Descriptor		
Sample 9	8224	Descriptor	Sample 25	14185	Descriptor		Sample 41		🗍 Descrip	tor 0	Sample 57		Descriptor		
Sample 10	7196	Descriptor •	Sample 26	8224	Descriptor		Sample 42	61680	Descrip		Sample 58	•	Descriptor		
Sample 11	20303	Descriptor	Sample 27	8224	Descriptor		Sample 43	1542	Descrip	tor o	Sample 59		Descriptor		
Sample 12	17990	Descriptor	Sample 28	12850	Descriptor		Sample 44		Descrip	tor o	Sample 60	•	Descriptor		
Sample 13	11565	Descriptor	Sample 29	12336	Descriptor		Sample 45		Descrip	tor o	Sample 61	•	Descriptor		
Sample 14	12336	Descriptor	Sample 30	12593	Descriptor		Sample 46		Descrip	tor o	Sample 62		Descriptor		
Sample 15	18247	Descriptor	Sample 31	8224	Descriptor		Sample 47		Descrip		Sample 63	59624	Descriptor		
Sample 16	17476	Descriptor •	Sample 32	8224	Descriptor		Sample 48	12336	Descrip		Sample 64	2570	Descriptor		

Versatile Diagnostic Monitoring

- Operates in initiator mode
- Access to enabled/disabled groups in the module
- Indexing available for module interrupts



FEC Tab

Analyzer		multi	Lane
About Help Monitoring Adapter Temperature 13 Ana	kyzer Temperature 14		
Monitor FEC CDB Control Signa FEC Advertisment FEC Monitor	ls R/W Functions MSA Table MSA	Validation VCC Current I2C Sco	ppe State Machine Analysis
Media Side FEC 😑		Host Side FEC	
PRBS Generator Pre FEC	Checker Data Invert	PRBS Generator Pre FEC	Checker Data Invert
Not Supported	Not Supported	Not Supported	Not Supported
PRBS Generator Post FEC	Checker Per Lane	PRBS Generator Post FEC	Checker Per Lane
Not Supported	Not Supported	Not Supported	Not Supported
PRBS Checker Pre FEC	Generator Per Lane	PRBS Checker Pre FEC	Generator Per Lane Enable
Not Supported	Not Supported	Not Supported	Not Supported
PRBS Checker Post FEC	Simultaneous Loopbacks	PRBS Checker Post FEC	Simultaneous Loopbacks
Not Supported	Not Supported	Not Supported	Not Supported
Generator Data Swap	Output Loopback	Generator Data Swap	output Loopback
Not Supported	Not Supported	Not Supported	Not Supported
Generator Data Invert	Per Lane Loopback	Generator Data Invert	Per Lane Loopbacks
Not Supported	Not Supported	Not Supported	Not Supported
Checker Data Swap	Input Loopback	Checker Data Swap	Input Loopback
Not Supported	Not Supported	Not Supported	Not Supported
Generator Per Lane Pattern	Checker Per Lane Pattern	Generator Per Lane Pattern	Checker Per Lane Pattern
Lane 1 pattern is used for all lanes	Lane 1 pattern is used for all lanes	Lane 1 pattern is used for all lanes	Lane 1 pattern is used for all lanes
Checker Supported Patterns	Generator Supported Patterns	Checker Supported Patterns	Generator Supported Patterns

FEC Advertisement

- Operates in initiator mode
- FEC advertisement for transceiver characteristics
- Access to post FEC
- FEC Monitoring interface for BER, error count, and SNR
- Reads FEC diagnostics from module, implements MSA formatting and presents final BER data

Analyzer						mı	ultiLang	~				– @ ×
Settings He Monitorir Adapter	lp ng Temperature	39 Analyzer T	emperature 38								Configuration OSFP Analyzer	
											INITIATOR Mode	Disconnect
Monitor	FEC CDB C	ontrol Signals R/	W Functions MSA	Table MSA Valida	ation Modu	le Emulation	VCC Current	I2C Scope State N	1achine Analysis	ePPS		
FEC Adve	rtisment EE	C Monitor										
Media S	ide FEC				Host Sid	e FEC						
	BER	Error Count	Total Bits Count	SNR		BER	Error Count	Total Bits Count	SNR			
Lane 1					Lane 1							
	BER	Error Count	Total Bits Count	SNR		BER	Error Count	Total Bits Count	SNR			
Lane 2					Lane 2							
	BER	Error Count	Total Bits Count	SNR		BER	Error Count	Total Bits Count	SNR			
Lane 3					Lane 3							
	REP	Error Count	Total Bits Count	SNP		RED	Error Count	Total Bits Count	SNR			
Lane 4	0	0	0		Lane 4		0	0				
			Total Bits Count	C110				T-1-1 0'1- C1				
Lane 5	0	Error Count		SINK	Lane 5	DEK	0		0			
Lane 6	BER	Error Count	Total Bits Count	SNR	Jane 6	BER	Error Count	Total Bits Count	SNR			
1 7	BER	Error Count	Total Bits Count	SNR	1 7	BER	Error Count	Total Bits Count	SNR			
Lane /	0	0	0		Lane /		0	0	0			
	BER	Error Count	Total Bits Count	SNR		BER	Error Count	Total Bits Count	SNR			
Lane 8					Lane 8							

EC Monitor

- Operates in initiator mode
- FEC Monitoring interface for BER, error count, and SNR
- Reads FEC diagnostics from module, implements MSA formatting and presents final BER data



Commong Data Management (CDB) Tab

CDB operates in initiator mode

Analyzer		multiLane				-	- O
Settings Help Monitoring Adapter Temperature 21 Analyzer Tem Monitor FEC CDB Control Signals R/W Features Performance/Data Monitoring	1 perature 27 7 Functions MSA Table MSA Validation 1 Commands FW Download Command	Module Emulation VCC Current I2C Scope Stat	e Machine Analysis	Configuration OSFP Analyz INITIATOR	n zer O Mode	Disconnect	
CDB Performance/Data Monitoring PM Controls PM Controls PM operation Clear All PM Feature Information Read PM Additional Features Data Monitoring and Recording Controls Refresh Clear DM and Recording Advertisement DM Advertisement Temperature Histogram Save Current histogram Clear Temperature Histogram Temperature Histogram	Max Duration for completion (ms) Get Module PM LPL/EPL © Bytes Record Type Module Temperature VCC Aux1 AUX2 AUX2 AUX3 Refresh and Read LPL Clear and Read LPL Clear and Read EPL Clear and Read EPL 	Get PM Media Side LPL/EPL Media Side Lane SNR Image: State Stat	Fype Lane 1-8 Refresh LPL Lane 9-16 Clear/Read LPL Lane 17-2 Clear/Read EPL Lane 25-3 Refresh EPL Øfter PM Host Side LPL/EPL Image: Clear And A LPP Image: Model of the stress of the	Name CDB status CDB status CDB complete flag Firmware download password Copy/Abort/Full Image Readb Start command payload size Erased Byte bstae Write LPL / EPL Read LPL / EPL Read LPL / EPL Run Image A or B hitless supp CMD Start 0101h max time m	Page 00 97 97 97 97 97 97 97 97 97 97	Address 37 8 136 137 138 139 140 141 142 143 144	

Performance and Data Monitoring

- CMD 0200h PM Controls: Extract Performance Monitoring data records such as minimum/average/maximum values. "No Operation" reads the most recent values, while "Clear All" clears the extracted values for all lanes in the interconnect.
- CMD 0201h PM Feature Information: Reads the PM's additional features.
- **CMD 0280h Data Monitoring and Recording Controls**: "Refresh" loads the most recent attributes. "Clear All" clears all values for all parameters for all lanes at the same time.
- CMD 0281h Data monitoring and recording advertisement
- **CMD 0290h Temperature Histogram**: Displays the temperature intervals of the interconnect and how long it stayed at each temperature interval.
- **CMD 0210h, 0211h Get Module PM LPL/EPL**: Choose parameters of the module's performance monitoring records, and replace the current values of the minimum, average, and maximum values. "Refresh" replaces the old values, while "Clear and Read" reads and resets the old values.
- CMD 0212h, 0213h Get PM Host Side LPL/EPL: Choose parameters of the host's performance monitoring records, and replace the current values of the minimum, average, and maximum values. "Refresh" replaces the old values, while "Clear and Read" reads and resets the old values.
- CMD 0214h, 0214h Get PM Media Side LPL/EPL: Choose parameters the performance monitoring records of specific lanes, and replace the current values of the minimum, average, and maximum values. "Refresh" replaces the old values, while "Clear and Read" reads and resets the old values.
- CMD 0216h, 0217h Get Data Path PM LPL/EPL: Choose the data path for specific lanes and replace the current values of the minimum, average, and maximum values. "Refresh" replaces the old values, while "Clear and Read" reads and resets the old values.



Analyzer	multi	<u>ane</u>					- @ ×
Settings Help Monitoring Adapter Temperature 21 Analyzer Temperature 27						Configuration OSFP Analyzer INITIATOR Mod	e Disconnect
Monitor FEC CDB Control Signals R/W Functions MSA Table MSA Validation	Module Emulation VCC	Current	I2C Scope	State Mac	hine Analysis		
reatures renormance/bata monitoring commands rw bownload command							
CDB Module Commands	CDB status	00	37	41	Command ID unknown		
Delay MSB (Hex) Delay LSB (Hex)	CDB complete flag	00	8	01	CDB complete flag assertion		
O O Query Status Password Entry/Change (Hex) O O O O O O O Change Password Enable/Disable password protection for writing to EEPROM Finable Disable Disable Disable Disable Disable Disable Disable Disable Disable Disable Disable Disable							
					Export		
Abort a CDB Command General Abort CDB PRBS Bert LoopBacks				Con	nmand Progress		

CDB Commands

- CMD 0000h Query Status
- CMD 0001h Enter Password
- CMD 0002h Change Password
- CMD 0003h Enable/Disable Password Protection
- CMD 0004h General Abort
- CMD 0380h Loopbacks



Analyzer	_		_				_	_				_		_		_	multiLane				_	- O
Settings Help Monitoring Adapter Temperature Monitor FEC CDB	21 Contr	rol Sig	Analyz Inals	er Te R/\	empe W Fi	eratur uncti	re (ions	27 : MS	A Ta	ble	MS	A Vali	datio	on	Mod	lule E	on VCC Current I2C Scope State Machine Analysis				Cor OS	Ifiguration IFP Analyzer O ITTIATOR Mode Disconnect
CDB Feature and car	ce/D	tion C		, mng	,	.omin	man	us	FVV L	JOWI	noac	1 001	iina	lu			Name					
		D	appo	r L					Devel	. A							CDB status		00			Command completed successfully
		Per	torm	ance		nito	ring		Bert	And		ignos	τις				Read FW Features	acquard	00	8	00	CDB complete flag assertion
Command Support																	Copy/Abort/Full Ima	e Readb	9F	130	1	Bit0: Abort Support, Bit1: Copy Support, B
CMDs 0000h-000Fh	•	0 (рс		0	0	0	0	0	0	0	0	0	0	0	0	Start command paylo	ad size	9F	138	16	Start command payload size in bytes
CMDs 0010h-001Fh	0	0 (эc	2	0	0	0	0	0	0	0	0	0	0	0	0	Erased Byte		9F	139	255	The default erased byte value
CMDs 0020h-002Fh			рс					0				0				0	bsize		9F	140	255	Block size = (bsize + 1) * 8, E.g.bsize= 0.Blo
CMDs 0030h-003Fh								0				0				0	Write LPL / EPL		9F	141		Firmware upgrade supported mechanism
CMDs 0040h-004Fh	۰	•	• c					0				0				0	Read LPL / EPL		9F	142		Firmware read / readback support mechar
CMDs 0050h-005Fh								0				0				0	Run Image A or B hit	ess supp	9F	143	0	0 : CMD Run A or B causes a reset. Traffic i
CMDs 0060h-006Fh			οс					0				0				0	CMD Start 0101h ma	time m:	9F	144		This is the maximum execution time for a (
CMDs 0070h-007Fh			οс					0				0				0						
CMDs 0080h-008Fh								0				0				0				Exp	ort	
CMDs 0090h-009Fh			ъc					0				0				0			Comman	d Progress		
CMDs 00A0h-00AFh								0				0				0						
CMDs 00B0h-00BFh			o c					0				0				0			C			
CMDs 00C0h-00CFh	0	0 (ъс		0	0	0	0	0	0	0	0	0	0	0	0			Success			
CMDs 00D0h-00DEh	0	0	o c		0	0	0	0	0	0	0	0	0	0	0	0						
CMDs 00E0b-00EEb	0	0	0 0		0	0	0	0	0	0	0	0	0	0	0	0						
CMDs 00F0h-00FFh								0								0						

CDB Features

- **CMD 0040h Module Features**: Identifies which commands are supported, from CMD 0 to CMD 00FF along with the maximum CDB command execution time.
- **CMD 0042h Performance Monitoring**: Identifies which commands are supported from 0200h to 02FFh.
- CMD 0043h Bert and diagnostics: Identifies CMD 0300h to 03FFh.
- **CMD 0041h Read FW Features**: Identifies many parameters supported the firmware features including firmware download transfer type, if copy/abort/full image readback commands are supported, start command payload size, erased byte, the firmware update features, if read/write firmware is supported, the firmware can be upgraded, etc. Use this feature to determine whether a device supports LPL or EPL firmware.
- The green buttons indicate which commands are supported.



Analyzer		multiLane	-				- 6
Settings Help Monitoring Adapter Temperature 21 Analyzer Temperature 27 Monitor FEC CDB Control Signals R/W Functions Features Performance/Data Monitoring Commands	7 MSA Table MSA Validation Module Emulati E EW Download Command	ion VCC Current 12C	: Scope Stat	e Machine Ar	nalysis		Configuration OSFP Analyzer O INITIATOR Mode Disconnect
Load Corresponding Rings file	Get Firmware Info	CDB status	00			Command ID unknown	
Load Corresponding Binary file	Get FW Version	CDB complete flag	00		01	CDB complete flag assertion	
Download new Firmware Image Program LPL Program EPL Abort Firmware download Abort Firmware	Contrast						
Run Downloaded Firmware Image						Export	
Delay MSB (Hex) Delay MSB (Hex) Reset				6	mmand D		
0 0 Traffic affecting reset to in Attempt hilless reset to in Attempt hilless reset to in Attempt hilless reset to react	active image active image Inning Image Inning Image			su	uccess	rogress	
Copy firmware image Copy Image A to B Copy Image B to A							

CDB FW Download Commands

- **CMD 0101h, 0103h, 0107h Program LPL:** Loads the firmware binary file for Local Payload (LPL). Allows for updating interconnect firmware.
- **CMD 0101h, 0104h, 0107h Program EPL:** Loads the firmware binary file for Extended Payload (EPL). EPL support varies depending on the interconnect. Allows for updating interconnect firmware.
- CMD 0101h, 0105h, 0107h Read Image LPL: Read the latest upgraded firmware image using LPL
- CMD 0101h, 0106h, 0107h Read Image EPL: Read the latest upgraded firmware image using EPL.
- **Export Image:** Exports an image of the firmware after the read is completed as a .bin file, which in turn can be loaded into and read by other interconnects.
- CMD 0102h Abort FW download: Stops the firmware from being installed onto the interconnect.
- **CMD 0109h Run image:** After the new LPL or EPL Firmware is loaded, this command switches to the latest firmware image. Does not replace the existing firmware image on the interconnect.
- **CMD 010Ah Commit image:** Replaces the firmware image on the interconnect with the new loaded firmware image. Prior to this command being executed, the old firmware will still be executed on startup. Always ensure the new image is running perfectly (by running it on the interconnect using the previous commands) before using this command.
- CMD 0108h Copy image A to B/B to A: In the event of two images being present on the same interconnect and both images are written to flash, this command makes ensures that both images are identical, with the copied image being specified in the commands as either image A to image B, or image B to image A.
- **CMD 0100h Get FW Info:** Loads the information about the latest firmware on the interconnect, for both image A and image B.



Control Signals



- INTn/PRSn and LPWn/RSTn
 - Read/ drive control signals
 - Analog sampling of signals in real time
- Graph features vertical and horizontal markers.
- Pull up resistors: display SDA and SCL resistors values, where I2C should be in idle state to detect accurate values.
- Ability to export/import data

Access to **OSFP** low-speed signals in three modes:

Signals Modes	LWPn	RSTn	INTn	PRSn
Initiator	Output signal	Output signal	Input signal	Input signal
Bypass*	No control	No control	No control	No control
Target	Input signal	Input signal	Output signal	Output signal

Access to **QSFP-DD** low-speed signals in three modes:

Signals Modes	LPMode	ResetL	IntL	ModPrsL
Initiator	Output signal	Output signal	Input signal	Input signal
Bypass*	No control	No control	No control	No control
Target	Input signal	Input signal	Output signal	Output Signal

*In bypass mode, Nexus only samples the signal between host and module.



I2C Read/Write Operations

Analyzer	mult	iLane,		- 0:
About Help Monitoring Adapter Temperature 16 Analyz Monitor FEC CDB Control Signals	er Tomperature 10 R/W Functions: MSA Table MSA Validation VCC Current 12C Sc	ope State Machine Analysis		Configuration OSIP Analyzer INITIATOR Mode Disconnect
Read/Write Byte		Advanced Read/Write		
Page(hex)	Bank(hex) 0	Page(hex) • Ba	nk(hex) • Slave address(he	x) A0
Single	Multiple	Single	Multiple	
Address(dec) Data(hox) Data(Dec) Data(Ascii) Read Write	Start Address(dec)	Address(Jec) 0 : Data(Nco) Data(Dcc) Data(Ascii) Read Write	Start Address(dec) Fed Address(dec) Read Address Data (Hex) Click hare to add a new row	Save Data (Aoci)

Operates in initiator mode

- Single byte read/write operations
- Multiple byte read operations
- Advanced R/W used to read from or write to multiple registers simultaneously

MSA Table Tab

Analyzer					multiLane		- 0
ings Help Monitoring Adapter Temperature onitor FEC CDB	32 Analyzer	Temperature 2/W Functior	38 ns MSA Table	MSA Validation	Module Emulation VCC Current 12C Scope State Machine Analysis		Configuration OSFP Analyzer INITIATOR Mode Disconnect
Memory Map							
Pages ^ 🝸	¶° Clear Filter			Data (Ascii)	Description	Read Only	Read Data
LowMem	Search				Identifier		
LowMem					Revision Compliance	~	Load Data from file
LowMem	CSelect A	л)			Characteristics		
LowMem	✓ LowMen				Module State		Save Data to file
LowMem	▼ Page 00				Bank 0 flag summary		
LowMem	= Page 01				Bank 1 flag summary		Write Data to Hardware
LowMem	= Page 02				Bank 2 flag summary		
LowMem	= Page 03				Bank 3 flag summary		Revert Read Only
LowMem	= Page 04				Data Path/Module firmware fault and Module State changed flag		
LowMem	= Page 10			0	Latched VCC3.3/Temp Alarm and Warning		To choose the desired page(s) use the filter button
LowMem	= Page 11				Latched AUX1/2 Alarm and Warning		
LowMem	= Dage 12				Latched Vendor Defined/AUX3 Alarm and Warning		
LowMem	= Page 12				Reserved		
LowMem	- Page 13				Custom		
LowMem	Page 14				Internally measured Temperature 1 MSB		
LowMem	_	OK	Cancel		Internally measured Temperature 1 LSB		
LowMem					Internally measured Supply 3.3v MSB		
LowMem	17	45	69	E	Internally measured Supply 3.3v LSB	₹	
LowMem	18	00			Internally measured AUX1 MSB		
LowMem	19	00	0		Internally measured AUX1 LSB		
LowMem	20	00	0		Internally measured AUX2 MSB	₹	
LowMem	21	00	0		Internally measured AUX2 LSB	₹	
	22	00	0		Internally measured ALIX3 MSB	7 -	

- Operates in initiator mode
- Select page(s) to read
- Read data from device for selected page(s)
- Save data to file
- Load data from file
- Write data to hardware to have the data required in respective addresses
- Read only column: checked boxes refer to read only registers, while unchecked boxes refer to read/write registers, **as per MSA**. Use these to make R/W registers RO, and RO registers R/W, affecting MSA compliance
- Revert read only: revert back to the original type access of all registers as per MSA



MSA Validation Tab

Analyzer		multiLane		- 🗆 ×
Monitoring Adapter Temperature Monitor FEC CDB	Analyzer Temperature B Control Signals R/W Functions MSA Table	ISA Validation Module Emulation VCC Cu	rrent I2C Scope State Machine Analysis	Configuration OSFP Analyzer INITIATOR Mode Disconnect
Select a validation type: Validation Table	- Read	Data Validate Data Save Data	a Load Data From File Generate PDF report	
Page A T	Denister Arres	Register	Notes	
Page 1 Jourt 1	n Clear Filter n	Content Validation		
 Fage : Lowine LowMem 	Search Q			
LowMem	✓ ■ (Select All)			
LowMem	▼ LowMern			
LowMem	▼ Page 00			
LowMem	= Page 01			
LowMem	= Page 02			
LowMem	= Page 03			
LowMem	= Page 04			
LowMem	= Page 10			
LowMem				
LowMem	Page 12			
LowMem				
LowMem				
LowMem	rage 14			
LowMem	OK Cancel			
LowMem	16 85			
LowMem	17 45			
LowMem	18 00			
LowMem	19 00			

- Operates in initiator mode
- Select page(s) to read
- Read data from device for selected page(s)
- Select validation type: Register Access Type Validation or Register Content Validation, or both
- Validate data against CMIS standards
- Save data to file
- Load data from file
- Generate PDF report for the selected page(s)

Anal	rzer					multiLane	- 🗆 ×
Settings Mor	Help itoring					Configuration	
Ada	pter Temperature	e 32 Ani	alyzer Temperature	, 38		OSFP Analyzer	
						INITIATOR Mode Disconnect	t
Monit	or FEC CDB	Control Sign	als R/W Functio	ne MSA Table MSA	Validation Module F	mulation VCC Current 12C Scope State Machine Analysis	
THOMAS		control orgin					
Select	a validation type	:: Type and Co	ontent Validation	Read Da Read Da	ta Validate D	ata Save Data Load Data From File Generate PDF report	
Vali	lation Table						
Vali							
	Page \land 🔻	Address	Data (Hex)	Register Access Type Validation	Register Content Validation	Notes	
v	Page : Page 01	- 128 Items					
	Page 01	128	01			Address 128 of Page Page 01, Register Access type Passed. Register Content Passed.	
	Page 01	129	00			Address 129 of Page Page 01, Register Access type Passed. Register Content Passed.	
	Page 01	130	02			Address 130 of Page Page 01, Register Access type Passed. Register Content Passed.	
	Page 01	131	01			Address 131 of Page Page 01, Register Access type Passed. Register Content Passed.	
	Page 01	132	00			Address 132 of Page Page 01, Read Only Register. Access type Failed: Register is writable. Register Content Passed.	
	Page 01	133	00			Address 133 of Page Page 01, Read Only Register. Access type Failed: Register is writable. Register Content Passed.	
	Page 01	134	00			Address 134 of Page Page 01, Read Only Register. Access type Failed: Register is writable. Register Content Passed.	
	Page 01	135	00			Address 135 of Page Page 01, Read Only Register. Access type Failed: Register is writable. Register Content Passed.	
	Page 01	136	00			Address 136 of Page Page 01, Read Only Register. Access type Failed: Register is writable. Register Content Passed.	
	Page 01	137	00			Address 137 of Page Page 01, Read Only Register. Access type Failed: Register is writable. Register Content Passed.	
	Page 01	138	00			Address 138 of Page Page 01, Read Only Register. Access type Failed: Register is writable. Register Content Passed.	
	Page 01	139	00			Address 139 of Page Page 01, Read Only Register. Access type Failed: Register is writable. Register Content Passed.	
	Page 01	140	00			Address 140 of Page Page 01, Register Access type Passed. Register Content Passed.	
	Page 01	141	00			Address 141 of Page Page 01, Register Access type Passed. Register Content Passed.	
	Page 01	142	00			Address 142 of Page Page 01, Read Only Register. Access type Failed: Register is writable. Register Content Passed.	
	Page 01	143	00			Address 143 of Page Page 01, Read Only Register. Access type Failed: Register is writable. Register Content Passed.	
	Page 01	144	00			Address 144 of Page Page 01, Read Only Register. Access type Failed: Register is writable. Register Content Passed.	
	Page 01	145	00			Address 145 of Page Page 01, Read Only Register. Access type Failed: Register is writable. Register Content Passed.	
	Page 01	146	00			Address 146 of Page Page 01, Read Only Register. Access type Failed: Register is writable. Register Content Passed.	
	Page 01	147	00			Address 147 of Page Page 01, Read Only Register. Access type Failed: Register is writable. Register Content Passed.	

After validating the chosen page(s), a set of pass/fail registers appear as shown with the respective description of success or failure.



Module Emulation

Module emulation works in target mode, where Nexus emulates a module memory as per CMIS. It allows you to validate the host register access, by confirming that the host is adopting the proper access types (RO/RW) for CMIS specific addresses.

Analyzer multiLane		
Settings Help Monitoring		Configuration
Adapter Temperature 45		OSFP Analyzer
		TARGET Mode Disconnect
Monitor FEC CDB Control Signals R/W Functions MSA Table MSA Validation Module Emulation VCC Current 12	C Scope State Machine Analysis	
Manana Man		
		Read Data
Pages T Address Data (Hex) Data (Dec) Data (Ascii)	Description	
A Pages : Page 00 - 128 Items		Load Data from file
A Pages : Page 01 - 128 Items		
		Save Data to file
		Write Data to Hardware
		Add/Damaya Damas
		Page02 Page03
		Page04 Page10h
		Page11h Page12h
		Page13h Page14h
		Page20h Page21h
		D
		Pagezzn Pagezon
		Page24h Page25h
		Page26h Page27h
		Page28h Page29h
		Page2Ah Page2Bh 🔹

Upon opening the tab, there are three pages added by default, LowMem, Pages 00 and 01.

You can add a maximum of three pages onto those, from the "Add/Remove Pages" window, by checking the pages you want to add and pressing "Add pages"

Analyzer	multiLane	
Settings Help Monitoring Adapter Temperature 35 Anal Monitor FEC CDB Control Signal	yzer Temperature 45 s R/W Functions MSA Table MSA Validation Module Emulation VCC Current 12C Scope State Machine Analysis	Configuration OSFP Analyzer TARGET Mode Disconnect
Memory Map		
Pages A T Address	Data (Hey) Data (Dec) Data (Ascii) Description	Read Data
▲ Pages : LowMem - 128 Items		
Pages : Page 00 - 128 Items		Load Data from file
Pages : Page 01 - 128 Items		
▲ Pages : Page 2B - 128 Items		Save Data to file
Pages : Page 2C - 128 Items		
Pages : Page 2D - 128 Items		Write Data to Hardware
		Add Remove Pages Page20h Page21h Page22h Page23h Page22h Page23h Page22h Page23h Page22h Page27h Page22h Page22h Page22h Page22h Page22h V Page22h Page22h V Page22h Page22h Add Page(s) Remove Page(s)

You can work with the added pages as custom pages, and can overwrite them as you see fit.

Deletion of pages is only possible with added pages. You cannot delete LowMem, Pages 00 and 01.



Graphs and Measurements

Nexus allows for the measruement of realtime VCC supply, In-rush and continuous current, I2C communication, and real time probing of voltage, current, SDA and SCL signals. All graphs and measurements are configured in the same steps, listed below:

The below example was done on the VCC tab, and applies to the Current tab, I2C Tab, and Scope Mode tab.

Data configuration:

• Set your required sampling speed

lonitor FEC CDB	3 Control Signals R/W Fun	ctions MSA Table N	ISA Validation	Module Emulatio	n VCC Current l	2C Scope S	itate Machine Analysis
Continu	and Resolution	1 MSPS V 8 Bit	Channe	el Configuration	AutoScale		
		4.166 MSPS					
4		3.125 MSPS					
		2.5 MSPS					
3.5		2 MSPS					
		1.5625 MSPS					
		1.25 MSPS					
3		1.111 MSPS					
		1 MSPS					

• Set your required sampling resolution



• Set your channel configuration





Once the measurement is done, expand the Details window as below:

Analyzer	multiLane		– D ×
Settings Help Monitoring Adapter Temperature 32 Analyzer Temperature 41 Monitor FEC CDB Control Signals R/W Functions MSA Table MSA	Validation Module Emulation VCC Current I2C Scope State M	lachine Analysis	Configuration OSFP Analyzer O BYPASS Mode Disconnect
► Continuous ▼ Sampling Speed and Resolution 1 MSPS ∨ 8 Bit ∨	Channel Configuration AutoScale		
4		Details «	Add Marker Off
3.34			Clear Graph
3		Ma	rkers Export
25		ti	me = 0.428395 and voltage = 3.3439154624939
S as a second se		Dif	Ierences
S 15			V = 0 t = 0.147722
			Curve Visibility ✓ VCC
as			
0		12 12	
10.5	Time (s)		

- Add Marker: go back to the graph and press on any point directly onto it to add your marker.
- "Markers" box indicates the time and voltage marker values
- "Differences" box indicates the difference by voltage and time between markers
- Clear graph:
 - Data: clear all markers
 - Graph: clear all captured data
- Export data:
 - Import: import a single file to visualize data on graph
 - Export: export data and save file
 - Import History: import more than one file

multiLane

Graph timeline:

After capturing data in continuous mode for a large interval of time, you can use the graph timeline as shown below, to focus the data on a specific interval of time.

Hovering over the timeline you will see the data is categorized into cached data, and session data.

Cached data offers real time reading of data, while session data is saved into files which we have to access to read.





VCC Measurements Tab:

VCC Measurements can be done in initiator, bypass or target modes.

Analyzer		multiLane		– 0 ×
Settings Holp Monitoring Adapter Temperature 27 Analyzer Temper	rature 28			Configuration OSFP Analyzer BYPASS Mode Disconnect
Monitor FEC CDB Control Signals R/W Fu	nctions MSA Table MSA Validation Module Emul	lation VCC Current I2C Scope State Machine Analy	sis	
II Continuous Sampling Speed and Resolution	1 MSPS v 8 Bit v Channel Configuration	n AutoScale		
4				** **
35				Deta
3				
25				
Voltage (V)				
1.5				
1				
0.5				
0				
9		10 10.5 Time (s)		

Measure VCC in continuous mode by configuring the sampling speed and resolution, as well as the channels:



Once your configuration is done, press "Continuous" to get the data.

multiLane

Current Measurements

Current Measurements can be done in initiator, bypass or target modes.

N Analyzer multiLane	- D ×
Settings Help Monitoring Adapter Temperature 32 Analyzer Temperature 41	Configuration OSFP Analyzer BYPASS Mode Disconnect
Monitor FEC CDB Control Signals R/W Functions MSA Table MSA Validation Module Emulation VCC Current I2C Scope State Machine Analysis	
Continuous Sampling Speed and Resolution 1 MSPS × 8 Bit × Channel Configuration AutoScale 4 AutoScale AutoScale AutoScale	Contraction of the second s
	18 2

Choose your required current measurement:

- Continuous current measurements
- In-rush current measurements

Set your sampling speed and resolution, and configure the channels:

		M Analyzer	multiLane
Monitor FEC CDB Control Signals R/W Functions MSA Table	MSA Validation Module Emulation VCC Current I2C Scope State Machine Analysis	Settings Help Monitoring Adapter Temperature 32 Analyzer Temperature 41	
Continuous Sampling Speed and Resolution 1 MSP5 8 Bit	t Channel Configuration AutoScale		
4.166 MSPS 4 3.125 MSPS		Monitor FEC CDB Control Signals R/W Functions MSA Table MSA V	alidation Module Emulation VCC Current I2C Scope State Machine Analysis
2.5 MSPS 3.5 2 MSPS		Continuous Sampling Speed and Resolution	Channel Configuration AutoScale
1.5625 MSPS 1.25 MSPS		4 B bit 10 Bit	
3 1.111 MSPS 1 MSPS		3.5 12 Bit	
	Analyzer	multiLane	
	Settings Help Monitoring		
	Adapter Temperature 32 Analyzer Temperature 41		
	Manitar EEC CDB Control Signals PAN Substitute MSA Table MSA Validation	Modula Emulation VCC Currant IDC Scona State Machine Analysis	
	► Continuous ► Sampling Speed and Resolution 1MSPS × 8 Bit ► Channel	Config atton	
	33	Channel 2 Current Oli Channel 2 Current Oli On	



In-rush current measurements:

- Nexus should be in Initiator mode
- DUT should be unplugged from Nexus
- To capture in-rush current upon module power-up, start capturing while DUT is unplugged, and plug in DUT once you start capturing data. (shown below)

Analyzer	multiLane	- O >
Settings Help Monitoring Adapter Temperature 32 Analyzer Temperature 40		Configuration OSFP Analyzer INITIATOR Mode Disconnect
Monitor FEC CDB Control Signals R/W Functions MSA Table MSA Validation Module E	Emulation VCC Current I2C Scope State Machine Analysis	
and Resolution	ation AutoScale	
		Details
Communities of the second seco		
0 0 0.005 0.01	a.015 0.02 0.025 Time (s)	0.03



I2C Packet Analysis



- I2C Captures can be done in initiator, bypass or target modes
- Single and continuous captures
- I2C trigger and tracking events
- Different sampling speeds available
- Represent SCL, SDA, ACK/NACK, and I2C edges graphically

Configure the sampling speed, resolution and choose channels:

Analyzer	multiLane		- 0 ×
iettings Help Monitoring Adapter Temperature 32 Analyzer Temperature 40			Configuration OSFP Analyzer INITIATOR Mode Disconnect
Monitor FEC CDB Control Signals R/W Functions MSA Table MSA Validation Mod	le Emulation VCC Current I2C Scope State Machine Analysis Configuration		
10 10	Channel 1 Channel 2		· · · · · · · · · · · · · · · · · · ·
	SDA On SDA (🗩 en:	E E
	-sci. •••• of sci.	on Internet	
	12C Trigger 🐻 Disabled 12C Tracker 🐻 Disabled		
	I2C Trigger Events NONE Y I2C Tracker Events NONE		
8, 5, 88, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5,	Trigger Delay: 0 ms (Value between 0 and 10 ms)		
0 0 0 04 08	0.8 1 1.2 Time (s)	14 16	1.8 2
<			>
☆ Packet Details			

After which, you can start your measurements.



Continuous Capture:



I2C continuous capture shows SDA and SCL data.

Single Capture:



I2C Single, trigger and tracking captures show SDA, SCL, Start, Stop and Edges on the graphs.



I2C Trigger capture:



Choose the trigger required and measure the data:

Trigger I2C with:

- Control Signals:
- o Module Interrupt
- o Module Present
- o Reset
- o Low Power
- State Machine
- I2C Signal:
- o Start
- o Stop



I2C Tracking capture:

Indicate which address you want to capture, and if you'd like this data tracked.





Packet details expansion:



Single/Trigger/Tracker Capture: press on Packet Details to expand and look into the data captured.

Continuous Capture: draw a precise portion of data on the graph, click Draw Edges, and expand Packet Details.

Press on one packet for more details on the data. This will also position you to the chosen packet on the graph:



Press on one byte from chosen packet to also position yourself accordingly on the graph:





Scope Mode Tab:



- Scope Mode data can be measured in initiator, bypass and target modes.
- Measure data in continuous mode.

Configure your sampling speed and resolution, and move on to the channel configuration:

State Machine Tests: Configure your sampling speed and resolution, and move on to the channel configuration:



Choose to measure two signals from two different channels at once, choosing between:



Current

VCC



Measure the continuous data:

multiLane

State Machine Test:

The below tests are all automatically done in initiator mode

Interactive tests to drive module state transitions, using MSM and DPSM to debug and validate module implementation, and confirm compliance between host and module.

Module state machine test:

Analyzer			multiL <u>ane</u>		– @ ×
Settings Help Monitoring Adapter Temperature 34	Analyzer Temperature 39				Configuration OSFP Analyzer BYPASS Mode Disconnect
Monitor FEC CDB Control	Signals R/W Functions MSA Table	MSA Validation Module E	mulation VCC Current I2C Scope	State Machine Analysis	
Module State Machine	Data Path State Machine 🔵 Module	Behavioral Model			
Stop Test	Generate PDF report	Save Log			
2023-05-24111:20: yet executed 2023-05-24111:20: yet executed 2023-05-24111:20: yet executed 2023-05-24111:20: yet executed 2023-05-24111:20: yet executed 2023-05-24111:20: yet executed 2023-05-24111:20: yet executed 2023-05-24111:20: yet executed 2023-05-24111:20: yet executed 2023-05-24111:20:	2U: Data path InitPendingLane<1> D 20): Data path InitPendingLane<2> D 20): Data path InitPendingLane<3> D 20): Data path InitPendingLane<4> D 21): Data path InitPendingLane<5> D 21): Data path InitPendingLane<6> D 21): Data path InitPendingLane<7> D 21): Data path InitPendingLane<8> D 21): Data path InitPendingLane<8> D 21): Data path InitPendingLane<8> D 21): Data path InitPendingLane<8> D	Pinit not	DPDeinit	DPDeactivated	Max Transition Time: (ms) 5000 Set SteppedConfigOnly Legend: Steady State Transient State

Data path state machine test:

Analyzer multiLane	– 🗇 ×
Settings Help Monitoring Adapter Temperature 34 Analyzer Temperature 89 Monitor FEC CDB Control Signals R/W Functions MSA Table MSA Validation Module Emulation VCC Current I2C Scope State Machine Analysis	Configuration OSFP Analyzer BYPASS Mode Disconnect
Stop Test Generate PDF report Save Log	
[2022-05-24TT112249]: Moduluk was naccendulify set in Renet mode. Elapsed time: 101ms [2023-05-24TT11250]: ResetL HW pin is set to high. ResetS state: [2023-05-24TT11250]: Initializing Module. [2023-05-24TT11253]: DModule was naccendulify set in Low Power [2023-05-24TT11253]: LPMode HW pin is set to low. LowPwrS sate: False [2023-05-24TT11253]: LPMode HW pin is set to low. LowPwrS sate: False [2023-05-24TT11253]: Powering up Module. [2023-05-24TT11253]: Powering up Module. [2023-05-24TT11253]: Powering up Module. [2023-05-24TT11253]: Powering up Module. [2023-05-24TT11253]: Module was naccendulify set in High Power resole. Blaged time: 132ms	Fault Image: Constraint of the second seco



Module behavioral model:

Access the Appsel codes supported on your DUT through the Module behavioral model.

N Analyzer	multiLane	– א פ
Setting: Help Monitoring Adapter Temperature 34 Analyzer Temperature 39 Monitor FEC CDB Control Signals R/W Functions MSA Table MSA Validation Module Emula Module State Machine Data Path State Machine © Module Behavioral Model Stop Test Generate PDF report Save Log	ation VCC Current I2C Scope State Machine Analysis	Configuration OSFP Analyzer BYPASS Mode Disconnect
	Application 1 : 400GAUI-8 C2M	
	Application 2	AppSelCode: 0001
		Ļ
	Application 5	
	Application 6	yimmidate ApplyDPInit
	Application 7	
		↓ ↓
		ConfigStatus

All three tests above are equipped with detailed logging on time and state transitions, which can be generated into a PDF report.

To stop a test, exiting the tab does not suffice. Press "stop test" to exit the tab and move forward with other tests.



Revision History

Revision Number	Date	Description
1.0	6/12/2023	Preliminary
1.1	8/2/2023	Added Module Emulation
1.2	11/1/2023	Added QSFP-DD Support in
		control signals



Accuracy of signals for ML4066-NX-Pro-OSFP REV1.0:

Signal	Notes
VCC	+/- 5 mv accuracy (12 bit sampling resolution)
Current	+/-40 mA accuracy (12 bit sampling resolution)
Operating Temperature	Max 85C
Sampling Resolution	6 bit, 8 bit, 10 bit, 12 bit
Sampling Speed	Min 1 MSPS
	Max 4.1666 MSPS



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