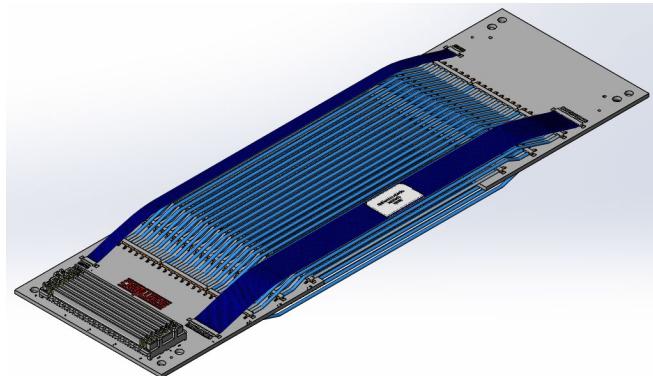




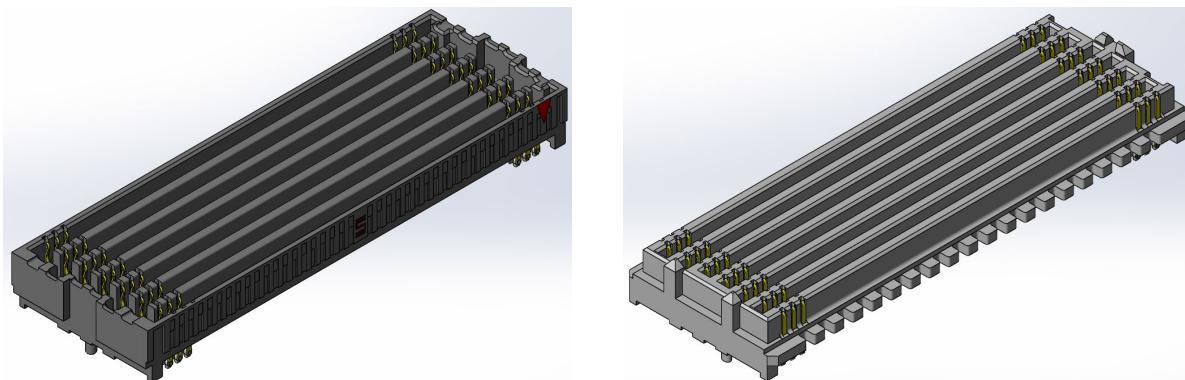
High Speed Characterization Report

HDR-199453-01-FMC



Mated with:

ASP-184329-01 and ASP-184330-01



Description:

**VITA 57.4 FMC+ High Data Rate Cable Assembly,
34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male**

Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

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Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Cable Assembly Overview

The VITA 57.4 FMC+ High-Speed High-Density Cable Assembly is constructed using 34 AWG, 100 Ω Eye Speed® ultra-low skew twinax cable. The cable is terminated at both ends with connector on a printed circuit board. The cable assembly is wired to facilitate a Pin 1 to Pin 1 mapping between the cable end terminations. The data in this report is only applicable to the HDR-199453-01-FMC with 12-inch cable length.

The VITA 57.4 FMC+ cable assembly was tested by mating it to ASP-184329-01 and ASP-184330-01. One sample of each assembly was tested. The actual part numbers that were tested are shown in Table 1, which also identifies End 1 and End 2 of each assembly. A relative sample picture is shown in Figure1.

Length	Part Number	End 1	End 2
12 inches	HDR-199453-01-FMC	SEAF (ASP-184329-01)	SEAM (ASP-184330-01)

Table 1: Sample Description



Figure 1: Test Sample

Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Frequency Domain Data Summary

Bandwidth Figures – Differential Insertion Loss

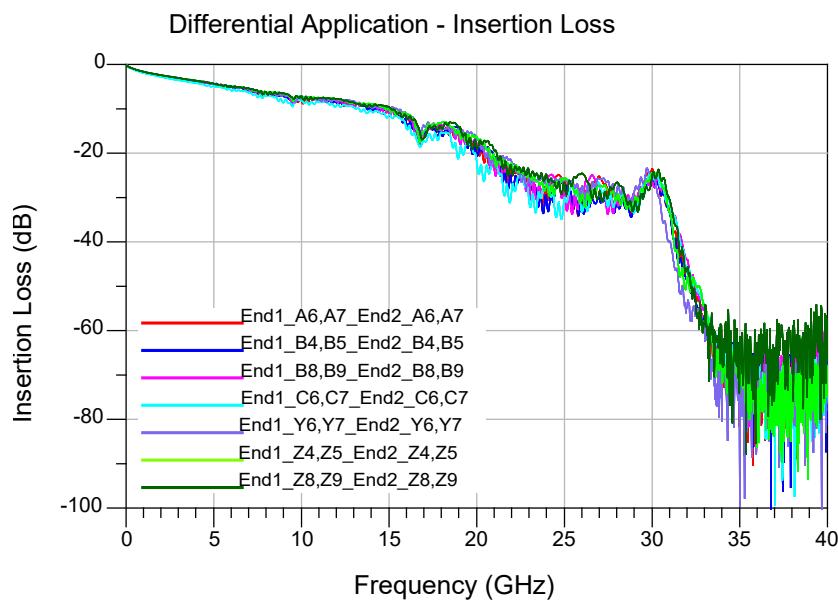


Figure 2

Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Time Domain Data Summary

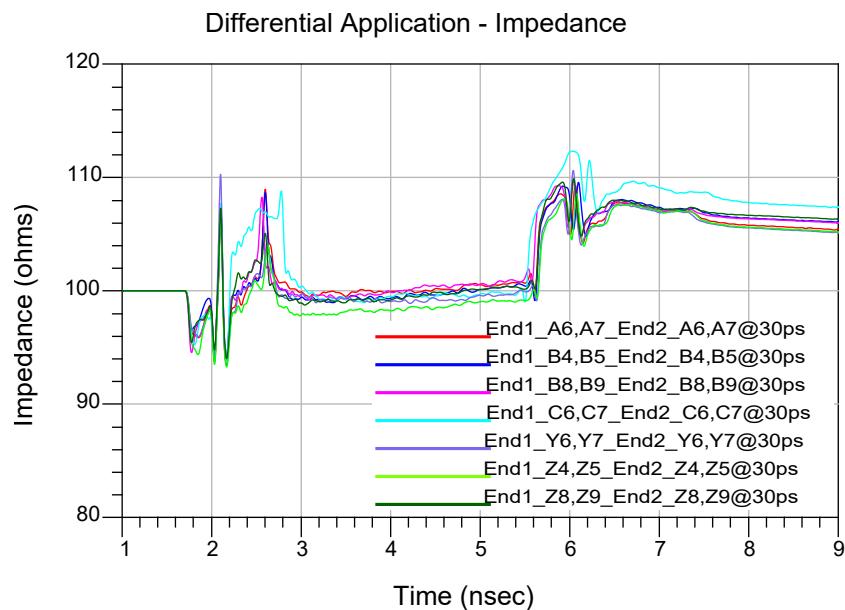


Figure 3

Table 2 - Propagation Delay (Cable Assembly)

Driver	Receiver	12 Inches
End 1_A6, A7	End 2_A6, A7	2.347 ns
End 1_B4, B5	End 2_B4, B5	2.364 ns
End 1_B8, B9	End 2_B8, B9	2.333 ns
End 1_C6, C7	End 2_C6, C7	2.428 ns
End 1_Y6, Y7	End 2_Y6, Y7	2.335 ns
End 1_Z4, Z5	End 2_Z4, Z5	2.354 ns
End 1_Z8, Z9	End 2_Z8, Z9	2.338 ns

Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Characterization Details

This report presents data that characterizes the signal integrity response of a cable assembly in a controlled printed circuit board (PCB) environment. All efforts are made to reveal typical best-case responses inherent to the system under test (SUT).

In this report, the SUT includes the mating connectors, cable assembly, and footprint effects on a typical multi-layer PCB. PCB effects (trace loss) are de-embedded from test data. Board related effects, such as pad-to-ground capacitance, are included in the data presented in this report.

Additionally, intermediate test signal connections can mask the cable assembly's true performance. Such connection effects are minimized by using high performance test cables and adapters. Where appropriate, calibration and de-embedding routines are also used to reduce residual effects.

Differential and Single-Ended Data

Most Samtec cable assemblies can be used successfully in both differential and single-ended applications. However, electrical performance will differ depending on the signal drive type.

Cable assembly Signal to Ground Ratio

Samtec cable assemblies are most often designed for generic applications and can be implemented using various signal and ground pin assignments. In high-speed systems, provisions must be made in the interconnect for signal return currents. Such paths are often referred to as "ground". In some cable assemblies, a ground plane or blade, or an outer shield, is used as the signal return, while in others, cable assembly pins are used as signal returns. Various combinations of signal pins, ground blades, and shields can also be utilized. Electrical performance can vary significantly depending upon the number and location of ground pins.

In general, the more pins dedicated to ground, the better electrical performance will be. But dedicating pins to ground reduces signal density of a cable assembly. Therefore, care must be taken when choosing signal/ground ratios in cost or density-sensitive applications.

Series: HDR

Description: VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

For this cable assembly, the following configurations are evaluated:

	C	B	A	Z	Y
1	GND	CLK_DIR	GND	HSPC_FRSNT_M2C_L	GND
2	DP0_C2M_P	GND	DP1_M2C_P	GND	DP23_C2M_P
3	DP0_C2M_N	GND	DP1_M2C_N	GND	DP23_C2M_N
4	GND	DP9_M2C_P	GND	DP22_C2M_P	GND
5	GND	DP9_M2C_N	GND	DP22_C2M_N	GND
6	DP0_M2C_P	GND	DP2_M2C_P	GND	DP21_C2M_P
7	DP0_M2C_N	GND	DP2_M2C_N	GND	DP21_C2M_N
8	GND	DP8_M2C_P	GND	DP20_C2M_P	GND
9	GND	DP8_M2C_N	GND	DP20_C2M_N	GND

Respective signal line numbers as viewed from End 1

Differential Impedance (denoted by purple circles):

- Optimal Horizontal (OPTH) signal mapping

Differential Crosstalk (denoted by red circles):

- In row: from the terminals to the other terminals on the same row.
- Across row: from one row of terminals to the other row of terminals.

See [Appendix C](#) – Product and Test System Descriptions for details

In a real system environment, active signals might be located at the outer edges of the signal contacts of concern, as opposed to the ground signals utilized in laboratory testing. For example, in a single-ended system, a pin-out of “SSSS”, or four adjacent single ended signals might be encountered as opposed to the “GSG” and “GSSG” configurations tested in the laboratory. Electrical characteristics in such applications could vary slightly from laboratory results. But in most applications, performance can safely be considered equivalent.

Signal Edge Speed (Rise Time)

In pulse signaling applications, the perceived performance of the interconnect can vary significantly depending on the edge rate or rise time of the exciting signal. For this report, the fastest rise time used was 30 ps. Generally, this should demonstrate worst-case performance.

Series: HDR

Description: VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

In many systems, the signal edge rate will be significantly slower at the cable assembly than at the driver launch point. To estimate interconnect performance at other edge rates, data is provided for several rise times between 30 ps and 100 ps.

For this report, measured rise times were at 20%-80% signal levels.

Frequency Domain Data

Frequency Domain parameters are helpful in evaluating the cable assembly system's signal loss and crosstalk characteristics across a range of sinusoidal frequencies. In this report, parameters presented in the Frequency Domain are Insertion Loss, Return Loss, Near-End and Far-End Crosstalk, and Mode Conversion. Other parameters or formats, such as VSWR or S-Parameters, may be available upon request. Please contact our Signal Integrity Group at sig@samtec.com for more information.

Frequency performance characteristics for the SUT are generated directly from network analyzer measurements.

Time Domain Data

Mathematically, Frequency Domain data can be transformed to obtain a Time Domain response. Perfect transformation requires Frequency Domain data from DC to infinity. Fortunately, a very accurate Time Domain response can be obtained with bandwidth-limited data, such as measured with modern network analyzer.

The Time Domain responses were generated using Keysight ADS 2017 update 1. This tool has a transient convolution simulator, which can generate a Time Domain response directly from measured S-Parameters. An example of a similar methodology is provided in the Samtec Technical Note on domain transformation.

http://suddendocs.samtec.com/notesandwhitepapers/tech-note_using-plts-for-time-domain-data_web.pdf

The measured S-Parameters from the network analyzer are post-processed using Keysight ADS to obtain the time domain response for signal propagation time. The Time Domain procedure is provided in [Appendix D](#) of this report. Parameters or formats not included in this report may be available upon request. Please contact our Signal Integrity Group at sig@samtec.com for more information.



High Speed Characterization Report

Series: HDR

Description: VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

In this report, propagation delay is defined as the signal propagation time through the cable assembly, mating connectors, and connector footprint. It also includes 21.05 mm of PCB trace on each connector side. Delay is measured at 100 picoseconds signal rise-time. Delay is calculated as the difference in time measured between the 50% amplitude levels of the input and output pulses.

Additional information concerning test conditions and procedures is in the appendices of this report. Further information may be obtained by contacting our Signal Integrity Group at sig@samtec.com.

Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Appendix A – Frequency Domain Responses

Differential Application – Insertion Loss

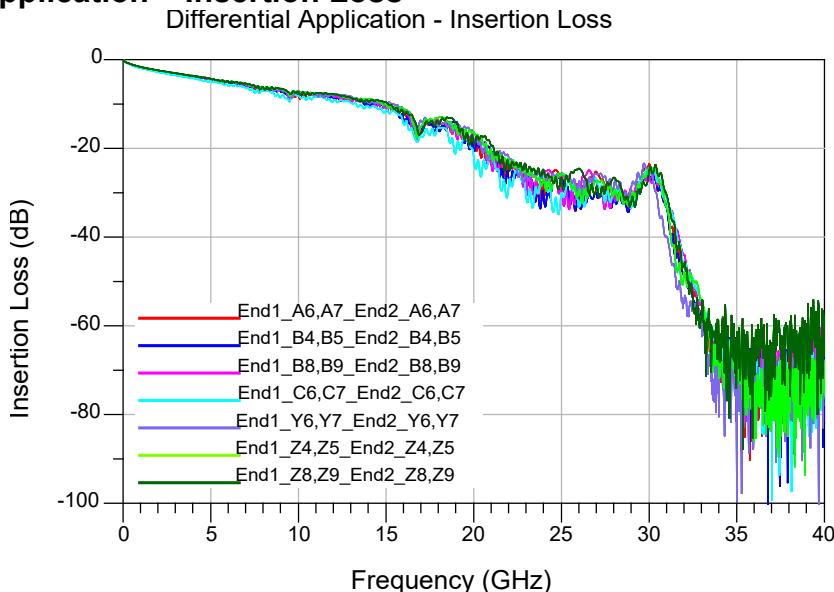


Figure 4

Differential Application – Return Loss

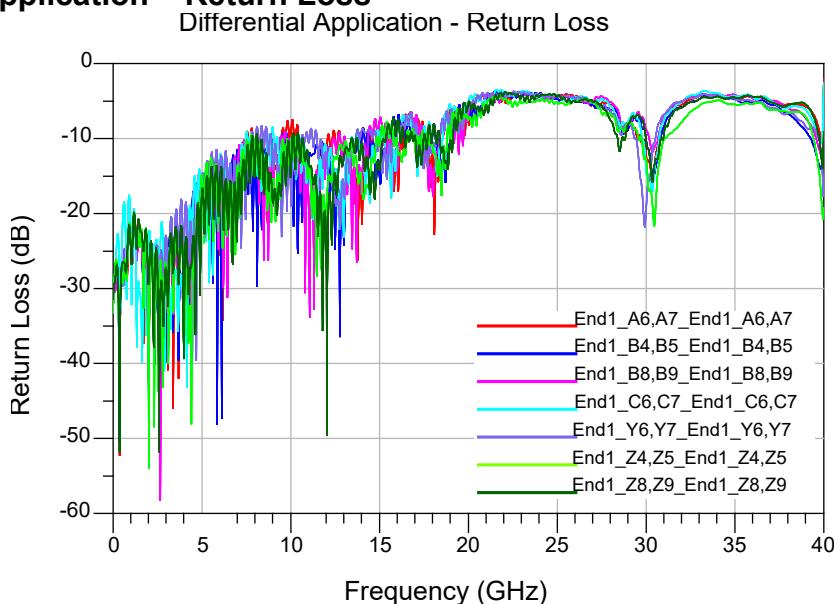


Figure 5

Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Differential Application – NEXT Configurations

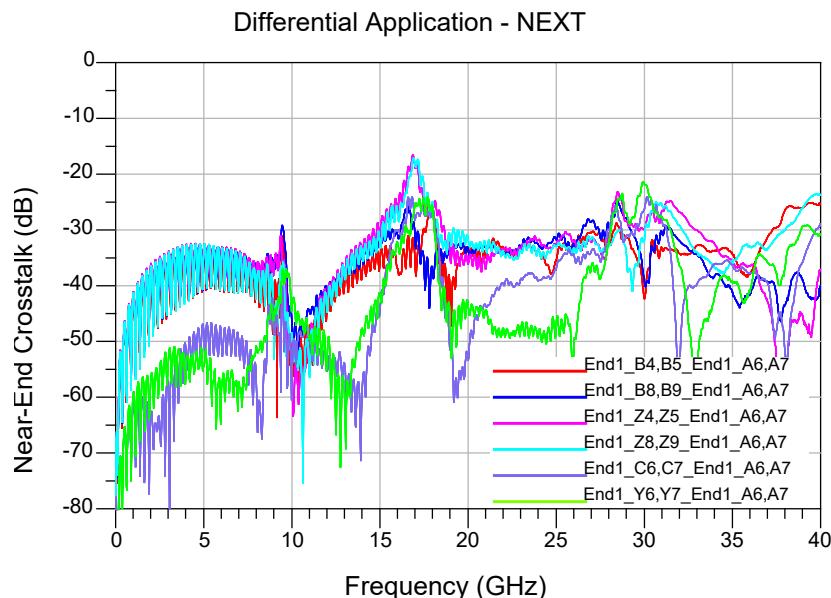


Figure 6

Differential Application – FEXT Configurations

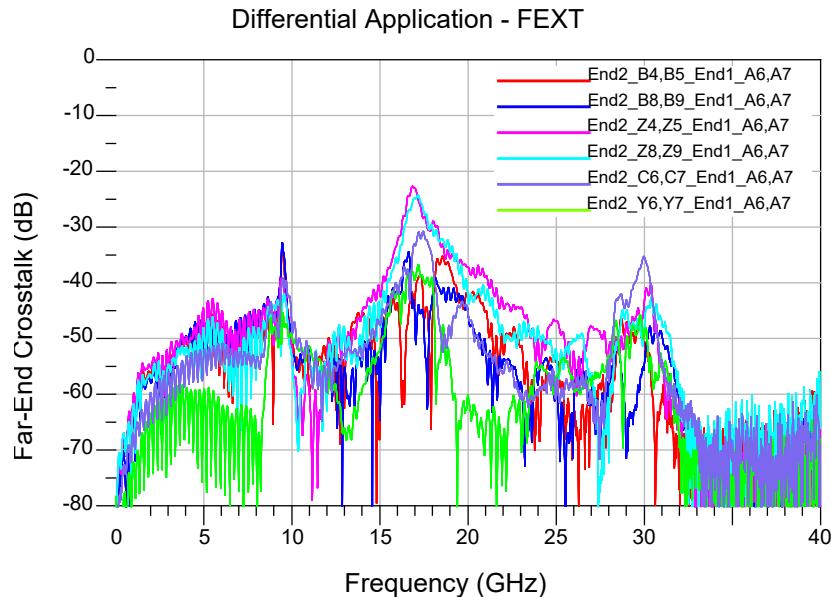
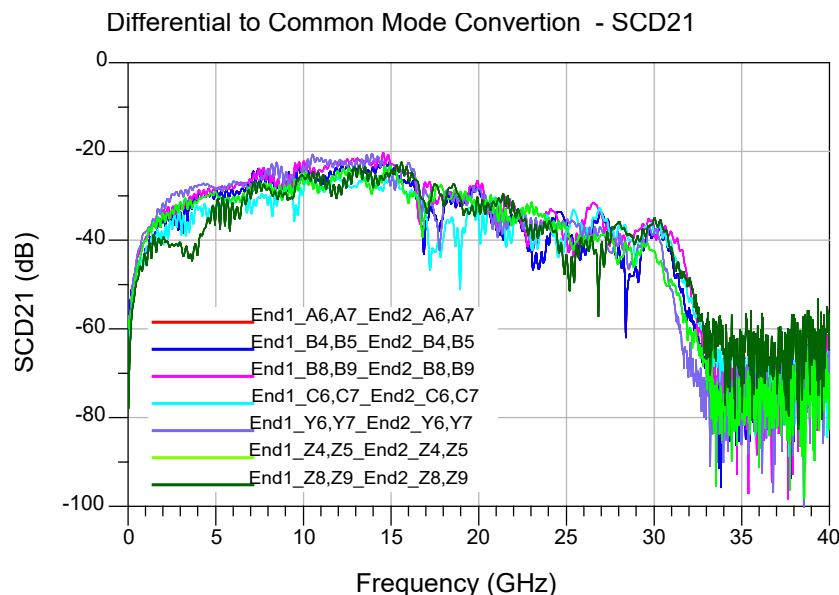


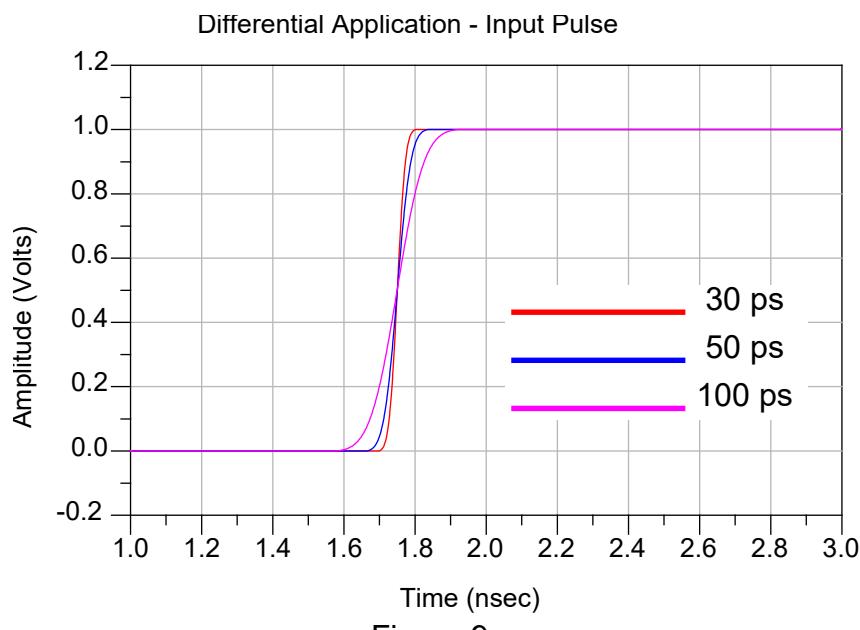
Figure 7

Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male**Differential Application – Differential to Common Mode Conversion****Figure 8**

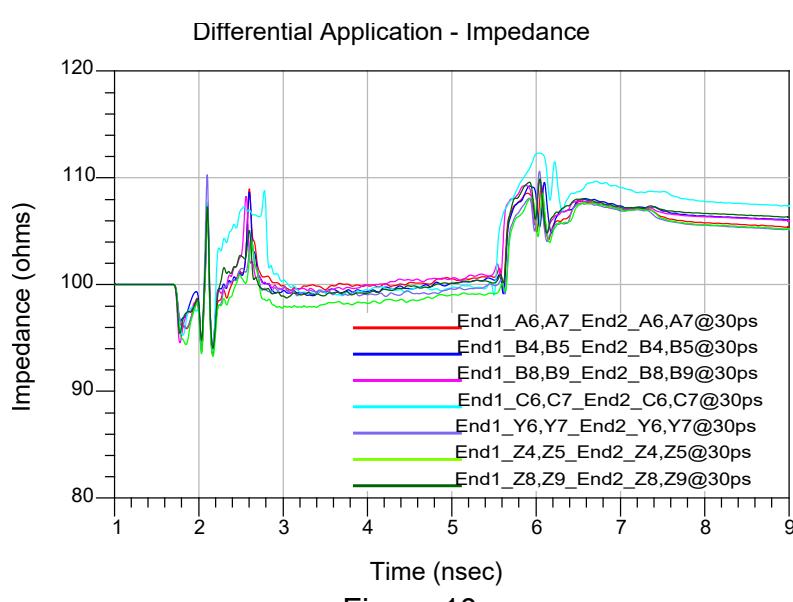
Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Appendix B – Time Domain Responses

Differential Application – Input Pulse



Differential Application – Cable assembly Impedance



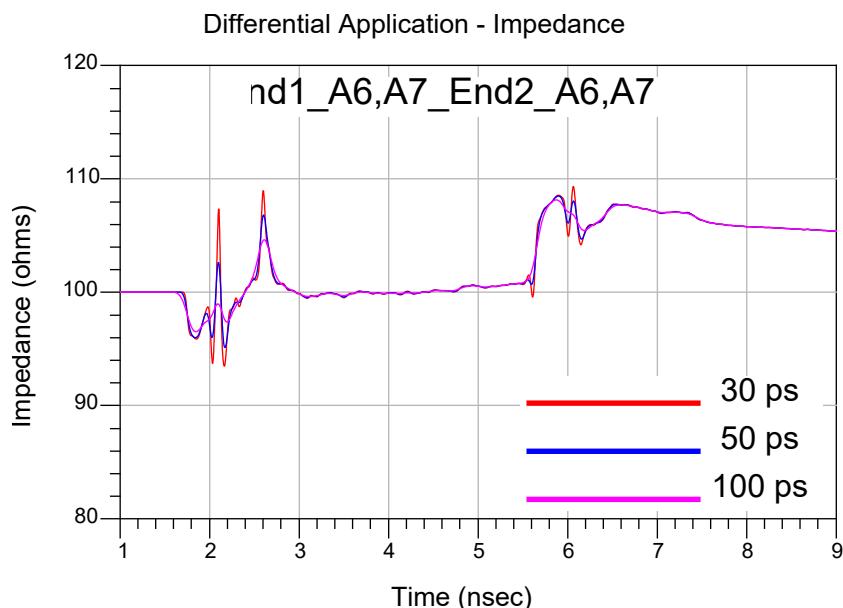
Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male**Differential Application – Cable assembly Impedance**

Figure 11

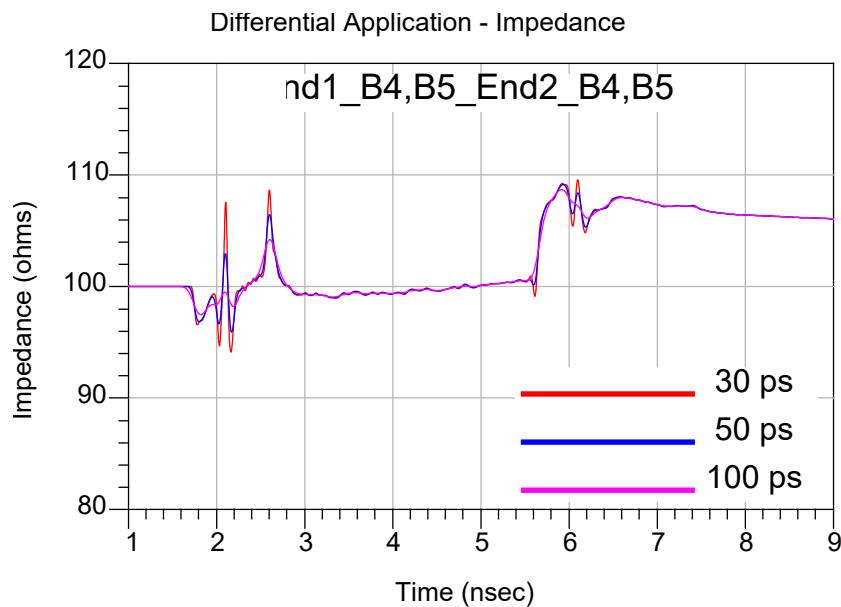


Figure 12

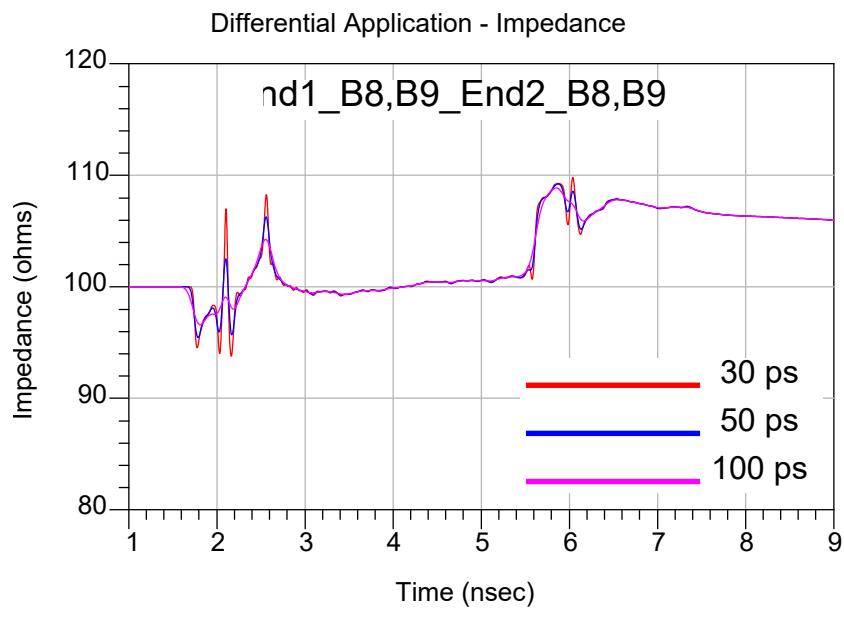
Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Figure 13

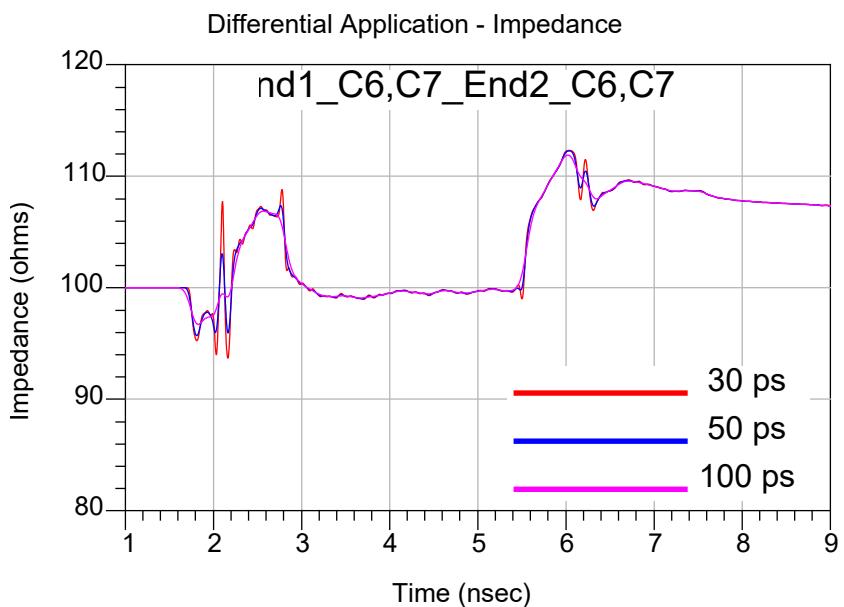


Figure 14

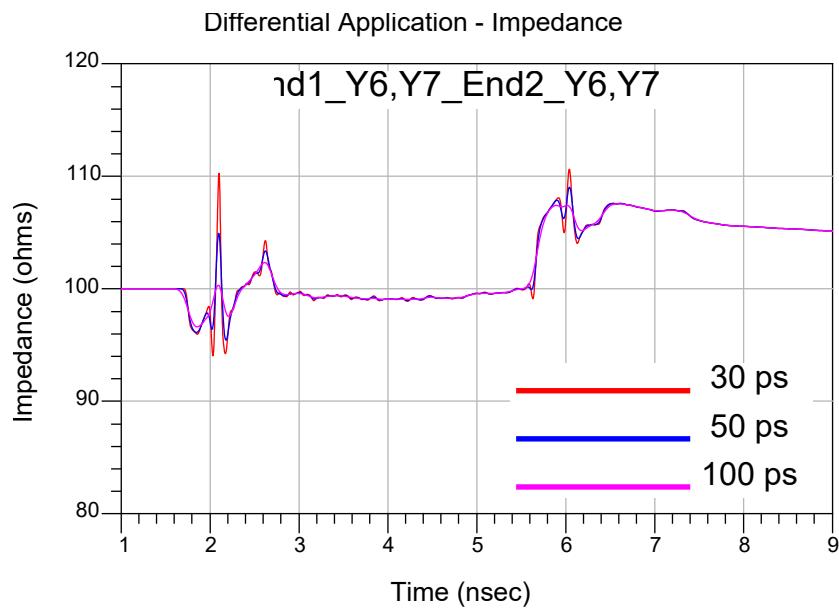
Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Figure 15

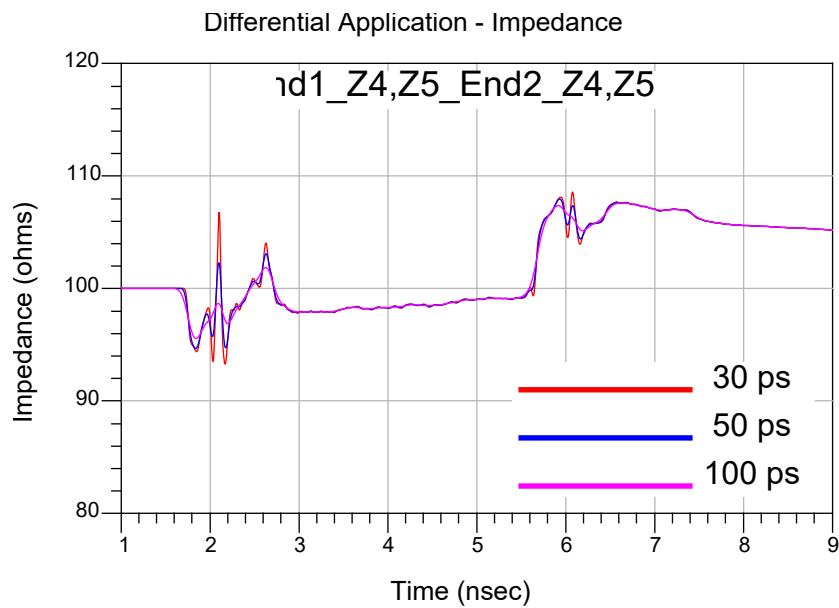


Figure 16

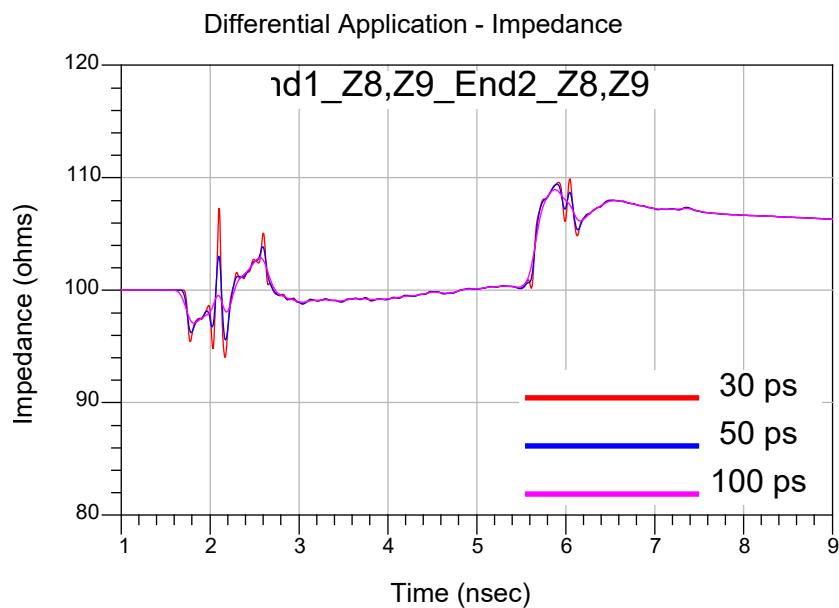
Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Figure 17

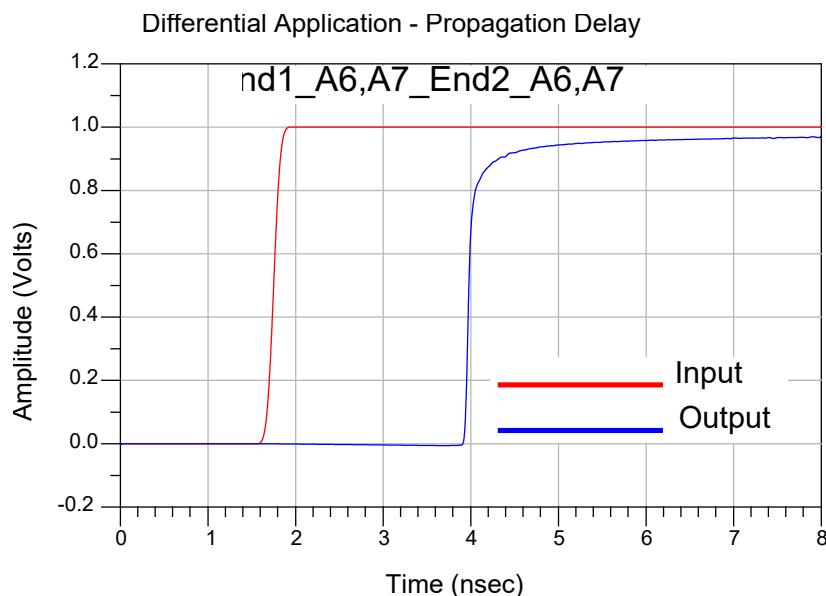
Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male**Differential Application – Propagation Delay**

Figure 18

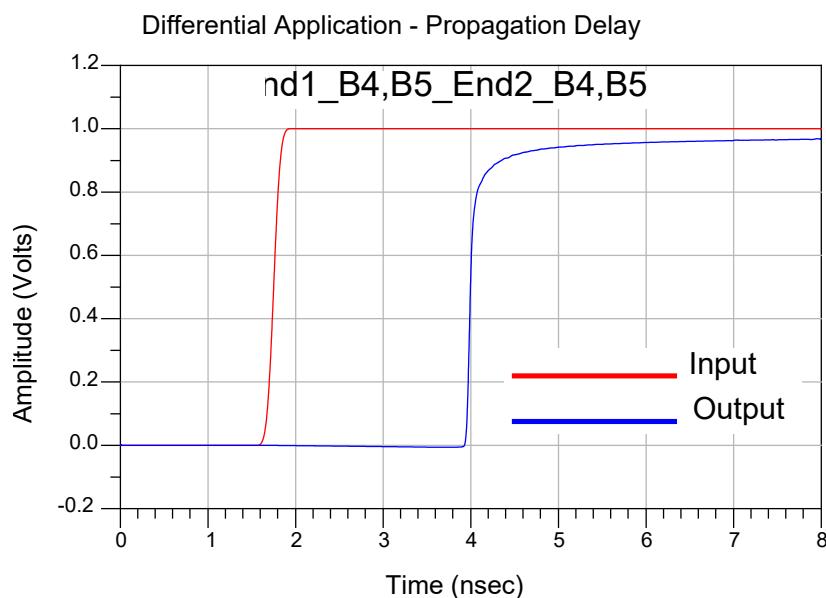


Figure 19

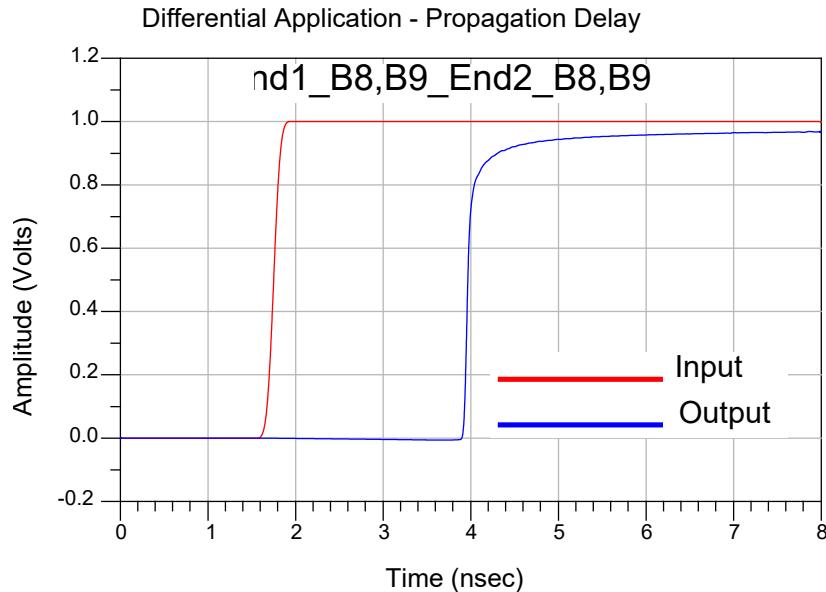
Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Figure 20

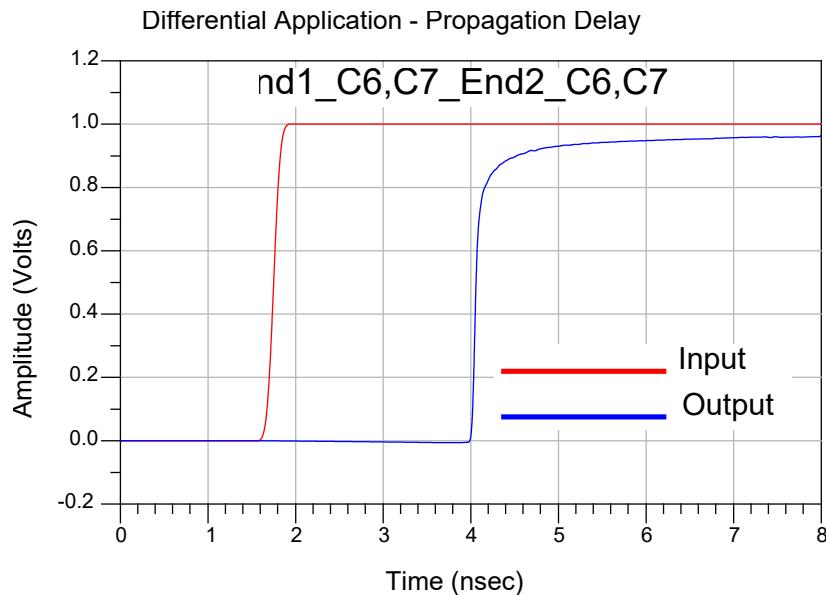


Figure 21

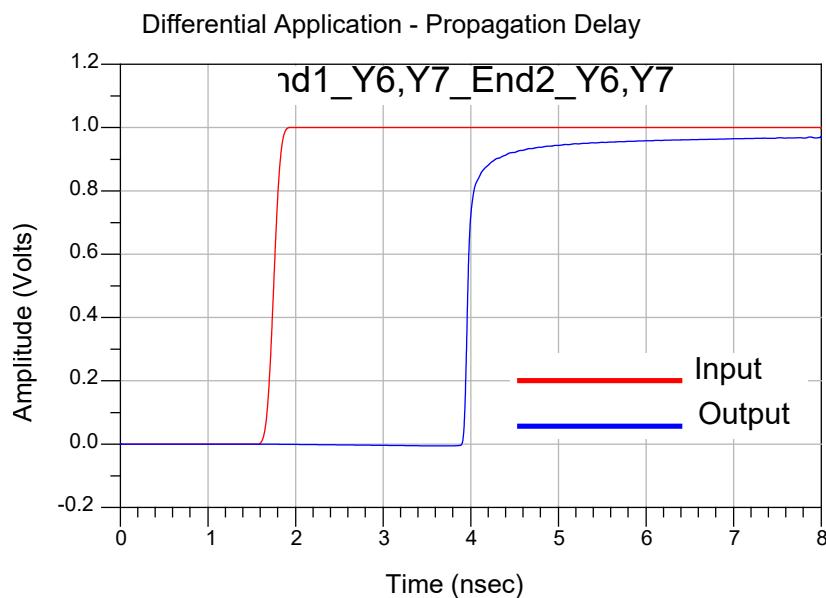
Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Figure 22

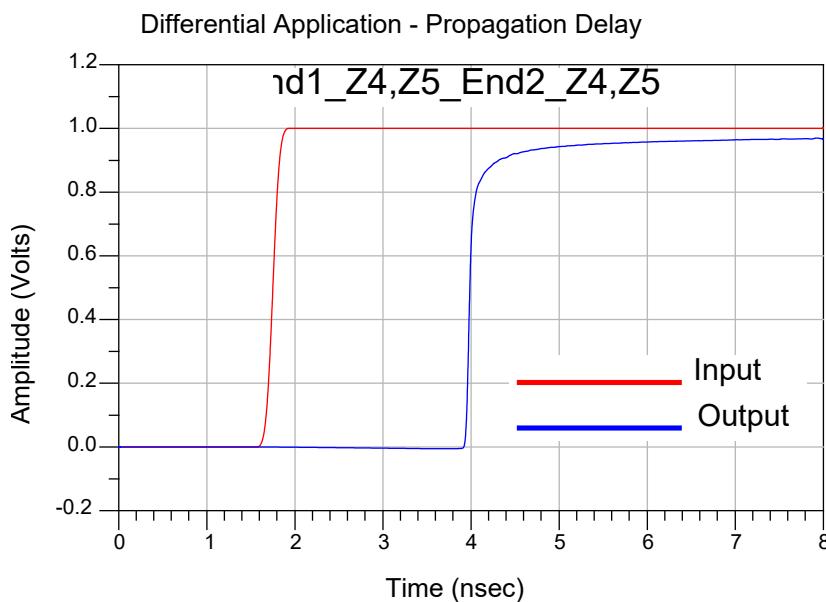


Figure 23

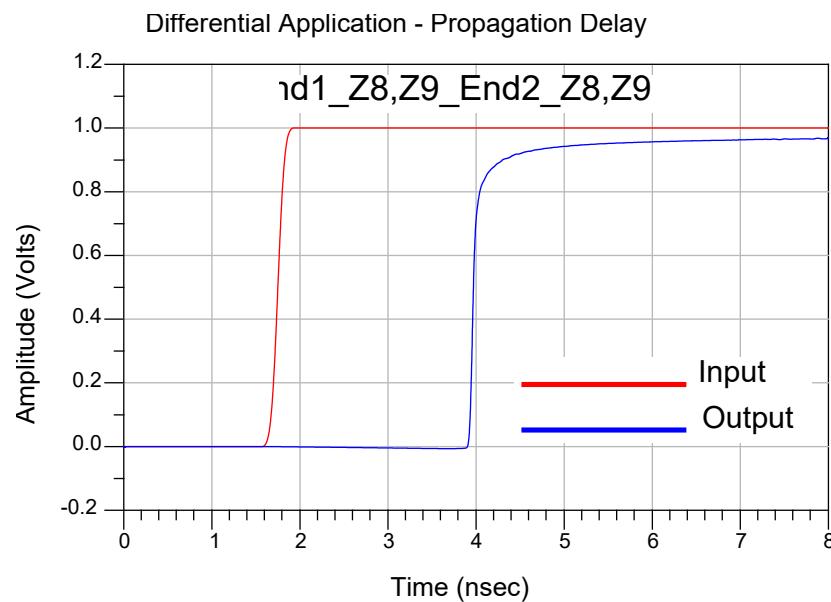
Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Figure 24

Series: HDR

Description: VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Appendix C – Product and Test System Descriptions

Product Description

Product test samples are VITA 57.4 FMC+ High Data Rate Cable Assemblies. The part number is HDR-199453-01-FMC. They mate with FMC+ connector part numbers ASP-184329-01 and ASP-184330-01.

The cable assembly terminations had a particular signal line configuration. The signal line numbers are shown in Table 3.

	M	L	K	J	H	G	F	E	D	C	B	A	Z	Y
1	GND	RES1	VREF_B_M2C	GND	VREF_A_M2C	GND	PG_M2C	GND	PG_C2M	GND	CLK_DIR	GND	HEPC_PRNT_M2C_L	GND
2	DP23_M2C_P	GND	GND	CLK3_BIDR_P	PRSN1_M2C_L	CLK1_M2C_P	GND	HA01_P_CC	GND	DP0_C2M_P	GND	DP1_M2C_P	GND	DP23_C2M_P
3	DP23_M2C_N	GND	GND	CLK3_BIDR_N	GND	CLK1_M2C_N	GND	HA01_N_CC	GND	DP0_C2M_N	GND	DP1_M2C_N	GND	DP23_C2M_N
4	GND	GBTCLK4_M2C_P	CLK2_BIDR_P	GND	CLK0_M2C_P	GND	HA00_P_CC	GND	GBTCLK0_M2C_P	GND	DP9_M2C_P	GND	DP22_C2M_P	GND
5	GND	GBTCLK4_M2C_N	CLK2_BIDR_N	GND	CLK0_M2C_N	GND	HA00_N_CC	GND	GBTCLK0_M2C_N	GND	DP9_M2C_N	GND	DP22_C2M_N	GND
6	DP22_M2C_P	GND	GND	HA03_P	GND	LA09_P_CC	GND	HA05_P	GND	DP0_M2C_P	GND	DP2_M2C_P	GND	DP21_C2M_P
7	DP22_M2C_N	GND	HA02_P	HA03_N	LA02_P	LA00_N_CC	HA04_P	HA05_N	GND	DP4_M2C_N	GND	DP2_M2C_N	GND	DP21_C2M_N
8	GND	GBTCLK3_M2C_P	HA02_N	GND	LA02_N	GND	HA04_N	GND	LA01_P_CC	GND	DP8_M2C_P	GND	DP20_C2M_P	GND
9	GND	GBTCLK3_M2C_N	GND	HA07_P	GND	LA03_P	GND	HA09_P	LA01_N_CC	GND	DP8_M2C_N	GND	DP20_C2M_N	GND
10	DP21_M2C_P	GND	HA06_P	HA07_N	LA04_P	LA03_N	HA08_P	HA09_N	GND	LA06_P	GND	DP3_M2C_P	GND	DP10_M2C_P
11	DP21_M2C_N	GND	HA06_N	GND	LA04_N	GND	HA08_N	GND	LA05_P	LA06_N	GND	DP3_M2C_N	GND	DP10_M2C_N
12	GND	GBTCLK2_M2C_P	GND	HA11_P	GND	LA08_P	GND	HA13_P	LA05_N	GND	DP7_M2C_P	GND	DP11_M2C_P	GND
13	GND	GBTCLK2_M2C_N	HA10_P	HA11_N	LA07_P	LA08_N	HA12_P	HA13_N	GND	DP7_M2C_N	GND	DP11_M2C_N	GND	DP11_M2C_N
14	DP20_M2C_P	GND	HA10_N	GND	LA07_N	GND	HA12_N	GND	LA09_P	LA10_P	GND	DP4_M2C_P	GND	DP12_M2C_P
15	DP20_M2C_N	GND	GND	HA14_P	GND	LA12_P	GND	HA16_P	LA09_N	LA10_N	GND	DP4_M2C_N	GND	DP12_M2C_N
16	GND	SYNC_C2M_P	HA17_P_CC	HA14_N	LA11_P	LA12_N	HA15_P	HA16_N	GND	GND	DP6_M2C_P	GND	DP13_M2C_P	GND
17	GND	SYNC_C2M_N	HA17_N_CC	GND	LA11_N	GND	HA15_N	GND	LA13_P	GND	DP6_M2C_N	GND	DP13_M2C_N	GND
18	DP14_C2M_P	GND	GND	HA18_P	GND	LA16_P	GND	HA20_P	LA13_N	LA14_P	GND	DP5_M2C_P	GND	DP14_M2C_P
19	DP14_C2M_N	GND	HA21_P	HA18_N	LA15_P	LA16_N	HA19_P	HA20_N	GND	LA14_N	GND	DP5_M2C_N	GND	DP14_M2C_N
20	GND	REFCLK_C2M_P	HA21_N	GND	LA15_N	GND	HA19_N	GND	LA17_P_CC	GND	GBTCLK1_M2C_P	GND	GBTCLK5_M2C_P	GND
21	GND	REFCLK_C2M_N	GND	HA22_P	GND	LA20_P	GND	HB03_P	LA17_N_CC	GND	GBTCLK1_M2C_N	GND	GBTCLK5_M2C_N	GND
22	DP15_C2M_P	GND	HA23_P	HA22_N	LA19_P	LA20_N	HB02_P	HB03_N	GND	LA18_P_CC	GND	DP1_C2M_P	GND	DP15_M2C_P
23	DP15_C2M_N	GND	HA23_N	GND	LA19_N	GND	HB02_N	GND	LA23_P	LA18_N_CC	GND	DP1_C2M_N	GND	DP15_M2C_N
24	GND	REFCLK_M2C_P	GND	HB01_P	GND	LA22_P	GND	HB05_P	LA23_N	GND	DP9_C2M_P	GND	DP10_C2M_P	GND
25	GND	REFCLK_M2C_N	HB00_P_CC	HB01_N	LA21_P	LA22_N	HB04_P	HB05_N	GND	DP9_C2M_N	GND	DP10_C2M_N	GND	DP10_C2M_N
26	DP16_C2M_P	GND	HB00_N_CC	GND	LA21_N	GND	HB04_N	GND	LA26_P	LA27_P	GND	DP2_C2M_P	GND	DP11_C2M_P
27	DP16_C2M_N	GND	GND	HB07_P	GND	LA25_P	GND	HB09_P	LA26_N	GND	DP2_C2M_N	GND	DP11_C2M_N	GND
28	GND	SYNC_M2C_P	HB06_P_CC	HB07_N	LA24_P	LA25_N	HB08_P	HB09_N	GND	GND	DP8_C2M_P	GND	DP12_C2M_P	GND
29	GND	SYNC_M2C_N	HB06_N_CC	GND	LA24_N	GND	HB06_N	GND	TCK	GND	DP8_C2M_N	GND	DP12_C2M_N	GND
30	DP17_C2M_P	GND	GND	HB11_P	GND	LA29_P	GND	HB13_P	TDI	SCL	GND	DP3_C2M_P	GND	DP13_C2M_P
31	DP17_C2M_N	GND	HB10_P	HB11_N	LA28_P	LA29_N	HB12_P	HB13_N	TDO	SDA	GND	DP3_C2M_N	GND	DP13_C2M_N
32	GND	RES2	HB10_N	GND	LA28_N	GND	HB12_N	GND	3P3VAUX	GND	DP7_C2M_P	GND	DP16_M2C_P	GND
33	GND	RES3	GND	HB15_P	GND	LA31_P	GND	HB19_P	TMS	GND	DP7_C2M_N	GND	DP16_M2C_N	GND
34	DP18_C2M_P	GND	HB14_P	HB15_N	LA30_P	LA31_N	HB16_P	HB19_N	TRST_L	GA0	GND	DP4_C2M_P	GND	DP17_M2C_P
35	DP18_C2M_N	GND	HB14_N	GND	LA30_N	GND	HB16_N	GND	GA1	12P0V	GND	DP4_C2M_N	GND	DP17_M2C_N
36	GND	12P0V	GND	HB18_P	GND	LA33_P	GND	HB21_P	3P3V	GND	DP6_C2M_P	GND	DP18_M2C_P	GND
37	GND	12P0V	HB17_P_CC	HB18_N	LA32_P	LA33_N	HB20_P	HB21_N	GND	12P0V	GND	DP6_C2M_N	GND	DP18_M2C_N
38	DP19_C2M_P	GND	HB17_N_CC	GND	LA32_N	GND	HB20_N	GND	3P3V	GND	GND	DP5_C2M_P	GND	DP19_M2C_P
39	DP19_C2M_N	GND	GND	VIO_B_M2C	GND	VA0J	GND	VA0J	GND	3P3V	GND	DP5_C2M_N	GND	DP19_M2C_N
40	GND	12P0V	VIO_B_M2C	GND	VALU	GND	VALU	GND	RES0	3P3V	GND	3P3V	GND	3P3V

Table 3: Signal line numbers

Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Test System Description

The test fixtures are composed of six-layer Itera MT40 material with 100Ω differential signal trace and pad configurations designed for the electrical characterization of Samtec high speed cable assembly products. A PCB mount 2.4mm connector is used to interface the PNA test cables to the test fixtures. Optimization of the 2.4mm launch was performed using full wave simulation tools to minimize reflections. The test fixtures and calibration kit are specific to the ASP-184329-01 and ASP-184330-01 connectors, and identified by part number PCB-FMCPSTM-110969-SIG.

PCB-FMCPSTM-110969-SIG Test Fixtures



Figure 25

Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Artwork of the PCB design is shown below.

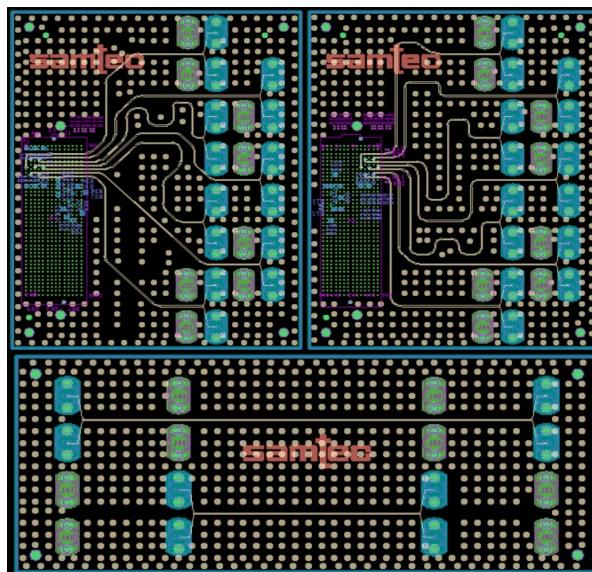


Figure 26

PCB Fixtures

The test fixtures used are as follows:

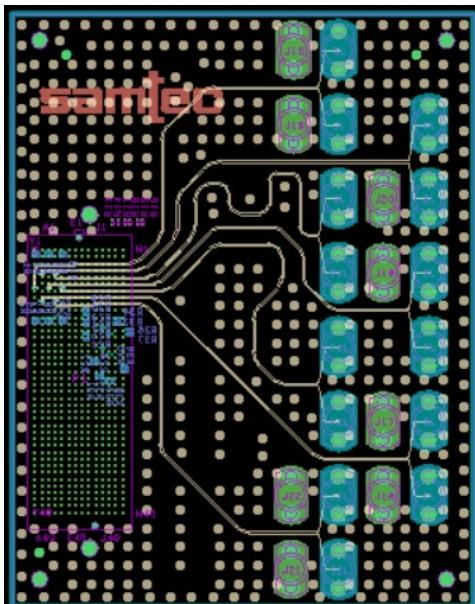


Figure 27

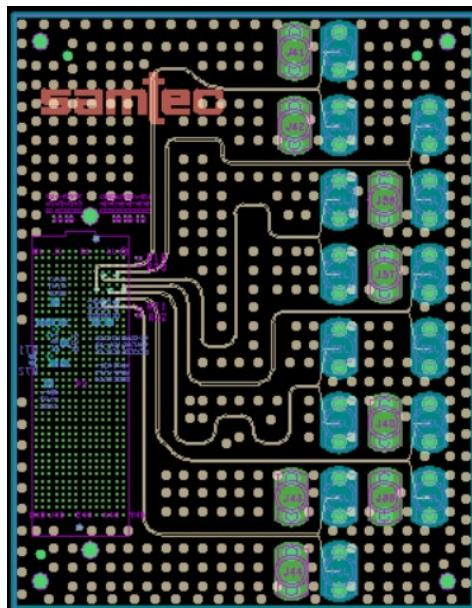
Series: HDR**Description:** VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed®
Twinax, HSPC Female to HSPC Male

Figure 28

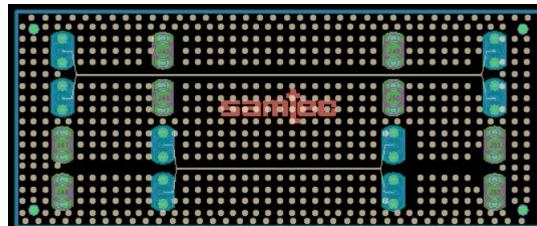


Figure 29

Series: HDR

Description: VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Appendix D – Test and Measurement Setup

For frequency domain measurements, the test instrument is the Agilent N5227B PNA-L network analyzer. Frequency domain data and graphs are extracted from the instrument by AFR application. The network analyzer is configured as follows:

Start Frequency – 10 MHz
Stop Frequency – 67 GHz
IFBW – 1 KHz

N5227B Measurement Setup

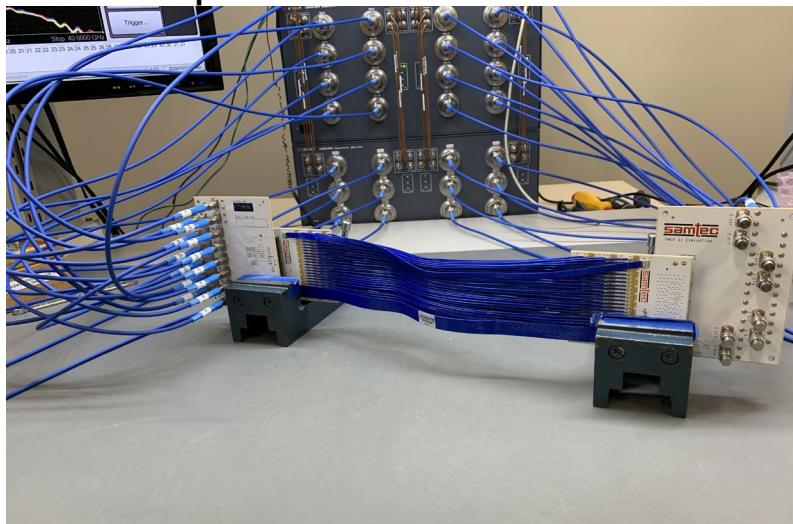


Figure 30

Test Instruments

<u>QTY</u>	<u>Description</u>
------------	--------------------

- | | |
|---|--|
| 1 | Agilent N5227B PNA-L Network Analyzer (10 MHz to 67 GHz) |
| 1 | Agilent N4694-60003 ECAL Module (10 MHz to 67 GHz) |

Test Cables & Adapters

<u>QTY</u>	<u>Description</u>
------------	--------------------

- | | |
|---|-------------------------------------|
| 4 | Gore 0F0CACB036.0-LF (DC to 67 GHz) |
|---|-------------------------------------|

Series: HDR

Description: VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed® Twinax, HSPC Female to HSPC Male

Appendix E - Frequency and Time Domain Measurements

Frequency (S-Parameter) Domain Procedures

The quality of any data taken with a network analyzer is directly related to the quality of the calibration standards and the use of proper test procedures. For this reason, extreme care is taken in the design of the calibration standards, the SI test boards, and the selection of the PCB vendor.

A coaxial SOLT calibration is performed using a N4694-60003 ECAL module. Then DUT measurements are performed under SOLT calibration. The measurements include the effect of test fixture. The measurements of the 2X THRU line standards are required to remove the test fixture effect.

Time Domain Procedures

Mathematically, Frequency Domain data can be transformed to obtain a Time Domain response. Perfect transformation requires Frequency Domain data from DC to infinity. Fortunately, a very accurate Time Domain response can be obtained with bandwidth-limited data, such as measured with modern network analyzer.

The Time Domain responses were generated using Keysight ADS 2017 update 1. This tool has a transient convolution simulator, which can generate a Time Domain response directly from measured S-Parameters. An example of a similar methodology is provided in the Samtec Technical Note on domain transformation.

http://suddendocs.samtec.com/notesandwhitepapers/tech-note_using-plts-for-time-domain-data_web.pdf

Propagation Delay (TDT)

The Propagation Delay is a measure of the Time Domain delay through the cable assembly and footprint. A step pulse is applied to the touchstone model of the cable assembly and the transmitted voltage is monitored. The same pulse is also applied to a reference channel with zero loss, and the Time Domain pulses are plotted on the same figure.

The difference in time, measured at the 50% point of the step voltage is the propagation delay.

Series: HDR

Description: VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed®
Twinax, HSPC Female to HSPC Male

Impedance (TDR)

Measurements involving digital pulses are performed using either Time Domain Reflec-tometer (TDR) or Time Domain Transmission (TDT) methods. The TDR method is used for the impedance measurements in this report.

The signal line(s) of the SUT's is energized with a TDR pulse and the far-end of the en-ergized signal line is terminated in the test systems characteristic impedance (e.g., 50Ω or 100Ω terminations). By terminating the adjacent signal lines in the test systems characteristic impedance, the effects on the resultant impedance shape of the waveform are limited.

Series: HDR

Description: VITA 57.4 FMC+ High Data Rate Cable Assembly, 34AWG, 100-ohm Eye Speed®
Twinax, HSPC Female to HSPC Male

Appendix F – Glossary of Terms

ADS – Keysight Advanced Design System

AFR – Automatic Fixture Removal

PCB – Printed Circuit Board

SUT – System Under Test

SOLT – acronym used to define Short, Open, Load & Thru Calibration Standards

TDR – Time Domain Reflectometry

TDT – Time Domain Transmission