

## Micro-D Camera Link High-Speed Characterization

T180110 Rev1 – April 12, 2018



### 1. Product Description

- 1.1. **Assembly P/N:** A98195-001
- 1.2. **Connector Description:** 1-meter & 3-meter CameraLink Micro-D Jumper
- 1.3. **Cable Primaries<sup>1</sup>:** 30 AWG SPC PFA
- 1.4. **Cable Shield:** Braided Shielded (90% Min coverage) + Foil
- 1.5. **Cable Jacket:** Polyurethane UL94 V0 & LSZH Jacket
- 1.6. **Insulator:** 31-position (Only 26 pins populated)

### 2. High-Speed Performance Targets<sup>2</sup>

- 2.1. **Cable Differential Impedance:** 100  $\Omega$  +/-10  $\Omega$
- 2.2. **Differential Insertion Loss:** Less than 3.5dB to 100 MHz; less than 10dB to 1000MHz
- 2.3. **Differential Far-End Crosstalk:** Less than 4%
- 2.4. **Differential Near-End Crosstalk:** Less than 4%
- 2.5. **Differential Skew:** Less than 50ps/m

	Parameter	Spec	1-meter	3-meter	
2.1	Cable Differential Impedance	Z <sub>MIN</sub>	90 $\Omega$	99 $\Omega$	
		Z <sub>MAX</sub>	110 $\Omega$	105 $\Omega$	
2.2	Differential Insertion Loss	LOSS <sub>100MHz</sub>	< 3.5 dB	1.7 dB	2.5 dB
		LOSS <sub>1000MHz</sub>	< 10 dB	2.9 dB	5.8 dB
2.3	Differential Far-End Crosstalk	FEXT <sub>100MHz</sub>	< 4%	2.0 %	1.1 %
2.4	Differential Near-End Crosstalk	NEXT <sub>100MHz</sub>	< 4%	2.8 %	2.8 %
2.5	Differential Skew	Skew <sub>MAX</sub>	< 50 ps/m	18.0 ps/m	13.3 ps/m

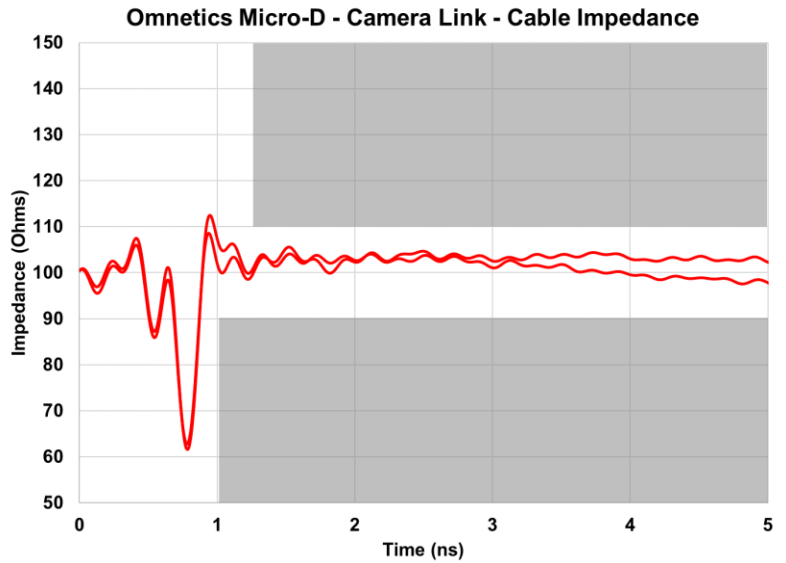
<sup>1</sup> Various cable options are available. Measurements shown above with cables manufactured in Asia.

<sup>2</sup> Per "Camera Link Appendix D Rev B", March 26, 2004.

## 2.1 Cable Differential Impedance

TDR (Time Domain Reflectometer) measures the impedance.

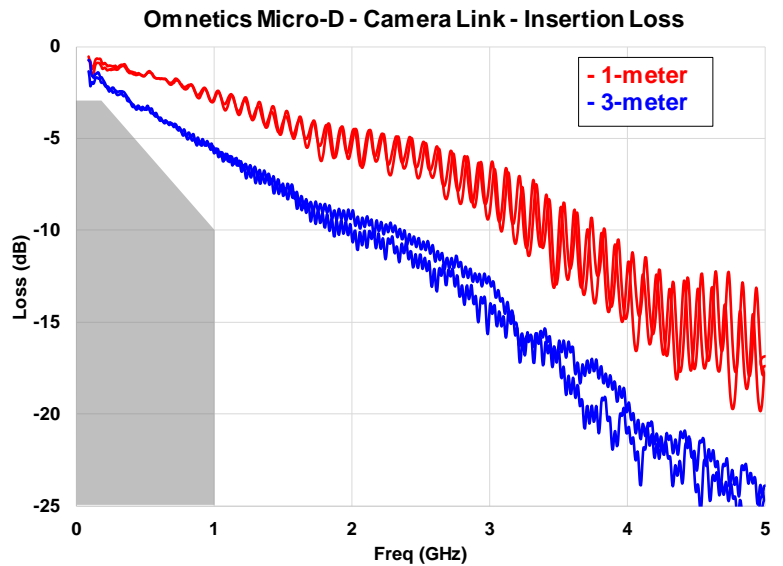
	SPEC	1-METER
Z <sub>MIN</sub>	90 Ω	98 Ω
Z <sub>MAX</sub>	110 Ω	106 Ω



## 2.2 Differential Insertion Loss

Insertion loss is the ratio of the transmitted signal to the incident signal.

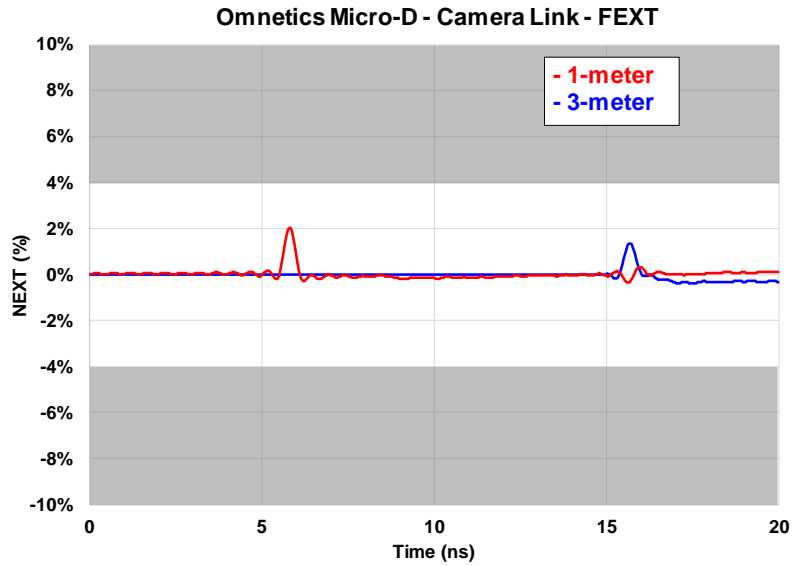
LOSS	SPEC	1-METER	3-METER
100 MHz	3.5 dB	1.7 dB	2.5 dB
1000 MHz	10 dB	2.9 dB	5.8 dB



## 2.3 Differential Far-End Crosstalk (FEXT)

Crosstalk measures the unwanted coupling between differential pairs.

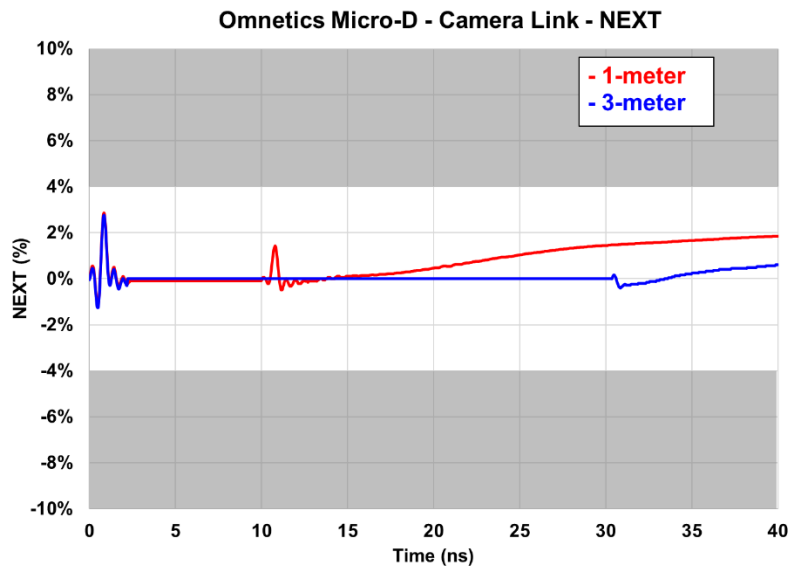
FEXT	SPEC	1-METER	3-METER
	< 4%	2.0 %	1.1 %



## 2.4 Differential Near-End Crosstalk (NEXT)

Crosstalk measures the unwanted coupling between differential pairs.

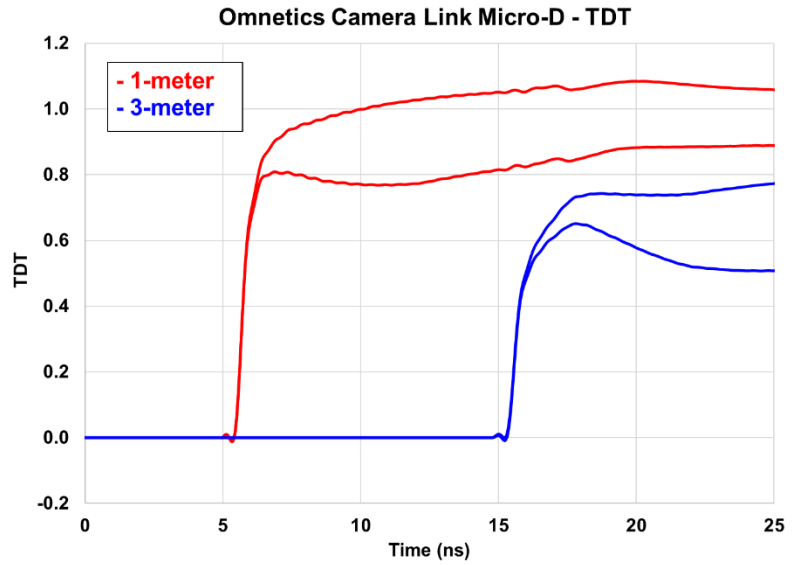
NEXT	SPEC	1-METER	3-METER
	< 4%	2.8 %	2.8 %



## 2.5 Differential Intra-Pair Skew

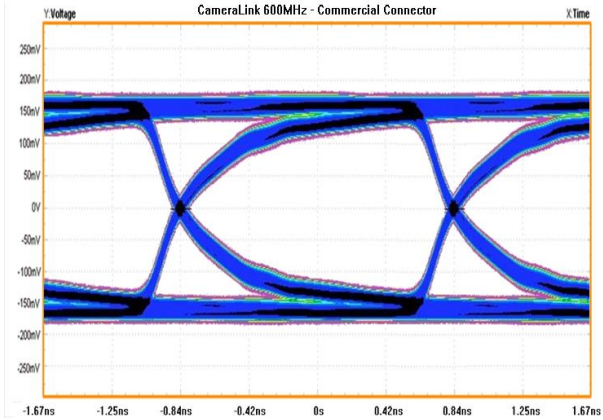
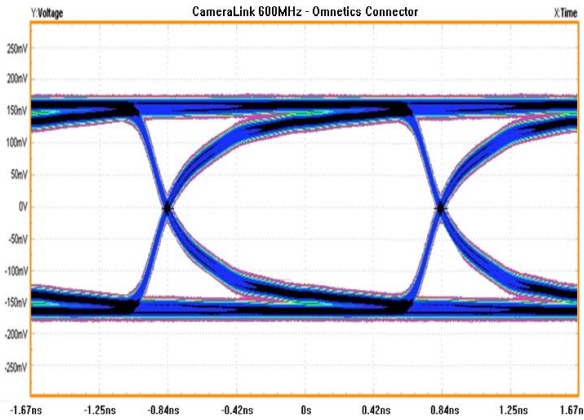
Intra-pair skew measures the difference in electrical length between signals within a pair.

SKEW <sub>MAX</sub>	SPEC	1-METER	3-METER
	< 50 ps/m	18 ps/m	13 ps/m



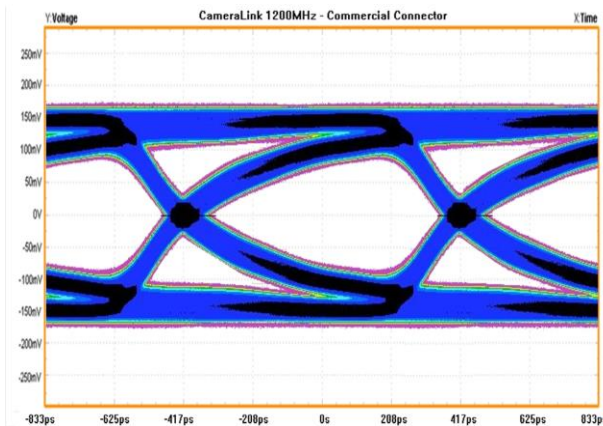
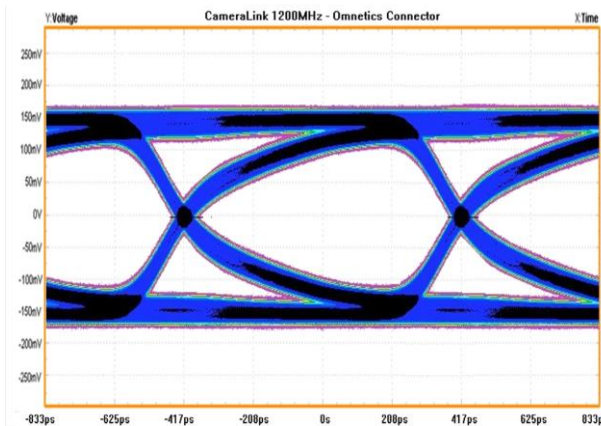
## Appendix 1 – Eye Diagram Measurements

### 600 Mbps<sup>3</sup> (Omnetics vs. Commercial)



Description	Omnetics	Commercial
Total Jitter	78 ps	136 ps
Data-Dependent Jitter	48 ps	97 ps
Eye Width	1.59 ns	1.53 ns
Eye Height	223 mV	201 mV

### 1200 Mbps (Omnetics vs. Commercial)



Description	Omnetics	Commercial
Total Jitter	98 ps	181 ps
Data-Dependent Jitter	72 ps	144 ps
Eye Width	0.74 ns	0.65 ns
Eye Height	162 mV	118 mV

### Test Equipment (Eye Diagrams Only)

Equipment Name	Manufacturer	P/N
Signal Generator	Keysight	M8020A
Real-time Oscilloscope	Tektronix	MSO73304DX

<sup>3</sup> Eye diagram testing performed by Granite River Labs

## Appendix 2 - Equipment List:

<b>VNA</b>	Agilent 8722ES
<b>Test Fixtures</b>	Omnetics Custom

## Revision Control:

<b>Rev1</b>	April 12, 2018
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