

TITLE**DisplayPort 1.3 HBR3
Plug to Plug Cable Assembly****Table of Contents**

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1.0 SCOPE

This specification covers the requirements for DisplayPort Plug to Plug Cable Assy.

2.0 PRODUCT DESCRIPTION

See the sales drawing for product shape; dimension and materials, the other section of this specification for the necessary referenced document and specification. The part number serial covered in this specification are as follow table:

Molex Series	Detail
68783	DisplayPort Plug to Plug Cable Assembly

3.0 PRODUCT SPECIFICATIONS

- 3.1 Rated voltage (Maximum): 30V AC (rms)
- 3.2 Rated current (Maximum): 0.5A AC (rms)/DC
- 3.3 Temperature
 - Operating temperature range: -20°C to +80°C (Without loss function)
 - Storage temperature range: -20°C to + 80°C (Without loss function)

4.0 QUALIFICATION

Laboratory conditions and sample selection are in accordance with EIA-364-1000.01

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5.0 PERFORMANCE

5.1 ELECTRICAL CHARACTERISTICS

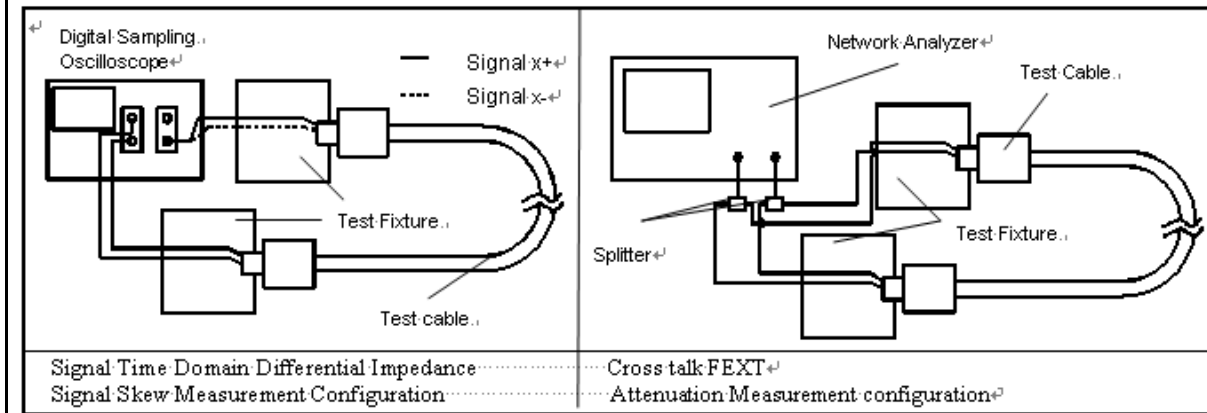
Test Description	Test Condition	Performance Requirement
Low Level Contact Resistance (Apply to DisplayPort plug connector kit)	Mated connectors Contact: measure by dry circuit, 20 mV Max., 10 mA (ANSI/EIA 364-23)	30 milliohm Max.
	Shell: measure by dry circuit, 5V Max., 100 mA (ANSI/EIA-364-06A-83)	50 milliohm Max.
Dielectric Withstanding Voltage (Apply to DisplayPort plug connector kit)	Unmated connector Apply 500V AC (rms.) for 1 minute between adjacent terminal and ground. Mated connectors Apply 300V AC for 1 minute between adjacent terminal and ground. (ANSI/EIA 364-20)	No breakdown
Insulation Resistance (Apply to DisplayPort plug connector kit)	Unmated connector Apply 500V DC between adjacent terminal and ground. (ANSI/EIA 364-21, method 302)	100megohm Min.
	Mated connectors Apply 150V DC between adjacent terminal and ground. (ANSI/EIA 364-21, method 302)	10megohm Min.
Contact Current Rating (Apply to DisplayPort plug connector kit)	Initial ambient temperature: 55°C Maximum After temperature changed: 85°C Maximum (ANSI/EIA-364-70, TP-70)	0.5A Min.
Applied Voltage Rating (Apply to DisplayPort plug connector kit)	40V AC (rms.) continuous maximum, on any signal pin with respect to the shield.	No breakdown
Electrostatic Discharge (Apply to DisplayPort plug connector kit)	Test unmated each connector from 1 kV to 8 kV in 1 kV steps using 8 mm ball probe. (IEC 61000-4-2)	No evidence of discharge to contacts at 8kV

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Time Domain differential Impedance	Rise time: 130ps. (20%-80%) Signal to ground pin ratio per Display Port designation. Differential measurement specimen environment impedance=100 ohms differential Source side receptacle connector mounted on a controlled impedance PCB fixture. (ANSI/EIA-364-108 Draft Proposal)	Connector & wire management	100±10% Ω
		Cable area(raw cable)	100±5% Ω
Cross Talk	Near End Noise (NEN) shall be defined in frequency domain and cover the bandwidth of up to 7GHz.	$Isolation_{max.}[dB] = \begin{cases} -26 & ; 0.1 < f \leq f_0 \\ -26 + 15 \text{Log}_{10}\left(\frac{f}{f_0}\right) & ; f_0 < f \leq 8.1 \end{cases}$ where: f is given in GHz f0=1.35GHz	
	The Far End Noise shall be defined in frequency domain.	$PSELFEN_{max.}[dB] = \begin{cases} -22 + 6\text{Log}_{10}\left(\frac{f}{f_0}\right) & ; 0.1 < f \leq f_0 \\ -22 + 40\text{Log}_{10}\left(\frac{f}{f_0}\right) & ; f_0 < f \leq 8.1 \end{cases}$ where: f is given in GHz f0=2.7GHz	
Differential Skew	Intra-Pair Skew Skew= TIME(Signal x+)-TIME(Signal x-) (Cable area only) Display Port designation. Differential measurement specimen environment impedance: 100 ohms differential Source-side receptacle connector mounted on a controlled impedance PCB fixture. (See fig. Below)	Intra-Pair Skew: 50ps Max. @TDR 130 ps(20%~80%)	
	Inter-Pair Skew Skew= TIME(Signal x+)-TIME(Signal x-) (Cable area only) Display Port designation. Differential measurement specimen environment impedance: 100 ohms differential Source-side receptacle connector mounted on a controlled impedance PCB fixture. (See fig. Below)	Inter-Pair Skew: 4 ns Max. @TDR 130 ps(20%~80%)	

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<p>Insertion Loss</p>	<p>Insertion Loss: Connect cable to connector on test fixture, Measure by Network Analyzer. (See fig. Below)</p>	$IL_{min}[dB] = \begin{cases} -8.7 \times \sqrt{\frac{f}{f_0}} - 0.072; & 0.1 < f \leq \frac{f_0}{3} \\ 5.68\sqrt{f} - 5.3 * f - 6.52; & \frac{f_0}{3} < f \leq 8.1 \end{cases}$ <p>where: f is given in GHz f0=1.35GHz (For High-bit-rate Cable Assembly)</p>
<p>Return Loss</p>	<p>Return Loss: Connect cable to connector on test fixture, Measure by Network Analyzer. (See fig. Below)</p>	$RL_{max}[dB] = \begin{cases} -15; & 0.1 < f \leq \frac{f_0}{2} \\ -15 + 12.3 \text{Log}_{10}\left(\frac{2f}{f_0}\right); & \frac{f_0}{2} < f \leq 8.1 \end{cases}$ <p>where: f is given in GHz f0=1.35GHz (For High-bit-rate Cable Assembly)</p>



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5.2 MECHANICAL CHARACTERISTICS

Test Description	Test Condition	Performance Requirement	
Cable Flexing	Rotate the specimen up to 100 cycles in each of 2 planes at the speed of 12 to 14 complete cycles (of 180 total traverse) per minute, see paragraph 6 Mandrel Diameter : X =3.7 × Cable Diameter. (ANSI/EIA-364-41, Condition I)	Appearance	No Damage
		Discontinuity	1 microsecond Max.
		Dielectric Strength and Insulation Resistance	Conform to item of Dielectric Withstanding Voltage and Insulation Resistance
Insertion Force/ Withdrawal Force (without latch type)	Insert and withdraw connectors at a rate of 25±3mm per minute. (ANSI/EIA-364-13)	Insertion Force	44.1N {4.5 kgf} Max.
		Withdrawal Force	
		After 2,000 times insert/ withdraw	9.8N {1.0 kgf} Min. 39.2N {4.0 kgf} Max.
		After 10,000 times insert/ withdraw	4.9N {0.5 kgf} Min. 39.2N {4.0 kgf} Max.
Latch Strength (with latch type)	Mate connectors, apply axial pull-out force in the axial direction at the speed rate of 13 mm/minute until the latch is disengaged or damaged. (ANSI/EIA-364-98)	Appearance	No Damage on both connectors
		Pull force	49.0N {0.5 kgf} Min.
Durability (Apply to DisplayPort plug connector kit)	Automatic cycling: 10,000 cycles at 100±50 cycles per hour. (ANSI/EIA-364-9)	Contact Resistance	Change form initial requirement : Contact:30 milliohm Max. Shell:50 milliohm Max.

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Vibration (Apply to DisplayPort plug connector kit)	Amplitude : 1.52 mm P-P or 147m/s ² {15G} Sweep time : 50-2000-50Hz in 20 minutes Duration : 12 times in each(total of 36 times) X, Y, Z axes. Electrical load : DC 100 mA current shall be Flowed during the test. (ANSI/EIA-364-28, condition III, Method 5A)	Appearance	No Damage
		Contact Resistance	Change form initial requirement : Contact: 30 milliohm Max. Shell:50 milliohm Max.
		Discontinuity	1 microseconds Max.
Shock (Apply to DisplayPort plug connector kit)	Pulse width : 11 msec., Wave form : half sine, 490 m/s ² {50G}, 3 strokes in each X, Y, Z axes. (ANSI/EIA-364-27 Condition A)	Appearance	No Damage
		Discontinuity	1 microseconds maximum
Pull Force	Cable pull-out (static) force: 5kgf for one minute	No damage, no open and short occur	

5.3 ENVIRONMENTAL CHARACTERISTIC

Test Description	Test Procedure	Performance Requirement	
Temperature Shock (Apply to DisplayPort plug connector kit)	Mate connectors and subject to the following conditions for 10 cycles. Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. 1cycle -55±3°C for 30 minutes +85±3°C for 30 minutes (Transit time shall be with in 3 minutes) (ANSI/EIA-364-32, Condition I)	Appearance	No Damage
		Contact Resistance	Change form initial requirement : Contact: 30 milliohm Max. Shell: 50 milliohm Max.
Humidity (Apply to DisplayPort plug)	A) Mate connectors together and perform the test as follows. Temperature : +25 to +85°C Relative Humidity : 80% to 95% Duration : 4 cycles (96 hours)	Appearance	No Damage

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connector kit)	Upon completion of the test, specimens shall be conditioned at ambient room conditions for 24 hours, after which the specified measurements shall be performed. (ANSI/EIA-364-31)	Contact Resistance	Change form initial requirement : Contact: 30 milliohm Max. Shell: 50 milliohm Max.
	B) Unmate connectors and perform the test as follows. Temperature : +25 to +85°C Relative Humidity : 80 to 95% Duration : 4 cycles (96 hours) Upon completion of the test, specimens shall be conditioned at ambient room conditions for 24 hours, after which the specified measurements shall be performed. (ANSI/EIA-364-31)	Appearance	No Damage
		Dielectric Withstanding Voltage and Insulation Resistance	Conform to item of Dielectric Withstanding Voltage and Insulation Resistance
Heat Resistance	Mate connectors and expose to 105±2°C for 250 hours. Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. (ANSI/EIA-364-17, Condition 4, Method A)	Appearance	No Damage
		Contact Resistance	Change form initial requirement : Contact:30 milliohm Max. Shell:50 milliohm Max.
Salt Spray	Mate connector and expose to the following salt mist condition. Upon completion of the exposure period, salt deposits shall be removed by a gentle wash or dip in running water, after which the specified measurements shall be performed. Nacl solution: Concentration: 5%±1%. Spray time: 24h±1h. Ambient Temperature: 35 °C ±2°C. EIA-364-26	Appearance	No Damage
		Contact Resistance	Change form initial requirement : Contact:30 milliohm Max. Shell:50 milliohm Max.

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