DisplayPort v1.3
Feature Summary

Sept 18, 2014

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DisplayPort 1.3 Summary

- The VESA DisplayPort Standard, Version 1.3, was released on Sept 15, 2015
- Replaces DisplayPort Version 1.2a for new designs
- Backward compatible, offers new optional features
- Compliance tests expected 1st Half of 2015

Summary of Main New Features for DP 1.3

- 50% Increase in video data transfer rate
  - supports higher resolutions
  - deeper colors
  - higher display refresh rates
- Further optimized for use on shared interfaces including DP Alt Mode on USB Type-C or DockPort
- "Living Room Friendly" features added to enhance applicability for consumer displays including digital televisions

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DP 1.3 Link Rate Increase

DP Version Introduction	Link Rate Name	Bit rate	Max Resolution Support (24 bpp, 60Hz Refresh, 4:4:4 format)	Max Resolution Support (24 bpp, 60Hz Refresh, 4:2:0 format)
DP 1.0	RBR	1.62 Gbps	1920x1080	Not supported
	HBR	2.7 Gbps	2560x1600	Not supported
DP 1.2	HBR2	5.4 Gbps	4K x 2K	Not supported
DP 1.3	HBR3	8.1 Gbps	5K x 3K	8K x 4K

Total useable data transfer rate for DP 1.3 = 25.92 Gbps

8.1 Gbps link rate, per lane
x 0.8 to account for 8b/10b transport coding overhead
x 4 maximum number of available lanes
25.92 Gbps total usable data transfer rate

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Example Display Support using HBR3 Link Rate

HBR3 enables the following display resolution through a single DisplayPort connection, without the use of compression:

- 5K x 3K (pixel resolution of 5120 x 2880) with 60Hz refresh, 24 bit color

- Enhanced 4K UHD display, with these example enhancements:
  - 120Hz refresh and 24 bit color
  - 96Hz refresh and 30 bit color

Note: The examples above assume the support of HBR3 by both the video source and display, and the use of VESA monitor timing. All examples assume the standard 4:4:4 display pixel format.

Example Display Applications for HBR3 Link Rate (Continued)

Using the DisplayPort Multi-Stream feature, HBR3 can enable the following example display configurations, without the use of compression:

- Two 4K UHD (3840 x 2160) displays
- Up to Four 2560 x 1600 displays (see note 2 below)
- Up to Seven 1080p or 1920 x 1200 displays (see note 2 below)
- One 4K UHD display with up to Two 2560 x 1600 displays

Notes:

(1) The examples above assume the following:

- *HBR3 and Multi-Stream supported by both the video source and displays*
- *60Hz refresh with 24 bit color, using the 4:4:4 pixel format and VESA monitor timing*

(2) The number of connected displays might be limited by video source capability. A typical personal computer will support a maximum of 3 to 6 displays, depending on the GPU.

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Optimization for Shared Interface Use

- Numerous specification enhancements to simplify the use of DisplayPort as an ingredient in the following interface examples:
  - The USB Type-C connector, using the DisplayPort Alt Mode
  - VESA DockPort Standard
  - VESA Mobility DisplayPort Standard (MyDP)
  - VESA Embedded DisplayPort Standard (eDP)
  - ThunderBolt
  - Future wireless interfaces

- Example enhancements to DP 1.3:
  - Improved link training to accommodate more varied and complex video transport topologies, along with the higher link rate of HBR3
  - The addition of link-trainable repeaters to increase performance and reliability across complex topologies (such as docking station + Hub + active cable)
  - Unified device register set to simplify implementation and allow devices to support various interface types

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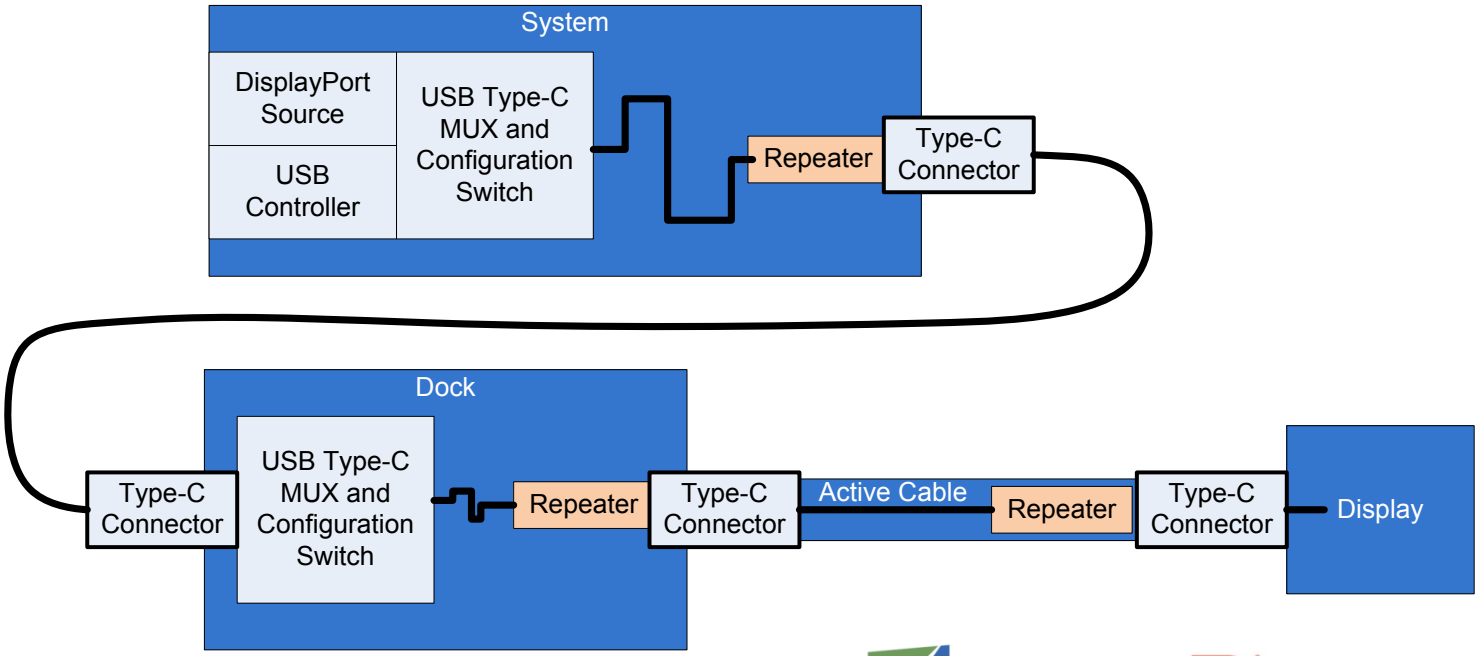
Example Link Trainable Repeater Application

- Used to overcome signal loss in complex signal distribution topologies
- Can be applied to active cables
- For each physical interface segment, link training results in signal transmitter and receiver adjustments to optimize signal performance
- This unique video interface feature yields a higher interface data rate with increased reliability and lower error rate



New “Living Room Friendly” Features

Support of HDCP 2.2

- New content protection protocol that will be required for viewing premium video content at UHD resolution

Support of DisplayPort-to-HDMI 2.0 Protocol Conversion

- Enables the support of DisplayPort-to-HDMI 2.0 protocol adapters for use with DisplayPort video source devices, include devices that use the USB Type-C connector supporting DisplayPort Alt Mode
- DisplayPort-to-HDMI 2.0 protocol converters will only require the HBR2 link rate and will support 4Kp60Hz in 4:4:4 pixel encoding format and CEC communication

New "Living Room Friendly" Features (Continued)

Support of native 4:2:0 pixel format

- This pixel format is often used for digital televisions to reduce video data rate requirements. The HBR3 link rate, combined with 4:2:0, can support a display resolution up to 8K x 4K (7680 x 4320), also known as QUHD
- Will also simplify DP-to-HDMI 2.0 protocol converter implementation when supporting HDMI digital TVs that require 4:2:0 format

Other New Features

- New definition for Branch Device using SST (Single Stream Transport mode)
  - Enables different link configurations between the upstream facing and downstream facing ports, such as 2 HBR2 links in, and 4 HBR links out
  - Simplifies the implementation of docking stations, those with USB Type-C receptacles supporting DisplayPort Alternate Mode
- Support of RAW pixel format to support high-performance camera sensors

DisplayPort 1.3 Continues to Support Other Features that are Unique to DisplayPort

- Support of multiple monitors using Multi-Stream
- Support of high-definition audio formats
- Support of Adaptive Sync
- Support of protocol converters to VGA, DVI, or HDMI
- Low voltage, AC coupled interface compatible with sub-micron process geometry, simplifying integration
- Data scrambling and fixed link rates simplify EMI and RFI mitigation
- Royalty free standard available to VESA members

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Expected DisplayPort 1.3 Deployment

- General availability of devices supporting new features such as HBR3 or 4:2:0 is expected in 2016.
- DP 1.3 is expected to be enabled in both native DP devices and devices using the USB Type-C interface with the DisplayPort Alternate Mode
- DisplayPort-to-HDMI 2.0 converters are expected in 2015. May require a firmware update for existing DP 1.2a systems.

For More Information about DisplayPort or VESA please visit:

www.vesa.org