Video Electronics Standards Association

New Developments Enabling Display Innovation

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VESA Board Member
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VESA - Who we are

An International Display and Display Interface Standards Development Organization

Over 280 Member Companies

Established in 1989

>50 Current Display-Related Standards Published
VESA Standards Serve Many Market Segments...

- PCs and laptops
- Smartphones and tablets
- Automotive
- Gaming consoles and headsets
- Digital projectors
- Digital signage / kiosks
...and Many Aspects of Display Technology

**Display Interface**
- DisplayPort
- DisplayPort over USB-C (DisplayPort Alternate Mode)
- Embedded DisplayPort
- Automotive (in development)

**Metrology**
- DisplayHDR

**Display Data Compression**
- Display Stream Compression (DSC)
- VESA Display Codec for Mobile (VDC-M)

**Display Capability Discovery**
- DisplayID
- Extended Display Identification Data (EDID)
- Multi-Display Interface
# VESA Standards Precede System Implementation

*VESA provides the display industry a place to create*

## DisplayPort Standard Releases

<table>
<thead>
<tr>
<th>DisplayPort Standard Version No.</th>
<th>1.0</th>
<th>1.2</th>
<th>1.3</th>
<th>1.4</th>
<th>2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Release Date</strong></td>
<td>Q2 2006</td>
<td>Q1 2010</td>
<td>Q3 2014</td>
<td>Q1 2016</td>
<td>Mid 2019</td>
</tr>
<tr>
<td><strong>Payload bit rate</strong></td>
<td>8.64 Gbps</td>
<td>17.28 Gbps</td>
<td>25.92 Gbps</td>
<td>25.92 Gbps + DSC capability</td>
<td>~3X data rate increase</td>
</tr>
<tr>
<td><strong>Display resolution supported (single display) 24 bit color or higher</strong></td>
<td>2456x1536 @60Hz 1080p @120Hz</td>
<td>4K @60Hz</td>
<td>4K @120Hz 5K @60Hz</td>
<td>8K @60Hz using DSC</td>
<td>Coming soon!</td>
</tr>
</tbody>
</table>

## Others Standards

<table>
<thead>
<tr>
<th>VESA Standard</th>
<th>First Version Published</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSC (Display Stream Compression)</td>
<td>Q3 2013</td>
</tr>
<tr>
<td>DisplayPort Alt Mode (for USB-C video support)</td>
<td>Q3 2014</td>
</tr>
<tr>
<td>DisplayHDR</td>
<td>Q4 2017</td>
</tr>
</tbody>
</table>
Today DisplayPort 1.4a supports:
- 4K @120Hz using no compression
- 8K @60Hz HDR using VESA DSC compression
- Multiple displays supported from a single interconnect

DisplayPort protocols applied to various application:
- **“Native” DisplayPort**: Standard and Mini DisplayPort connectors and cables
  - Graphics cards, PC, monitors
- **DisplayPort Alt Mode**: USB-C connectors and cables
  - Phones, notebooks
- **Embedded DisplayPort (eDP)**: Embedded cables and displays
  - Embedded displays in notebooks, all-in-ones, tablets, and automotive
- **Tunneled DisplayPort**: Thunderbolt
  - Thunderbolt enabled devices and cables
• DisplayPort 2.0 – Coming mid-2019

  • 3x the data rate of DP 1.4a, the current standard
    • Will enable higher resolutions
      – 8k (7680x4320) @60 Hz, 30 bits per pixel with no compression
    • Improved support for multiple displays (such as for AR/VR)
      – 2 displays of 8k @120Hz 4:4:4 using VESA DSC compression
• Vehicular DisplayPort (VDP)
  • Longer term development for the automotive market
  • To address automotive requirements for embedded displays
    • Functional Safety
    • Security
    • EMC requirements
    • Serialized bit stream tunneling for long-reach box-to-box connections
VESDA DisplayHDR

- DisplayHDR is VESA’s High-Performance Monitor and Display Compliance Test Specification
- The display industry’s first fully open standard for HDR quality
  - Not display interface specific
- There are now over 60 DisplayHDR certified displays from 10 monitor suppliers
  - Includes both DisplayPort and HDMI enabled displays
VESA DisplayHDR

- DisplayHDR 1000 – PC monitors
- DisplayHDR 600 – PC monitors, Laptops
- DisplayHDR 500 – Low power laptops
- DisplayHDR 400 – Monitors and laptops
- DisplayHDR 500 True Black – OLED
- DisplayHDR 400 True Black - OLED

- Content-Creators
- Professionals
- Enthusiasts
- Lower Power, Good Quality
- HDR Entry level
- Great Shadow Detail and Visual Experience
VESDA Display Compression Codecs

- Industry-standard display interface compression codecs
- Visibly lossless, low complexity, low latency
- Support HDR and Wide Color Gamut
- Saves power and wire count in portable devices
- Enables higher display performance with a single video connector
  - Increased resolution, color depth, refresh rate
# VESA Display Compression Codecs

<table>
<thead>
<tr>
<th>VESA Codec</th>
<th>Max Compression Recommended</th>
<th>Adopting standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSC 1.1</td>
<td>3:1 (24 bit color) 3.75:1 (30 bit color)</td>
<td>VESA eDP 1.4b MIPI DSI 1.2 MIPI DSI-2 1.0</td>
</tr>
<tr>
<td>DSC 1.2a</td>
<td></td>
<td>VESA DisplayPort 1.4a HDMI 2.1</td>
</tr>
<tr>
<td>VDC-M 1.1</td>
<td>5:1 (24 bit color) 4:1 (30 bit color)</td>
<td>MIPI DSI-2 1.1</td>
</tr>
</tbody>
</table>
VESDA Developments

VESDA is a Member-Driven Organization

• New and Updated Standards are driven by:
  • Member contributions (VESDA policies provide IP protection for contributors)
  • Committee discussions and membership review

• Ecosystem based on new VESA standards is enabled by:
  • Member PlugTests
  • Compliance / logo test development and implementation
  • Marketing and tradeshows
  • Training seminars
Come See Us at Booth 641

• VESA’s Display Week Exhibit Demonstrations
  • DisplayHDR
  • Compression Codecs
  • Automotive eDP
For More Information

• VESA Websites:  www.vesa.org, displayport.org and displayhdr.org

THANK YOU!