HDMI LA
The Road to 8K and Next Generation Features

HDMI Licensing Administrator, Inc.
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HDMI Adopter and Marketplace Update
HDMI Technology Market Position

• Almost **900 million** HDMI-enabled devices shipped in 2017

• Installed base of over **7 Billion** HDMI products have shipped worldwide

• **1,800** of the world’s largest consumer electronics, PC and mobile device manufacturers include HDMI connectivity in their products
A Broad Range of Product Categories

- Flat Panel TV
- DVD & Blu-ray player/recorder
- TV Set Top Box
- Media Stick
- Projector
- AV Receiver
- Video Game Console
- VR and AR solution
- Digital Still Camera
- Digital Camcorder
- Wearable Camera
- Automotive
- Drone Camera
- Discrete Adapter Solution
- Desktop PC
- Notebook PC
- PC Tablet
- LCD PC Monitor
- Notebook PC Docking Station
- Smart Phone
- Media Tablet
- Karaoke Player
- Health Care AV
HDMI Technology Product Volume

Shipments of HDMI enabled products continue to grow overall
4K TVs Continue Market Growth

4K TV shipments continue to increase taking over the mid-price and getting deeper into the lower tier segments.

In 2018 4K UHD TVs are expected to reach over 40% of total shipments worldwide.

And forecast to reach almost 50% in 2020.
What’s Next? 8K TV Shipment Forecast for Strong Growth

Tokyo Olympics in 2020 and Beijing Winter Olympics in 2022 to be broadcast in 8K

Even before there is 8K content, 8K TV shipments are projected to grow rapidly with China leading the way

Most major panel makers have added 8K resolution to their immediate product road maps
Beyond Resolution

More immediate drivers for new product development

• Virtual Reality and Augmented Reality driving resolution and faster frame rates

• Drone cameras adopting the higher resolutions and faster frame rates

• Automotive entertainment systems enabling more connected device integration

• Smoother, faster, no-lag, no-latency and blackout-free overall experiences with Variable Refresh Rate for gaming, Quick Media Switching, Quick Frame Transport, and Auto Low Latency Mode for movies, TV and personal content

• Dynamic HDR is the next leap in video quality

• Easier-to-connect and better audio quality with eARC
The HDMI Forum Mission

Support and develop future versions of the HDMI Specification

Support the eco-system of interoperable HDMI-enabled devices

Foster broader industry participation in the development of future versions of the HDMI Specification
HDMI Forum Milestones

- October 25, 2011: HDMI Forum, Inc. established
- September 4, 2013: Version 2.0 of the HDMI Specification released
- April 8, 2015: Version 2.0a of the HDMI Specification released
- March 9, 2016: Version 2.0b of the HDMI Specification released
- November 28, 2017: Version 2.1 of the HDMI Specification released

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The organization brings together the world’s leading companies including:

- Manufacturers of consumer electronics, personal computers, mobile devices, cables and components and silicon
- Movie studios and content providers, service providers, test labs and test equipment manufacturers

In the last year the organization has grown from 83 to 92 members
Broad Spectrum of 92 Global Member Companies
Membership in the HDMI Forum is open to any interested company wishing to become a member

Companies are encouraged to apply and help shape the future of HDMI technology

Benefits:
• Participate in the HDMI specification development
• Gain insight into the future of HDMI technology
• Members are eligible to join the Technical Working Group, the Marketing Working Group, and be elected to the Board of Directors
HDMI 2.1 SPECIFICATION
HIGHER RESOLUTIONS
FASTER REFRESH RATES
8K delivers a super-immersive viewing experience with 2x the horizontal and vertical resolution of 4K, and 4 times as many pixels.
In addition to 4K and 8K, a range of resolutions are supported including 5K and 10K.
**Faster Refresh Rates**

8K60 enables smooth and sharp viewing of content with high-speed action

4K120 enables ultra fast-motion UHD images to be crisp and razor sharp – in particular sports, action movies, high-performance gaming and VR benefit significantly
Both uncompressed and compressed bandwidth are supported and enabled to deliver a full range of features.

Supports the latest color spaces such as BT.2020 with 10 or more bits per color and at higher frame rates.

CIE 1931 chromaticity diagram showing the Rec. 2020 (UHDTV) color space in the triangle and the location of the primary colors.

DYNAMIC HDR
Dynamic HDR enables a noticeable progression in overall video image quality from SDR to static HDR, and now static HDR to dynamic HDR.

simulated images
Movies and other content will be able to take advantage of HDR’s expanded contrast ranges, brightness levels, and heightened levels of detail—and now have them optimized on a scene-by-scene or even a frame-by-frame basis.
Static HDR uses a single image descriptor in metadata that is a compromise that applies to every scene and every frame of the whole movie.
Dynamic HDR ensures every moment of a video is displayed at its ideal values for depth, detail, brightness, contrast, and wider color gamuts—on a scene-by-scene or even a frame-by-frame basis.

Dynamic HDR image descriptor in metadata can be specific to each individual scene...

or even on a frame-by-frame basis

simulated images
ULTRA HIGH SPEED HDMI CABLE
Ensures high-bandwidth dependent features are delivered including enhanced video and audio performance, and also improves EMI characteristics relative to High Speed Cables.
INTRODUCING THE ULTRA HIGH SPEED HDMI CABLE

Supports the full range of uncompressed HDMI 2.1 Specification features including 8K video with HDR

Enables up to 48Gbps bandwidth
eARC
eARC (Enhanced Audio Return Channel)

eARC is an HDMI 2.1 feature which ensures full compatibility between audio devices and upcoming HDMI 2.1 products.

eARC simplifies connectivity, provides greater ease of use, and supports the most advanced audio formats and highest audio quality.
eARC supports the most advanced high-bitrate home theater audio formats, object-based audio, uncompressed 5.1 and 7.1, and 32-channel uncompressed audio.

Object-based audio provides an immersive multi-dimensional experience and enhanced audio detail and depth.
ENHANCED REFRESH RATE FEATURES
Enhanced refresh rate features ensure an added level of smooth and seamless motion and transitions for gaming, movies, and video.
Variable Refresh Rate (VRR) is a gaming feature which produces a more fluid and better detailed gameplay experience. Variable Refresh Rate syncs up source and display with continually changing refresh rate, up to a frame-by-frame basis.
** VARIABLE REFRESH RATE **

3D graphics processor transmits video frames at the moment they are rendered, without being constrained to a fixed output or frame rate.

Each frame is rendered, delivered and displayed at its optimal quality.

Frames transmitted as soon as rendered without restraints
**Variable Refresh Rate**

Reduces or eliminates...
- Game interaction lag
- Frame stutter, skipping, and freezing
- Frame tearing
With Quick Media Switching (QMS) a source device can instantly switch the resolution or frame rate of its content without any display blackout, such as when switching between 60fps and 24fps video. The QMS-capable system will:

• Instantly change refresh rate
• Eliminate screen blackout
• Provide seamless transition
No matter the source or content – Quick Media Switching is super smooth, eliminating delay that may result in display stutter or blank screens before the content is displayed.
Another aspect of the enhanced refresh rate capabilities is Quick Frame Transport (QFT)

- Each video frame travels faster from the source even though the source does not increase its frame rate and results in deceasing latency
- This reduces lag for gaming, real-time interactive virtual reality, and enables more responsive karaoke
AUTO LOW LATENCY MODE
Auto Low Latency Mode (ALLM) allows the ideal latency setting to automatically be established for various entertainment applications, allowing for uninterrupted viewing and interactivity.

Auto Low Latency Mode enables latency mode auto-switching from applications such as movies and video to low latency applications such as gaming and real-time interactive virtual reality.

The latency setting is optimized for whatever application is used.
Premium HDMI Cable Certification Program
Premium HDMI Cable Certification Program

Supporting the installed base of hundreds of millions of 4K UHD high-speed HDMI-enabled products

Program elements include:

• Enhanced speed tests
• High-speed specific EMI test
• Design guideline
• Authenticity and verification program
• Product lifecycle checks and audits
• HDMI smartphone app for in-store and in-field authentication check
The only HDMI cable test program:

• Administered by the agent for the HDMI specification

• That requires every length of every model line to be tested

• That requires each cable to be tested at an official HDMI Authorized Test Center

• That regularly audits cables for continuing test compliance throughout the life of the product

• That requires a proprietary anti-counterfeiting label on each product

• That uses a proprietary 2-level commercial grade mobile scanning app available for Android and Apple and also in the top 10 China app stores
Global Distribution

Global distribution includes hundreds of major brands and resellers in CE and commercial AV including:

- Best Buy
- Walmart
- Vanco
- Liberty Wire
- Binary
- Crutchfield
- Rocketfish
- Lowes
- Saturn
- HAMA
- Blackweb
- GE
- Panasonic
- JVC
- Media Markt
- Amazon
- Sony
- Monoprice
- Startech
- Legrand
- Swisscom
HDMI Alt Mode for USB Type-C
HDMI Alt Mode for USB Type-C™

Enables two of the most popular connectivity solutions to come together

- Allows HDMI enabled sources with USB Type-C connector to connect directly to HDMI enabled displays
- USB Type-C connector is reversible, small form factor, multi-purpose, and gaining penetration in the mobile and PC markets
- Enables HDMI features to be utilized in source devices with USB Type-C connectors
- Uses a simple USB Type-C to HDMI cable with no adapters or converters

“USB Type-C is quickly becoming the connector of choice for many types of consumer electronics products wanting a single solution for audio, video, data and power,” said Jeff Ravencraft, USB-IF President and COO.

“Easily connecting devices with USB Type-C to the huge installed base of HDMI-enabled TVs is a substantial benefit to consumers.”
Key Benefits

Other Alt Mode connectivity requires a world of adapters, converters, and docks
Key Benefits

Single USB Type-C to HDMI Cable

No Adapters. No Converters.
What’s IN the Booth?

• HDMI 2.1 Feature Demonstrations by HDMI Forum members
  – eARC featuring 3 pre-production AVRs
  – Ultra high speed bandwidth
  – Ultra High Speed HDMI Cable
  – Link Compression
  – Dynamic HDR

• Premium HDMI Cables and demonstration

• HDMI Alt Mode for USB Type-C with Power Delivery and HDR

• HDMI Adopters displaying HDMI technology
Thank You

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