



## An Update from HDMI Licensing, LLC

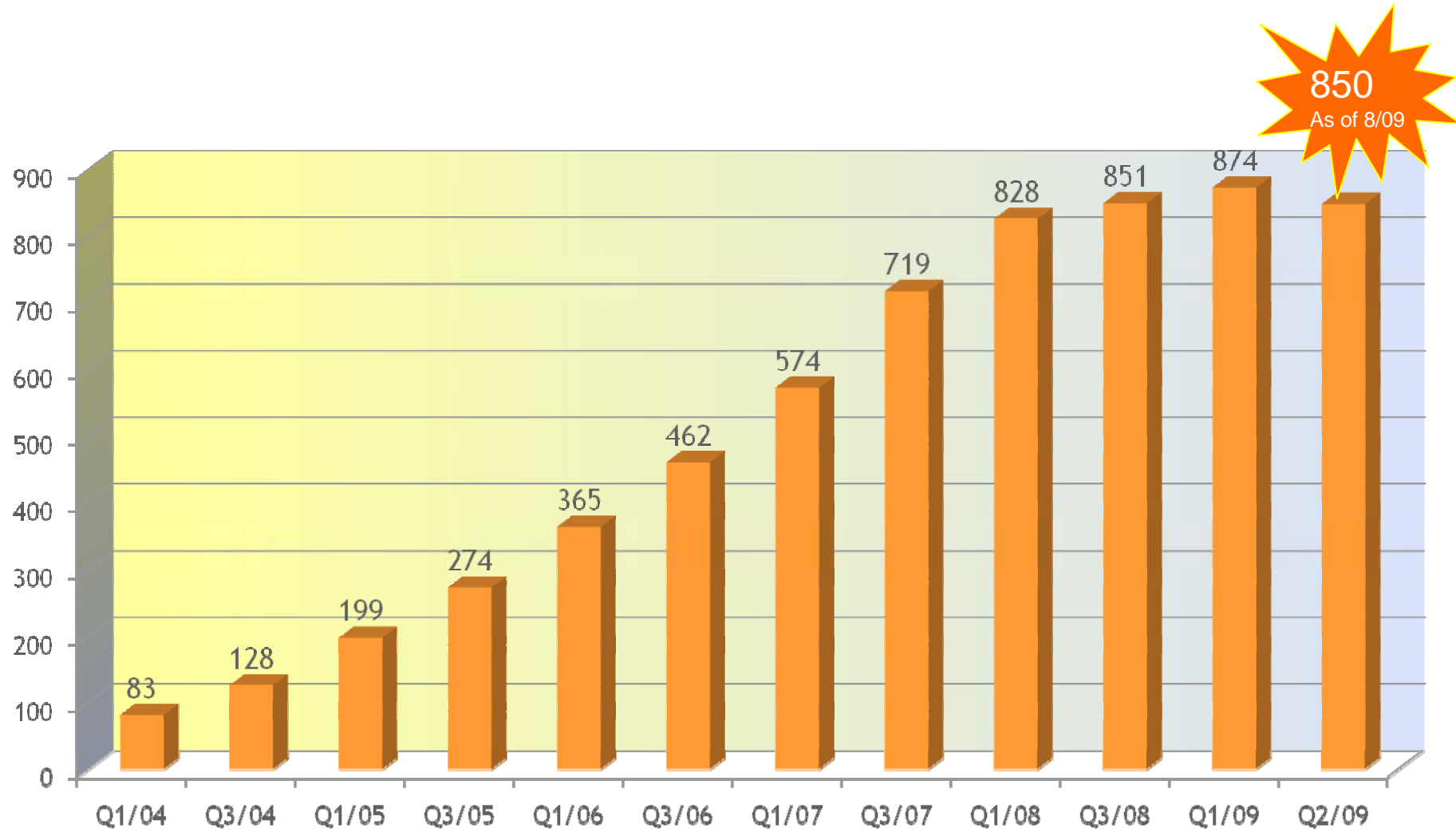
Steve Venuti, President  
HDMI Licensing, LLC

# Discussion Topics



- Market Overview
- HDMI 1.4 Overview of Features
- HDMI Licensing Adopter Update
  - Opening of a New Authorized Test Center
  - Launch of Compliance Test Specification 1.4
  - Launch of Revised Trademark and Logo Guidelines
  - Adopter Road Shows

# 850 Licensed Adopters



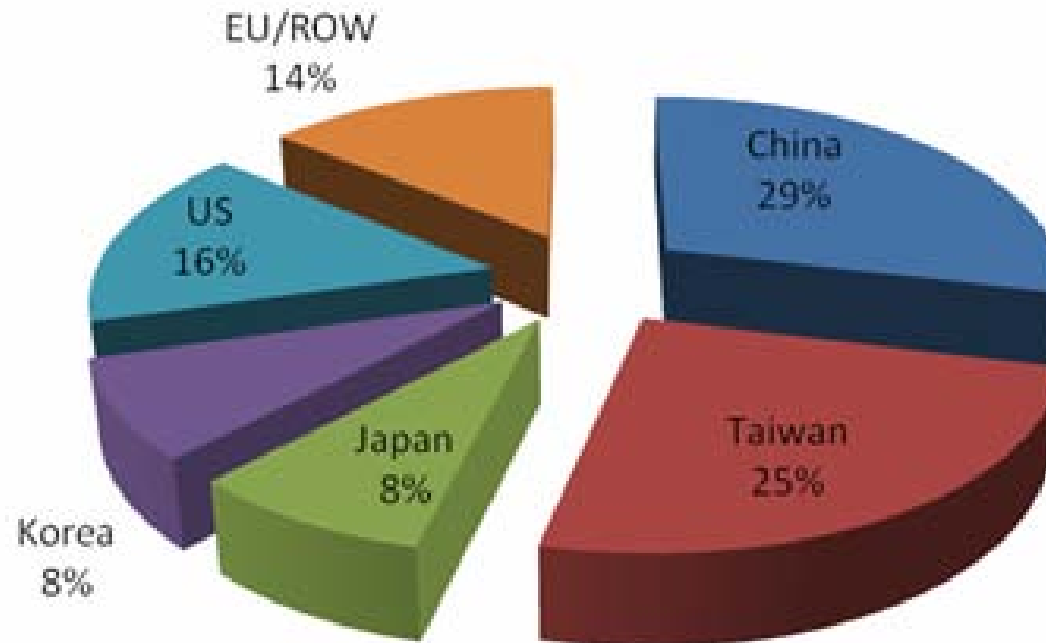
Source: 04/2009, HDMI, LLC



# Adopters by Geographic Distribution

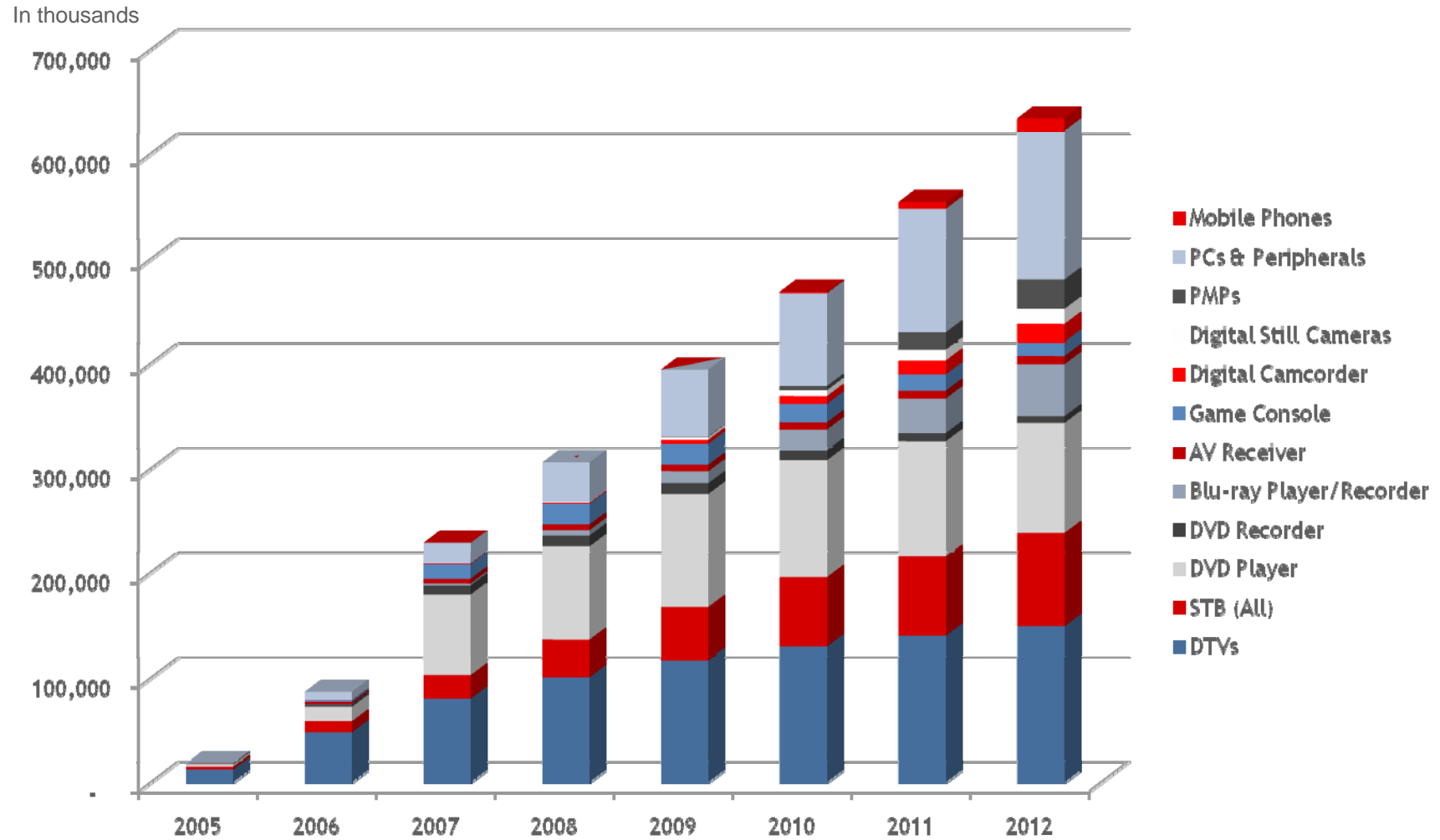


## HDMI Adopters Distribution



Source: 04/2009, HDMI, LLC

# Projected HDMI Devices Shipped



# One Billion Unit Installed Base...



[million units]

1200

1000

800

600

400

200

0

2004

2005

2006

2007

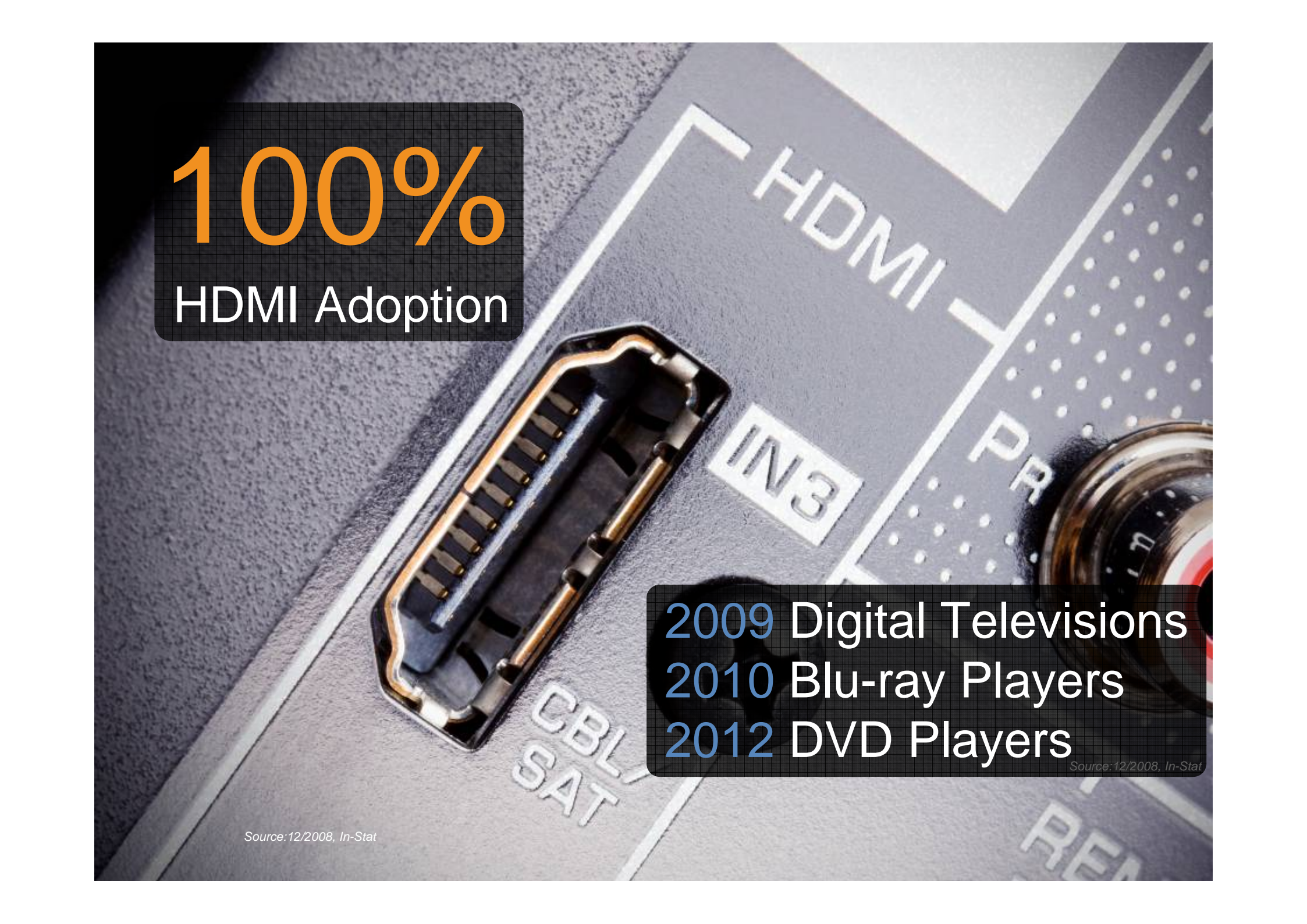
2008

2009

Source: 12/2008, In-Stat



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100%

HDMI Adoption

2009 Digital Televisions  
2010 Blu-ray Players  
2012 DVD Players

Source: 12/2008, In-Stat

Source: 12/2008, In-Stat

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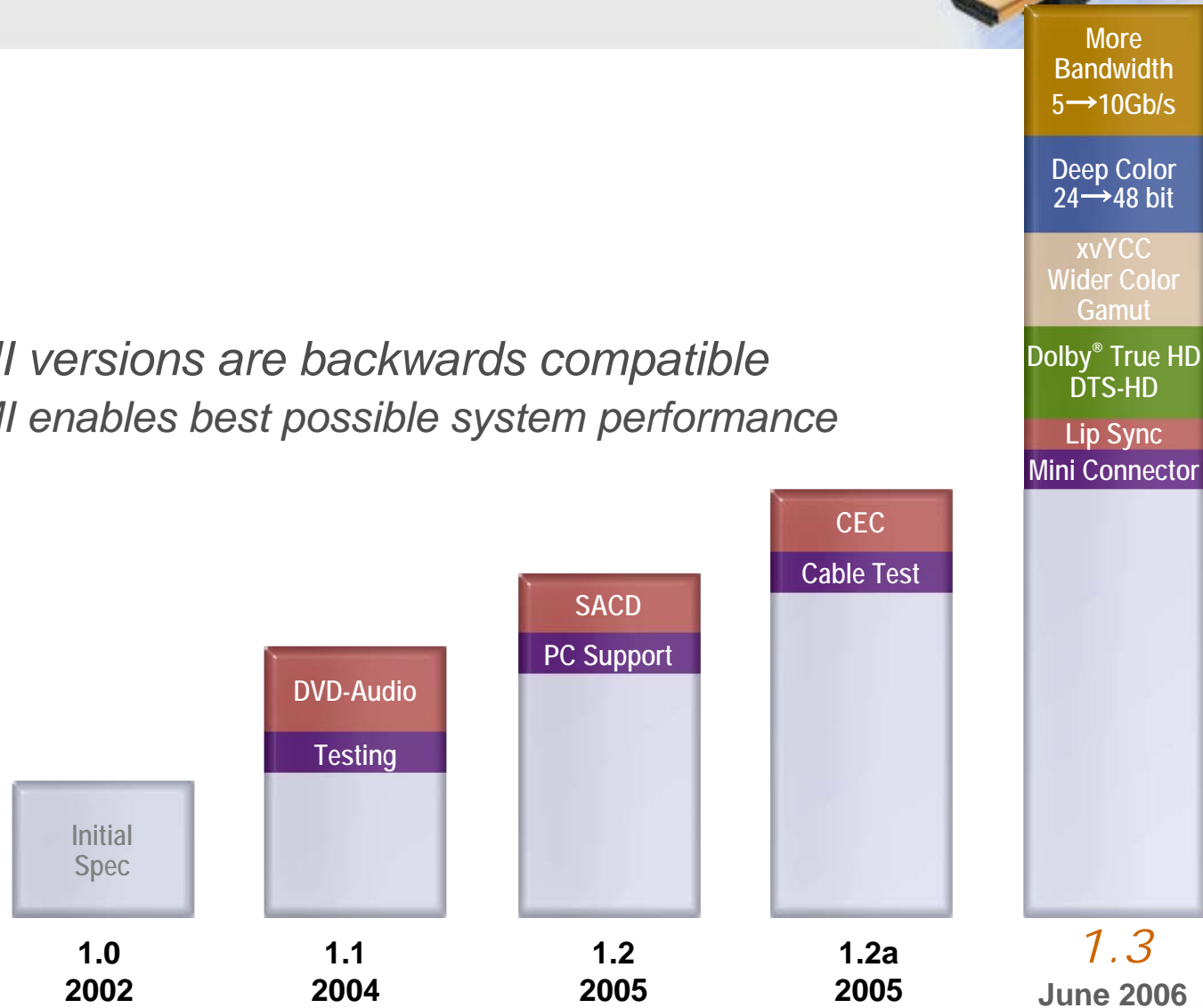
## HDMI 1.4 Overview of Features



# HDMI Evolution



*All HDMI versions are backwards compatible*  
*-HDMI enables best possible system performance*



# Our Vision



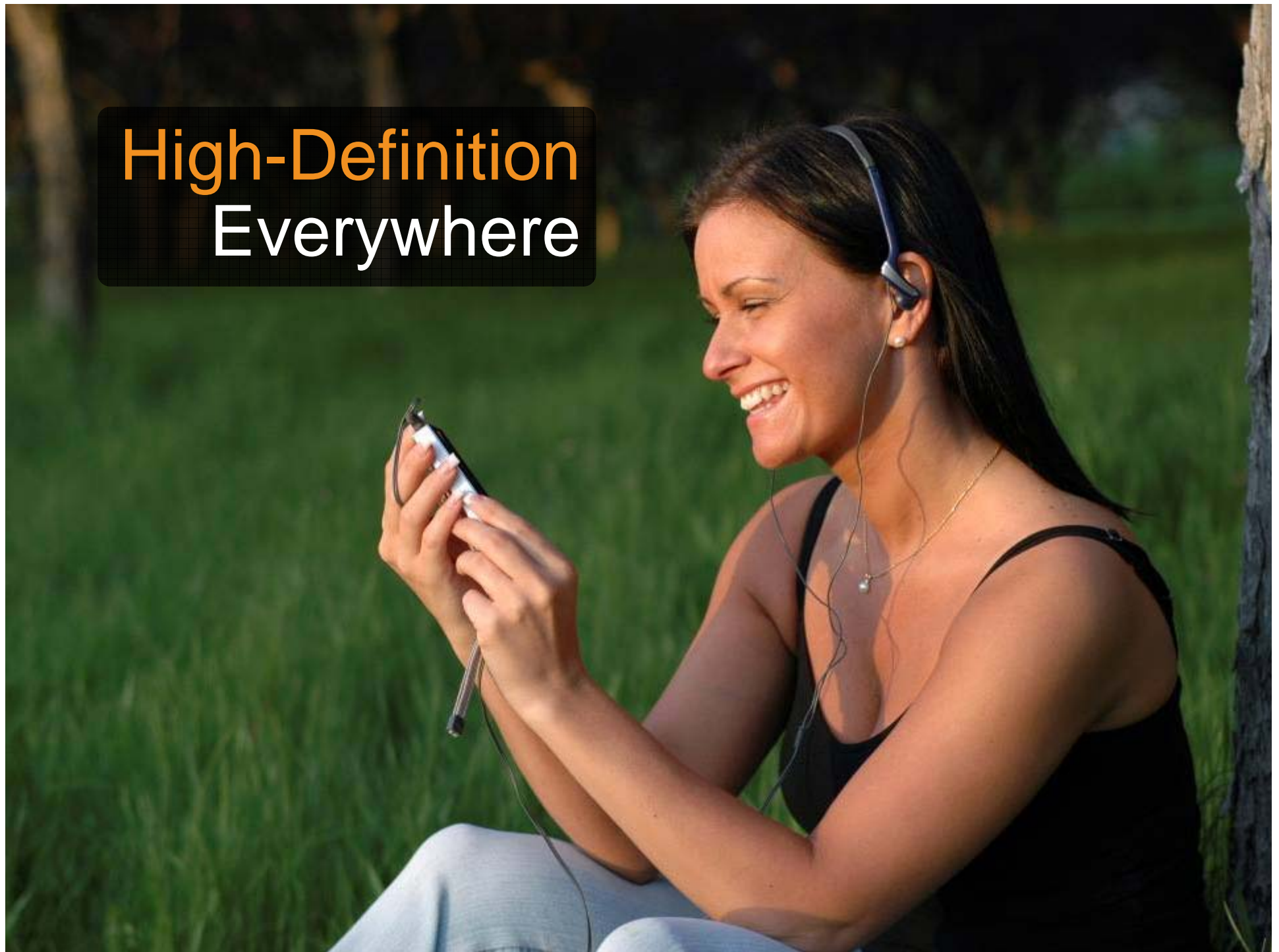
What are the trends that will impact the near-term future of consumer electronics?

# A New Era of Broadband Convergence



Heightened  
Viewing  
Experience

# High-Definition Everywhere



Simplicity,  
Ease of Use





HDMI Ethernet Channel  
Audio Return Channel  
3D Support  
4K x 2K Support  
More Color Spaces  
New Connectors

**HDMI 1.4**  
Specification

# Broadband Convergence: 2009

## The Next Evolution in CE

**24%** of all **consumer electronic** devices will require Ethernet

**100%** of **game consoles** and **digital media adapters** will have network capabilities

**80%** of **Blu-ray** devices will have network capabilities

**72%** of **PVR/DVRs** will have network capabilities



# HDMI Ethernet Channel

Consolidation of HD video, audio, and **data** in a single cable

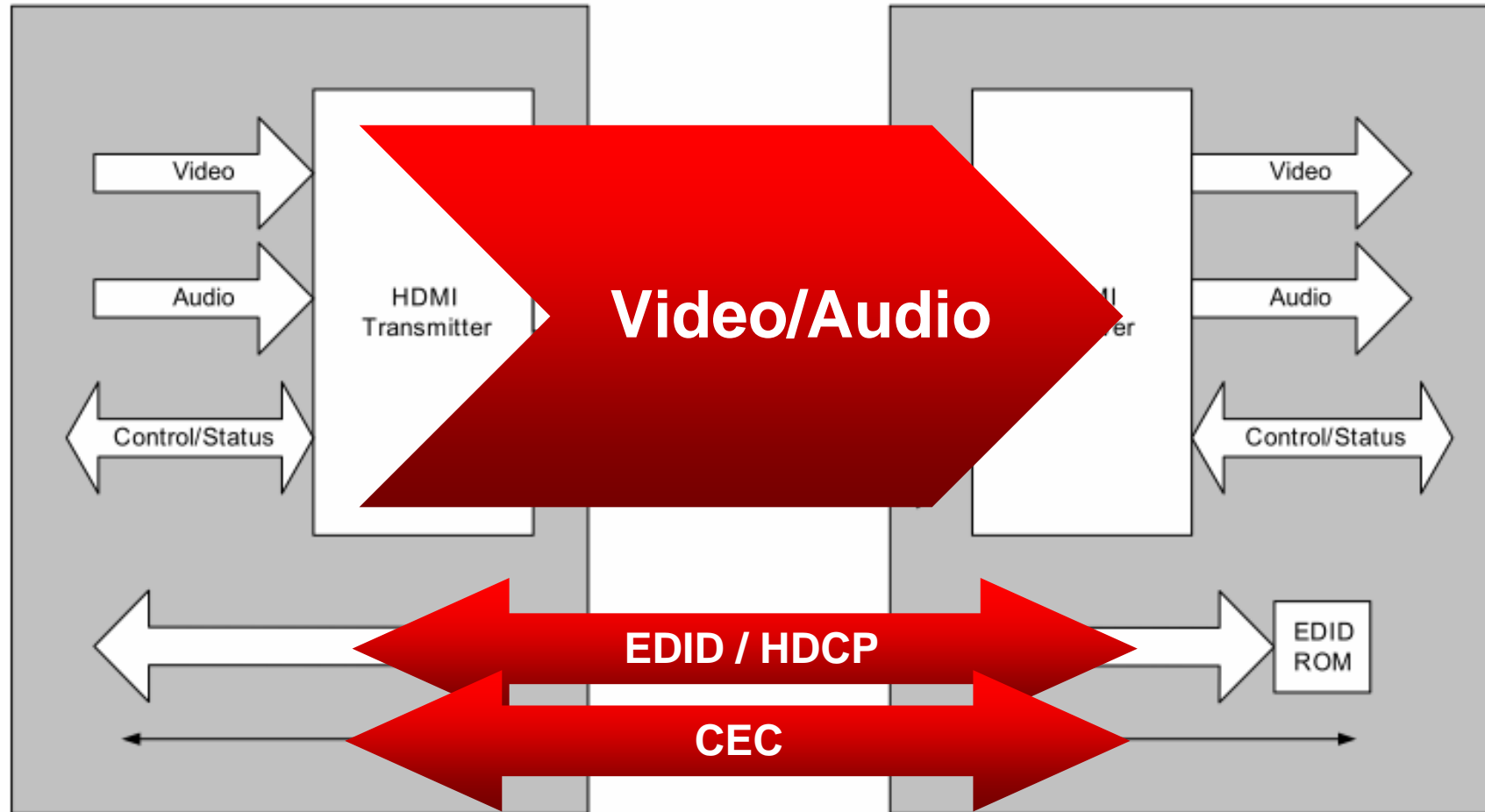
Enables high speed **bi-directional** communication

Enables **IP**-based applications over HDMI

Transfer speeds up to **100Mbps**

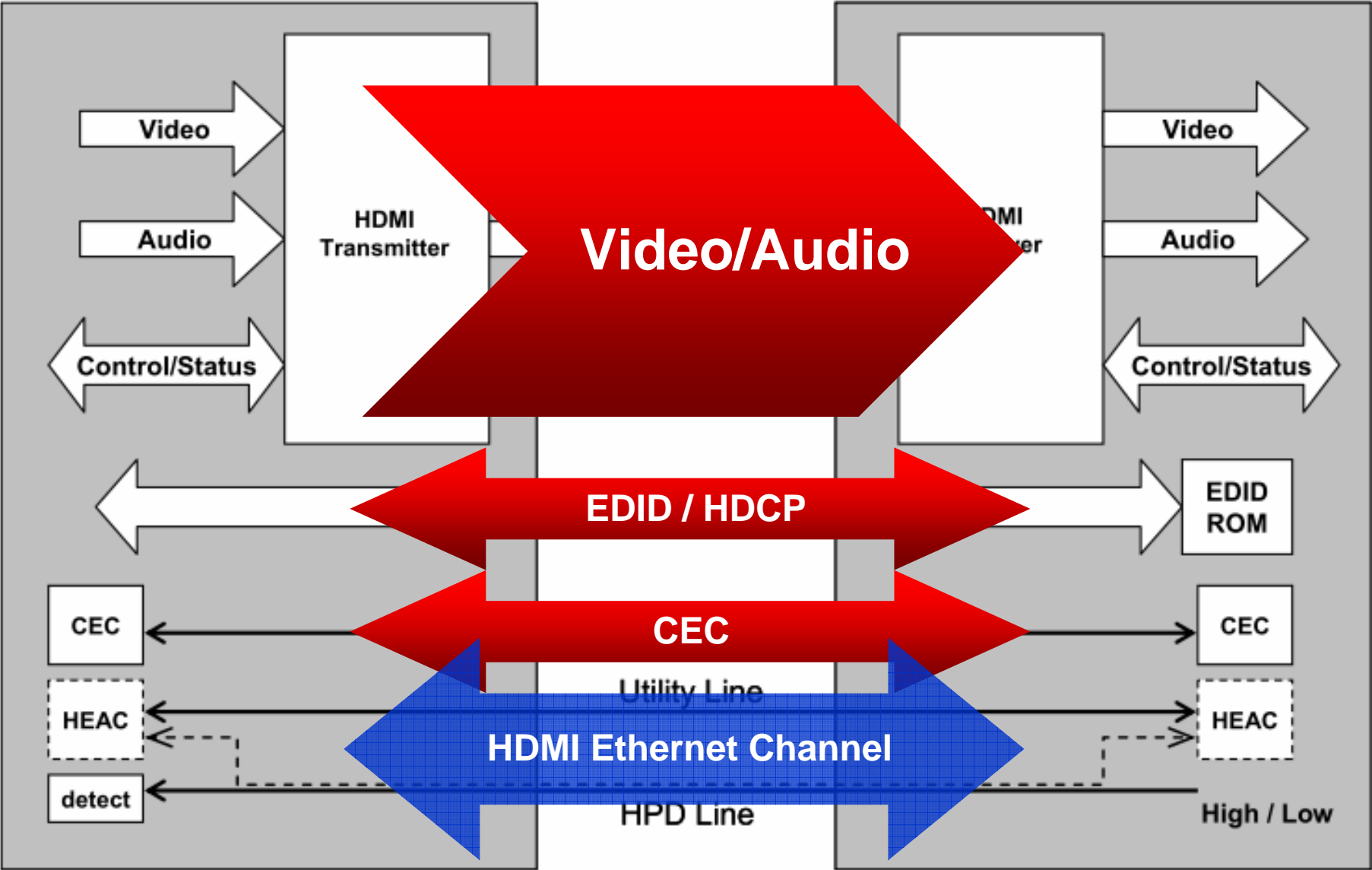


# HDMI Structure

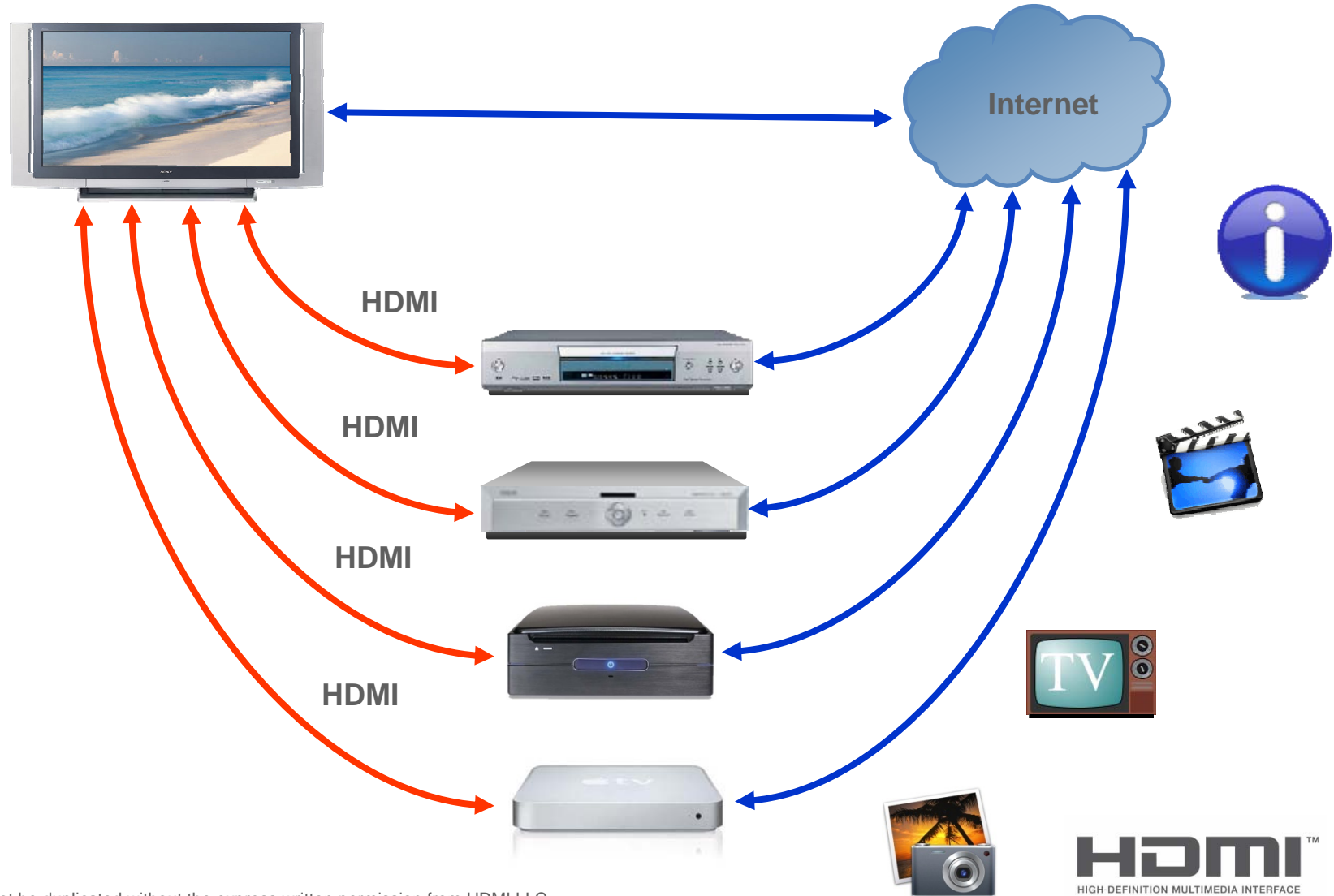


Before HDMI 1.4

# HDMI Structure



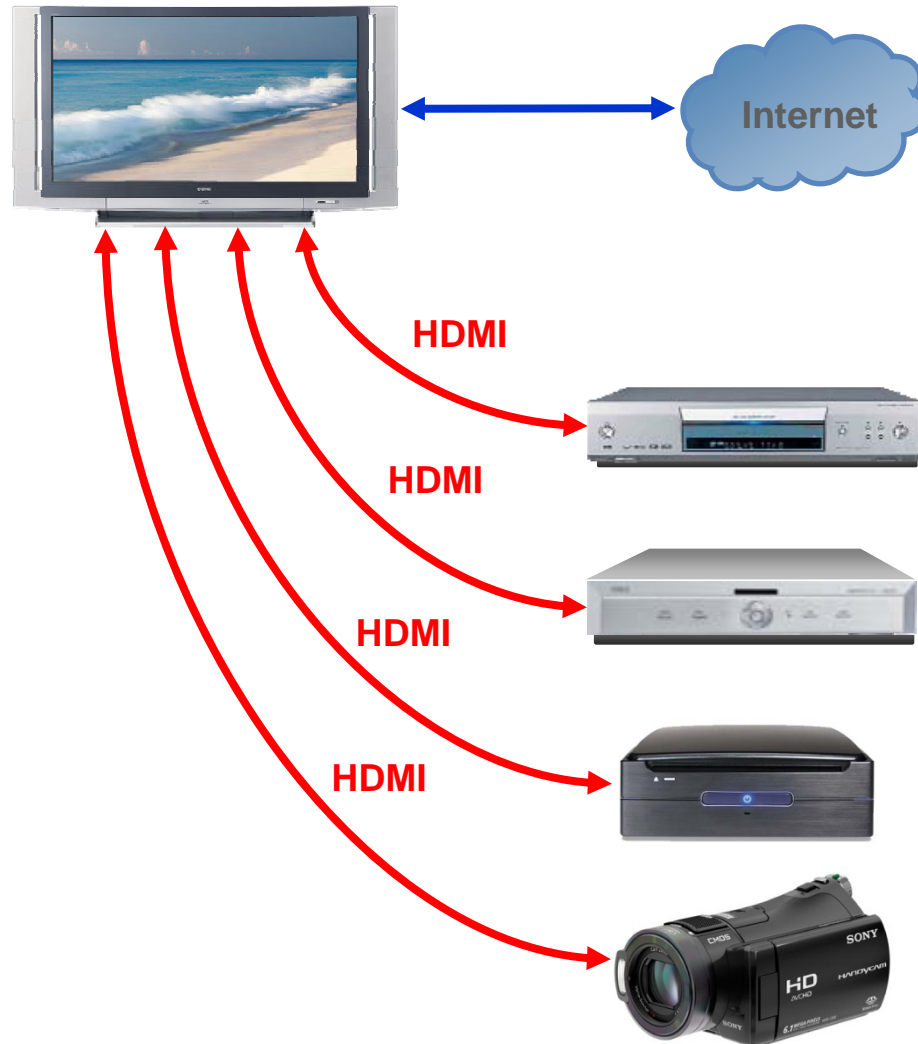
# HDMI Ethernet Channel: Use Case



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# HDMI Ethernet Channel: Use Case



Internet connection sharing  
Device-to-device content distribution

Enables “recording” over HDMI


Enables current and future IP-based applications such as DLNA, UPnP, IPTV, LiquidHD™ and others

All over a **single HDMI cable**

HDMI 1.4 defines new cables:

Standard HDMI Cable with Ethernet  
High Speed HDMI Cable with Ethernet





Simplicity,  
Ease of Use

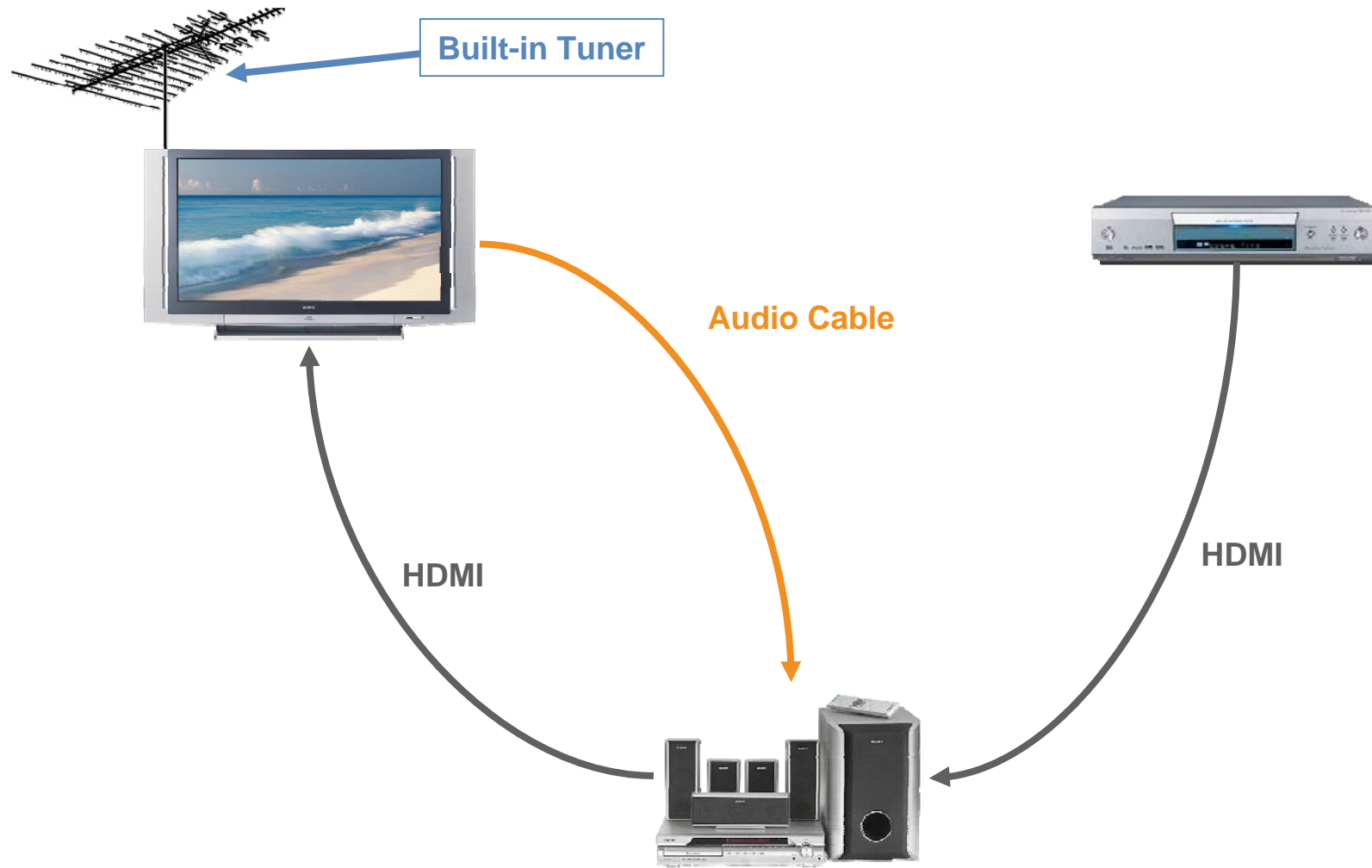
Adds an audio channel that enables “upstream” audio connections via HDMI

Simplifies the audio connection between the TV and Audio/Video Receiver

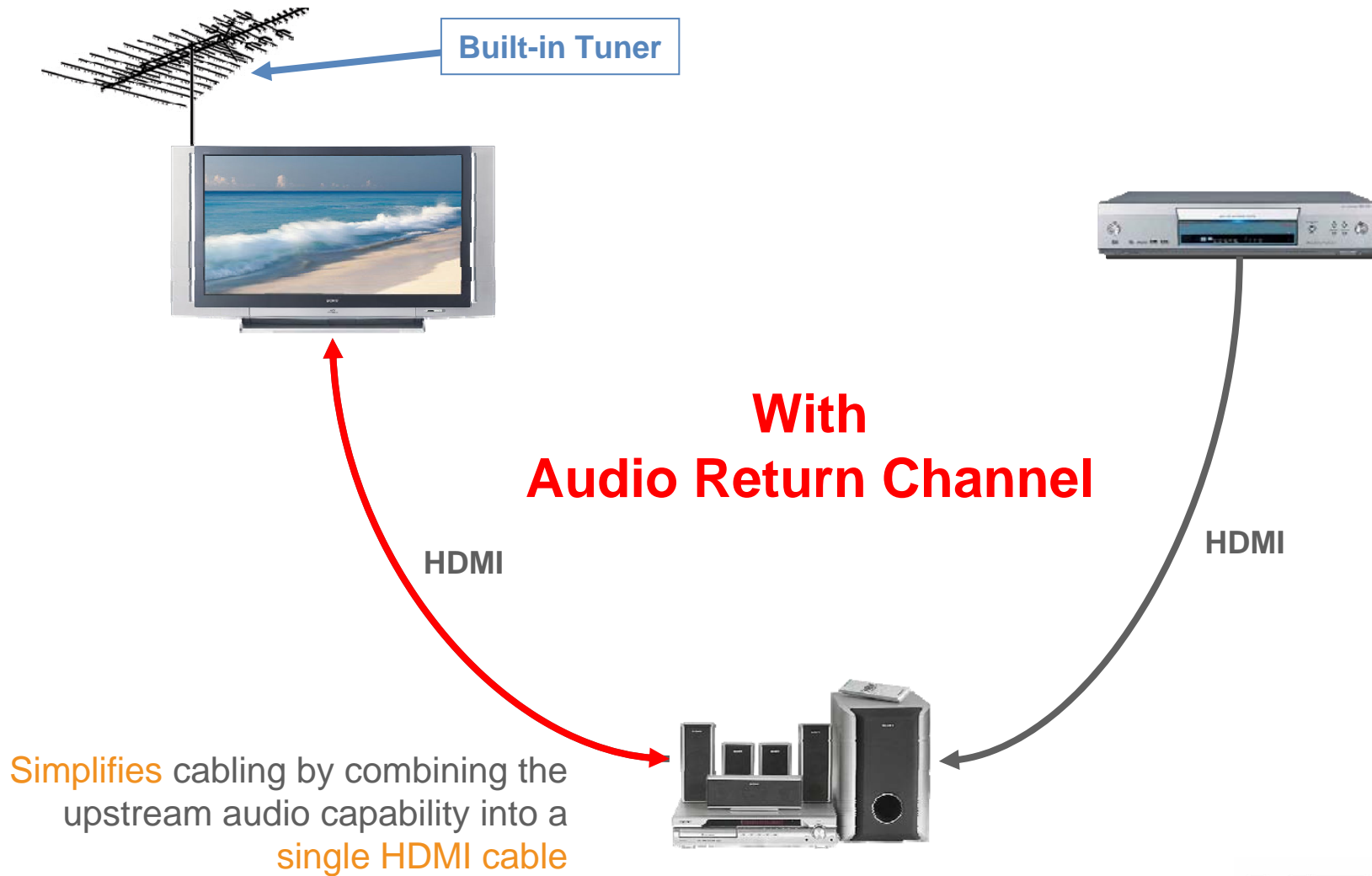
Helps reduce yet another cable within the home

Audio Return Channel

# Audio Return Channel: Use Case



# Audio Return Channel: Use Case





# Heightened Viewing Experience: 3D over HDMI



- The HDMI 1.4 Specification has established a critical **infrastructure** for implementing 3D in the home
- A major **milestone** on the path to bringing true 3D gaming and 3D home theater to the **mass market**



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# Heightened Viewing Experience: 3D over HDMI



Defines **common** 3D formats and resolutions

3D support for up to **1080p** resolution

Supports many **3D structures**:

Full side-by-side

Half side-by-side

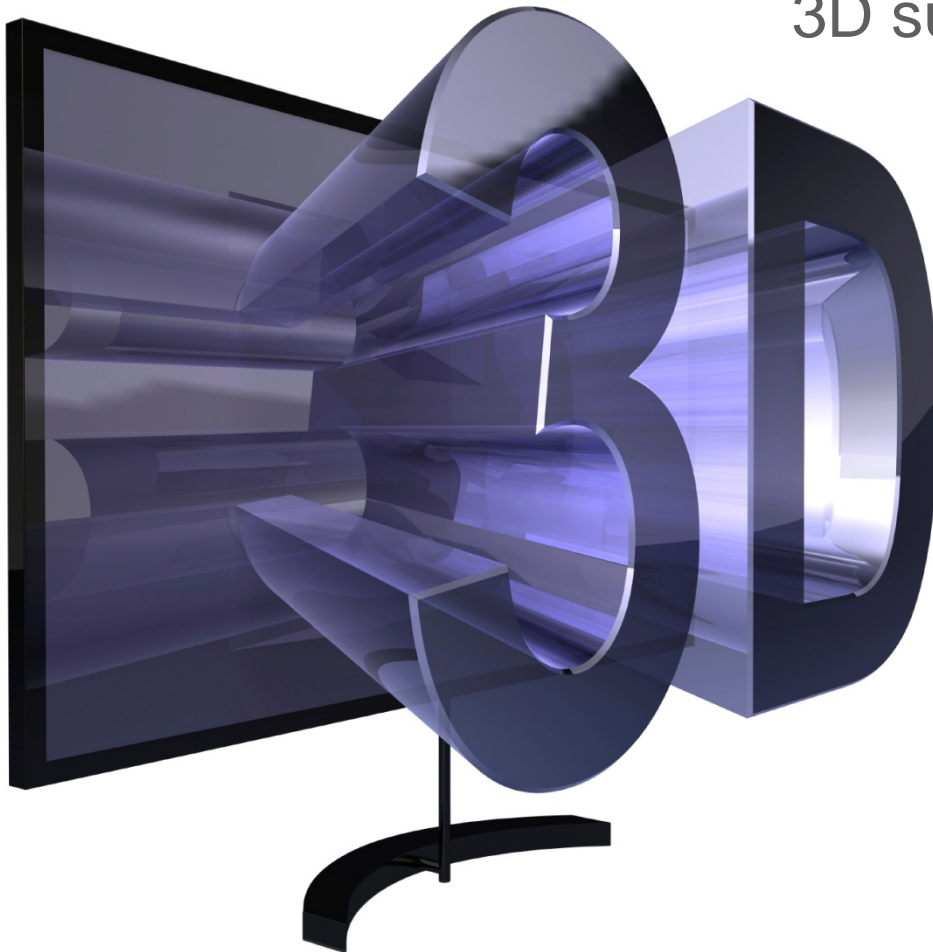
Frame packing

Field alternative

Line alternative

Left + Depth

Left + Depth + Gfx + Gfx Depth



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# HDMI 3D Interoperability



- Device Specific Requirements
  - Display devices must support **ALL** mandatory 3D formats
  - Source devices must support **AT LEAST ONE** of the mandatory 3D formats
- Mandatory 3D Formats
  - For **60Hz** devices:
    - 1080p @ 23.98/24Hz – Frame Packing
    - 720p @ 59.94/60Hz – Frame Packing
  - For **50Hz** devices:
    - 1080p @ 23.98/24Hz – Frame Packing
    - 720p @ 50Hz –Frame Packing

# 3D Formats and Content Types



- Mandatory 3D Formats
  - 1080p @ 23.98/24Hz
    - For **film** based content
  - 720p @ 59.94/60Hz or 50Hz
    - For **gaming** based content
- **Broadcast 3D Formats**
  - 3D format for broadcast-type content has **not** been defined at this time
  - **Not enough** 3D broadcast content to define a mandatory 3D format
  - HDMI Consortium intends to announce a mandatory 3D format for broadcast-type content within **one year** from the launch of the HDMI 1.4 specification

# Informative 3D Formats



- Informative 3D Formats
  - **Optional** 3D Formats
  - Manufacturers can choose their own combination of 3D structure and video resolutions to meet their needs
  - Formats maybe **added** and **existing** formats maybe **removed** based on market needs
- **3D Structures** Defined
  - Frame packing
  - Field Alternative
  - Line Alternative
  - Side-by-Side (Half)
  - Side-by-Side (Full)
  - Left + Depth
  - Left + Depth + Graphics + Graphics-depth

# 3D Capability and Discovery Process



- Display Device
  - 3D capability is declared within the EDID using the HDMI Vendor Specific Data Block
- Source Device
  - Confirms 3D capability of the Display via the EDID
  - Sends additional metadata via InfoFrame
    - Uses HDMI Vendor Specific InfoFrame
    - 3D Structure and other relevant information is sent to the Display

# Heightened Viewing Experience: Support for 4K x 2K Resolution



Same resolution as many **state of the art** digital theaters

Up to **4 times** the resolution of 1080p

**3840x2160** 24Hz | 25Hz | 30Hz

**4096x2160** 24Hz

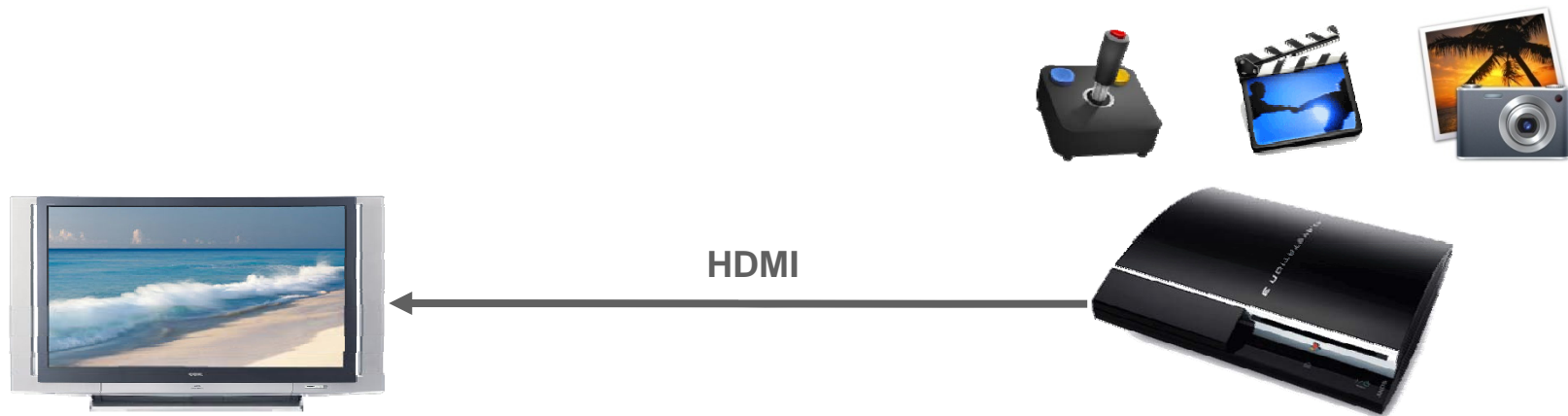


# Heightened Viewing Experience: Real-Time Content Signaling



Enables **real-time signaling** of content types between display and source devices

Enables the TV to **optimize** picture settings based on content type



Enables **simple, automated** picture setting selection with no user intervention



# Heightened Viewing Experience: Real-Time Content Recognition



Text/Graphics



Photo



Movie/Cinema



Game



Text/Graphics



Photo



Movie/Cinema



Game



HDMI



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# Heightened Viewing Experience: Support for Additional Color Spaces



Supports digital still camera (DSC) - specific color spaces

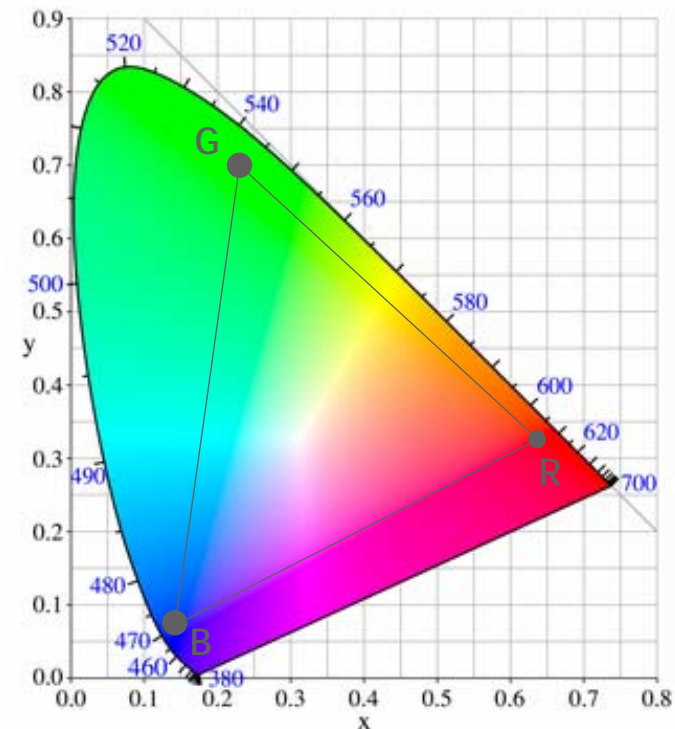
**sYCC601**

**AdobeRGB**

**AdobeYCC601**

Enables HDTV's to reproduce the **rich, natural, lifelike** colors from digital still cameras (DSC)

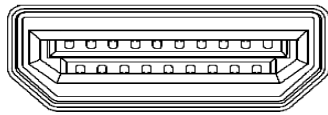
Enables **consistency** and **accuracy** between DSCs and HDTVs



# High-Definition Everywhere: Micro HDMI Connector



Smaller, portable devices are becoming sources of HD content.



Micro



Significantly smaller connector for portable devices

Full 19-pin design

Supports same electrical performance as the HDMI Standard & Mini connectors

Enables compact devices to have all the benefits of HDMI



# High-Definition Everywhere: Micro HDMI Connector



Smaller, portable devices are becoming sources of HD content.



Connector Foot Print **➡** 37% Smaller  
Connector Volume **➡** 43% Smaller

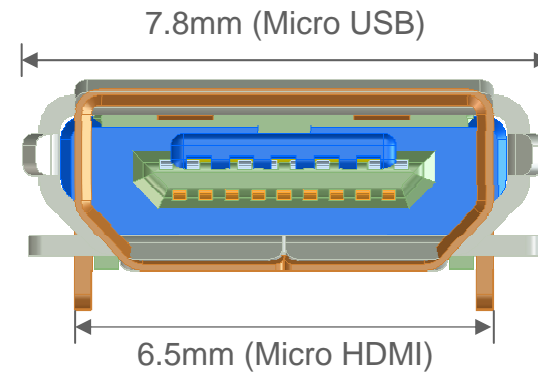
\* Compare with Type C



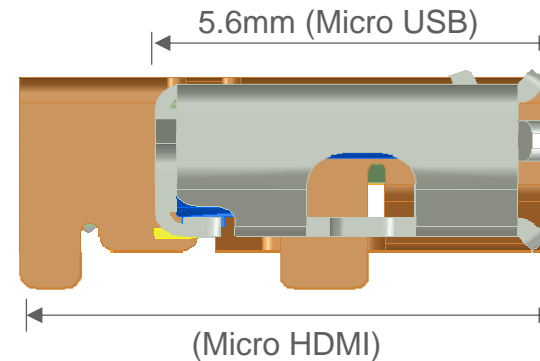
# High-Definition Everywhere: Micro HDMI Connector



	HDMI TYPE D	Micro USB
Pitch	0.4mm	0.65mm
Circuit Size	19	5
Contact Rows	2	1
Height (H)	2.9mm	2.94mm
Width (W)	6.5mm	7.8mm



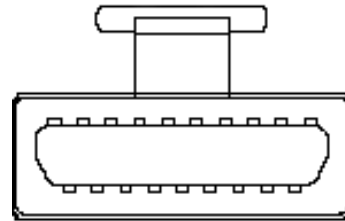
HDMI Type D / Micro USB (Front View Overlay)



HDMI Type D / Micro USB (Side View Overlay)

- HDMI Type D is has 2 rows of contacts and results in a larger depth dimension than the Micro USB with 1 row of contacts
- HDMI Type D and Micro USB are Dimensionally Different and Will Not Allow Inter-Mating

# High-Definition Everywhere: Automotive Connection System



## Automotive Connection System

An **Automotive Connection System** designed specifically for in-vehicle HD distribution

New **inter-locking** connector for internal connections

A more **robust** connection specification to withstand the rigors of an automotive environment

vibrations, heat, noise, etc.

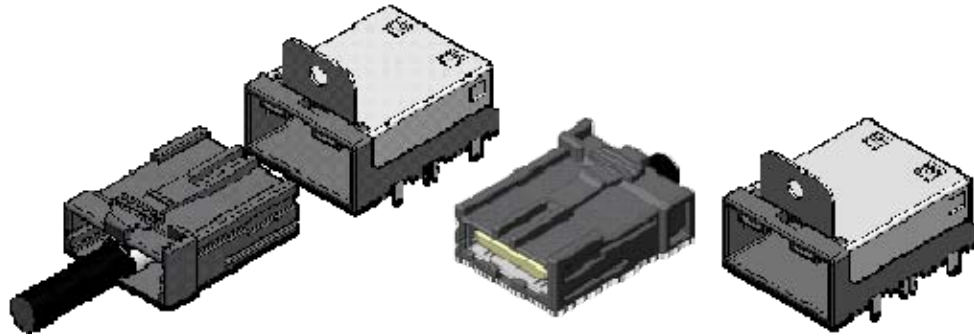
NOTE: Does NOT support HDMI Ethernet Channel



# High-Definition Everywhere: Automotive Connection System

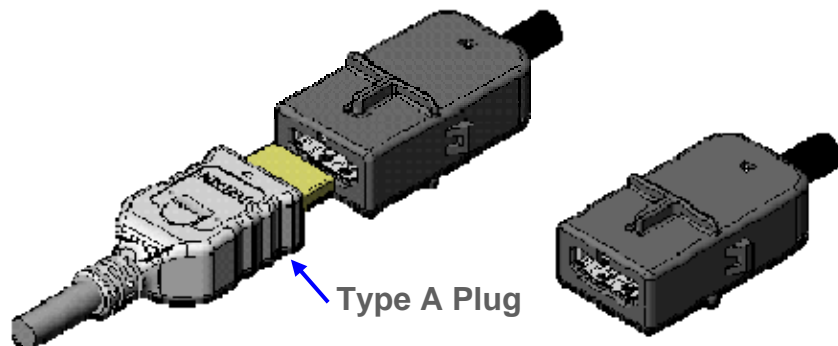


## 1) Automotive HDMI Type E Connector



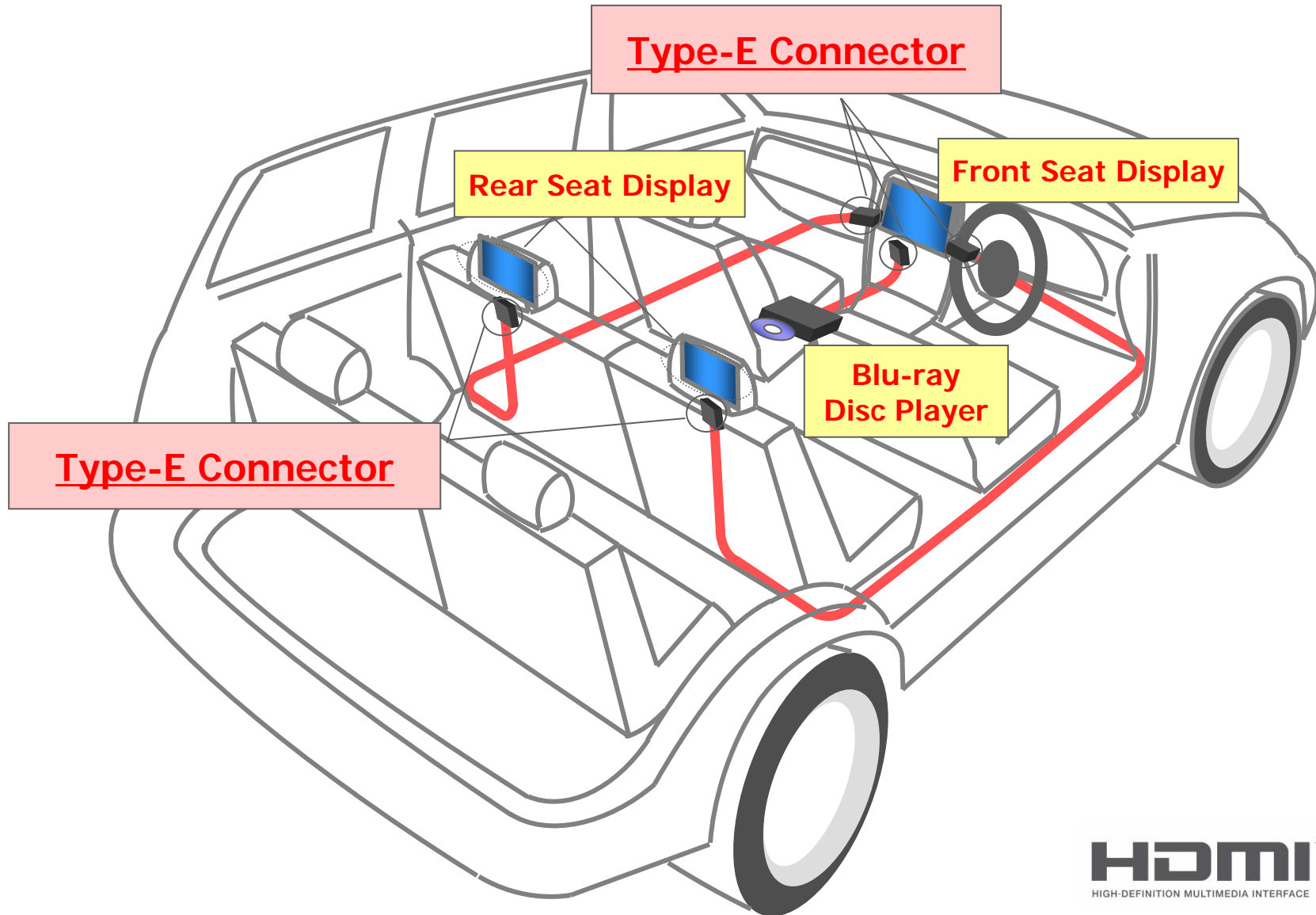
- **Satisfy In-vehicle Spec**  
Incorporates design theory for common automotive connector
- **Connector Requirements**
  - Integrates HDMI and in-vehicle Spec.
  - Mechanical lock structure
  - Multiple keying variation

## 2) Type A Relay Receptacle



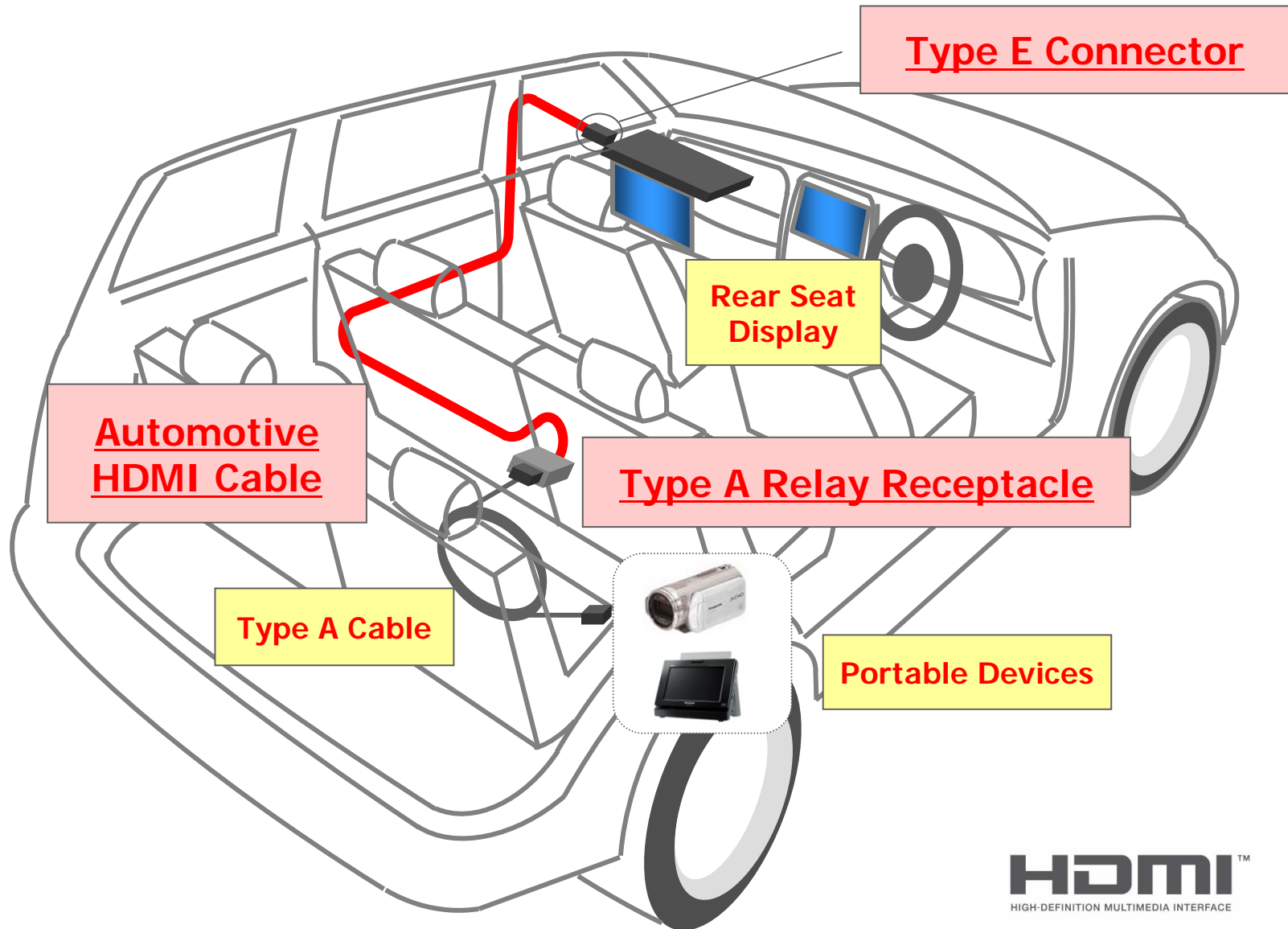
- **Connection with Carry-on CE Devices**
- **Connector Requirements**
  - Based on HDMI Type A Spec.
  - Friction lock structure
  - Mates with standard HDMI Type A Plug

Use Case(1) : Connection of In-vehicle Devices





Use Case(2) : Connection of Carry-on CE Devices



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## New Cable Types

# Current HDMI Cable Types



- Existing Cable Categories (introduced with HDMI 1.3)
  - **Standard HDMI Cable**: Supports up to 720p/1080i. Total bandwidth of 2.25Gbps
  - **High Speed HDMI Cable**: Supports 1080p or higher. Total bandwidth of 10.2Gbps
- Supports all HDMI 1.4 spec features **except HDMI Ethernet Channel**

# New HDMI Cable Types



- New HDMI Cable Types
  - **Standard HDMI Cable with Ethernet:** Supports up to 720p/1080i. Total bandwidth of 2.25Gbps. Adds support for HDMI Ethernet Channel (up to 100Mbps)
  - **High Speed HDMI Cable with Ethernet:** Supports 1080p or higher. Total bandwidth of 10.2Gbps. Adds support for HDMI Ethernet Channel (up to 100Mbps)
- What's new?
  - Supports all the HDMI 1.4 spec features
  - The reserve line is now known as the “**Utility**” line. Pin 14.
  - Creates a **new shielded twisted pair** using the following:
    - DDC/CEC Ground + HPD + Utility
    - All lines are now shielded
  - HDMI Ethernet Channel uses this **single** shielded twisted pair for bidirectional transmission

# New HDMI Cable Types



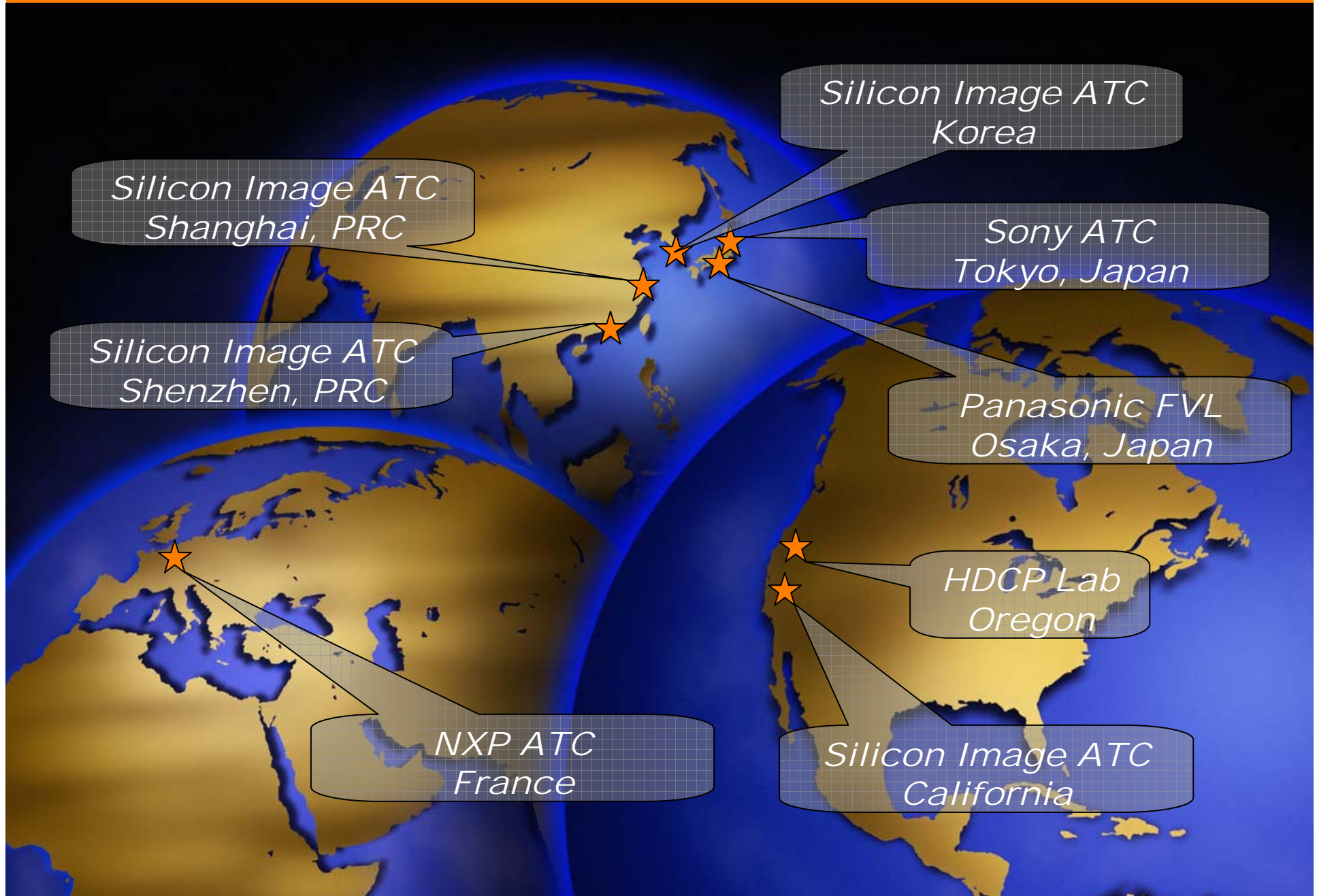
- **Automotive Standard HDMI Cable**
  - Supports up to 720p/1080i
  - Supports all HDMI 1.4 spec features **except HDMI Ethernet Channel**
  - Uses the same Type-A plug
  - Different testing requirements than other cable types
    - Tighter tolerance to support Automotive Connection System relay connections and other Automotive specific requirements



## HDMI Licensing Adopter Update

- Opening of a New Authorized Test Center
- Launch of Compliance Test Specification 1.4
- Launch of Revised Trademark and Logo Guidelines
- Adopter Road Shows

# HDMI/HDCP ATCs Worldwide



# Compliance Test Specification 1.4



- What is the Compliance Test Specification?
  - Defines procedures, tools and criteria for testing the compliance of HDMI devices with the HDMI specification
  - Four device categories are covered by the CTS:
    - Sink
    - Source
    - Repeater
    - Cable
  - Any device that falls into these device categories **MUST** be tested
  - Any device that does not pass CTS testing is **NOT** a compliant device
  - Compliance testing does not ensure 100% interoperability
    - Additional interoperability testing should be done after compliance testing



# Compliance Test Specification 1.4



- HDMI Founders are currently finalizing the 1.4 CTS
- CTS 1.4 will cover testing and compliance for 1.4 features
- CTS expected to be released to Adopters end of October, 2009
- **PLEASE NOTE: The HDMI CTS and the HDMI Specification are confidential documents and available ONLY to Adopters.**

# New Trademark and Logo Guidelines



- HDMI Founders are currently finalizing the Logo and Trademark Guidelines
- Logo and Trademark Guidelines provide requirements for the correct and legal use of HDMI logo, HDMI name as well as HDMI feature names
- New Trademark and Logo Guidelines scheduled to be released by the end of October.

# New Trademark and Logo Guidelines – NEW!



- Revised Trademark and Logo Guidelines will have some critical new rules about cables communications.
  - It is not allowable to use “1.4” when marketing cables
    - No use of 1.4 in literature, packaging or any cable marketing materials
  - Within one year, no versions can be used when marketing cables
    - Use of 1.3 or lower version numbers cannot be used after one year.
  - Cable manufacturers and marketers will need to use official HDMI cable logos to designate cable functionality

# New Trademark and Logo Guidelines – NEW!



- Cable manufacturers and marketers will need to print cable names on cables
  - Standard HDMI Cable
  - High Speed HDMI Cable
  - Standard HDMI Cable with Ethernet
  - High Speed HDMI Cable with Ethernet
  - Standard Automotive HDMI Cable



# Cable Labeling System—Rectangular



<b>HDMI</b> <b>STANDARD</b>	<b>HDMI</b> <b>STANDARD</b> with ETHERNET	<b>HDMI</b> <b>STANDARD</b> AUTOMOTIVE	<b>HDMI</b> <b>HIGH SPEED</b>	<b>HDMI</b> <b>HIGH SPEED</b> with ETHERNET
<b>HDMI</b> <b>STANDARD</b>	<b>HDMI</b> <b>STANDARD</b> with ETHERNET	<b>HDMI</b> <b>STANDARD</b> AUTOMOTIVE	<b>HDMI</b> <b>HIGH SPEED</b>	<b>HDMI</b> <b>HIGH SPEED</b> with ETHERNET
<b>HDMI</b> <b>STANDARD</b>	<b>HDMI</b> <b>STANDARD</b> with ETHERNET	<b>HDMI</b> <b>STANDARD</b> AUTOMOTIVE	<b>HDMI</b> <b>HIGH SPEED</b>	<b>HDMI</b> <b>HIGH SPEED</b> with ETHERNET
<b>HDMI</b> <b>STANDARD</b>	<b>HDMI</b> <b>STANDARD</b> with ETHERNET	<b>HDMI</b> <b>STANDARD</b> AUTOMOTIVE	<b>HDMI</b> <b>HIGH SPEED</b>	<b>HDMI</b> <b>HIGH SPEED</b> with ETHERNET

<b>HDMI</b> <b>STANDARD</b>	<b>HDMI</b> <b>STANDARD</b> with ETHERNET	<b>HDMI</b> <b>STANDARD</b> AUTOMOTIVE	<b>HDMI</b> <b>HIGH SPEED</b>	<b>HDMI</b> <b>HIGH SPEED</b> with ETHERNET
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Minimum size guidance: .75" (w); 19mm (w)



# Cable Labeling System—Round



Minimum size guidance: .75" (w); 19mm (w)

# Adopter Road Shows



- HDMI Licensing is announcing Adopter road shows to provide continue to provide information to Adopters:
  - Shenzhen
  - Shanghai
  - Beijing
  - Taipei
  - Seoul
  - Tokyo
- Currently scheduling for October/November

# Questions and Answers



Thank you!

Visit: [www.hdmi.org](http://www.hdmi.org)

One Cable, One Standard

Simplicity | Reliability | Performance

