MHL® Technology

Chandlee Harrell

September 25, 2012
HD Connectivity That Just Works
Agenda

- MHL Market Update
- Overview of the MHL Standard
- MHL Specification
- Summary
- Demonstration
The Transformation to Mobile is Everywhere

Over 2.5 billion mobile devices by 2015

Phones . Tablets . Cameras

>2.5 billion mobile devices ship in 2015
Source: In-Stat November 2011
Mobile Video Market Trends

- VGA to 1080p
- Single/dual- to quad-core GHz CPUs
  - 3G to 4G broadband
  - Casual to serious gaming
- Content engine in the palm of your hand
Mobile Device Usage Constraints

- Screen Size: 4”~5”
- Battery Life
- Interactivity
Expanding Mobile Device Usage

Home Entertainment

Gaming

Productivity

Automotive

Connectivity to large displays is central to consumer experience
Need for Optimal Mobile Connectivity

- HD audio and video
- Interactivity, without video latency
- Mobile form factor
- Excellent battery operation
- Easy to design
MHL Ecosystem

50 Million Products Shipped in 2011
200 Million Total by end of 2012

ADOPTERS
150+ Adopters (and growing)
Mobile, DTV, PC, Auto, SOCs

REFERENCE DESIGNS
Leading mobile SOC vendors providing MHL reference designs

SPECIFICATION
Spec & CTS, Authorized Test Centers

PRODUCTS
Variety of MHL end products

COMPONENTS
Spec compliant, production-proven MHL Tx, Rx, and switches
MHL In Today’s Hottest Mobile Devices

SAMSUNG
- Galaxy S3
- Galaxy S2
- Galaxy Note 1, 2
- Galaxy Nexus
- Infuse

LG Mobile
- Optimus LTE II
- Optimus LTE
- Nitro HD
- Spectrum
- Captivate Glide

Optimus G
- Optimus 3D Max
- Optimus 4X
- Optimus LTE Tag
- Optimus Vu

HUAWEI
- Ascend P1, P1 S
- Ascend D1, D1 Quad

ZEET 中兴
- PF200
- Era

PANTECH
- VEGA LTE

lenovo
- S2

acer

sony
- Xperia T, TX, V, GX and SX

SHARP
- AQUOS ISW16SH

OPPO
- Find 3

htc
- One X and One XL
- One S
- EVO 3D
- EVO 4G LTE
- Vivid
- Raider
- Amaze
- Rezound
- Sensation/Sensation XE
- Jetstream
- Flyer

XIAOMI
- Phone 2

Copyright © 2012, Silicon Image Inc.
Major DTV Brands Embrace MHL

**Samsung**
- 46ES8000, 55ES8000, 60ES8000, 65ES8000, 46ES7500, 55ES7500, 60ES7500, 46D8000, 55D8000, 60D8000, 65D8000, 46D7900, 55D7900, 46D7000, 55D7000, 60D700

**LG**
- TM2792, 72LM9500, 55LM9600, 55LM8600, 47LM8600

**Insignia**

**Sharp**

**Toshiba**
- 55RW1, 47RW1, 46VL20, 40VL20, 46TL20, 40TL20, 55WL863, 46WL863, 42WL863, 55WL800A, 46WL800A

**Sony**
Announced MHL Monitors and Projectors

Smart Station: C24B750X, C27B750X, C24B550U

EA93, IPS277L, IPS237L

23” Philips IPS display with Smart MHL

Aiptek MobileCinema

Mini Projector
Other Announced MHL Products & Accessories

A/V Receiver

AQUOS Media Station BD-AMS20U

AppRadio 2
In-Dash Car Receiver

MHL to HDMI, VGA adapters, cradles, cables
Innovative MHL Use Cases

Roku Streaming Stick with MHL

= Smart DTV

Galaxy S3

= Notebook PC

Korea Telecom Spider Laptop
Overview of the MHL Standard
MHL Consortium

- **MHL was founded by leading Mobile and Consumer Electronics companies:**

  - Nokia
  - Samsung
  - Silicon Image
  - Sony
  - Toshiba

- **MHL 1.0 specification released June 2010**

  **Key Features**
  - Low pin-count 1080p60 HD video & digital audio interface
  - Architected to be used with any mobile connector
  - MHL Sink provide power to the mobile device
  - Interoperable remote control function
MHL: Connectivity for the Mobile Community
MHL – Content On the Go

Streaming
Downloads
Camera
VideoCam
Game
Business/ Productivity
MHL – Evolution

CTS1

MHL1

June 2010

Digital Connectivity
1080p60 Video
Digital Audio
-8 channels, 192kHz, 24bit
-Compressed, Dolby & DTS
Power, battery charging
Device Control

MHL2

April 2012

3D Video
Increased Power, battery charging
Enhanced Device Control

CTS2
MHL – Architectural Overview

Baseband Transmission
MHL Technology

1080p60Hz HD Interface
- HD Video
- 3D Video
- Digital Audio

Control
- Bi-directional channel for interactivity (Remotes, touch screens...etc.)

Power
- Charge your mobile device while enjoying your HD content
MHL is Connector Agnostic

- MHL allows connector to be multi-purposed for
  - HD Audio & Video
  - Data
  - Power

- Reduces mobile device cost
- Saves connector & board space
- Enhances industrial design
MHL Video

- Streaming
- Downloads
- Camera
- VideoCam
- Game
- Business/ Productivity

480p
720p
1080i
1080p
XGA/SXGA
MHL Video (cont.)

- Streaming
- Downloads
- Camera
- VideoCam
- Game
- Business/Productivity

Left-Right
Top-Bottom
Frame Sequential
MHL Audio

5.1 Speakers

Mobile Phone

5.1 & 7.1 Surround Sound
MHL – Power

Simultaneous Charging for the Mobile Device
MHL – Control
Connecting MHL

MHL to HDMI, VGA adapters, cradles
Summary

HD connectivity to larger displays is essential for the ultimate, interactive experience from mobile device

MHL is the de facto choice for mobile to display connectivity

*Delivering a premium quality, real-time HD experience*

Silicon Image, a founding Promoter of MHL, delivers HD video connectivity, wired or wirelessly, that just works
More Information

- Additional information is available at:
  
  www.siliconimage.com
  www.mhlconsortium.org
Thank You!

Questions & Answers