Introduction to HANA

Bill Rose: President, WJR Consulting, Inc.
Chairman: CEA R7 Home Networking Committee
CEA Technology and Standards Council
Organization

Incorporated on Oct. 14th

Chairman

Vice Chairman

Board Of Directors
(Content owner, Service provider, CE, IT)

Business & Marketing WGs

Technical WGs

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Promoter Members*

* Membership Prior to CES 2006

Contributor Members*

* Membership Prior to CES 2006
History of TV

Commercial Terrestrial: 1941
History of TV

Commercial Terrestrial: 1960's
History of TV

Pay Cable: 1972

Cable

STB

Remote Control
History of TV

VCR: 1976

Cable

STB

VCR

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History of TV

VCR : 1976
History of TV

DVD : 1997

Cable  Satellite  STB  VCR  DVD  HTS
History of TV

2005

- HDTV
- Media Center PC
- HD Satellite STB
- IP STB
- Component1
- Component2
- DVI
- VGA

- VCR
- Video1
- PVR
- Video2
- Cable STB
- Video3
- HTS

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Industry Trend

Millions of Households with wide-screen HDTVs

[ In-Stat, Nov.'05 ]
Why 1394?

• Designed for Streaming applications
  – 1394 is an Isochronous network
    • Guaranteed QoS using BW reservation
    • Synchronous (network clock)
  – Bandwidth
    • 1394a: 400 Mbps/4.5 m
    • 1394b: 100 Mbps/100m over UTP
    • 1394b: Several vendors developing 400-800 Mbps over UTP
    • 1394b: 1600 Mbps/1000 meters for GOF
  – Reduces system cost
Why 1394 NOW?

• Cable STB Mandate
  – FCC now mandates 1394 in all HD STBs (procurement mandate)

• All DTVs must include an ATSC Tuner
  – Requires MPEG decoder
  – Adding 1394 exposes decode
1394 Provides Cost Benefits

• Consumers
  – Fewer devices / components needed
    • Decoders
    • Eliminate buffers and associated delays
    • Share devices

• Manufacturers
  – Device resources
  – Development/Time to Market
1394 Shortens Time To Market

- Off-the-shelf software
  - Web Browser / Web Server
- No complex middleware
  - Reduces development, testing, compatibility issues
- Hot Plug and Play
  - Auto discovery, power management
  - No complex QoS solutions required
Web Browser / Server Model

- Command/Control/UI using IP over Asynch channel
  - DTV supports thin browser
  - Connected devices support thin server
  - AV/C commands over IP (CEA 931B)
  - xHTML
  - CSS
CEA-2027 Architecture

HDTV Logical devices

AV HDD

- Media Path
- User Interface Path
- Navigational Cmds
- IR or RF remote control path
- L-unit = Logical Unit

Architecture for Network GUI and Control

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<table>
<thead>
<tr>
<th>HANA HDTV Display - Browser Stack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Browser Display from XHTML, DOM1, CSS1, JPEG, GIF, PNG, JavaScript</td>
</tr>
<tr>
<td>Web Server (virtual server for 2027 GUI controller and other 2027 logical unit services)</td>
</tr>
<tr>
<td>CGI interface to Web Server and State Machine (also funnels incoming 931B remote control commands)</td>
</tr>
<tr>
<td>HDTV state machine for dynamic HDTV logical unit control, network controller, and XHTML GUI services</td>
</tr>
</tbody>
</table>
## CEA-2027 Stack - HDTV IR

### HANA HDTV IR receiver Stack

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Protocol Stack</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAVi Web Browser</td>
<td>navigational input (Up, Down, Left, Right, Select, Exit, Back)</td>
<td></td>
</tr>
<tr>
<td>Local IR input queue</td>
<td>(if local menus are on screen)</td>
<td>CEA-931-B HTTP command dispatcher (part of HDTV and Network controller code)</td>
</tr>
<tr>
<td>IR receiver driver</td>
<td></td>
<td>HTTP/TCP/IP/1394</td>
</tr>
</tbody>
</table>
## CEA 2027 Stack - Service Side Devices

### HANA NIU for \{ Satellite | ATSC Broadcast | Digital Cable \} A/V services

<table>
<thead>
<tr>
<th>Web Server (virtual server for 2027 GUI controller and other 2027 logical unit services)</th>
<th>HTTP</th>
<th>CCM over AV/C and IEC 61883</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGI interface to Web Server and State Machine (also funnels incoming 931B remote control commands)</td>
<td>TCP/IP</td>
<td>AV/C</td>
</tr>
<tr>
<td>NIU state machine for dynamic NIU control and XHTML GUI services.</td>
<td>1394 (IEEE 1394TA-2000)</td>
<td></td>
</tr>
</tbody>
</table>
HANA GUI components
HANA GUI components

Select AVHDD
User Benefits

- **Simple Connection**
  - Single 1394 Cable
  - Hot ‘Plug & Play’

- **Ease of Use**
  - Single Remote Control

- **Secure Network**

*With 1394*
Today – No A/V Network

Complicated setup

- Multiple Wires, Multiple Remote
- Redundant Devices and Components

No HD AV Network is available

HD STB
HD PVR STB
HDTV

3”(H)x15.5”(W)x13.5”(D)

AV Lines

Decoder
Tuner
Decoder
Tuner
Decoder
ATSC Tuner

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HANA A/V Network

Competitive Cost
- Eliminate duplicate components in an HD AV Network
- Utilize existing standards and infrastructure (e.g., COAX)

1.6”(H)x8.2”(W)x10”(D)

Light Module

HD PVR

HDTV

Cable Tuner

Decoder

ATSC Tuner
Usage Scenarios

Ease of Use

- Control all AV devices with a single remote per room
- Access Contents via a rich TV GUI and EPG
Usage Scenarios

**HD Multi-Channel**

- View, Pause and Record 5+ HD channels simultaneously with QoS

Multiple HD Programs
Usage Scenarios

Room to Room

View, Pause and Record HD anywhere in home with just one STB

Room 1

Room 2

Room 3
Usage Scenarios

Contents Sharing

- Allow *Personal* Content to flow between the IT and AV networks but restrict *Commercial* Content to within the AV network
Service Provider Issues (Solved)

- No UI over 1394
  - Solved with Browser/Server solution
    - Charter Cable using MOXi UI
    - Future OCAP compatibility
- No in-home wiring
  - CAT5/5e/6 (S100, S200, S400, S800)
  - Coax (at least 4 companies: up to S400 demonstrated)
  - UWB (S800)
Service Provider Benefits

• Reduced CAPEX
  – Lower CAPEX = Higher Share Price
  – No decoder required
  – PVR becomes a retail buy
• Fewer Truck-Rolls
• Lower Customer Service costs
• Lower Customer Acquisition costs
  – Bundle DTV + NIU + Service at retail
• Reduced churn
Design Guidelines

• The first HANA reference implementation will incorporate existing specifications and technology:
  – CEA 2027A
  – CEA 931B
  – CEA 851A
  – IEEE 1394
  – 1394 Localization
Design Guidelines

• Initial HANA reference implementations will enable:
  – QoS for HD content (+5 simultaneous, isochronous HD video streams)
  – Content protection for HD DVD and Blu-ray
  – Hot ‘Plug & Play’ with auto device discovery and configuration
  – Personal content (not part of trusted network)
  – Standard IP protocols
  – 1 Cable / 1 Remote
Compliance and Certification

- HANA will address compliance and certification testing:
  - HANA Third Party Interoperability Testing
  - HANA Interoperability Guide
  - HANA Developer’s Conference
  - CEA and 1394TA Interoperability Events
  - SDK (Software Developers Kit)
Product Introductions

- HANA-ready product introductions at CES 2007
  - HDTVs
  - High Definition DVD
  - Personal video recorders / HD hard disk drives
  - NIU with downloadable code and video on demand
  - 1394 over CAT-5, coax
  - Digital home theater audio
Roadmap – Future Activities

• Continue to work with standards organization as needed (CEA, 1394TA, CableLabs)
  – CEA 931C
  – CEA 2027-x
  – 1394 over coax
  – OCAP harmonization and interfaces
• UPnP Bridging through VHN / CEA-851A
• Enhanced content protection and trust models
• Enhanced compliance and certification testing
• Enhanced bridging to AV/C world
Summary

- **Content Owners**
  - Time to market solution for HD with Trusted network environment

- **Service Providers**
  - Easy installation
  - Save CapEx (Capital Expenditure)

- **CE Manufacturers and IT Companies**
  - New business opportunities with HANA devices

- **Consumers**
  - Easy to connect (Single Wire)
  - Easy to control (Single Remote Control)
For More Information on HANA

www.hanaalliance.org

Or contact Bill Rose at:
BRose@WJRConsultinginc.com
Mobile: (860) 794-3846
Office: (860) 313-8098