



A Brief Introduction to AVB

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IEC TC100 Plenary
September 23, 2013

Topics

- ▶ What is AVB?
- ▶ Current Markets
- ▶ Components of AVB

What is AVB?

AVB (Audio Video Bridging)

- ▶ AVB allows for the creation of time-synchronized low latency streams across a network
 - 802.3, 802.11, MoCA, G.hn, etc.
- ▶ Now called Time Sensitive Networking (TSN)
- ▶ Responsible for:
 - Distributing exact time (+/- 500ns) for synchronization
 - Protection of bandwidth across the network
 - Reducing network bottlenecks
 - Media Clock Recovery
 - Audio/video stream transmission
 - Upper layer control

Current Markets

Industrial



*borrowed from <http://www.techspot.com/news/53267-teslas-model-s-factory-is-full-of-advanced-robotics.html>

Professional



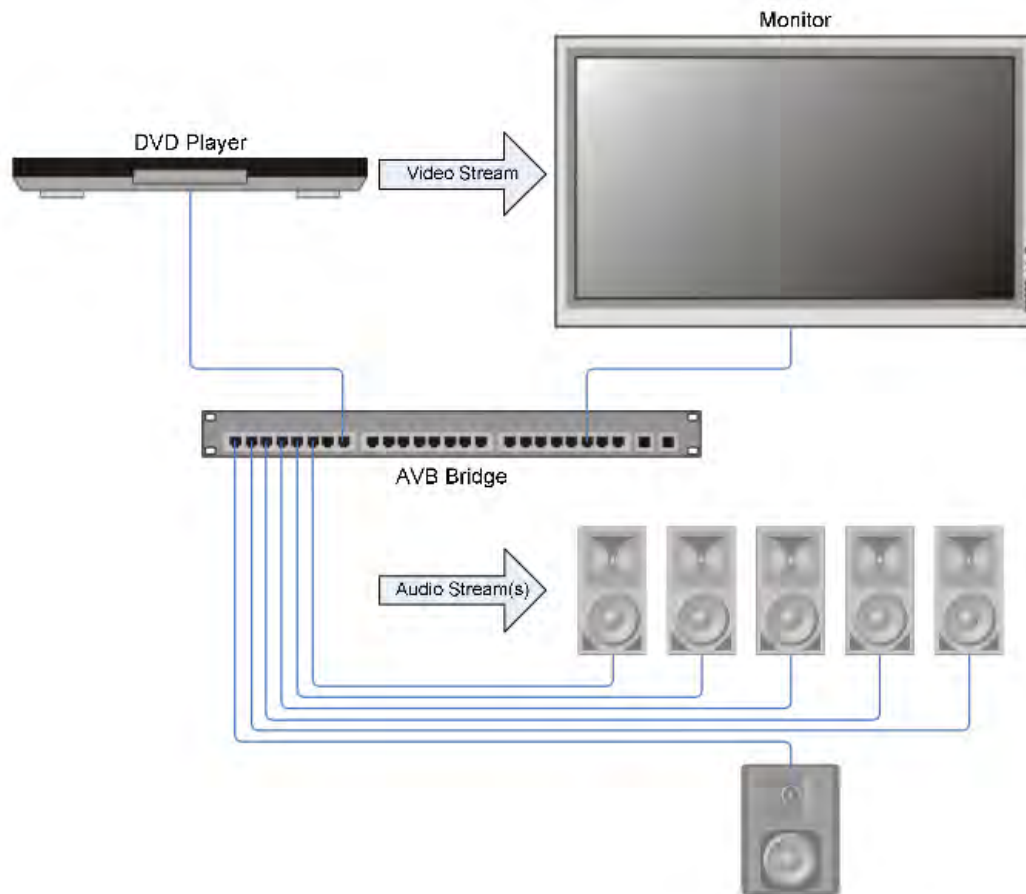
Professional

▶ Walt Disney World's Mission: SPACE

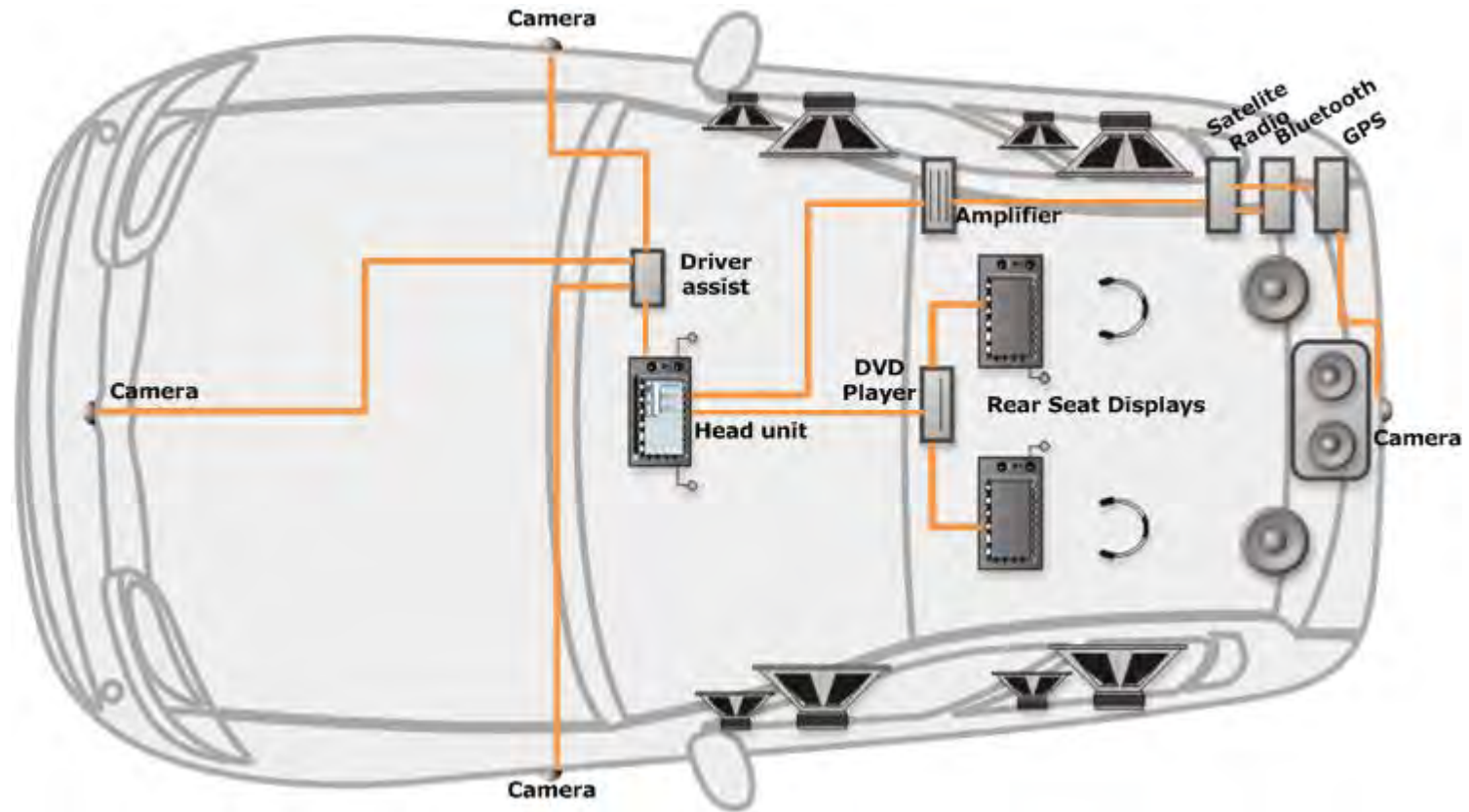
- 42,450 watts of amplifier power
- 116 channels of audio per ride system (x4)
- 433 video displays
- 598 additional audio channels
- 208,430 watts of electrical power
- 36 racks of equipment

▶ Hundreds of streams are common

Consumer



Automotive



Components of AVB

IEEE 802.1AS-2011 (gPTP)

- ▶ “Precision Time Protocol”
- ▶ Purpose: Distribute a single, accurate time reference to all devices in AVB network
- ▶ Accurate
 - Worst-case error less than +/- 500ns
- ▶ Plug and Play
 - Grand Master clock is selected automatically
- ▶ One clock for the entire LAN
 - Including IEEE 802.3, IEEE 802.11, others

Precision Time Protocol

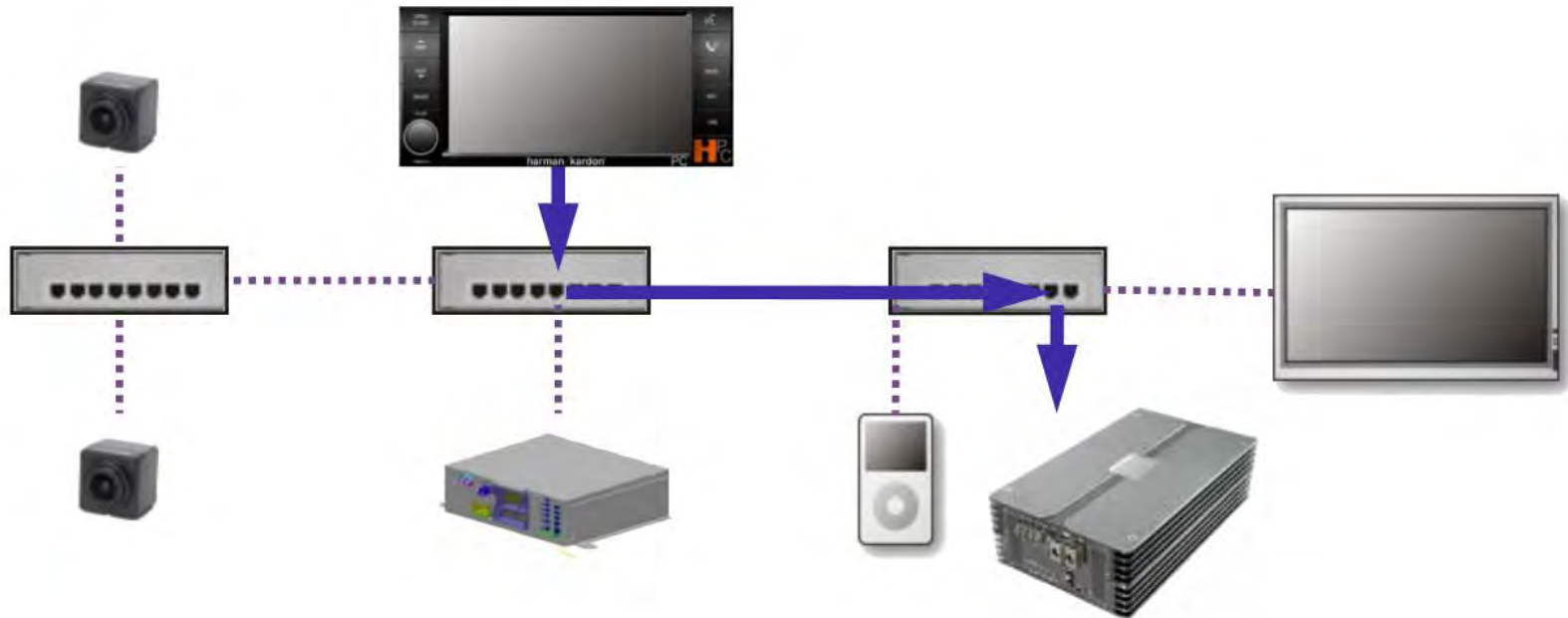


Every device has the same time

IEEE 802.1Q-2011 Clause 35 (SRP)

- ▶ “Stream Reservation Protocol”
- ▶ Establish reservations between talkers, listeners, and intermediate bridges
- ▶ Disseminate stream resource requirements to the network
- ▶ **Establish AVB “cloud” boundaries**
 - Exclude non-AVB devices

Stream Reservation



Bandwidth is reserved along the entire path

Bandwidth Guaranteed

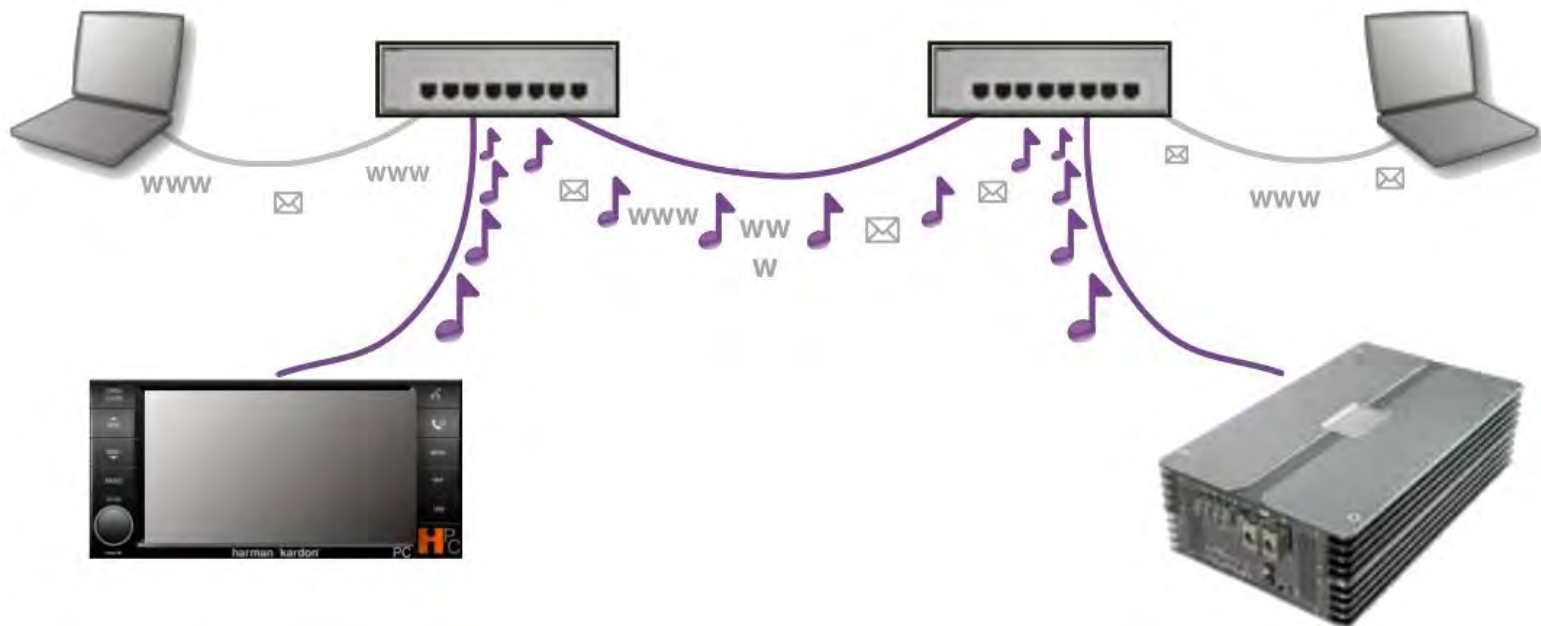


Reserve up to 75% of any given link

IEEE 802.1Q-2011 Clause 34 (FQTSS)

- ▶ “Forwarding and Queuing for Time Sensitive Streams”
- ▶ Shapes traffic according to SRP reservation criteria
- ▶ Protects port queues (remaps conflicting traffic)
- ▶ Calculates SRP reservation size

Forwarding and Queuing (FQTSS)



Queuing and Forwarding rules

IEEE 1722.1-2013 (AVDECC)

- ▶ “Audio/Video Discovery, Enumeration, Connection Management and Control”
 - ▶ Discovery
 - Handles advertising and discovery of AVB devices
 - ▶ Enumeration and Control
 - Handles enumeration and control of capabilities, formats and controls
 - ▶ Connection Management
 - Handles the process of making and breaking connections between stream sinks and stream sources

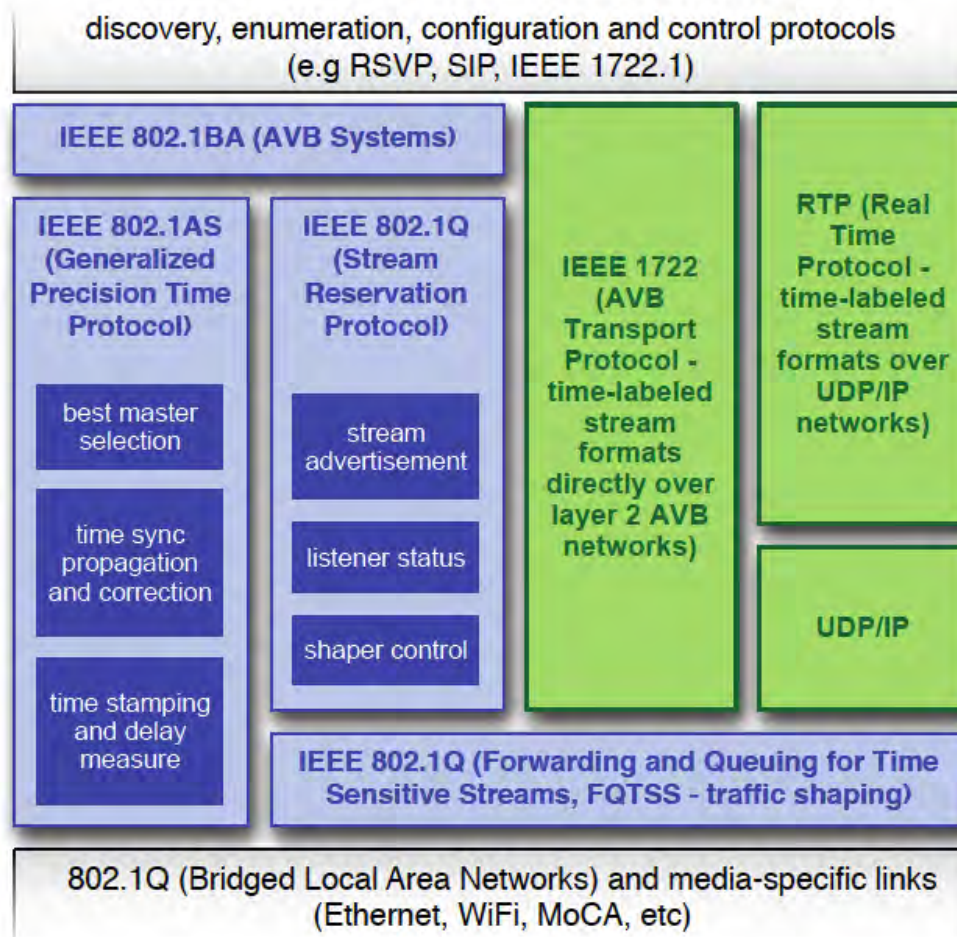
IEEE 1722-2011 (AVTP)

- ▶ “Audio/Video Transport Protocol”
- ▶ Enables interoperable streaming by defining:
 - Media formats and encapsulations
 - Media synchronization (media clock recovery)
 - Latency normalization
 - Multicast address assignment
- ▶ Strong basis in IEC 61883 standards

IEEE P1722a

- ▶ Addendum to IEEE 1722-2011 to define new formats
- ▶ Expected publication: mid 2014
- ▶ Simple Formats
 - AVTP Audio
 - AVTP Video
 - Control Streams
 - Automotive Frame Formats (Flexray, CAN, LIN, MOST)
- ▶ Support for encrypted and signed streams
- ▶ Clock Reference Streams
- ▶ Diagnostics

Putting It All Together



Thank You