MPSoC presentation

Predictable and Composable Multiprocessor Systems for Car-Entertainment. Part 1: business view

René van den Berg
System Architecture Innovation
NXP Semiconductors
BL Car Entertainment Solutions
The Netherlands

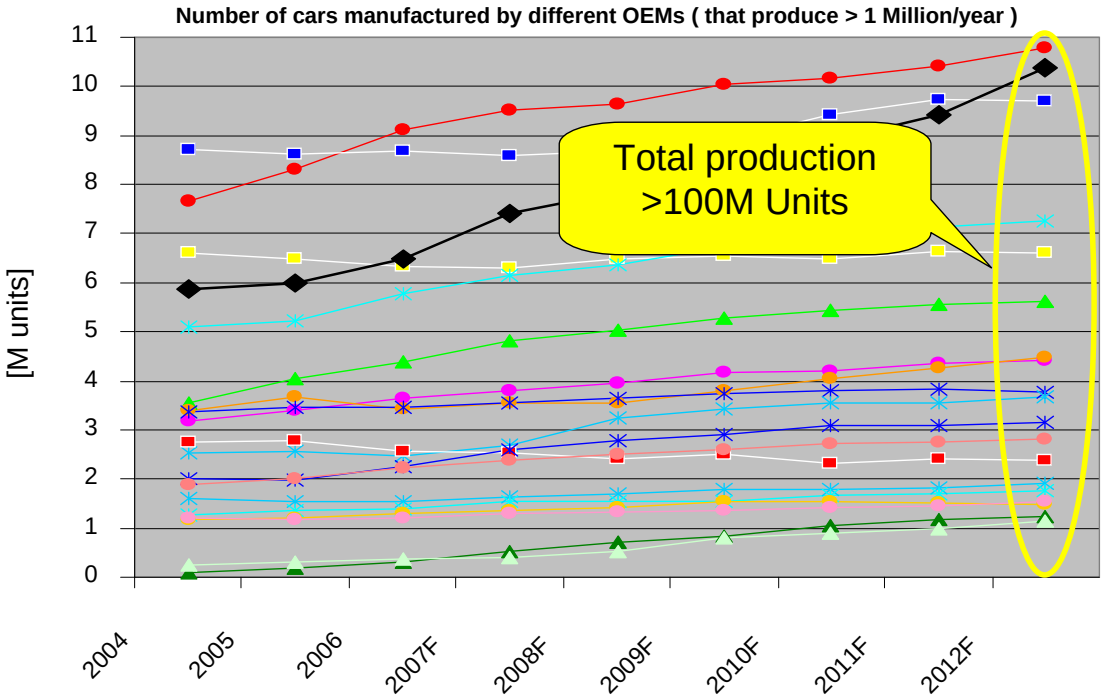
Marco Bekooij, Kees Goossens

NXP Semiconductors
Research
The Netherlands

Presentation outline

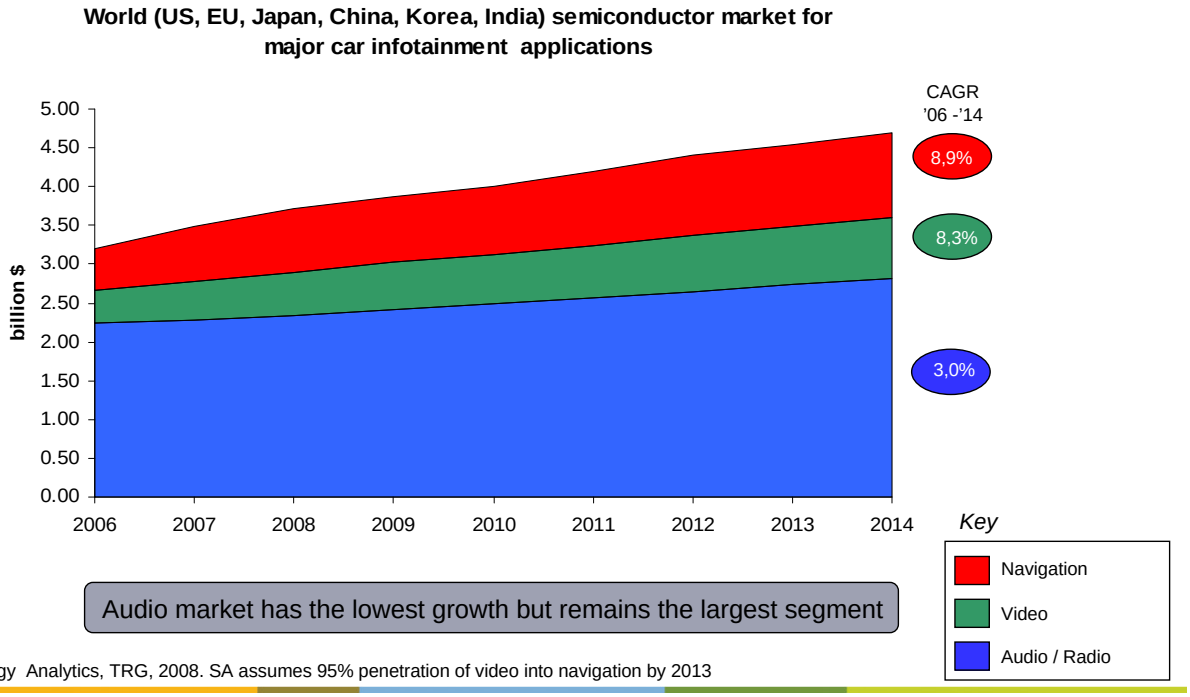
- Car infotainment market
- Important car applications aspects
- Car entertainment implications
- Key challenge

Global Light Vehicle Production Forecast by Manufacturer



Source:Global Insight (Sept 07)

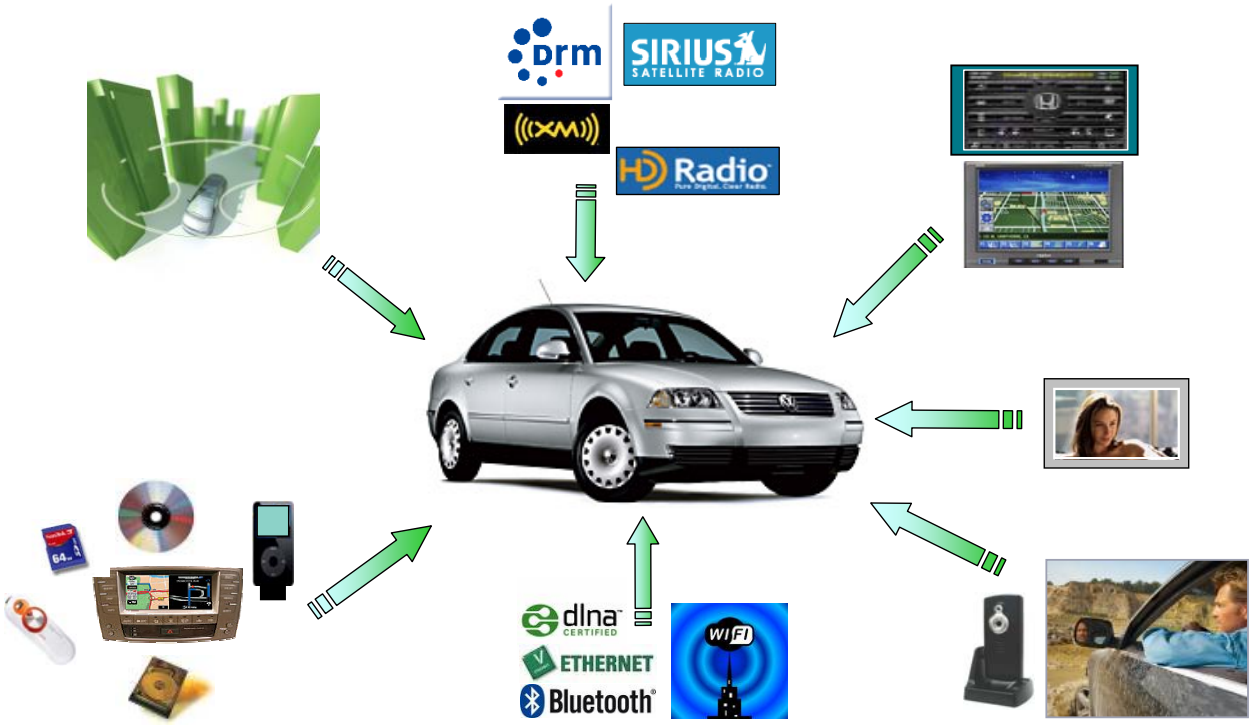
Car infotainment ICs will be a $4,7 billion market by 2014



Audio market has the lowest growth but remains the largest segment

Source: Strategy Analytics, TRG, 2008. SA assumes 95% penetration of video into navigation by 2013

Different types of car applications



Car environment aspects

- Car environment creates unique challenges for infotainment system design
  - ***Audio and Reception environment*** – Changes in signal strength & direction, multipath reflections, Doppler effect, Noise, speaker distance, etc.
  - ***Multi-user devices*** **–** Head units increasingly becoming “infotainment hubs”, which need to serve the individual needs of several occupants simultaneously
  - ***Driver distraction*** **-** Driver distraction must be minimized as the main operator of the system might at the same time be driving over 100 km/h.
  - ***Very high quality and reliability requirements*** – field returns are costly as the complete car needs to be returned to the garage

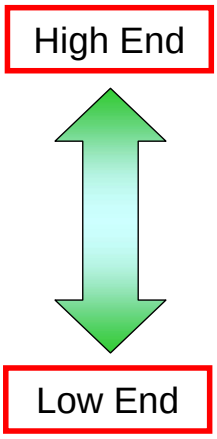
Trend implications

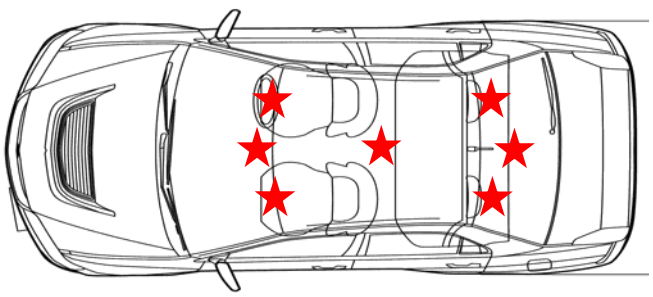
- Support for multiple sources, sinks of data and multi-users at the same time
- Demand for greater flexibility regarding feature sets, regions (multiple standards) and time
- In-car systems will have to become cheaper and more flexible to compete with portable device. Functional integration to keep the cost down
- Sophisticated user interfaces become key technologies which reduce driver distraction becomes key
- Increased focus for powerful, multi functional chips, within the context of scalable platforms
- Growing importance of software and upgradeability

Reuse for different types of car systems

- Distributed

Several boxes in different locations in the car





- Centralized

One head unit with functionality combined in one box

System implications

- Originally, distributed systems serve the aspect of separation of concerns
- To reduce overall systems costs of lower end systems, functional integration and resource sharing is required
- Integrating all functionality into single powerful multi-core chips
- Temporal isolation of functional domains becomes key to:
  - Create and control complex designs
  - Avoid disruptions of neighbour subsystems if
    - a subsystem is fully verified and validated and behaves correctly
    - a subsystem malfunctions
  - Test and validate subsystems before final integration
  - Reuse subsystems in new designs

Conclusion

temporal isolation

is key to car entertainment systems and applications

for adding and reusing subsystems