Halbleiter als Enabler für zukünftige Mobilitätskonzepte


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NXP Semiconductors

High Performance Mixed Signal and Standard Product solutions that leverage our leading RF, Analog, Power Management, Interface, Security and Digital Processing expertise

- **Employee base:**
  - ~ 25,000 employees in more than 25 countries
  - R&D in Europe, US, and Asia
  - Manufacturing in Asia and Europe

- **Net sales:** $4.4 B in 2010, > 60% in Asia Pacific

- #5 in Global Automotive Semiconductors
  - #3 in China
  - #1 in Car Infotainment
  - #1 in In Vehicle Networks
  - #1 in Car Access & Immobilization
Automotive Semiconductors …
addressing THE societal **challenges of mobility**

### Safety
- EU: 38K deaths PA
- US: 37K deaths PA
- US: 5.8M accidents cost $230B PA

### Congestion
- US: $87.2B PA cost
- EU: 1% GDP cost
- Lost hours

### Environment
- Wasted fuel
- CO$_2$ emissions
- Dependence on fossil fuels
Automotive Semiconductors … while delivering **security and convenience**

**Security**
- Protect connected cars against hacking
- Provide privacy

**Convenience**
- Connect transportation seamlessly into tomorrow’s ‘always on’ lifestyle
NXP connects the car!
Cars ... People ... Infrastructure

802.11p

LF, UHF

Cellular

NFC

NFC

Cellular
Automotive Semiconductors address challenges of mobility with security & convenience: - **location-based services** -

Location-based services

... to find and reserve your closest battery charging spot or car sharing opportunity

... for eCall

... and many more use cases
Automotive Semiconductors address challenges of mobility with security & convenience: - location-based services -

- location-based services
  - to find and reserve your closest battery charging spot or car sharing opportunity
- for eCall
- and many more use cases

Telematics
NFC
Authentication

Ein Chip gegen die Reichweiten-Angst
Die Furcht vor Akku-Pannen hat sich als entscheidende Bremse für E-Mobile erwiesen. Chipspezialist NXP hat ein Gegenmittel parat.
Flexible road pricing concepts and traffic management based on GPS

IBM and NXP conduct joint field trial testing GPS-based kilometer pricing

- 70% of drivers changed behavior
- Overall result >16% lowered usage
Automotive Semiconductors address challenges of mobility with security & convenience: - **personalization** -

Personalizing your car settings
Automotive Semiconductors address challenges of mobility with security & convenience: - **personalization** -

**NXP and Continental Demonstrate the World's First Concept Car Embedding NFC**
Automotive Semiconductors address challenges of mobility with security & convenience: - **secure payment** -

Smooth and secure payment, no matter which type of transport

NFC Authentication
Automotive Semiconductors address challenges of mobility with security & convenience: - **secure payment** -

2 billion people travel with NXP MIFARE™

Smooth and secure payment, no matter which type of transport

NFC Authentication
Automotive Semiconductors address challenges of mobility with security & convenience: - remote car management -

Remote car management: car finder, vehicle status & maintenance, battery health, remote route planning, fleet management . . .

Two-way RF Telematics Authentication
Automotive Semiconductors address challenges of mobility with security & convenience: - car-to-x communications -

C2X for hazard warnings and smooth traffic flow

802.11p via Software-defined Radio Telematics Authentication
Automotive Semiconductors address challenges of mobility with security & convenience: - car-to-x communications -

C2X for hazard warnings and smooth traffic flow

802.11p via Software-defined Radio Telematics Authentication

Technology News
NXP demos car-to-x communications platform

May 19, 2011 | Christoph Hammerschmidt | 222907477
Automotive Semiconductors address challenges of mobility with security & convenience: - enabling technology -

A look behind the scenes –

from flexible digital broadcast reception to automotive-ready Car-to-X

May 2011:
NXP and Cohda are the first to demo automotive-ready car-to-x communication on a public road
Software Def. Radio: flexible Digital Broadcast Reception
saving R&D investment and supply chain costs

IC suppliers
- ISDB-T
- DRM
- DAB
- DVB-T
- DMB
- CMMB
- HD Radio
- Sirius XM

Module makers
- ISDB-T
- DRM
- DAB
- DVB-T
- DMB
- CMMB
- HD Radio
- Sirius XM

Tier-1s

Car OEMs

Consumers

- Japan
- India
- Europe
- Korea
- China
- USA

Multiple HW R&D investment

Multiple HW validation and qualification

Complex logistics and assembly
Software Def. Radio: flexible Digital Broadcast Reception
saving R&D investment and supply chain costs

Single hardware for all digital radio standards
Future-proof for emerging standards, e.g. DRM in India

... ready for Car-2-X communication (802.11p)
Applying Software Defined Radio to Car-to-X communication (802.11p)

Key challenges

- Ability to „see“ through objects
- Reliable reception quality
  - in high-rise building surroundings
  - with fast-moving compared to static objects
- Cost-efficiency to enable mass deployment
- Low power-consumption

Test at 90 km/h highway: conventional WiFi fails with fast-moving vehicles

- Conventional WiFi
- First automotive-ready platform NXP/Cohda
Applying Software Defined Radio to Car-to-X communication (802.11p)

Key challenges

- Ability to „see“ through objects

Conventional WiFi radios do not meet the requirements of harsh traffic environments and cannot achieve automotive-level reliability:

- Dedicated IEEE802.11p implementation required
- NXP technology selected for simTD field trial starting spring 2012

- Low power-consumption

Conventional WiFi

First automotive-ready platform NXP/Cohda
Automotive Semiconductors address challenges of mobility with security & convenience: - **enabling technology** -

**A look behind the scenes –**

**Smart and Connected Car Key**
Smart and Connected Car Keys

NXP has developed car keys from single-function devices into secure multifunction gateways between driver and car.
Automotive Semiconductors address challenges of mobility with security & convenience: - **Connected Mobility** -

But Connected Mobility . . .

. . . requires secure protection against manipulation, hacking, fraud, and counterfeiting
Automotive Semiconductors address challenges of mobility with security & convenience: - Integrity & Security -

The New York Times

“Researchers Show How a Car’s Electronics Can Be Taken Over Remotely”
By John Markoff, published on March 9, 2011

United States Department of Transportation

“Vehicle odometer fraud jeopardizes safety…and pocketbooks”
published on April 19, 2011

Automotive News China

“Counterfeit auto parts flood China’s aftermarket”
Namrita Chow, Shanghai on February 10, 2011
Automotive Semiconductors address challenges of mobility with security & convenience: - *Integrity & Security* -

- **Connected Car**
  - Brings with it one of the banes of the Internet: hacking…
  - In Vehicle Network security is a *precondition* to Car-2-X

- **(H) EV**
  - Secure billing and battery swapping
  - Safe charging
  - Protection of expensive batteries, against theft

- **Manipulation**
  - Immobilizer reflashing
  - Car key replication
  - Engine tuning
  - Unpaid (optional) feature activation

- **Counterfeiting**
  - Counterfeiters don't have to cover R&D, marketing, and advertising costs
  - Parts are looking good but performing badly …

Safety Risks; Environmental Pollution; Financial Damage
Automotive Semiconductors address challenges of mobility with security & convenience: - *Integrity & Security* -

- 80 of 96 countries (>85%) with ePassports worldwide have chosen NXP
- Long time relationship with trusted financial organizations: VISA, MASTERCARD, CUP
- Partner of choice with top 5 players serving >80% of the payment market:
  1 billion SmartMX secure elements sold to date

NXP with top position in global security markets
Automotive Semiconductors address challenges of mobility with security & convenience: - **Integrity & Security** -

- **Secure microcontrollers**
- **Contactless readers**
- **Contactless Tags & Labels**

- Car 2 X: secure access to in-vehicle networks
- eVehicles: secure financial transactions
- Tracking: privacy protection
- Traffic management: vehicle identification
- Remote car management: SW upgrade, feature activate
- Device protection: against theft, cloning, counterfeiting, tuning and manipulation

**NXP protects the Connected Car**
Automotive Semiconductors address challenges of mobility with security & convenience: *example road pricing*
Conclusion

The challenges of tomorrow’s mobility

- Safety
- Congestion avoidance
- CO₂ reduction
- Respect individualism: security & convenience

⇒ Connected Mobility

What it takes

- Blend technology from different domains … RF, Security, etc
- Open industry standards … international; within and beyond automotive
- New business models … more complex than traditional automotive value-chain

⇒ Innovation and Courage