RFID Solution Excellence Center

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Opening: System Lab

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Never stop thinking.
Agenda

- Infineon at a Glance
- Development Center Graz
- RFID Solution Excellence Center: System Lab
Infineon on the Way to the Top

Ranking Q2 2003
1. Intel
2. Samsung
3. TI
4. Renesas
5. STM
6. Toshiba
7. NEC
8. Philips
9. Motorola

# x = Rank
= Market Share [%]

Source: Gartner/Dataquest, before 2000; iSuppli 2000-Sept. 2003

Target 2007
6%
Infineon at a Glance

- Infineon - a top 10 semiconductor company
- Revenues of EUR 6.15 billion in fiscal year 2003; revenues growth of 26% year-on-year ⇒ outperforming market growth
- Improved market position in our target markets and gaining market share in all business groups
- Approx. 32,900 employees (incl. 6,100 R&D staff) as of December 31, 2003
- Strong technology portfolio with more than 37,000 patents and applications; 46 major R&D locations world-wide
- Most advanced fab cluster and world leader in 300mm production
- Focus on communications, automotive and memory products
- Successfully pioneering the solution business in target markets, e.g. secure mobile applications, telematics, etc.
Strategic Objectives
Agenda 5-to-1

Within the framework of the Agenda 5-to-1, Infineon intends to:

1. focus within the 5 YEARS from 2002 to 2007
2. to become a TOP 4 global semiconductor player
3. by achieving a minimum TOP 3 position in each segment served
4. with a TOP 2 financial performance in all businesses against competition
5. and being the NUMBER 1 semiconductor company pioneering the solution business
Infineon: Market-oriented Business Structure

### Business Groups

- **Wireline Communication**

  Broadband and Carrier Access, high speed line cards for metro and long-haul optical networks

- **Secure Mobile Solutions**

  Secure mobile applications and systems: communication, payment, identification, computing, entertainment, wide area wireless and local area wireless networks, personal area wireless networks, GPS

- **Automotive & Industrial**

  Car Electronics (powertrain, body, convenience, safety, vehicle dynamics, infotainment), industrial drives, automation and control systems, power supplies

- **Memory Products**

  PC and notebooks, PC-upgrades, workstations, infrastructure (servers and networking), PDA’s, SMART phones, computer peripherals
Agenda

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- RFID Solution Excellence Center: System Lab
Infineon Technologies Austria AG
Locations

Foundation: 1970
Total surface area: 158,000 m²
Products: Automotive and Industrial, Secure Mobile Solutions, Wireline Communications
Workforce: 2,600 (including 600 employed in R&D)
Sales/year: EUR 533 million (including DICE and Comneon)
Production volumes: 10.4 billion/year
Innovative Products out of Austria

COM (Wireline Communications)
Telephony via Internet, ADSL and VDSL (fastest form of Internet communication)

SMS (Secure Mobile Solutions)
Electronic ID cards, SIM cards, health care cards, encrypted computer communication, new UMTS and GPRS mobile radio generations, base stations

AI (Automotive and Industrial)
Airbags, ABS, power switches, engine management, sensors, Remote keyless entry

Ident Solutions (Radio Frequency Identification)
Libraries, Logistics, Production
Development Center Graz

Foundation: 1998 as R&D site
Products: Automotive and Industrial, Secure Mobile Solutions, RFID solutions
Workforce: about 140
F&E Budget FY03/04: about EUR 30 million
Infineon Technologies in Graz

- Worldwide competence center for contactless solutions
- Development of the applications of the future (E-Ticketing, E-Passport, radio frequency systems in cars, powertrain, …)
- Chip → System → Solution

Graz provides solutions
Products / Developments out of Graz

- The data capacity of RFID chips (my-d) developed at Graz are about 40 times larger than other currently available.
- Contactless security controller in cooperation with Sony
  - SESAMES Award 2002 for the best technological innovation within the smart card arena
- Every 2 remote keyless entry car key in the world incorporates chips developed in Graz
- Tire pressure monitoring systems of every 10th car worldwide use chips developed in Graz
- On average, one in six inhabitants of the Earth use an Infineon chip on a chip card – every second of these chips was developed in Graz
Competence Center for Contactless Solutions

- Market success with products
- Outstanding security expertise – „Best-in-Class“
- Longtime experience with contactless interfaces
- Technical universities and technical colleges on site
- International network inside and outside of Infineon
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Market for complete RFID Solutions: Tags, Readers, Infrastructure, Software and Services

- Growth rate: more than 20 percent p.a. from 2002 to 2007
- In 2007 the worldwide RFID market amounts up approx. EUR 2.5 billion

Growth Rate:

Quelle: VDC Corporation, USA
Market-oriented Business Structure with four Business Groups and the Corporate Center, with Emerging Business

- Communications
- Intellectual Capital
- Investor Relations
- Strategy
  - Emerging Business

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Customers’ Logistics Needs

- Supply chain efficiency: Increased throughput at minimum costs calling for accurate track & tracing (100% automated identification)
- Supply chain transparency: Reduced losses, transfer of perils
- Sound decision bases by visibility of demands, supplies and buying behavior
- Integration into existing infrastructure (standard IT, legacy)
- Security measures for SCM and privacy issues
- Decentralized data handling on item level: data on tag (dot) with read / write capability
- Flexibility for new business models and tools
- Anticipation of future technology solutions where items are becoming increasingly smart (e.g. sensors to monitor cool chains)
Benefits of RFID Technologies in Logistics Processes

- Effective quality assurance already during production process for individual goods
- Significant cost reductions due to redundancy of human intervention in material flow processes
- Automated just-in-time delivery of goods to production lines, storage, subsidiaries or customers
- Quick and easy locating, inventory and check of date-of-expiry of goods in interim storage
- Cost-effective traceability of goods after delivery to customers
- Consumer benefits from all-time availability of up-to-date maintenance data of consumer durables and electronic certificate of guarantee
Advantages of RFID Technology compared to Barcode

- No line-of-sight required to read or change tag data
- Simultaneous multiple item identification (fast bulk read) vs. barcodes’ single read only
- Significant time saving by a factor of 10 within distribution value chain
- High storage capacity of up to 10,000 characters
- Write / update capability
- Secure information due to encryption
- Resistance to harsh / dirty environments
- One Tag from production to shelf
Infineon’s 3 Core Competences for Contactless Interfaces, Process Management and IT for successful System Integration

Challenges of RFID system integration

- Integrate into heterogeneous IT landscape
- Design processes that work
- Offer excellent know-how of RFID technologies

- Underestimated by SW companies
- Underestimated by RF companies

No understanding of technology limits
Challenges of RFID System Integration
Examples of critical parameters

- Claimed minimum operating distance
- Minimum identification speed (tags/sec)
- Size and handling of items
- Material of items (surface, mounting of labels, special tags, tag distance to metal, ...)
- Bulk reading requirements (minimum distance of tags, tag position, item surface, ...)
- Surroundings (metal, ...)
- Noise (engines, neighboring readers, ...)
- Long-distance problems
- Mounting of readers and antennas
- Failure modes (avoidance, software measures)
- ...

...
Current Situation

- The customer has to deal with up to 7 companies
  - only a few true system integrators

- Interfaces between different players lead to:
  - high level of coordination requirements
  - increased cost
  - loss of information
  - conflicts of interest

- Most current system integrators are not suited for multi-national projects
Infineon is the one Partner to handle complex Sub Systems
One-Stop-Shop for all RFID Needs

Analysis of demand (specs, timetables) -> Feasibility study -> Pilot project -> Rollout: supply of systems

Complete RFID System Solution

- Labels (ICs and packaging)
- Printers, readers, antennas, scanners (core reader technology)
- Software & network Integration Adaptation Additional SW services
- Integration & Services Consulting Project Mgt. System integration Additional services
The RFID Solution Excellence Center, System Lab Graz

Tasks and Responsibilities

Taking responsibility of the RFID infrastructure requires bundled RF, software and process know-how and **extensive testing and verification**

- **Development and Verification Center**
  - for application specific RFID system infrastructure (readers, tags and platform software)

- **Application Center**
  - to see and experience various RFID technologies at work

- **Technology Evaluation Center**
  - to evaluate RFID technology capabilities and limits in order to enhance their value

- **Training Center**
  - to train customers, partners and global RFID service staff
Product Portfolio

- Complete RFID solution competence from conception to implementation and beyond
- In-depth experience of RF systems, volume RF chip development and production
- A broad skill set and resource base: RF physics, hardware, manufacturing, software, project management
- Access to world-class chip foundry and packaging for RFID cost leadership
- Business scalability secured through training & partnering
- A broad supplier-independent technology basis
- Commitment to future RFID technology trends
- Extensive Quality Management competence
The PC needs an Operating System
The RFID infrastructure needs an Operating Environment

**RFID Value Chain**

**Technology focus**
- **RFID OPerating ENvironment** (Data & Device management)
  - Process RF signal into application-ready information
- **HW Devices**
  - Reader, Printer, Scanner, Scales, Touch screens..
- **ICs, Antenna, Inlay, Label, Tag**

**Process focus**
- Inter-enterprise data
  - Backend infrastructure for inter-enterprise lookups
- Application software
  - SCM, ERP, WMS*
- Enterprise Appl. Integration (EAI)
  - Collects information from legacy and other systems

**IT and Process Consulting**

* Supply Chain Management, Enterprise Resource Planning, Warehouse Management Systems

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* Supply Chain Management, Enterprise Resource Planning, Warehouse Management Systems
A distributed Server Architecture is required to configure, administrate and run scaleable RFID applications.

**You-R® OPEN - The RFID OPerating ENvironment**
A complete RFID Integration needs to consider all factors of the project implementation.

RFID system integration services

Integration based on Infineon
You-R® OPEN
RFID sub system integration platform

Develop -> Install -> Operate -> Maintain

Upgrade

Globally distributed multi company/multi site RFID infrastructure must be managed by the right bundle of services, tools and organization.
Infineon offers tailor-made RFID System Solutions

RFID TUBEs are composed, tuned, installed, operated and maintained in Infineon's You-R® OPEN (RFID OPerating ENvironment) Platform.
Preview to RFID Solution Excellence Center current Demonstration and Evaluation Stations

- **Ground floor**
  - **Room A**
    - Infineon’s Library Solution
    - B2B Logistics Solution
  - **Room B**
    - Process optimization in the textile supply chain
    - High Speed RFID for Pharmaceuticals using PJM technology

- **2nd floor**
  - **Your-R® OPEN**
    - Infineon’s RFID System Integration Platform
  - **Room C**
    - UHF Long distance identification