ON THE MOVE

Identification News

Semiconductors

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NFC takes first steps to commercial reality

NFC technology evolved from a combination of contactless identification and interconnection technologies. Combining the functions of a contactless reader, a contactless card and peer-to-peer functionality, NFC enables short-range wireless communication in the 13.56 MHz frequency range. NFC technology is standardized in ISO 18092 and ISO 21481, ECMA (340, 352 and 356) and ETSI TS 102 190 and is also compatible with the widely established contactless smart card infrastructures based on ISO 14443A.

Enabling rapid and easy communications, NFC (Near Field Communication) is the perfect solution for exchanging data in our increasingly complex and connected world. Its intuitive operation makes it particularly easy for consumers to use, while the high level of security it offers makes it ideal for payment/financial applications. After co-developing NFC, Philips and Sony teamed up with Nokia to form the NFC Forum.

Mobile phones enabled with NFC are set to spur consumer usage and open up revenue opportunities >

for wireless operators, merchants and handset makers. For consumers, NFC's easy touch-based interactions constitute a quick and convenient way to access and pay for physical and digital services.

Delivering an intuitive 'Connected Consumer' experience, NFC-equipped phones will change the way information and services are distributed, paid for and accessed. Enabling secure mobile payments and transactions, they will also allow easy peer-to-peer communication and simple access to information on the move.

The first NFC-enabled products and services to hit the market exploit two basic principles of modern society: everyone needs to pay for products and everyday services such as public transport ticketing; and just about everyone carries a phone. Demonstrating the ease of implementation – a key factor in accelerating the uptake of NFC – the products and applications discussed on the following pages and on page 13 show how NFC is taking the first steps towards commercial reality.

NFC IN MOBILE COMMUNICATION

Nokia unveils the world's first NFC product

The Nokia NFC shell is a functional cover developed for the Nokia 3220 phone. The latest step in the development of innovative products for mobile communications, the Nokia NFC shell (the phone's outside cover) enables consumers to use their mobile phone to access a variety of services and exchange information with a simple touch.

The Nokia NFC shell lets consumers access browsing and text message services simply by touching tags that contain service shortcuts. Consumers are also able to give their favorite service shortcuts to other users by touching another NFC-compatible device with their phone.

In addition, the Nokia NFC shell comes with tags that can be used for creating personal service shortcuts. Compatible with the widely-established contactless smart card infrastructure based on Philips' MIFARE® technology (ISO 14443 A), as well as with Sony's FeliCa card, NFC opens the door to a huge range of information and services.

"Touch-based interactions will improve the consumer experience of existing services and create new opportunities for users to benefit from their phones. This technology has the potential to significantly improve the way operators provide and users discover and activate different mobile services," said Gerhard Romen, Head of Market Development at Nokia Ventures Organization. "By introducing the new Nokia NFC shell, Nokia clearly demonstrates its strong commitment to offering users an intuitive wireless experience."

The Nokia NFC shell, with four tags, will be available during the first quarter of 2005 in Europe and during the second quarter in the Americas and Asia.

NFC IN PUBLIC TRANSPORT

Speed and convenience – NFC for public transport ticketing

Philips and Nokia, together with Rhein-Main Verkehrsverbund (RMV), the public transport authority for Frankfurt, are trialing an NFC ticketing solution in Germany.

Starting in early 2005, the trial will use NFC-enabled mobile phones to gain access to the local bus network in Hanau, a city near Frankfurt. The system will allow RMV's customers to use a Nokia 3220 phone equipped with a tailored Nokia NFC shell to purchase, store and use electronic travel tickets.

"Nokia is taking a leading role in bringing easy and convenient touch-based interactions to the market. Local ticketing is a great example of how mobility can bring completely new value to consumers and the companies that serve them. This ticketing trial will provide us with valuable experience to meet requirements from mobile operators, transport operators and end-users," said Jarkko Sairanen, Vice President, Strategy and Planning, at Nokia Technology Platforms.

For RMV, one important aspect of the project is the Nokia NFC shells' compatibility with the contactless smart card infrastructure already installed in Hanau. NFC offers customers a quick and convenient way to use the public transport networks, and RMV is at the forefront of understanding how customers will approach the technology.

Travelers simply need to touch their phones against the contactless reader as they get on and off the bus to register their journey. The trial will provide Philips, Nokia and RMV with practical experience of using NFC-enabled mobile ticketing on a check-in/check-out basis, paving the way for the broad adoption of the technology. Furthermore, as an integrated device, the mobile phone can also supply transport information, such as timetables, as well as acting as a terminal for ticketing. >

NFC IN PAYMENT

Deploying NFC payment and promotion solutions with ViVOtech

Philips and ViVOtech have announced a major new initiative to deploy contactless payment and promotion solutions based on Philips' NFC technology in stores. This partnership between Philips and ViVOtech will allow shoppers to make purchases simply by waving their NFC-enabled mobile phone near a ViVOtech reader at the checkout or point-of-sale (POS).

"Consumers are seeking easier and faster ways to make payments with their mobile devices, and NFC offers a natural way to link consumers with the merchant's POS systems. Philips has been leading the development of this technology and we're excited about partnering with a worldwide leader to deploy our solutions and make payment transactions quicker than cash and safer than a check," said Jorge Fernandes, CEO and co-founder of ViVOtech.

NFC-enabled mobile phones can securely transfer payment data to the ViVOpay 3000™ readers. In combination with ViVOtech's ViVOwallet™ software, the phones will allow consumers to carry coupons digitally and make payments or redeem promotions at any ViVOtech-enabled location. The addition of these powerful features to mobile phones is set to spur new consumer usage and open the door to incremental revenue opportunities for wireless operators, merchants and handset makers.

Leveraging the combined strength of these two companies, the relationship between Philips and ViVOtech is set to enrich the payment experience. This initiative will provide consumers with easier access to content and services through a convenient, fast and secure mobile payment solution.

NFC Forum expanding rapidly

The NFC Forum, a non-profit industry association launched in 2004 by Philips, Nokia and Sony to promote NFC technology, recently announced that 20 more organizations from around the world have joined the group. The Forum is a global standards development and advocacy group dedicated to advancing NFC technology, educating the public about its benefits, and furthering its implementation around the world.

Receiving seats on the Forum's Board of Directors, the new Sponsor Members are: MasterCard International, Matsushita Electric Industrial Co. Ltd., Microsoft Corp., Motorola, NEC, Samsung, Texas Instruments and Visa International.

Organizations that have joined the NFC Forum in other membership categories include 3ALogics Inc., CETECOM Spain, Gemplus, Giesecke & Devrient, Innovision Research & Technology plc, JCB Co. Ltd., LG Electronics, Logitech, MeT Ltd., Mobey Forum, SKIDATA AG and Smart System Technologies Inc.

"The strong interest the Forum has received from key players in the industry is a clear endorsement of our goals and a predictor of energetic Forum activities," said Christophe Duverne of Philips, Chairman of the NFC Forum. "We invite additional companies from all relevant sectors – mobile communications, consumer electronics, chip manufacturing, computing, media and entertainment, telecom and payment services – to join the NFC Forum and help work toward our goal, enabling consumers to connect to other devices and services in an intuitive and convenient way."

ICODE sees steady growth in library market

Today, talking *is* allowed in libraries – but only for machines. Already implemented in 200 libraries worldwide, ICODE lets systems talk to books and other media, enabling all kinds of wireless benefits.

The world is moving from proprietary solutions to systems based on ISO 15693. The largest producer of RFID ICs worldwide, Philips is a clear leader in the library market with its ISO 15693-compliant ICODE smart label ICs.

In Asia and Europe, the market for ICODE is continuing to grow steadily. Libraries throughout The Netherlands are adopting the technology, and the world's largest RFID library installation, bringing about great benefits in Singapore, is also based on ICODE. In the US, the first implementations have now been successfully rolled out.

US libraries see benefits of RFID

Based in Canada, library automation specialist Libramation Inc. has successfully implemented ICODE in libraries in its home country and in the USA. Most recently, its ICODE-based Lib~Chip™ solution has been put into operation in three American libraries in Princeton, NY, Oakland, CA, and Lexington, KY. Back in Canada, it's also been adopted by the Whitby Public Library just outside Toronto.

The innovative Lib~Chip addresses many of the challenges found in library management, such as reader logistics, material identification, inventory and information storage. It's unobtrusively stuck to books and other media using a self-adhesive label, storing data such as type of material, title, author, bar code and serial number, shelf location, last borrowed date and last returned date.

To carry out material inventory – one of the most important applications of RFID – library personnel simply walk past the shelves, using a hand-held RFID scanner. In addition, each Lib~Chip offers an anti-theft function (EAS – Electronic Article Surveillance) to reduce inventory shrinkage.

World's largest mail-order retailer trials RFID

With a history of setting the industry benchmark for logistics, the Otto Group has recently started trials with RFID technology to further streamline the efficiency of its logistics processes. The first trial took place in Q3 2004, tracking high-value goods – such as digital cameras or mobile phones – within Otto's massive distribution center in Hamburg, Germany.

The Otto Group is the world's largest mail-order retailer and is second only to Amazon in worldwide online sales revenues. With over 123 companies and operations across Europe, North America and Asia, its mail-order business presents a significant logistical challenge. Hence, Otto has a team of dedicated logistics experts who are constantly looking for ways to improve the group's already highly optimized logistics network. This team identified RFID technology as one possibility for making further improvements to Otto's operations.

The goal of the trial was to test RFID technology in a real application. Accuracy, principally at the pick-and-pack stage, was of primary importance to Otto, as this ensures that the correct orders are sent to each customer. The trial system was implemented by Siemens Business Services and featured readers from Siemens Automation and Drives unit and ICODE-based smart labels from German RFID specialist X-ident.

During the trial, Philips ICODE smart labels were applied to high-value items at Otto's distribution center. The labels were read at a dozen points to ensure that the orders were sent reliably and to identify areas where product shrinkage occurs.

"The initial job was to test the RFID hardware. The trial is in progress and achieving close to 100% read rates at all points in the distribution center – which is really excellent," said Markus Kehrwald, senior business developer at Siemens Business Services.

Each smart label carried a transponder ID, shipment code and internal return code number, and these were encrypted to improve security and ensure privacy. None of the data contained on the labels included any personal customer information. In addition, Otto inserted a small leaflet with each tagged parcel, informing the recipients about the customer benefits

of RFID and providing a telephone number for customer inquiries. This clear and open communication was well received by privacy advocates in Germany.

In the trial, only high-value goods were tagged within Otto's distribution center. With the success of the trial, Otto is now looking to move forward to full implementation of RFID tracking for its high-value products. And as label prices drop with increasing volumes, Otto is planning to extend smart labeling to all its products.

Otto is also looking to extend RFID out of the distribution center and across the complete supply chain. Following on from discussions with its major suppliers, Bültel International Fashion Group (Trek & Travel, Hattric, Camel Active and Mephisto) has already agreed to start testing RFID tags on its clothing goods. These will be tagged at source in East-Asia, enabling the companies to track the products through their own supply chains as well as aiding Otto's operations. Otto is also in discussion with its delivery partner, Hermes, looking at how to make use of the tags once the items leave the distribution center.

If Otto can convince all the players in the supply chain to use RFID, they will all benefit. In addition to improvements in efficiency, reduction of losses through shrinkage and increased transparency along the whole supply chain, there are significant mutual savings to be obtained through cost sharing – as the same labels are used throughout the entire supply chain, from manufacturer to customer.

As RFID label tagging becomes an integral part of Otto's business strategy, the high level of automation that it provides will also help in its plans to grow revenue. In the future, the group expects to be able to save millions of euros by using RFID to further streamline its logistics processes.

National security – on a national level

Raising security in its facilities nationwide, the U.S. Department of Interior (DoI) began full-scale deployment of a physical access system using Philips' MIFARE® DESFire contactless chip technology last December. Philips is the only company offering a contactless chip solution compliant with the Government Smart Card-Interoperability Specification (GSC-IS).

At the end of 2004, the entire DoI had issued almost 30,000 of these smart cards based on Philips' secure contactless chip solution. By late 2005, the Department expects to have issued 70,000 to all its employees including 'first responders' such as affiliated firefighters, police and emergency personnel.

"Contactless smart card technology is a logical next step for secure access within government facilities," said Bob Donelson, smart card program manager for the DoI. "With Philips' leading-edge smart card technology, the U.S. Department of Interior is able to provide our employees with an easy-to-use interface while maintaining the highest levels of security."

Donelson is one of the key proponents driving the U.S. government toward using GSC-IS-compliant smart card solutions to ensure a secure and interoperable method of access control and identification. Enabling the storage and contactless retrieval of basic employee information, the system allows DoI employees to access other departments' facilities with their smart cards.

As we reported in autumn 2004, NASA (the National Aeronautics and Space Administration) has also selected MIFARE DESFire to enable secure smart card access to its facilities. "Selection by the U.S. Department of Interior, which closely follows the selection by NASA to use Philips' technology, confirms our leadership in the contactless smart card market," said Jan-Willem Reynaerts, general manager for market sector RFID at Philips Semiconductors. "Philips plans to further its relationship with the U.S. government to address its security needs across departments."

As the chairman of the Interoperability Advisory Board, Donelson is working closely with other agencies, including NASA, the U.S. Department of Homeland Security and the Veterans Administration to translate GSC-IS requirements into a new, more comprehensive document – the FIPS201. All contactless/contact smart cards procured by the US Government must be compliant with this specification, which is expected to be finalized in 2005. Tens of millions of FIPS201-complaint cards are expected to be ordered in a consolidated purchase placed by the GSA (General Services Administration).

U.S. stadiums go contactless

Sports fans in North America are discovering the convenience of contactless payment thanks to SMART System Technologies' (SST) PowerPay™ solution. In the largest deployment of multi-application smart cards for contactless payment and loyalty schemes in North America, Powerpay has been implemented in a number of major stadiums. Besides providing a quick and rewarding cashless payment experience to consumers, the technology offers a powerful marketing tool for sports stadiums, branded merchants and retailers.

Leveraging the ISO 14443A standard for proximity card technology, SST's PowerPay tags are based on Philips' MIFARE® interface technology. The key-chain fob tags can be linked to any credit card, debit card or checking account and are printed with the stadium's team logo. They can be used for cashless payment at concession stands inside the stadiums, team merchandise stores inside the venues as well as in the surrounding areas and with local merchants and retailers in the respective markets.

U.S. sports stadiums are not alone in discovering the benefits of contactless technology. Contactless schemes are increasingly common in Europe, but there the focus is on access control rather than contactless payment and loyalty applications. However, it would be easy to add this functionality to the kind of multi-application tags used in the SST solution. Parking and transport ticketing could also be incorporated, offering sports fans even greater convenience.

Consequently SST is closely following the roll-out of contactless access control systems at soccer stadiums in the UK and hockey stadiums in Finland where this functionality is the key driver for adoption of contactless smart cards. >

Faster payments, increased revenues

Currently SST has deployed its contactless payment solutions at three U.S. stadiums in Seatle, Philadelphia and Detroit. In Philadelphia, more than 7,000 PowerPay tags have been issued and over 300 readers installed at concession stands and merchandise areas. The Detroit Lions boast the largest wireless ISO 14443 infrastructure in the USA with more than 50 mobile stands using wireless readers to enable PowerPay transactions anywhere in the stadium. In addition, the Lions have another 400 PowerPay-enabled stands and merchandise areas.

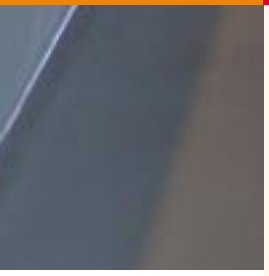
The results at these stadiums have been impressive: the average PowerPay transaction was more than three times faster than cash transactions, and up to seven times faster than using a credit or debit card. In addition, the stadiums' revenues have gone up significantly – averaging a 10% purchase increase over cash and 60% more purchases per event than with credit cards.

Michael Richardson, president and chief operating officer of SST, said "These teams have experienced the potential of PowerPay first-hand and are highly committed to enhancing the fan experience. PowerPay users are assured that their personal information is always protected and never exposed to third parties without their permission. Furthermore, SST has combined state-of-the-art chip-level and contactless technologies with a proven, scalable and secure hosted solution that makes the system safe and reliable for nationwide deployment."

SST is also extremely interested in the possibilities of Near Field Communication (NFC) technology and has recently formed an alliance with Philips and 3united (see sidebar), the results of which were first presented at 3GSM in Cannes in February. "The ability to deliver real-time rewards and promotions to consumers based on mobile handset activity and purchases are unique benefits of combining the NFC chip with the mobile phone," said Michael Richardson. "Marketers will now

be given the power to reward and provide incentives to consumers based on their purchases, purchase intent or loyalty to a brand or merchant. We see significant benefits to carriers worldwide as they become an integral part of delivering unique and highly-targeted messages to a willing audience of consumers."

SST believes that contactless payment is the next big step for the U.S. market. All the major credit card companies are looking into contactless payment. Mastercard's Paypass, for example, is also based on ISO 14443A and if all the others were to adopt this open standard, merchants would only need one reader in their POS terminals to read any contactless card. In the past, Philips predicted that the future was contactless. With the successful roll-out of PowerPay at these sport stadiums in America, it seems that the future has finally arrived.



Industry leaders enable exciting loyalty and reward programs through NFC

A recent alliance between Philips, SMART System Technologies (SST) and 3united aims to enable exciting mobile entertainment applications, as well as loyalty and reward programs, via NFC.

This joint effort will allow consumers to make purchases or redeem e-coupons simply by waving an NFC-enabled phone in front of a smart poster, contactless retail point-of-sale (POS) device or kiosk. What's more, consumers will be able to receive instant promotions and rewards based on their location and preferences.

The alliance leverages Philips' expertise in the smart card space and its leadership in pioneering NFC technology, and combines it with the experience of SST and 3united in the contactless payment and mobile messaging markets, respectively. SST has developed customized software for NFC phones and will be demonstrating NFC interoperability with its PowerPay solution for sports stadiums. 3united is one of Europe's market leaders in premium short message services (SMS), m-commerce and mobile content solutions. It already provides NFC interfaces for more than 500 premium services for national and international content providers, media enterprises and mobile network operators.

Philips' smart card chip for smart passports – first to achieve highest security certification

The German Federal Office for Information Security (BSI – Bundesamt für Sicherheit in der Informationstechnik) has presented Philips' P5CT072 Smart*MX* triple interface smart card controller IC with CC EAL5+ certification. Based on third-party evaluation, the certification demonstrates the company's leading role in the development of advanced, secure smart card chip solutions.

A Common Criterion of the Information Technology Security Evaluation, the EAL (Evaluation Assurance Levels) scale of 1 to 7 expresses not just the level of security offered but also the cost and feasibility of acquiring it. Indicating that a product has been 'semiformally designed and tested', EAL5+ guarantees a high level of security at a reasonable price – exactly what is required for large-scale applications which affect national security.

Security continues to be a top concern for governments worldwide, as business and holiday travel continues to increase. Meeting the highest security and memory requirements of major smart passport projects in the United States, Germany and the United Kingdom, Philips' Smart*MX* triple interface ICs provide air travelers with increased convenience and safety.

Philips is working in close cooperation with government and industry standards bodies in the development of secure identification technologies to meet current and future security needs. With 72 Kbytes of EEPROM memory, the P5CT072 exceeds the specifications for smart passports set by the International Civil Aviation Organization (ICAO) and is being used by SDU Identification in field trials of the new ICAO-compliant Netherlands Smart Passport and various other trials.

"With developments in smart passport technology being driven by the United States Visa Waiver initiative, the industry is in urgent need of recognized and reliable platforms. The BSI's Common Criteria EAL 5+ is one such platform for evaluating hardware solutions," said Anoop Ubhey, senior smart card analyst, Frost & Sullivan. "With this certification, Philips further confirms their understanding of industry needs. Their identification technology has consistently set the industry benchmark, and continues to do so with this new certificate for its Smart*MX* family."

Already in volume production, the P5CT072 offers – in addition to its Dual Interface capabilities (ISO/IEC 7816 and ISO/IEC 14443) – a USB 2.0 LS interface to drive end-user acceptance, enabling e.g. easy-to-use digital signature functionality and secure physical network access. The chip can be integrated into smart cards or other form factors, such as dongles, for direct connection to a PC's USB interface.

It provides an additional 1 Kbyte EEPROM for each implemented 8 Kbytes as a standard industry practice. This ensures that the specified EEPROM size is fully available for applications, unimpeded by the operating system memory overhead. Therefore, the 72-Kbyte product delivers at least 64 Kbytes EEPROM of fully usable application memory.

The Smart*MX* family uses a unique handshaking technology that allows a significant reduction in power consumption. In addition, Philips has further increased the reliability of its technology by extending the data retention time from the industry standard of 10 years to 20 years – and by increasing the number of write cycles to 500,000. Meeting customers' need for efficiently programmable devices to shorten time-to-market for new products, Smart*MX* also offers linear memory addressing, a dedicated instruction set and state-of-the-art security sensors.

The certification of this solution confirms Philips' unique leadership in both chip security and contactless technology for smart cards in a broad variety of applications, including smart passports, electronic ID cards and bank cards. With its large memory, sophisticated low-power handshaking technology and high resilience, the P5CT072 chip is not only the first certified triple interface device, but also the first in volume production.

e-Passport ICs receive EAL5+ certification

In addition to the secure triple interface smart card IC P5CT072, two Smart*MX* ICs particularly suitable for e-passport applications – the Dual Interface P5CD072 and the P5CD036 – have also achieved EAL5+ certification.

Meet us at the following events

- Event: **RFID Journal Live**
  Date: 10 - 12 April 2005
  Location: Chicago, USA
  Website: www.rfidjournallive.com

- Event: **EURO ID 2005**
  Date: 19 - 21 April 2005
  Location: Wiesbaden, Germany
  Website: www.euro-id-tradefair.com

- Event: **Smart Card and Smart Label**
  Date: 19 - 21 April 2005
  Location: Beijing, China
  Website: www.scfc.org.cn/sdsl/english/

- Event: **ECR Europe Conference**
  Date: 26 - 28 April 2005
  Location: Paris, France
  Website: conference.ecrnet.org/ecrfolder/home.cfm

- Event: **RFID World Asia**
  Date: 27 - 29 April 2005
  Location: Suntec, Singapore
  Website: www.worldofcards.biz/2005/

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