Mobile Credit Card From Barclaycard and Mercury

Mobile credit card services using the Mercury One-2-One mobile phone network are to be tested by Barclaycard in the south-east of England. The alliance is the first of its kind in the world and the first financial application to be added to the Smart Card SIM (Subscriber Identification Module) used in mobile phones.

In addition to being able to access a wide range of Barclaycard services, future options include payment of household bills and the order of goods.

Continued on page 103

Smart Card News

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Next Month

Smart Card Tutorial Part 23 - Multi- application Smart Cards continued

CONTENTS

Mobile Credit Card

Continued from page 101

Cardholders will be able to use a wide range of services including checking balances, altering credit limits, confirming receipt of payments, obtaining details of recent transactions, reporting lost and stolen cards and making general inquiries.

Customer benefits are:

* direct automatic billing of all One-2-One phone calls and other service charges to

their Barclaycard account, giving up to eight weeks interest free credit.

* free access by mobile phone 24 hours a day to Barclaycard services.

* Barclaycard Profiles points for the purchase of a One-2-One phone (costing £299.99) and the cost of all One-2-One calls billed to a Barclaycard account.

By selecting from a menu of services displayed on the phone screen, a Barclaycard customer will be routed directly to an appropriate Customer Service Operator who will handle enquiries. In addition, Mercury One-2-One and Barclaycard customer service staff will be linked by a direct line enabling operators to switch a caller from one company to the other.

Up to 750,000 Barclaycard customers will be mailed over the next six months with invitations to participate in the scheme.

Smart Cards in the Mercury One-2-One system have been supplied by Datacard Corporation in the United States and Orga Card Systems (UK).

Mercury One-2-One is a joint venture company equally owned by Cable and Wireless Plc and US West Inc. Mercury Personal Communications Ltd, a partner in Mercury One-2-One, is licensed as a public telecommunications operator for switched voice and data communications services to users of mobile telephones.

Contact: Daryl Booth, Manager, Barclaycard New Product Development, England - Tel: +44 (0)604

The Smart Card and phone will also provide the existing range of Mercury One-2-One services such as the in-built VoiceMail service, which works like a personal answering service; 24-hour customer service, and access to other information services such as travel and weather news.

The Mercury One-2-One service was launched in May 1994 in south east England and is expanding to major cities and interconnecting motorways. The service will be available in the top 30 major UK conurbations by Spring 1996 with coverage of 90% of the population by the end of the decade. At 31 March 1994, Mercury One-2-One had 62,500 customers and expects to break through the 100,000 barrier this month.

253220. Fax: +44 (0)604 253422.

Vending Card Bank Link

A new multi-application contactless card system is to be launched in the UK later this year by GiroVend, Europe's largest cashless catering and vending services group, and they are looking for a High Street bank or licensed deposit taker to join in the scheme.

The new card will also be available in the United States following the announcement last month of a merger with Debitek Inc., the US cashless systems subsidiary of soft drinks bottling giant Coca-Cola Enterprises Inc.

The merger with Debitek, based in Chattanooga, Tennessee, will create the world's largest cashless payments group specialising in the manufacture and supply of magnetic stripe and Smart pre-paid card systems to the in-house catering and vending services market and give British-owned GiroVend, 59% controlling interest in the new company. Both companies will continue to operate under their trade names in Europe and North America.

Future growth

About 60% of all cashless catering and vending sites in the US and Europe are GiroVend and Debitek operated, says Richard Smart, GiroVend's Chairman and Chief Executive. "We estimate that this represents about one percent of the potential in-house market for pre-paid cards within these sectors - the scope for future growth is therefore massive," he said.

This year, the merged company is expected to handle over 22 million card transactions daily with an annual systems turnover in excess of £1.8 billion.

ERG Wins Hong Kong Contract

A HK$400 million contract to supply three million contactless Smart Cards, over 5,000 Smart Card processors and associated equipment has been awarded to ERG Australia Ltd for implementing the new fare collection system in Hong Kong which is the largest application in the world to date.

This month, five major public transport operators in GiroVend expects this volume to more than triple over the next three years with the launch of their new contactless card system later this year. GiroVend has focused on in-house services supplying shops, department stores, factories and offices etc., but the new Smart Card system will take them into the high street. The cards will be linked with the bank's ATM network.

GiroVend is expected to issue shares with outside investors to help finance the project.

Debitek's core business has been in the sale of pre-paid cards, card readers and systems software and their systems are also designed to link into the US banking system, enabling cardholders to transfer funds directly onto their cards from local ATMs which will facilitate the introduction of the new Smart Card system in the US.

In addition to traditional catering and vending applications, GiroVend also supply cashless system interfaces for photocopiers, fax machines, telephones and launderettes.

Contact: Richard Smart, Chairman and Chief Executive, GiroVend Holdings, London - Tel: +44 (0)71 738 0616. Fax: +44 (0)71 738 0331.

Five Million Phonecard Order

A contract to supply five million phonecards to Compania Anonima Nacional Telefonos de Venezuela (CANTV), the Venezuelan telephone company, has been awarded to SOLAIC, the Smart Card manufacturing subsidiary of Groupe Sligos. CANTV operates, manages and develops all of Venezuela's telecommunications networks and services.

Contact: Charles Juster, SOLAIC, France - Tel: +33 1 49 00 96 33. Fax: +33 1 49 00 96 07.

Hong Kong announced that they would join forces to develop and introduce a modern ticketing system for payment of fares and have formed a new company, Creative Star Ltd, to develop and operate Hong Kong's first multi-application electronic purse Smart Card System.

The companies are: Mass Transit Railway Corporation (MTRC), Kowloon-Canton Railway Corporation (KCRC), Kowloon Motor Bus

Company (1993) Ltd, (KMB), Hongkong and Yaumati Ferry Company Ltd (HYF) and Citybus.

A spokesman for Creative Star said he was pleased that the major transport operators had been able to co-operate in forming the jointly-owned company to introduce the Smart Card system.

"Our aim is to provide the most convenient and reliable fare payment system which passengers can ultimately use on all forms of public transport," he said.

Performance testing

Performance testing trials will start in 1995 and the scheme will be gradually introduced to the travelling public in mid-1996. Initially the cards will be used throughout the rail systems operated by the MTRC and KCRC (the latter including the LRT and feeder bus services), the cross harbour services operated by KMB, the outlying island and new territories services of the HYF, and about 50% of the routes operated by Citybus.

Passengers will place the card within a short distance of the target located on a dedicated processor integrated into the existing fare collection equipment of the respective transport operators, and the transaction will be initiated without the need, in most cases, for the card to be taken out of the passenger's wallet or purse.

Passengers will have three major options for adding value to the Smart Card. The first is to pay cash to staff at the railway stations, major bus interchanges and ferry piers. The second is to use cash or debit cards in machines at the transport operators' premises.

The third option is an innovative way of recharging the card automatically. In this scheme, the passenger will sign an autopay form so that additional value is automatically added by the Smart Card processing equipment and the nominated amount subsequently deducted from the passenger's bank account.

Creative Star says that customer service will be enhanced in terms of convenience, reliability, flexibility and security. The public will be able to use the same card for a wide selection of transport services and eliminate the need to carry small change. High levels of reliability are expected with an anticipated transaction failure rate of only one in over 50,000.

System flexibility

The flexibility of the system provides for "through ticketing" possibilities and could be utilised in the future as a method of payment for other "coin-dominated" businesses such as parking meters, telephones and vending machines.
Finally, if the card is lost the passenger will be able to claim the remaining value using information on the receipt issued at the time of original purchase of the card. The lost card will also be blocked or blacklisted.

The contract signing ceremony was attended by Peter Fogarty, Chairman & Chief Executive of ERG Australia, and the Board Members of the jointly owned company: Rob Noble, Marketing and Planning Director of MTRC, Jonathan Yu, Light Rail Director of KCRC; Tim Ip, Assistant to General Manager of KMB; David C S Ho, General Manager of HYF; and Lyndon Rees, Managing Director of Citybus.

Contact: Brian Chambers, Project Leader, Mass Transit Railway Corporation, HongKong - Tel: +852 751 2278. Fax: +852 759 5062.

Major Contract for Landis & Gyr

British Gas has confirmed the award of a five-year contract to Landis & Gyr Energy Management (UK) for further supplies of the Smart Card-based Quantum pre-payment gas metering system.

Peter Robertson, Managing Director of Landis & Gyr, described the new contract as "a further major commitment from British Gas recognising the benefits available from the wide-scale introduction of advanced technology."

The contract follows the successful joint development a field trial which has culminated in over 168,000 British Gas customers having their homes equipped with the Quantum system of paying for gas using a rechargeable Smart Card.

British Gas is extending the system nationwide over the next five years and it is expected that the total requirement for meters will be around 1,250,000.

Contact: Tom White, Landis & Gyr Energy

Management, England - Tel: +44 (0)952 677661.

Twelve Thousand Cards Issued

About 12,000 Smart Photocards, the contactless tickets in the Bus Electronic Smartcard Ticketing (BEST) trial by London Transport Buses in Harrow, have been issued since the project started in February this year. (SCN March 1994).

The contactless Smart Cards are supplied by GEC Card Technology and the trial involves 200 buses on 19 routes operated by five bus companies.

Contact: Roger Torode, BEST Project Leader - Tel: +44 (0)71 918 4123.

New Vice President for Danmont

Leif Kjoller has been appointed Vice President, Systems Development at Danmont. He succeeds Jens Lindboe-Larsen who has established his own consultancy company, PlusCON, but will continue to work on special tasks for Danmont until the end of 1994.

Health Professionals Card

Schlumberger Smart Cards & Systems has been awarded the project management role to develop the operating system for France's future Carte de Professionel de Sante (CPS) - the Smart Card which will be issued in 1966 to more than one million doctors, dentists, nurses and other health professionals.

The contract was signed last month with GIP (Le Groupement d'Interet Public), a French public interest group established to bring together all the interested parties to conceive, issue and promote a single national Smart Card for all health professionals.

The development calls for a card with powerful security mechanisms and the chip design will have its own integrated cryptographic processor.

This initial phase of the project will be extended with a health card for the general public which will be issued by health assurance organisations.

Laurence de Talence, Schlumberger's Product Manager for Health Systems, said: "All developed countries are finding that the costs of running national health systems are spiralling. Schlumberger is convinced that this new generation of Smart Card technology will provide the foundation to substantially reduce the costs of administration, while additionally opening up avenues to enhance the quality and efficiency of patient care. We anticipate that this advanced technology will be adopted by many nations during the next decade."

Contacts: Murielle Berges, General Secretary, GIP(CPS), France - Tel: +33 1 44 53 36 42. Fax: +33 1 40 16 90 15. Bertrand Dussauge, Communications Manager, Schlumberger Smart Cards & Systems, France - Tel: +33 1 47 46 62 47. Fax: +33 1 47 46 68 66.

Belgian EP is Named PROTON

PROTON is the commercial name announced for the Belgian Smart Card Electronic Purse system being developed by Banksys, the operator of the Belgian network for electronic payment Bancontact/Mister Cash.

The blue and yellow colours of the card are identical to the colours of the Bancontact/Mister Cash logo, anticipating the possible future integration of the various means of payment.

Copying Machine Terminal

Fincard Systemer, which supplies payment systems for copying machines etc., has entered into a development agreement with Danmont to develop a Danmont terminal for the copying machine market.

The card, which will be used to pay small amounts in food shops, at newsagents, vending machines, parking meters, payphones, public transport, and mobile activities such as taxis and home deliveries, etc, will be field-tested from December in the cities of Leuven and Wavre.

Project overview

PROTON cards will be issued by the banks and will be reloadable with electronic money withdrawn from the account of the cardholder at cash dispenser machines (ATMs) or by bank tellers. Banksys are

also evaluating the loading of cards over the home or public payphone.

Two new types of payment terminals have been developed by Banksys for the service providers - a terminal for small shops, with two versions, fixed and portable, and a module to be integrated in vending machines. Existing C-ZAM Point-of-Sale terminals will be upgraded for shops that wish to be able to accept the card.

It has been decided that a secret PIN is not necessary for purchase transactions as only small amounts will be involved. Merchants will be able to transfer electronic money from their terminals into their bank accounts either by a simple telephone call using a modem or, if the terminal is not linked to a telephone line, it can be downloaded onto a special card which the service provider then unloads at an ATM or bank branch.

Anyone can ask for a card at his bank and as there is no secret code involved in a purchase transaction, the initial cardholder can pass his card on or lend it to any other person and there is no age limit for usage.

The cardholder can check the balance on the card in several ways - at a cash dispenser, on the terminal of the service provider, and on a small personal pocket device which will display the balance when the card is inserted.

Stolen or lost cards are not subject to any reimbursement and the cardholder is expected to take the same care of his card as he takes with cash. However, one of the possible functions of this personal device might be to lock access to the card to prevent others from using it without his agreement.

New GAM Card from Gemplus

Gemplus is carrying out market trials of a new range of memory cards called GAM (Gemplus Authenticated Memory).

The current range of memory cards from Gemplus are the GFM (Gemplus Free Access Memory) and GPM (Gemplus Protected Memory) product lines.

The new cards are the start of a new generation of more sophisticated memory cards aimed at completing the product offering between protected memory cards and microprocessor cards by offering

Banksys also says that it will be possible to extend the system to use the card for other currencies and the ECU. However, in the pilot, payments will be transacted in Belgian francs.

On reaction to the scheme, Banksys says: "Contacts with large service providers (public transport companies, car park operators, Belgacom for public phones, vending machine operators etc) are very positive and indicate that the electronic purse responds to a real need of the marketplace."

Similarities with Mondex

It is interesting to note the similarities with the Mondex International electronic payment system (SCN December 1993). Many of the facilities likely to be offered by Banksys closely mirror those first announced by Mondex - a personal balance reader, the ability to lock the card to prevent unauthorised use, loading the card with value over the telephone, and the ability to hold several different currencies on the card. The technical architecture of the two schemes is however quite different.

Contact: Youri Tolmatchov, Communication Manager, Banksys, Belgium - Tel:+32 2 727 6666. Fax:+32 2 727 6767.

Orga Appointment for Rogers

Nick Rogers, Marketing Manager Chip Cards at Siemens Plc, joins Orga Kartensysteme GmbH as International Sales Manager on 1 July. He will be based at the Henley-on-Thames offices of Orga Card Systems (UK) - Tel: +44 (0)491 410997. Fax: +44 (0)491 410295.

a level of security that has previously been reserved for microprocessor cards.

First product

First product is the GAM144, which is compatible with the existing GPM103 cards (used mainly for pre-paid telephone cards in Germany) in terms of functions, electrical specifications and memory configuration, but with a larger personalisation zone, anti-pulling protection and an authentication algorithm (Cryptographic Hardware Identification Procedure CHIP).

Products in the GAM line have a specific virtual memory zone designed for card authentication. Using a challenge response scheme, the card is queried by the reader and the answer depends on the question itself (random number) and on personalised data as well as the counter and the secret key contained in the card. Authentication involves comparing this answer to the response calculated by the security module.

Gemplus says that the secret code characterizing each card in the GAM line differs according to the serial number and the secret application key (master key). This key must remain secret in order to ensure optimal security for the application.

To achieve this, Gemplus has developed specific security modules that are actually high security microprocessors for use in appropriate readers.

Another first in this card line is the anti-pulling system which protects against loss of units stored on the card even in the case of sudden withdrawal from the card reader. This can occur during intermittent transactions, for example, voltage drops, or when the card is withdrawn before the end of the operation.

Gemplus believes that market demands will soon require reinforced protection for memory cards and have developed the GAM144 for applications that use limited value pre-payment, for example, telephone or service station cards.

Contact: Jacek Kowalski, Gemplus - Tel: +33 42 32 50 00. Fax 33 42 32 50 90.

Swipe Not Smart for Post Office Cashcard Systems Closure

Cashcard Systems Ltd., the Welwyn Garden City-based Smart Card company specialising in the leisure and retail market, ceased trading from 4 May 1994.

Set up some five years ago, it is best known for its pioneering work in the use of Smart Card technology in Amusement with Prize machines and a continuing successful project at resort hotels at EuroDisney, near Paris, France. Another scheme was at Funtazia, Whitbread Inns' family entertainment centre in Leeds, England, where cards can be used to buy food, pay for drinks, use of the tenpin bowling alley and amusement machines.

Speculation that the UK Government might sanction the use of the latest Smart Card technology for benefits payments at Post Offices was killed off by Peter Lilley, Secretary of State for Social Security, when he announced last month that the way forward was to be swipe card technology.

The speculation was fuelled by the Government's crackdown on social security fraudsters and the fact that losses through order book fraud account for about £100 million a year.

Mr Lilley told the annual conference of the National Federation of Sub-postmasters that he was examining options for progressive action on extending the use of bar codes on benefit books, installing computer terminals to verify payments over the counter, and eventually replacing order books with special payment cards.

Social security payment card

"Computerisation of benefit payments would mean that, over time, order books could be phased out in favour of a social security payment card which customers would produce at their local post office. It would be swiped through a machine reader and the system would check the card against a database and tell the post office clerk how much to pay," he said.

It is the Government's intention to involve the private sector in funding and organising the project with the Benefits Agency and Post Office Counters who will shortly be asking the private sector for innovative ideas and proposals.

It also carried out field trials of pre-payment cards in Whitbread public houses.

The product has taken longer than foreseen to be fully accepted in the UK and as a consequence, Cashcard Systems has decided to sell its principal asset, the software, on the open market.

Chief Executive John Kelly, commented: "It has become clear to the Board of Directors that the product, despite its undoubted and proven potential, will require on-going and substantial financial support during its period of introduction to the marketplace. This level of 'deep pocket' commitment has not been possible to source in the current climate, and inevitably, therefore, the

consequence has been the closure of the company."

He said their success overseas - distribution agreements in both central Europe and North America, and the highly successful and expanding EuroDisney application - had been in markets where Smart Card technology had already been absorbed and accepted, adding:

"In the UK, it was perhaps a product before its time, but I am sure it will ultimately be very successful."

He regretted that they had been unable to secure a new commercial relationship which would have allowed the company to exploit its long term potential.

Contact: Tony Hyams, Berley, Chartered Accountants, England Tel: +44 (0)71 636 9094.

Road Toll Trials in Germany

Large-scale field testing of road tolling technologies being conducted by Germany's Federal Ministry of Transport on the A555 Cologne-Bonn motorway are likely to continue until mid-1995.

One scheme on trial is the ChipTicket developed by Siemens AG, Siemens Nixdorf AG and ITF Intertraffic, a subsidiary of Daimler Benz.

Communication between pay points and cars on the move is via infra-red transmission. A Smart Card - the SICRYPT Computer Card V2.0 - is inserted in an in-vehicle unit and the toll charge is deducted from the card as the vehicle passes the pay point.

The Siemens Nixdorf SICRYPT Computer Card is a multi-functional chip card with a built-in microprocessor and 3K bytes EEPROM.

Privacy issues

The system addresses the privacy issues associated with some types of automatic road tolling systems by making the purchase of the card anonymous. There is no registration procedure and the card does not contain any personal data such as the vehicle registration number.

While other systems use video cameras to capture the vehicle registration numbers of drivers who intentionally attempt to avoid paying tolls or do not have enough credit or their cards, the ChipTicket system relies on random checks by specially equipped control vehicles.

The number of drivers refusing to pay can be ascertained by using traffic detectors and control checks can be related to this number.

A video monitor in the control vehicle identifies the vehicle being checked and displays its chip ticket using infra-red technology. Vehicles that do not have a valid ChipTicket can be stopped and the driver fined.

Contact: Manfred Reichherzer, Siemens Nixdorf, Germany - Tel: +49 89 636 2471. Fax: +49 89 636 44820.

Identity Control Terminal

GEM-ID from Gemplus is a portable terminal for Smart ID Cards enabling security personnel to carry out on-the-spot identity control checks.

The hand-held unit reads and displays colour photos and data such as a national identity card or a driver's licence, which are stored in the Smart Card, in a single operation. Security officers can compare the colour photo on the card with the photo displayed on the screen.

The GEM-ID can only be operated by security personnel who have been identified using their

secret PIN code entered on the keyboard. Lost or stolen identity cards can be detected by means of a black list held within the terminal.

A Smart ID Card combines the advantage of imprinted security on the card, for example ID number, signature and photograph, with the security of the tamper proof chip, cross authentication between card and terminal, and data encryption protection. Potential users are police, immigration, security and military personnel.

Contact: Regine Wojciechowski, Gemplus - Tel: +33 42 32 50 42. Fax: +33 42 32 52 79.

PAYSMART From British Gas

PAYSMART is a new Smart Card development derived from the British Gas Quantum pre-payment gas metering system and is now available to other businesses.

Peter Stoddart, Project Manager, Quantum Card Services (a joint venture between British Gas Plc and Landis & Gyr Energy Management (UK) Ltd) says that while the Quantum system has obvious advantages to British Gas, the network also provides an opportunity for others.

The chip card allows data to be stored securely, for example, customer reference number, other client/customer data, date and amount of last 50 payments, time and location of last 50 payments, balance on the card.

Takashimaya Loyalty Card

Takashimaya, a Japanese department store chain, has ordered 200,000 Smart Cards from Gemplus to introduce a large-scale customer loyalty application for its department stores in Singapore.
Project objectives include, increasing customer loyalty by rewarding frequent shoppers or high-value purchases in the Singapore stores, and obtain detailed information about customer buying patterns to improve customer service.

Cardholders can collect one point for each 10 Singapore dollars spent, and benefit from special

TV Licensing Card

The first business to take advantage of the Quantum network is TVL on behalf of the BBC in a pilot application to enable customers to make small payments towards their TV licenses using a PAYSMART card customised as the TV Licensing Card (shown on the front page). Some 200 customers are taking part in the trial involving 11 shops equipped with card charging units in the White City area of London.

Contact: Peter Stoddart, Project Manager, Quantum Card Services - Tel: +44 (0)91 491 4245. Fax: +44 (0)91 491 4248.

Omron Renews Agreement

Card Systems, UK distributor for Omron since December 1990, has received a long term commitment agreement from Omron Systems Europe GmbH until at least September 1997 with automatic continuation thereafter.

Guy Boxhall, Managing Director of Card Systems (UK), based in Henfield, West Sussex, England, said: "This commitment by Omron will allow Card Systems to proceed with further expansion into systems development, with particular emphasis on Smart Card Technology."

Contact: Guy Boxhall - Tel: +44 (0)273 495034. Fax: +44 (0)273 495123.

reductions on parking, delivery of purchased goods, or gift offers in the stores. The loyalty programme targets two distinct groups - regular Singaporean customers and the large number of Japanese tourists.

The scheme is the result of collaboration between a number of players - Takashimaya, Gemplus, VeriFone, Fujitsu, VISA and the Development Bank of Singapore (DBS).

Gemplus is supplying their COS 2K bytes EEPROM Smart Card which will be issued to regular Singaporean customers. (The Gemplus GPM896 memory card will be issued as a pre-paid card to tourists.)

Local use of the card is complemented by international acceptance through the partnership with VISA, while customers with accounts at DBS can use ATMs in the shopping centres. VeriFone have supplied their Omni 380 and Pinpad CM450 terminals.

Contact: Edmond Tuilier, Gemplus, France: Tel: +33 42 32 52 70. Fax:+33 42 32 52 79.

Guests at the inauguration of ESEC SEMPAC SA's Smart Card Compact Line at their headquarters in Cham, Switzerland, last month. Attendees from some nine European countries were shown the new production line which ESEC SEMPAC say produces cards that are more secure, reliable and attractive at a lower cost than current production methods. A complete production line has been sold to a German company.

Electronic Purse Market Prospects

Open national electronic purse schemes most likely to succeed were monopolistic government initiatives notably in Singapore, Taiwan and Finland, said Dr Peter Harrop, Chairman, Kalamazoo Plc, speaking at the "Prepayment Cards and the Electronic Purse" conference organised by AIC Conferences in London last month.

The other schemes were mainly backed by retail banks. These had advantages such as the respect of governments as clearers of currency, possession of ATM networks to reload cards and knowledge of open payment card systems.

However, he said, the retail banks lacked routes to market in the sense that they did not control major payphone, mass transit, benefit payment, road tolling or retail networks or other existing or potential major applications.

While this independence could be an advantage, it greatly impeded any roll-out.

"No-one can forecast the growth of national and global electronic purses with any certainty at all," said Dr Harrop. "It is not enough to say that they replace coins. Prepayment cards are already substituting for most other payment media as well. The future course of major closed systems is only slightly more certain.

Although most applications use disposable cards at present, a small but increasing minority of prepayment cards were reloadable, notably in vending, catering, education and most national electronic purses.

It was popularly argued that most prepayment cards in the world would become reloadable in the years to come but this ignored the particular profit earning, customer-pleasing benefits of disposable cards.

With disposable cards, he said, it was much easier to maximise float, sale of advertising, and income from lost, hoarded or collectors' cards. They can act as visiting cards, autodial cards and give-away cards in supermarket promotions.

Chip cards would take over the majority of business within a few years, not so much because of security, but because of such features as transaction speed, very low power consumption, and very small cheap, silent read-writers

Dr Harrop, along with Peter Hirsch, Managing Director of Retail Banking Research Ltd, led a project team in the preparation of an in-depth study "Future of Prepayment cards: Markets, Technologies and Opportunities," available (price £3,750) from Retail Banking Research, London, England -Tel: +44 (0)71 495 8871. Fax: +44 (0) 71 493 0539.

Parking / Electronic Purse Systems

The Urban Terminals and Systems Division of Schlumberger, France, and the Smart Card division of Setec Oy, Finland, have joined forces to offer parking management systems compatible with new generation electronic purse payment schemes.

Setec Oy, owned by the Bank of Finland, specialises in security systems and Smart Cards, and developed AVANT, the Finnish Electronic Purse system as well as the in-car parking meter currently being trialled in Helsinki.

Schlumberger is a major manufacturer of parking management systems and Smart Card based electronic payment components and systems.

Contacts: Helene Victor-Pujebet, Schlumberger Technologies, France - Tel: +33 81 54 56 16. Fax: +33 81 52 76 38. Fred Granberg, IC Card Division, Setec Oy, Finland - Tel: +358 0 89411. Fax: +358 0 8786133.

Little Mermaid Card

The artist who designed the Little Mermaid card (see front page) for Danmont is Lina Murell Jardorf. She is the first artist to design cards for Danmont which has built up a reputation for interesting and colourful cards. To date there have been 48 different designs.

Contact: Henning Jensen, Managing Director, Danmont, Denmark -Tel: +45 4344 9999. Fax: +45 4344 9030.

New Chip for Bank Cards

A new generation of microcontroller-based Smart Card for financial applications has been developed in France by Schlumberger Smart Cards & Systems with the support of Texas Instruments. A major feature is that it offers a recyclable memory structure for transactions, as an alternative to the fixed storage capacity of existing chips, and extends the potential life span and flexibility of banking Smart Cards.

The new product has been approved by GIE Cartes Bancaires, France's national bank card association, and will be in commercial production later this year with market deployment during 1995.

Called the B0' v2, the new product offers re-programmable EEPROM memory cells controlled in a first-in first-out, or FIFO style, which allows the chip to store approximately 160 transactions in a sequential file; once it reaches this capacity (the point at which conventional cards would cease to work) control logic automatically shifts all records by one step, deleting the oldest record.

By extending the life span of the card it overcomes the limitation faced by banks and other credit/debit card issuers who are forced to re-issue cards regularly to frequent users.

Reduced die size

In addition to improving flexibility of performance, Schlumberger says it has considerably reduced the die size for greater economy and reliability, and protection against environmental and operating hazards, including electro-static discharge, has been enhanced for greater reliability.

The chip's transaction memory may also be accessed by terminals, opening up significant development potential for both issuers and retailers. Potential uses include statistical analysis of transaction history for monitoring and business development purposes, and customer loyalty programmes.

The BO' v2 chip has been developed by Texas Instruments' European Microcontroller R&D centre utilising their TMS370 microcontroller architecture, and will be manufactured by Texas Instruments using an advanced 1.2-micron process.

Toll System via Satellite

Project ROBIN, Mannesmann's automatic toll collection system is currently undergoing field tests in the German Ministry of Transportation trials on the A555 Cologne-Bonn motorway.

Contact: Bertrand Dussauge, Communications Manager, Schlumberger Technologies Smart Cards & Systems - Tel: +33 1 47 46 62 47. Fax: +33 1 47 46 68 66.

ICC Specs from Card Issuers

Europay International, MasterCard International and Visa International last month published the first part of common technical specifications for the integration of microprocessor chips in payment cards.

The joint working group of the three major payment card issuers have based their Integrated Circuit Card Specifications for Payment Systems on the ISO/IEC 7816 series of standards.

Part 1 defines electromechanical characteristics, logical interface, and transmission protocols as they apply to the exchange of information between an IC Card and a terminal.

It covers, for example, mechanical characteristics, voltage levels, and signal parameters as they apply to both ICCs and terminals, an overview of the transaction session, establishment of communication between the ICC and the terminal by means of the answer to reset, and character and block-oriented asynchronous transmission protocols.

Data elements, command structures, application protocols, and the use of these to achieve application level functions will be addressed in Parts 2 and 3.

The card issuers say that these specifications are intended for a target audience that includes manufacturers of integrated circuit cards and terminals that will be used in payment system applications.

Europay International has already announced the intention to introduce Smart Cards as a fraud prevention methodology (SCN December 1993), and is working with MasterCard and Visa in developing a common standard.

ROBIN (ROad BIlling Net) utilizes the GPS (Global Positioning System) satellite navigation system to determine the distance a vehicle travels on tolled roads and motorways, and a processing unit installed in the vehicle calculates the fees which are debited from a Smart Card.

The project is a co-operative effort by Mannesmann Kienzle, VDO Adolf Schindling AG, Mannesmann Datenverarbeitung, and Mannesmann Pilotentwicklung.

System overview

Twenty-four GPS satellites orbit the Earth and continuously signal their positions and the corresponding time. A GPS receiver is integrated in the ROBIN vehicular unit. Similar to a sextant, it precisely determines the vehicle's geographic position and current time.

The dashboard unit includes an electronic memory in which data such as the geographic description of the highway network, tariff structure, toll roads and respective toll recipients are maintained. The internal data is compared to the vehicle's current position to identify toll roads and the unit then calculates fees according to distance travelled, time of day and vehicle type.

The Smart Card holds an account from which the tolls are deducted during the trip and a digital display keeps the motorist updated on the balance of funds available in the card.

If the remaining funds do not cover the toll calculated by the unit for the next highway portion, a control light alerts the driver who can stop at the next service station to reload value on the card.

Spot checks, similar to speed traps, are a way of detecting drivers who misuse the system. Mobile control vehicles monitor the dashboard units via 5.8GHz communication systems and when misuse is indicated the offender is photographed, identified and ticketed in a similar fashion to speeding offenders.

System benefits are seen as:

* No roadside infrastructure required for toll collection
* Can be selectively integrated into all vehicle classes
* Easy to expand to other road networks, for example, cities
* Protection of privacy ensured
* additional services are available to drivers and operators, for example, traffic controllers.

Contact: Guenther Weber, Project Leader, Mannesmann Pilotentwicklung, Germany - Tel: +49 89 678008-0. Fax: +49 89 678008-16.

Smart Card Diary

Developments, Applications and Implementation Strategies in Smart Card Technology, Sheraton

QuickLink to Pilot Australian SVC

The Quicklink consortium of ERG Australia and Fujitsu Australia has been awarded preferred tenderer status for the New South Wales Government's Stored Value Card (SVC) scheme.

Quicklink has signed an agreement with the Commercial Services Group within the NSW Government to finalise key service provider requirements and to conduct an SVC pilot scheme to evaluate the breadth of applications suited to its use in Australia and consumer reaction. Subject to successful trials it is intended to expand the SVC scheme to cover the whole of New South Wales and then to expand nationally.

Discussions are already taking place between Quicklink and Australian companies regarding the supply of various components.

ERG and Fujitsu are also the major members of OneLink, the consortium managing the Melbourne Automatic Fare Collection project for the Victorian Government.

Contacts: Kip Cole, Fujitsu - Tel:+61 2 410 4400. Colin Simpson, ERG - Tel:+61 9 273 1100.

Walker Hill Hotel, Seoul, Korea, 16/17 June.

A chance to hear about the Smart Card market in Korea as well as technology issues and

applications. Contact: Elsa Dana, Centre for Management Technology, Singapore - Tel: +65 345 7322. Fax: +65 345 5928.

Plastic Card Fraud & Security, The Cumberland Hotel, London, England, 16/17 June.

International speakers include representatives from Europay International, Banksys, APACS, Visa UK, and New Scotland Yard. Contact: AIC Conferences - Tel: +44 (0)71 329 4445.

Customer Loyalty Programmes, The Mount Royal Hotel, London, England, 11/12 July.

Speakers include British Airways, American Express, Air Miles and Girobank. Contact: AIC Conferences - Tel: +44 (0)71 329 4445. Fax: +44 (0)71 329 4442.

2nd International Seminar on Pre-paid Cards, Denmark, 31 August/1 September.

Organised by Danmont, the programme includes system technology and marketing experience from the first two years of operation as well as strategic and more political issues. Contact: Ms Berit Nielsen, Marketing, Danmont - Tel: +45 4344 9999. Fax: +45 4344 9030.

ESCAT 1994 (European Smart Card Applications & Technology), Hotel Inter-Continental, Helsinki, Finland, 7-9 September.

Three days of Smart Card applications and user experiences from international speakers from ten countries. Contact: Congrex, Finland - Tel: +358-0-752 3611. Fax: +358-0-752 0899.

Paycard '94, The Gloucester Hotel, London, England, 19/20 September.
Topics include Europay International on the business case for the introduction of chip-based POS payment systems and BT on exploiting chip card technology in telephony, as well as loyalty schemes, fraud reduction and co-branding opportunities for retailers. Contact: IIR - Tel:+44 (0)71 412 0141. Fax:+44 (0)71 412 0145.

CarteS 94, Palais des Congres, Paris, France, 18-20 October.

The 9th International forum for plastic cards technologies with plenary conferences on Smart Cards in the fields of payment, security, information management, commerce and technology, electronic payment systems; one-day forums on Cards and Local Authorities and Health Care Cards; and half-day seminars on Card and Law, Cards and Telecommunications, Technocard, Stored Value Ticketing, Components 2000 and Cards and Security. There is also a major exhibition with over 100 exhibitors. Contacts: Joelle Catalano (Congress) - Tel:+33 1 49 68 52 60. Gilles Benay (Exhibitors) - Tel:+33 1 49 68 52 84.

European Payments 94 (EFTP0S & Home Services), Sheraton Grand Hotel, Edinburgh, Scotland, 15-17 November.

Celebrating its 10th anniversary, the conference aims to provide an in-depth review of financial payment systems throughout the world. Contact: Scottish Electronics Technology Group - Tel: +44 (0)41 553 1930. Fax: +44 (0)41 552 0511.

Smart Card Europe, Royal Lancaster Hotel, London, 13/14 December.

The 2nd annual European conference focuses on the security issues, particularly regarding electronic purse schemes, and examines the major applications in the rapidly developing fields of transport and telecommunications. New to the conference is a tutorial on 12 December by Dr David Everett for those who want to get up to speed on Smart Card technology. Also new is an exhibition area for Smart Card industry suppliers and service providers. Contact: IBC Technical Services - Tel: +44 (0)71 637 4383. Fax: +44 (0)71 631 3214.

Smart card Tutorial - Part 22

Multi Application Smart Cards - continued

Last month we established the concept of an application identifier (AID) for International use as defined by ISO 7816 - 5 (Numbering system and registration procedure for application identification). This was really the easy bit because the ISO standard allows an extensive number of options for application selection. Before we start digging in, it does not seem unreasonable to make a few assumptions on the environment in which the ICC

(Integrated Circuit Card) and its application are going to be used. Lets consider a general model for the interaction with an application in an ICC (fig 1).

The ICC is considered to have one or more applications which may be selected by some application process control. The interface device (IFD) forms the basic interaction with the ICC in terms of ISO 7816-1,2,3 but is itself controlled by some application either resident in the IFD or remotely accessed across a network. Clearly the terminal system may also invoke one or more applications using a process control system by which means a particular application may be selected. Now here comes the first interesting commercial question - who selects what? intuitively one feels that the ICC should be the slave process and as such the choice of an application be made through the IFD. In particular it is obvious that whatever application is to be selected in the ICC a corresponding application in the IFD must control the interface to the ICC application.

According to ISO 7816 - 5 the identification of the application will enable the IFD,

- To ascertain that the card has the capability of initiating a particular application

- To identify the method by which a particular application in the ICC is evoked.

The standard determines three methods by which an application may be selected,

a) - Direct selection using the AID

b) - Indirect selection using information stored in the ICC either in a DIR file or an ATR file

c) - Implicit selection where the application is considered to be invoked at the time of reset.

We may recall from previous discussions in the tutorial that ISO 7816 - 4 defines a file structure for the ICC and that the dedicated files (DFs) can contain application files. Thus to invoke an application we effectivelyy need to select the relevantt DF.

Let us look at each of these methods in turn,

Direct Selection

The assumption here is that the IFD wishes to invoke a particular application in the ICC and that it knows the AID for that application. In this situation the IFD will issue a 'Select File' command to the ICC where the AID is specified as the dedicated file name.

Clearly it is necessary that the IFD knows which application in the ICC to invoke and it proceeds by a trial and error approach. If the application (i.e the dedicated file) is present then the card will invoke the select file command and return a normal status response (90.00) to the command. If the application is not available then the response status bytes will indicate an error. These status bytes were discussed previously when exploring part 3 of the ISO 7816 standard. The select file command was discussed when we examined part 4 of the ISO 7816 standard.

Indirect Selection

a more complex DIR record could define an application template which can contain a number of

The ICC may optionally contain a DIR or ATR file. Both of these files if present may contain application templates or the AIDs themselves. These data elements when present are always encoded using the ASN.1 (Abstract Syntax Notation) rules. The data fields are constructed as TLV (Tag, Length Value) objects, where the tag identifies the data semantics, the length represents the size of the data and value is the particular data element. The 7816-5 standard defines the following data elements encoded as shown in the table below,

TAG 1 byte	Length (L) 1 byte	VALUE (data element)	TYPE
'4F'	'01'to'10'	Application identifier (AID)	P
'50'	'00'to'10'	Application label	P
'51'	'00'to'7E'	Path	P
'52'	'04'to'7F'	Command to perform,see ISO/IEC 7816-4	P
'53'	'00'to'7F'	Discretionary data	P
'73'	'00'to'7F'	Discretionary ASN.1 objects	C
'61'	'03'to'7F'	Application template	C
TYPE: P = primitive ASN.1 object			
All other application class tags are reserved by ISO			

In its simplest form the DIR file could contain a set of records each of which contains the AID for each application present on the ICC. A typical record would be as follows,

Tag (1byte)	Length (1byte)	VALUE
$4F_{hex}$	10_{hex}	AID (16 $bytes_{hex}$)

data elements referring to the application. By this means a typical DIR record might be as follows,

Tag (1byte)	Length	VALUE								
61 hex	2A hex	Tag	Length	value	Tag	Length	Value	Tag	Length	Value
		4F	10	AID	50	10	label	51	04	Path

Here the application template contains the AID, its path (in the file structure) and an application label.

The application label is a variable length (up to 16 bytes) data element that can be read by the IFD and displayed to the user as part of the man machine interface. It could be for instance an application brand name. The application template can be up to 127 bytes long.

In a practical situation the main advantage of the Indirect Selection method is the ability to check the ICC by reading say the DIR file to see if it contains the application that the IFD wishes to invoke. The ability to examine what other applications a particular ICC supports may in many situations be commercially debateable.

In any event both the DIR and ATR files are optional which means that the IFD cannot predict if this method of application selection is available. The application template may also contain one or more commands as defined in ISO 7816-4 that the IFD should invoke in order to select the application. The value of such techniques in a general purpose multi application environment is debateable.

Implicit Selection

The purpose of this form of selection is really to allow backwards compatibility with a single application ICC. After the ICC has been reset it is assumed that the application is already selected. The AID is contained in the historical bytes encoded by ASN.1 to confirm the particular application. As pointed out in the ISO 7816-5 standard this form of application selection is not recommended for multi - application cards.

contain that application and therefore the direct method of application selection would be the most appropriate. In many situations the alternative

In a normal commercial environment we could argue the case that the IFD should be configured to select a particular application as the result of some interaction with a user. It might reasonably expect that the ICC presented for use should approach would be clearly wrong. If for instance a point of sale terminal were to examine the financial applications available on a presented ICC and choose the preferred application for the retailer then that would cause serious implications in terms of consumer rights.

In order to tie up a few loose ends we also need to expand on the AID. We referred last month to the first 4 bits of the first byte of the RID (Registered Application Provider Identity) as being 'A' for International registration. ISO 7816-5 defines 7 classes for the registration category values as follows,

'0'-'9'	As defined in IOS 7812
'A'	International registration
'B'	Reserved for ISO
'C'	Reserved for ISO
'D'	National registration
'E'	Reserved for ISO
'F'	Proprietary non-registered

Registration category 'D' is for registration by the National Standards Authority. The five bytes of the RID are defined as follows,

CC1 - CC3 are the country code BCD digits of the National registration authority. The remaining 6 BCD digits (SNA) are specified by the National authority. The PIX (Propriety Application Identification Identifier Extension) is applied as previously.

The registration category 0 - 9 is used to allow compatibility with IINs (Issuer Identification Numbers) as defined in ISO 7812. The first BCD nibble is the first digit of the IIN. Successive digits follow, where an odd number of digits is padded with F_{hex}. If a PIX is included as part of the AID it should be proceeded with FF_{hex}. The total AID must not exceed 16 bytes.

David Everett

Next month - Multi Application Smart Cards continued.

Boots Weight Monitoring Card

A weight monitoring rechargeable Smart Card is being tested by The Boots Company Plc in over 20 chemist stores in the UK.

Customers can purchase the card, supplied by US^3 Inc. for £2.50 which includes three "free" credits (one credit = one weigh). The card can be recharged on the PW7 weighing machine.

When using the card for the first time, customers are asked by a screen prompt for their sex, height, age and build to assist the weighing machine to calculate a guide to their ideal weight. The machine then weighs the customer and prints out a ticket and automatically deducts one credit from the card.

The card always retains details of the first weigh and retains an updated record of the last 10 weighings for comparison with the customer's ideal weight. Weight is shown in kilos and stones/pounds.

Credits remaining are shown on the screen. If the card is in credit the machine brings up the customer's personal details (entered on first use) and asks if the information is still correct. This is confirmed by pressing a "Yes" key, or can be amended.

Danmont Transaction Volume

The number of transactions in the Danmont pre-payment card scheme amounted to 145,496 in the first quarter of 1994 - an increase of 108% on the last quarter of 1993.

Danmont cards are now available in 21 towns in Denmark as national roll-out continues.

New Gemplus Plant in France

Aiming to increase its monthly production capacity from 15 million to 20 million cards a month, Gemplus has opened a third micromodule manufacturing plant at La Ciotat where the group already has its hardware subsidiary and will benefit from existing security, transport and logistics facilities.

Now with three operational production sites, Gemplus will benefit from increased flexibility in production scheduling and allow the group to respond to new market demands.

Smart Card Industry Guide

Don't know who is producing what in the Smart Card industry? Can't find the right company? Don't know who to contact there? Want to be up-to-date on what is happening in the industry worldwide in the fields of Finance, Transport, Healthcare, Security, Education, Entertainment and Leisure and keep abreast of the Technology?

The answers are coming in the definitive guide to the Smart Card industry worldwide to be published later this year by Smart Card News.

The guide will provide the opportunity, free of charge, to suppliers, service providers and consultants to the industry to provide details of their company, products and services.

Advertising space is also available in this prestige publication at highly competitive rates.

If you have not yet received a questionnaire for your free entry in the guide please contact Chris Stephenson. To book advertising space contact Iain Just. Tel:+44 (0)273 302503. Fax:+44 (0)273 300991.