Banco do Brasil to Pilot Proton Electronic Purse

Banco do Brasil, which has 5,000 branches in Brazil, is to launch a pilot electronic purse project using Belgian electronic purse PROTON technology and is inviting other financial institutions to participate in the development of a national purse.

The pilot will take place in the city of Blumenau and will be supported by the Brazilian company MITEL which implements PROTON in collaboration with Banksys, the Belgian developer and operator. Also participating will be BESC, the Bank of the State of Santa Catarina where Blumenau is situated.

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Next Month

Smart Card Tutorial - Part 9
From There to Here -
Transmission Protocols continued.

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Banco do Brasil Purse

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The Brazilian electronic purse will also have the name PROTON and is intended for payment of small amounts at retail outlets, vending machines, on public transport and even as electronic meal tickets.

SCN notes, however, a particular application in Brazil will be the characteristic payment of salaries onto the cards. Banco do Brasil estimates this market at 50 million cards.

The pilot scheme is scheduled to start on 5 October in Blumenau which is an industrial city and one of the most important in Brazil. It is planned to issue some 7,500 Smart Cards which will be reloadable up to the equivalent of US$ 200 during the trial period.

Contact: Akira Ensiki, Banco do Brasil, Belgium - Tel: +32 2 289 52 11. Fax +32 2 502 8244.

New CPMS for Interpay

Data Sciences BV, the Dutch subsidiary of British computer services company Data Sciences, is to develop and implement a client/server based Card Program Management System for Interpay Nederland BV.

The contact involves the replacement of nearly all of Interpay's IT systems and will handle both debit and Eurocard/MasterCard credit card transactions and eventually the new Dutch electronic purse Chip Knip.

Data Sciences BV is the prime contractor and will carry out the software development and systems integration. It will be working with Card Systems Europe which will provide business knowledge of the card processing industry. The system will run on a Tandem fault-tolerant mainframe with a client/server architecture with Windows based PCs running as clients.

Interpay Nederland BV is jointly owned by all the Dutch banks and was formed in 1994 by the merger of BankGiroCentrale, BeaNet and Eurocard Nederland.

Chip Knip Launch

Phase One of the new Dutch electronic purse, Chip Knip, starts next month in Arnhem (population 144,000) where there is a high density of payment card users. Interpay has selected CP8 Transac's Cash Card 60 (1K bytes EEPROM) for the trial and plans to issue up to 100,000 cards.

Contacts Sue Wright, Corporate Communications Manager, Data Sciences UK - Tel: +44 (0)1252 544321. Fax: +44 (0)1252 513739.
Antoon Kuipers or Evert Fekkes, Chip Knip Project Managers, Interpay, The Netherlands - Tel: +31 30 2 835795. Fax: +31 30 2 835236..

Solaic Opens US Company

Solaic, the Smart Card manufacturing subsidiary of Group Sligos in France, has launched a new company in the United States.

The San José, California-based company is headed by Francis Lavelle, Chairman and CEO of Solaic. Kurt Brunner has been appointed head of sales and marketing.

The mission of the company is to promote and sell Solaic's products and services in the US. Amongst existing clients is US West Communications which has contracted Solaic to supply 500,000 phone cards.

Contact: Boris Eloy, Solaic, France - Tel: +33 1 49 00 96 33. Fax: +33 1 47 73 07 63.

Major Cards Event in Australia

The Asia Pacific Smart Card Forum and AIC Exhibitions are organising the Cards Australia '96 Conference and Exhibition to be held at the State Sports Centre in Sydney, Australia, from 4-6 June. It is planned to cover Smart Cards, Stored Value Cards and electronic purse, co-branded/loyalty cards and procurement cards.

Contact: Erika Morton, AIC Exhibitions, Australia - Tel: +61 2 210 5700. Fax: +61 2 223 8216.

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China to Produce Smart Cards

China Banknote Printing & Minting Corporation and the Peoples Bank of China in Beijing are gearing up to manufacture plastic cards to Visa and MasterCard specifications, including the milling and insertion of chips.

They have signed what is described as a "major contract" with Louda Systems of Germany for the supply of the manufacturing equipment and the Bank of China says the plant will be the prime credit card and chip card manufacturing facility in China.

Equipment purchased includes machines for magnetic tape applications, collection of layers, sheet lamination, punching, application of holograms and signature panels, and milling and placement of chips.

Louda Systems says the Bank of China chose their range of machines after two years of market investigation and fierce competition from other suppliers. It adds that China Banknote also selected the "hot liquid" system of gluing chips into the card developed by Louda and co-operating companies. This, adds Louda, has all the benefits of cold liquid and hot melt but none of the disadvantages such as patent protection for the gluing process or distortion on the reverse of the card.

Contact: Peter Liebenau, Marketing-Sales Director, Louda Systems - Tel: +49 89 61 38 51 21. Fax:+49 89 61 38 51 93.

Banksys Rolls out PROTON

Banksys, developer and operator of the Belgian electronic purse PROTON, has announced plans for the national roll-out following the successful technical pilot phase in the towns of Wavre and Leuven.

It is planned to progressively extend PROTON all over the country on the basis of the number of terminals to be sold by Banksys and the number of electronic purses commercialised by the banks.

In addition, communities will be approached - companies, universities, hospitals - that find the management of small amounts, for example in restaurants, cafeterias, vending machines, telephones, copiers etc, time-consuming and unpractical. The members of these communities will also be able to use PROTON within their environments and in the equipped cities.

The towns to be equipped with the electronic purse from the end of the first quarter of 1996 onwards will be Mons and Namur in Wallonia, Mechelen and Ghent in Flanders.

In the second half of the year, PROTON will be extended to Brussels, Antwerp and Liege. Expansion will continue through a series of towns in 1997 and 1998 to cover the whole of Belgium by the end of 1998.

Banksys says that in the long term, the PROTON card and Bancontact/Mister Cashcard could be merged to meet consumer requirements for fewer cards in Belgium for paying for purchases.

Statistics

In six months, Banksys says it registered over 500,000 payments with PROTON, installed 1,200 terminals in shops, 110 phone booths, 35 public indoor phones, 50 miscellaneous vending machines and two carpark ticket dispensers.

Contacts: Youri Tolmatchov, Communication Manager or Georges Gijsels, International Sales & Business Development, Banksys - Tel: +32 2 727 6666. Fax: +32 2 727 6767.

ODS Supplies Telecom Eireann

An order for 2.5 million pre-paid telephone chip cards has been awarded to ODS Oldenbourg Datensysteme of Munich, Germany, by Telecom Eireann.

This is the third international order for phone cards for ODS this year. It is supplying Hungarian Telecom with seven million chip cards over the next two years, and Slovak Telecom with 1.6 million chip cards for 1995 and 1996.

Internal Passport at Toulouse

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Airbus Training, the training department of Airbus Industrie, the European consortium for selling Airbus aircraft, is to introduce a Smart Card company card to be used by the trainee crews for the Airbus aircraft sold throughout the world.

Each year, some 3,000 trainee pilots, ground crews, stewardesses etc. are trained at Toulouse in south-west France.

Fast Maintenance Informatique was awarded a contract to install the FUNCHIP Corporation system from Innovatron Data Systems.

Airbus says it expects the system will significantly improve the services offered to trainees.

The card, called an Internal Passport and featuring the Airbus logo and colours, will contain the trainee's name, company name, training code, and start and end date of the training course.

Trainees will be issued with a Smart Card on arrival for use as identification, attendance check, pay for services such as restaurants, vending machines, etc., and to connect to the data network to obtain information about hotel reservations, training courses and general information.

In the next development phase, direct access through the switched telephone network and TPScam terminals will be used by the trainees at their hotels to access the computer network. Later it will be possible to control access to equipment and training facilities such as flight simulators, classrooms, consoles and workstations.

Airbus has ordered 4,000 C3744 cards, five TPScam 1000 terminals (electronic funds transfer, checking access to software tools, personalisation) and three TPScam 4100 terminals (attendance checking).

Contact: Geneviève Bœuf, Communication, Innovatron Data Systems, France - Tel: +33 1 40 13 39 42. Fax: +33 1 40 13 39 59.

Smart Cards Promote Town

Ledøje-Smørum, a small community of 10,000 inhabitants, has become the first municipality in Denmark, and possibly in the world, to use Smart Cards for promotional advertising.

The small town, just outside Copenhagen, has issued two cards. One with a value of 100 kroner (approximately US$ 20) is for distribution through banks all over the country. Side one shows a "romantic" scene in front of an old church with the text: "A nice place to live." Side two displays the new industrial area where the authority want to attract new non-polluting industries with the text: "Ledøje-Smørum municipal welcomes you to 'King Svend's Park' - the new exclusive industrial area."

The other card is a 20 kroner card (US$ 4) card produced as a special edition which the authorities want to use for direct mail and other promotional activities. It carries the same designs and text but the sides are reversed.

Contact: Henning N Jensen, Managing Director, DANMØNT A/S, Denmark - Tel: +45 43 44 99 99. Fax: +43 44 90 30.

ICMA Goes On-line

Information on the plastic card industry is now available on the Internet as the International Card Manufacturers Association (ICMA) goes on-line with its World Wide Web site.

Jeffrey Barnhart, Executive Director of the Association explains: "With more than half of ICMA's 120 corporate members from countries other than the United States, it made sense for us to establish a presence on the Internet. The ICMA Web site will enable us to more efficiently communicate with industry participants as well as receive feedback world-wide."

The ICMA Web site will provide free information on the latest news and developments in the plastic card industry, including forth-coming events and seminars. The URL (uniform resource locator) or electronic address for the ICMA Web site is http://www.icma.com/icma.

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Electronic Purses: A Comparative Review - Part 2

Country	**The Netherlands**	**Portugal**
Name of scheme	Chip Knip	PMB (Multibanco EP)
Capital investment	Not available	Six million ECU for ATM upgrade, 500,000 PMB cards, 10,000 deposit cards, 5,000 EFTPOS and 5,000 PMB only terminals.
Operator	All Dutch banks	Sociedad Interbancaria de Servicos SA (SIBS) - a private company owned by 30 Portuguese banks and the national clearing house for POS and ATM networks
System developer	Interpay BV (Bank Giro Centre, BeaNet, Eurocard Netherlands)	SIBS
Status	Phase One starting October in Arnhem. Phase Two national roll-out in 1996	National roll-out April 1995 (Field trials October 1994-March 1995)
Multiple currencies	No	
Loadable amount	500 guilders (about £55) in Phase One	Initially $10 for students; $20 for public
Current applications	Electronic purse for small payment based on the Belgian PROTON system. Applications will include retail, parking and vending	Low value amounts to replace cash. Private cards (cards combining PMB with one extra applications such as access control, loyalty, transport, etc.)
Planned applications	Intention to migrate to Europay specifications	Dual card (bank credit/debit) in October 1995
Method of settlement	Fully accounted system with Interpay as the clearing centre	SIBS is central repository and clearing centre. Retailers with portable terminals use special deposit card to transfer payments via ATMs. Terminals with communication capabilities transfer payments by modem.
Card fabricators	CP8 Transac, a division of Groupe Bull, in Phase One	Gemplus - PMB card (PCOS); Solaic - deposit card (SX)
CPU (Yes/No)	Yes	Yes
Country	**The Netherlands**	**Portugal**

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ROM	8K bytes	
EPROM/EEPROM	1K bytes EEPROM	Gemplus PMB: 1K bytes Solaic SX: 3K bytes
RAM	128 bytes	
Co-processor (Yes/No)	Yes	No
Chip manufacturer/Type No.	SGS-Thomson ST 16601 CMOS	Motorola SGS-Thomson
Security algorithm(s)	Triple DES	DES
PIN	No, except for loading	No. PMB card is anonymous
Cards issued	up to 100,000 in Phase One	700,000 PMB cards 25,000 deposit cards
Card target	-	1,200,000 PMB cards and 50,000 deposit cards end 1995
Card reader/terminal suppliers	Banksys, Belgium	Payment Module to be integrated into all terminals supplied by SIBS; More than 20 types of terminals and manufacturers already certified and 20 more under certification (cash registers, small EFT terminals, self-service machines, food, petrol stations, postal, transportation, etc.)
Number installed	Estimated 800-1,000 in Phase One	(July 1995) 200 electronic cash registers, 2,000 small EFT terminals, 10,000 portable PMB terminals, 3,500 ATMs, 200 self-service terminals and 200 bank branch terminals.
Portable balance reader	Yes	Under preparation
Card recharging points	Specific cash loading machines in banks, bank lobbies and shopping areas	ATMs, manned bank branch terminals and self-service PMB dispensing machines. Under preparation: home loading devices based on personal computers
Contact	Antoon Kuipers or Evert Fekkes	Rui Ferro Meneses, SIBS
Telephone	+31 30 2 835795	+351 1 847 3642
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Electronic Purses: A Comparative Review - Part 2

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Country	**Switzerland**	**Taiwan, Republic of China**
Name of scheme	POSTCARD - Bienne	Taiwan ROC
Capital investment	Not available	NT$: 800,000,000
Operator	Swiss PTT, Payment Services	FISC (Financial Information System Center)
System developer		FISC
Status	Trial in the town of Bienne from November 1991 to October 1995.	Started in January 1987
Multiple currencies	No	No
Loadable amount	Up to Sfr 100 - debited from postal account	NT$ 200,000
Current applications	Cashless payment of goods/services and withdrawing cash from Postomat dispensers. The card contains a reloadable electronic purse which can be used in shops, cinemas, payphones etc.	National payment system, small/large transactions, open system EP
Planned applications	National launch according with the Swiss market for EP applications	Ultimately multi-application
Method of settlement	Debit to PO account	Interbank transactions are settled by an on-line real-time process. Participants are required to deposit an "Interbank Settlement Fund" to their settling banks which are Central Bank, Bank of Taiwan and The Co-operative Bank of Taiwan. For participants linking directly to FISC, the settlement is processed according to respective participants. For those joining the FIS through joint centers, the accounts are collectively settled in agreement with joint centers.
Card fabricators	Bull CP8 Transac, a division of Groupe Bull	Gemplus Schlumberger
CPU (Yes/No)		Yes
Country	**Switzerland**	**Taiwan, Republic of China**
ROM		6K bytes - 8K bytes
EPROM/EEPROM	8K bytes EPROM	3K bytes EEPROM

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RAM		128 bytes - 286 bytes
Co-processor (Yes/No)		No
Chip manufacturer/Type No.	Motorola	SGS-Thomson (ST16623) Motorola (SC21)
Security algorithm(s)		DES
PIN	Yes - to reload the card (EP) up to Sfr 100. No PIN protection for using the EP	Yes - 1-16 digits
Cards issued	9,000 (July 1995)	400,000
Card target		800,000 (end 1995)
Card reader/terminal suppliers		Systex
Number installed	150 sales points for debit transaction on-line, 70 EP terminals in shops, restaurants, petrol stations, swimming pool, cinemas, payphones in the town Bienne. The card can be used like a "normal" POSTCARD without EP everywhere else in Switzerland.	4000
Portable balance reader	No	No
Card recharging points	Thirty public payphones in Bienne, and at equipped Post Offices in Bienne. (Security system: MID (Mobile Intelligent Data-carrier) based on a Bull CP8/M9 - TB100 chip with 3K bytes EEPROM	ATM, self-service bank terminals
Contact	Beat Tschannen, Swiss PTT	Silvia S F Lee, Executive Vice President, FISC
Telephone	+41 31 338 5445	+886 2 741 5220
Fax	+41 31 338 6829	+886 2 741 8083

Digital Decoder Ring

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There is no reason why the chip in a plastic card cannot be inserted in another, perhaps more robust environment, as CMOS chip manufacturer Dallas Semiconductors and Jostens showed with the announcement last month of a digital Decoder Ring with an embedded memory chip.

The primary use of the IC Card is for the portable storage and retrieval of data, and the fact that the chip carrier is a standard size bank card is for commercial interoperability purposes.

A large number of non-standard devices exist, for example, in key and tag forms for use in such areas as access control and animal tagging, but the development of a chip in a ring you can wear all the time on your finger opens up some interesting applications.

Carry digital data

Dallas Semiconductor says that the ring can collect and carry digital data as the wearer roams

The product has been developed primarily to control access to Personal Computers and authenticate transactions, but has other potential uses.

Michael Bolan, Vice President of Product Development at Dallas Semiconductor, says: "This new ring communicates directly with your Personal Computer (PC) to authenticate you as its owner. It also supplies a secret encryption key to decode data files in a PC without requiring lengthy passwords.

"The chip in the ring features a built-in reader/writer as well as a transmitter/receiver capable of sending data 300 metres over an electrically conductive path using just one signal plus ground."

* Business card data can be represented in about 1K bits, including name, title, company address, phone and e-mail or Internet address.

Using Dallas Semiconductor's Priva-C software, the Decoder Ring controls access to PCs and authenticates transactions. Wearers touch the ring to a designated contact point so that it can communicate with the chips inside the PC for simple chip-to-chip communications. Access to information stored on the PC is then granted.

Decoder Rings have been encoded according to the American Banking Association Standard, which emulates Visa or MasterCard credit cards. This feature facilitates electronic commerce.

The ring is based on Dallas Semiconductor's patented Touch Memory Button technology. Information can be read or written with a momentary contact, allowing information to be updated instantly and travel with the wearer.

In addition to computer access, more than 20 companies of door entry systems use Touch Memory Buttons to ensure safe, convenient access to hospitals, laboratories, offices and bank vaults.

Construction

The microchip is protected by being encased in a jewellery-grade, stainless steel MicroCan 16mm in diameter which is then mounted in a custom-designed setting. The lid of the MicroCan can be embossed like the face of a coin, enamelled with colours, or decorated with a bi-metallic inlaid crest.

Data flows through the lid to the chip inside using only one signal with the same voltage level and binary representations as the chips inside computers for simple chip-to-chip communications. The chip is formatted in data files like a floppy disk. A built-in directory is first read and then files are randomly accessed. In this way, specific files can be targeted without disturbing others, permitting multiple, independent applications.

The chips are manufactured in capacities up to 64K bits (8K bytes), and Dallas Semiconductor gives the following examples of memory usage:

* An electronic purse for public transit fares would take 256 bits, and

* A compressed, digital black and white **D** photo takes about 16K bits.

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Security protection

Dallas Semiconductor says it is "impractical" to attempt to duplicate the ring. Over 60 process steps are required to fabricate the microchips and each ring is individually numbered and registered with a unique 64-bit code laser etched in the silicon chip to provide authentication. A Cyclic Redundancy Check (CRC) code validates that the serial number is never repeated.

As an extra safeguard, Touch Memory Buttons self-destruct if attempts are made to open them.

First application

The first rings were worn by stockroom pickers in warehouses. Pickers can record an item taken off the shelf by touching their Decoder Ring to a simple probe, recording who removed the item at what time and leaving a record of the transaction in the ring. Information in the ring can be deposited to a PC fitted with a Touch Memory probe. (The Touch Memory Button on the ring has a PC-compatible serial port for reading and writing.) Inventory reports can then be automatically generated.

Jim Halt, Sales Manager for Jostens Recognition Division, part of Minneapolis-based Jostens Inc., says: "We have been asked to quote 100,000 rings for the Indonesian army with sufficient memory to store medical records and encryption/decryption keys for secure communications."

Prices for the Decoder Ring start at US$ 59.50 in quantities of one for the sterling silver version. The price is lower for large quantities or non-precious metals.

Custom settings are available through Jostens' Recognition Division by contacting Jim Halt on Tel: +1 214 528 9200. The rings are distributed through Touch Connections - Tel: +1 214 778 6003. Fax: +1 214 778 6004.

ODS Contactless Card Move

German chip card manufacturer ODS R Oldenbourg Datensysteme GmbH of Munich is adding contactless Smart Cards to its range of products.

In an agreement with Mikron AG of Austria, ODS will manufacture contactless cards and modules for Mikron and market cordless Mikron technology on an independent basis in the long term. Initially, ODS will manufacture 150,000 contactless cards.

Mikron, a wholly-owned subsidiary of the Philips group, is the supplier for a number of contactless card projects including the Transcard project in Sydney, Australia, which will be rolled out nation-wide upon successful completion of current trials.

The project uses a 1K byte MIFARE contactless card in an electronic purse system for payments, transport ticketing and loyalty programmes and is supported by major public transport operators, retailers, vending operators and banks.

Contact: Monika Schlesinger, ODS - Tel: +49 89 45019-163. Fax: +49 89 45019-315.

CARCG Acquires Scanpoint

Holdings.

Raymond L deKozan, Chairman and Chief Executive Officer of CARCG, says the Scanpoint bus equipment completes the CARCG product line giving them products for all sectors of the

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Automatic Fare Collection (AFC) market, and enhances their position on the European continent.

"While CARCG has major contracts and a number of operating subsidiaries around the world, including Great Britain, we have not previously had a major presence on the European continent," he said.

Scanpoint is a leader in providing AFC systems for buses and has contracts in Denmark, Sweden, Norway, Germany, France and Spain. The largest current contract is with Billetsystemer A/S of Oslo, Norway, for a fully integrated AFC system for buses, trams, commuter rail, subways and ferries and features both magnetic stripe tickets and contactless Smart Cards.

CARCG pioneered contactless Smart Card technology for transit systems on the London Underground and is presently supplying it, in conjunction with AFC systems, in Washington DC and Chicago, Illinois.

Contact: Garry Reevan, Cubic Corporation, USA - Tel: +1 819 277 6780.

NORWEB Software Deal

Landis & Gyr (UK) which supplies Smart Card-based pre-payment metering systems for gas and electricity utilities, has obtained exclusive world-wide rights for NORWEB's Message Command software which links the Smart Card network into billing and customer information systems. NORWEB, based in Manchester, uses the software as part of its Power Card system.

Ken Harvey, Chairman and CEO of NORWEB , says: "We have worked in close collaboration with Landis & Gyr for some time, and they have developed a comprehensive understanding of our business. Given their knowledge of the marketplace it was a natural step for us to allow them to market this software on a world-wide basis."

CP8 Transac, a division of Groupe Bull, has won major contacts with Eastern Bloc banks. It has a contract with BalkanBank to supply 31 cash dispensers equipped with Smart Card readers, over 300 TMF EFTPOS terminals equipped with Cyrillic characters and a number of PinPadLINK terminals.

Contact: Martin Pollock, Landis & Gyr (UK) - Tel: +44 (0)1952 677661. Fax: +44 (0)1952 677594.

Card Readers for ORGA

ORGA Kartensystem GmbH of Paderborn, Germany, has taken over the Card Reader Product Division of Hagenuk GmbH of Kiel to strengthen its position in the market for chip card readers and systems, particularly in the fields of healthcare, time data capture and access control.

The division has a turnover of DM 10 million in the current business year. It is the market leader in card terminals for the healthcare sector with its main customers the German Federal Association of Doctors, pharmaceutical companies, system houses and end customers.

Contacts: Bernd Schäfers-Maiwald, ORGA Kartensystem GmbH - Tel: +49 (0)6254 991-600. Fax: +49 (0)5254 991-199. Simon Reed, ORGA Card Systems (UK) - Tel: +44 (0)1491 410997. Fax: +49 (0)1491 410295.

Gemplus Celebrates at Telecom

Gemplus will be celebrating the delivery of their 10 millionth SIM (Subscriber Identity Module) Smart Card for personal mobile communications subscribers at Telecom '95 in Geneva next month.

The French-based company will also be marking delivery of their 500 millionth phone card.

Contact: Caecilia de St Victor, Communication, Gemplus, France - Tel: +33 42 32 51 54. Fax: +33 42 32 51 17.

Eastern Bloc Contracts for CP8

BalkanBank is developing its own payment system based on three types of card services - electronic purse, electronic wallet and debit cards. The bank has issued more than 30,000 Smart Cards with plans for 100,000 by end1995.

Gerald Hubbard, Vice President of Marketing for CP8 Transac's North American subsidiary, Micro

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Card Technologies Inc., says: "While Bulgarian consumers were initially cautious about using Smart Cards, the need to increase security, provide an alternate means to using cash, and to capture hard currency were major factors in acceptance."

CP8 Transac also has a contract with the Moscovite Mitichinsky Commercial Bank to deliver 400 units of its EFTPOS terminal product, the TMF. The terminals will be integrated in the bank's existing payment system which already integrates CP8 automatic teller machines.

Contact: Dominique Mercier-Chevalier, Communication, CP8 Transac, France - Tel: +33 1 39 66 45 20. Fax: +33 1 39 02 44 02.

Svigals Joins Hall of Fame

Jerome Svigals of the United States has been honoured for his pioneering work and practical involvement in Smart Card innovations by being appointed to the ESCAT (European Smart Card Applications and Technology) Conference Hall of Fame. The award was presented at the conference in Finland last month by chairman Jahani Saari.

A banking industry specialist with over 20 years' experience, Svigals was one of the first 50 digital computer programmers in the world and one of 12 people to create the IBM 360 system.

He retired early from IBM in 1987 and is now an independent consultant, author of 12 definitive reference books on current and future bank card technology, branch evolution and planning market events. Recent titles include: Bank Branching 2000, Cards 2000, Smart Cards 2000, and the Smart Card Year Books started in 1991.

He is a popular and dynamic speaker at international conferences around the world and has been the publisher since 1984 of *Smart Cards and Comments,* the oldest Smart Card newsletter.

Banking Success for Delphic

DeLaRue says in its 1995 annual report that Delphic, its joint venture in Smart Cards with Philips, has been awarded the contract to write the specification for the operating system for the Association for Payment and Clearing Services (APACS), which plans to introduce Smart Cards into the UK banking sector after trials next year.

Megalink & Advantage Products

In our report in *Smart Card News,* June 1995, page 113 regarding the Megalink electronic wallet used by customers of South African Breweries (SAB) to pay for their beer consignments, we wish to point out that the Megalink product is only provided by Nedcor and not by the other banks in South Africa.

In another joint venture between Nedcor and SAB - the Advantage Smart credit card - we are informed that the Advantage card can be used in 19 different retail chains within the SAB group and not two as stated.

New Products from AU-System

AU-System of Sweden will be launching the following new products at Telecom '95 in Geneva next month - AviSIM Toolbox rel 1.0) (engineering tool), AviSIM rel 3.0 (SIM personalisation system) and AviSIMPOS rel 3.0 (SIM point of sales personalisation system). Contact: Anders Hardebring, Sales Manager - Tel:+46 8 726 7500. Fax:+46 8 19 33 22.

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Smart Cards in Japan

Smart Card programmes in Japan are primarily concerned with ID cards for buildings/ corporations, access to medical and/or public services, incentives at shopping centres, customer service enhancement, and financial services, says Hitoshi Kondo, Vice President and Assistant General Manager for Japan Visa International.

Speaking at the ESCAT (European Smart Card Applications & Technology) conference in Finland last month, he described several applications including the Land Mark Tower IC card. The Tower is a key facility in the Minato-Mirai 21 area of Yokohama and the IC card is used as part of the building management system.

Since 1993, more than 7,000 cards of two types have been issued. One type provides basic functions required to use the facilities: it works as an ID card at the entrance and elevator, providing 24-hour security, and access to information. The other type has credit and pre-paid card functions in addition to the basic features. These cardholders are able to use the card at the shops, restaurants, vending machines, and business support services in the building. There are seven reloading machines within the building where the pre-paid card can be loaded up to Yen 99,999.

Due to the success of the scheme, the city of Yokohama is currently investigating the feasibility of introducing a multi-purpose IC card for all facilities in the area.

The system was created by Mitsubishi Real Estate, Mitsubishi Bank, Bank of Yokohama, and DC Card as issuers, with NTT Data, Fujitsu, Dai-Nippon Printing and Toppan Printing as system suppliers.

Mydo Card

In another scheme, Mr Kondo says 7 million Mydo Cards have been issued since July 1993 by Idemitsu Oil Co. These can be used at any petrol station that deals with Idemitsu, regardless of the ownership structure, for cash purchases as well as obtaining reward points per every 100 Yen purchase. The card works as a membership ID, and also stores the accumulated reward points, the oil-change record, Contact: Alexander Zeppelzauer, Kapsch, Austria - expiration date of the cardholder's driving licence and other relevant information. A reloadable pre-paid function has now been added to the card.

Kapsch Contactless Multicard

The Kapsch Company of Austria has developed the contactless Multicard for applications requiring very short transactions times coupled with a high level of security, for example, road pricing systems.

It is designed for multi-application/multi-service systems and can be used for access control (buildings, rooms, parking lots), electronic ticketing, subscriber management, banking applications, item data storage, electronic purse, electronic prescription/health records/health insurance, city card.

Technical details:

Dimensions:	According to ISO 10536
Technology:	Single chip Short channel EEPROM CMOS Mixed signal
Processor:	8 bit RISC processor with integrated data encryption unit
Memory:	7.25K x 14 bit ROM 2K x 8bit EEPROM, 16 byte block write 256 x 8 bit RAM
Power consumption:	<40 mW
Power supply:	contactless inductive power transmission according to ISO 10536 3.5 - 5.5 v
Operating system:	According to ISO 7816/3 T=1 protocol

Tel: +43 1 81 111 5409.

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Smart Card Diary

CarteS '95, CNIT Trade Centre, La Defense, Paris, France, October 25-27.

The 10th International Forum for Plastic Card Technologies and Applications includes conferences on Access to New Solutions and Cards and Security plus an exhibition. Contacts: CEP Exposium, France - Tel: +33 1 49 68 52 64. Fax: +33 1 47 37 75 09.

Mobile Communications: Fraud and Security, The Merchant Centre, London, 26/27 October.

Major conference giving an international perspective on fighting crime affecting network operators and service providers. Contact: International Conference Group - Tel: +44 (0)181 743 8787. Fax: +44 (0)181 740 1717.

Maximising the Potential of the Electronic Purse, Rembrandt Hotel, London, 30/31 October.

Updates from key players in the electronic banking industry. Contact: Smi - Tel: +44 (0)171 252 2222. Fax: +44 (0)171 232 2292.

The Revolution in Technology for Retail Banking, Cafè Royal, London, 8/9 November.

Includes using chip cards to build customer relationships and developing strategies for the information superhighway. Contact: IBC Financial Focus - Tel: +44 (0)171 637 4383. Fax: +44 (0)171 323 4298.

Smart Cards in Transport - The Next Steps, The Merchant Centre, London, 13/14 November.

A review of experience both in developing card technology and in implementing transport applications with an examination of multi-function cards in transport-related uses and the provision of travel information. Contact: International Conference Group - Tel: +44 (0)181 743 8787. Fax: +44 (0)181 740 1717.

The 11th European Payments '95 (EFTPOS) & Home Services) Conference, Sheraton Grand Hotel, Edinburgh, Scotland, 21/22 November.
Overview of the changing payments scene plus sessions on fraud and security, Smart Cards and the electronic purse, chip standards, cross border payments, etc. Contact: SETG, UK - Tel: +44 (0)141 553 1930. Fax: +44 (0)141 552 0511.

Smart Card Expo '95: Into the Smart Card Era, Hong Kong Convention and Exhibition Centre, 22-25 November.

Organised by the Hong Kong Productivity Council, the Expo aims to provide a major window for Smart Card technology and products. Contacts: Ms Joyce Leung or Andrew Hau - Tel: +852 278 85798/278 85840. Fax: +852 278 85770.

On-line & Electronic Payment Mechanisms for Internet & Computer Mediated Transactions, Cafe Royal, London, 28/29 November plus one-day workshop on 30 November.

Contact: IIR Ltd - Tel: +44 (0)171 915 5055. Fax: +44 (0)171 915 5056.

Global Smart Cards '95, Marriott Hotel, London, 4/5 December.

Contact: Juliane Jung, AIC Conferences - Tel: +44 (0)171 827 5967. Fax: +44 (0)171 242 1508.

Smart Card Europe, The Royal Lancaster Hotel, London, 11-13 December.

The third annual conference starting with a one-day workshop exploring both the underlying technology and the commercial issues conducted by Dr David Everett, Independent Consultant and *Smart Card News* Technical Advisor, and Richard Poynder, The Smart Card Club. The conference features presentations by pioneers like Moreno and Dethloff on Intellectual Property Rights and Smart Card Patents, the latest developments in electronic purse applications, topical sessions on contactless cards, government applications and data protection, and major applications in social security and healthcare. Contact: IBC Technical Services - Tel: +44 (0)171 637 4383. Fax: +44 (0)171 631 3214.

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From There to Here - part 8

Electronic Signals and Transmission Protocols - continued

The asynchronous character frame (fig. 1) is at the heart of the communications system for Smart Cards. It looks remarkably simple but we have probably all experienced the problems of using the RS 232C communications bit and the

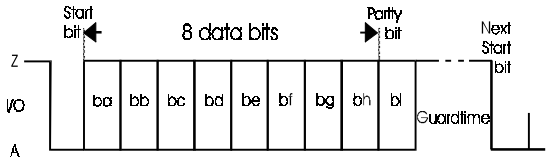

Fig. 1. Asynchronous Character Frame

undeniably subtle problems that can take hours to fix.

This month we will just tidy up the error detection and correction used with the byte asynchronous (T=0) communication protocol and then go and look at the answer to reset. Although these protocols are well established, very few cards and terminals strictly obey the standard, but then very few devices correctly obey all the aspects of RS232C. In practice, life is based on de-facto standards which are all an agreed interpretation of a significant part of the International Standard for interoperability (under normal conditions) to be achieved.

The T=0 error detection mechanism described in ISO 7816-3 is mandatory for the card and optional for the terminal. It's operation can be followed by reference to figure 1.

When the receiver detects a parity error on reception it takes the I/O line to the space or low state in the middle of the first stop bit guard time. The transmitter is mandated to sample the I/O line at the start of the second stop bit guard time period. When the error condition is sensed then the transmitter should retransmit the erroneously received character. Clearly the transmitter cannot be outputting stop bits but must let the line go high during the guard time in order to sense the line state. Given the close coupling normally achieved between an IC card and the interface The least significant 4 bits of the TO formal character give the number (binary encoded) of bytes in the historical field. The use of 4 bits restricts the maximum size of the historical

device one has to question whether this level of error control has sufficient benefits to outweigh the disadvantages. Error control at a higher level in the OSI model is preferable in this situation and although this could be handled at the application level the T=1 communication protocol applies error control at the frame level.

Answer to reset

After the reset signal is applied by the interface device the IC card responds with an answer to reset. For the active low reset mode the IC should respond between 400 and 40,000 clock cycles after the rising edge of the reset signal. The answer to reset is at most 33 characters (including the initial character) and consists of 5 fields,

- The initial character (TS)
- The format character (TO)
- The interface characters (TA_i,TB_i,TC_i,TD_i)
- The historical characters (T1, T2....TK)
- The check character (TCK)

Each of these fields is sent in order as shown in fig.2. The initial character TS is really a bit synchronisation pattern which may be sent in order to determine the data transmission rate (auto baud rate sensing) and also to determine the sense of the logic. The format of the TS character is shown in fig.3. This shows the two possibilities of the direct and inverse convention. In the inverse convention where the logic level 1 is the space or low state the most significant bit is transmitted first. With the direct convention where the logic level 1 is the mark or high state then the least significant bit is transmitted first. This means that the selection of the appropriate logic sense will result in the initial character being interpreted as `3F' for the inverse convention and `3B' for the direct convention in hexadecimal coding.

The format character TO provides information necessary to interpret the remaining answer to reset characters. The most significant 4 bits use a bit map to indicate the presence or otherwise of TA1, TB1, TC1 and TD1. For example if the most significant bit (b8) is set then TD1 is present in the interface characters field. Similarly the presence of TC1 is indicated by the state of the `b7' bit etc.

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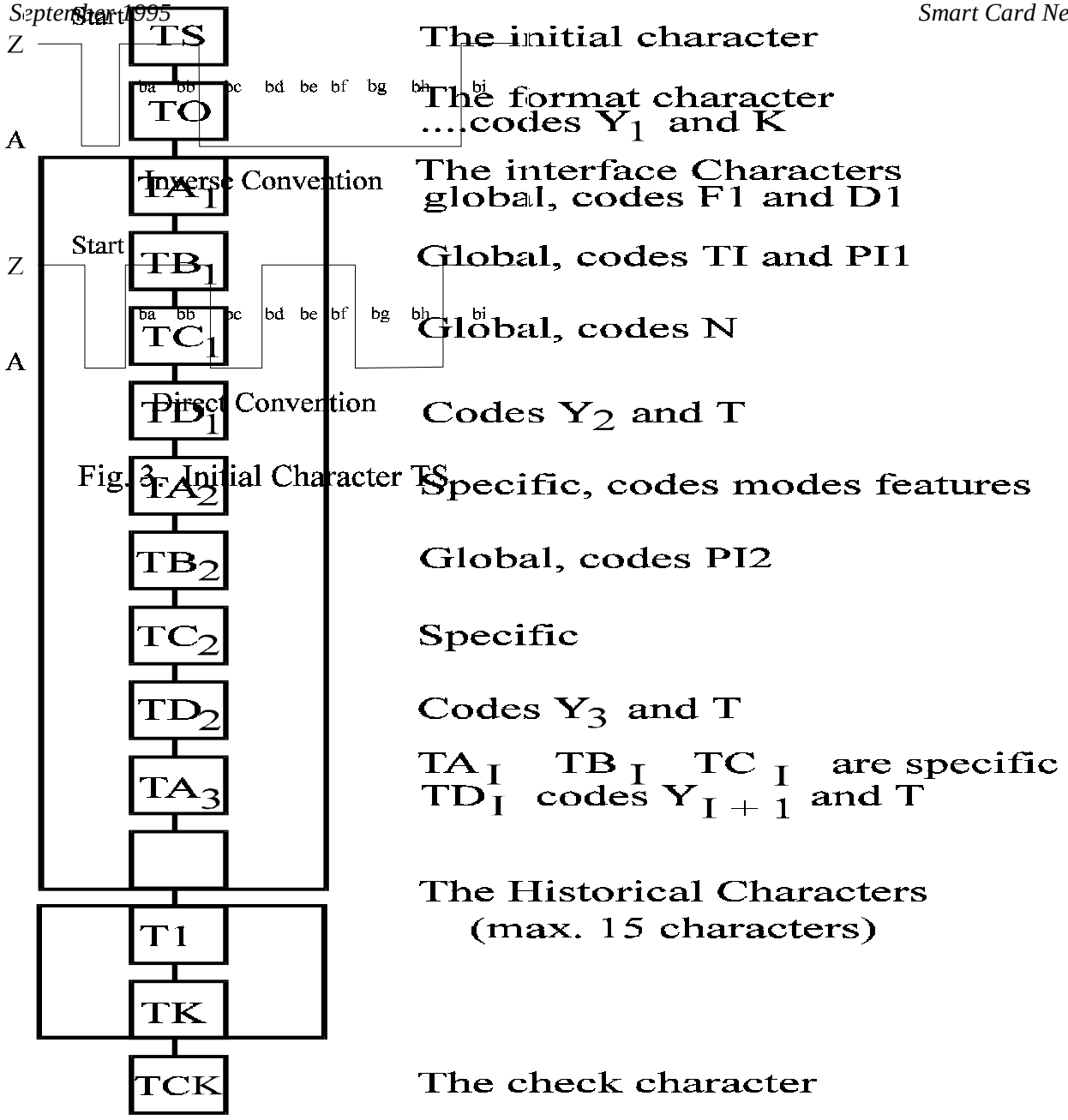

Fig. 3. Initial Character TS

Fig. 2. General Configuration of the Answer-to-Reset

character field to 15 bytes.

The interface characters (TA_i, TB_i, TC_i, TD_i,) are the complex part of the answer to reset. They carry information relating to the available communication protocols as well as the programming voltage and current parameters for the EPROM. There is currently a proposed revision to the ISO 7816-3 to remove ambiguities and to ensure an effective method of operation for changing the protocol type and the protocol parameters. Much of the complexity is brought about by the desire to achieve backward compatibility with commercial implementations of the T=O communication protocol. At the current time there are commercial applications running either the T=O or T=1 communication protocol whilst multi-protocol operation is somewhat scarce.

The proposed revisions to the standard may alter this situation. We will discuss the interface bytes and protocol type selection against these proposed revisions but readers are warned that these recommendations are only provisional.

The interface bytes (which are optional) are defined in fig.4. The T0 and TD_i characters

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contain bit maps which indicate the presence or otherwise of the following TA_i, TB_i, TC_i, and TD_i bytes.

The TA_1, TB_1, TC_1, and TB_2 characters are referred to as the global interface bytes and are fundamental to the operation of the card.

TA_1 defines the basic characters of the serial transmission, FI is the clock rate conversion factor and DI is the bit rate adjustment factor. The binary encoded fields are compared against tables supplied in the standard to achieve actual values for F and D as defined below,

Install Equation Editor and double-click here to view equation.

An elementary time unit (etu) is the nominal bit duration used in the character frame. Thus as described previously one character frame is equal to 12 etu (1 start etu, 8 data etu, 1 parity etu, 2 guard time etu).

The default values for F1 and D1 are 1 which is defined in the tables to give a value for F of 372 and D of 1. Hence the work and initial etu are the same. At these default values the frequency of the clock should be in the range 1MHz - 5MHz.

TB_1 is used to define the EPROM programming voltage and current. The value of II and PI1 are

TC_1 provides the value of N which defines the extra guard time to be used between successive characters. N can be in the range 0 - 254 etu. When N is equal to 255 this indicates that the minimum guard time (2 etu for T = 0 and 1 etu for T = 1) should be used. As noted previously the T = 0 communications protocol requires the extra guard time to enable the parity error detection and signalling to be implemented.

TD_1 indicates the protocol type TDI as between 0 and 15,

T = 0	Asynchronous half duplex byte transmission
T = 1	Asynchronous half duplex block transmission
T = 2/3	Reserved for full duplex operation
T = 4	Reserved for enhanced half duplex byte transmission
T = 5..13	Reserved for further use (RFU)

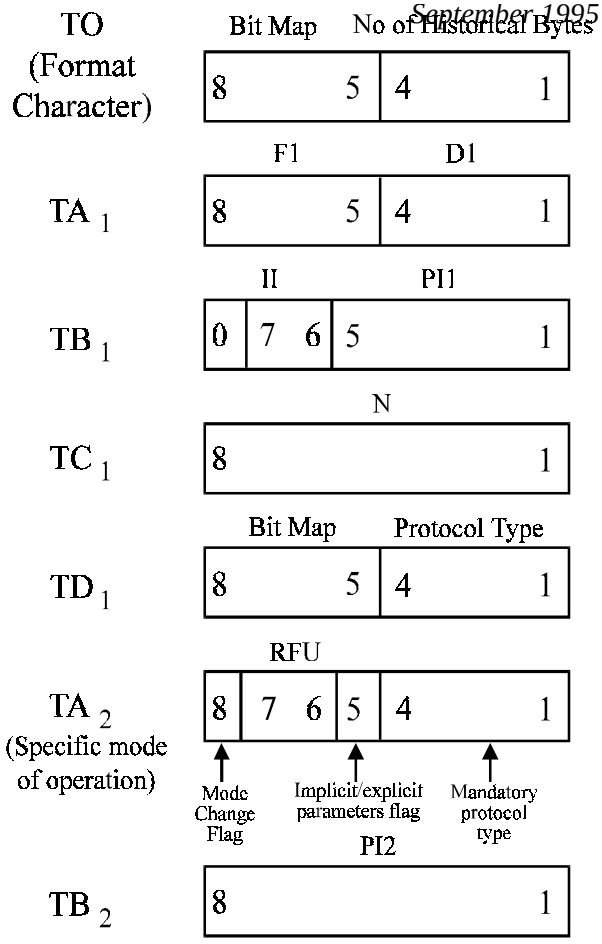

Fig. 4. The Interface Bytes

used against tables to obtain the value of I mA and P volts. It should be noted that TB_2 is used to define the programming voltage with higher granularity (8 bits instead of 5).

T = 14	Non ISO protocols
T = 15	Reserved for future extension

It should be noted that Japan uses T = 14 for a National block asynchronous protocol.

The TD_1 byte also contains a bit map that indicates the presence or otherwise of TA_2, TB_2, TC_2 and TD_2.

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The proposed revision defines a new use for the TA_2 interface byte which has a special role in the selection of communication protocols and parameters. We will discuss this further in the communications section.

The Historical Characters

The historical characters may be used to convey information relating to the life cycle of the card. There are clearly other possibilities and the use of these characters is still subject to agreement. This subject is being considered further as part of the emerging part 4 of the ISO 7816 standard.

The Check Character (TCK)

The check character should not be sent when only the T = 0 protocol is indicated in the answer to reset. In all other cases TCK is sent as the last character of the ATR. The check character is calculated such that the Exclusive OR of all the bytes from T0 to TCK inclusive is equal to zero.

David Everett (next month part 9) - Transmission protocols continued.

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Technology Award for Barclays

Barclays Bank in the UK has been awarded the ESCAT (European Smart Card Applications and Technology) conference award for the most innovative Smart Card accomplishment of 1994 for "adding banking functions to the GSM cellular cards."

The first financial application to be added to the Smart Card SIM used in mobile phones, the project was launched by Barclaycard to provide their customers using the Mercury One-2-One cellular phone service with mobile credit card services (*SCN* July 1994).

Card Europe Changes

Card Europe has made major changes in its structure, operation and pricing. Out goes travel, meetings, paperwork and high membership fees. In comes electronic communication via electronic mail and the Internet, and fees are slashed from £2,000 (£1,000 for academic organisations) to £425 to cover basic running costs.

However, the organisation will still run special events such as workshops, courses, conferences and host special member meetings, all of which will be chargeable at 50% of public charges.

The aim is for Card Europe to operate a single pan-European body communicating primarily via electronic means offering its activities across the board to its members. It will not maintain country specific organisation although individual groups of members may meet locally.

Card Europe operates primarily through working groups which are expected to expand across European borders as the new methods of electronic communication are introduced. Working groups may be set up by any group of members and their aims and activities will be registered with Card Europe.

Contact: Alan Leibert, Director, Card Europe - Tel: +44 (0)1923 897477. Fax: +44 (0)1923 897414. e-mail: alan@cardeurope.cityscape.co.uk

Polish Company Card

Poland's largest cement producer, Cementownia Ozarów, is introducing a Smart Card system for access control and time management.

Innovatron Data System's Polish licensee, Bonair Ltd, is to implement a company card system for the 1,2000 employees.

The system manages simultaneously access and time clocks. Employees insert their cards in the card reader to verify the holders' access rights and store the arrival time. At the end of the day, they again insert their cards in the reader to clock off work. Data is then transferred directly to the personnel department for use in calculating salaries and social security taxes.

At a later stage it is planned to include an electronic purse application.

Contact: Geneviève Bœuf, Communication, Innovatron Data Systems, France - Tel: +33 1 40 13 39 42. Fax: +33 1 40 13 39 59.

Europay Appointment

Manager, Director Information Technology

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Division of Europay International. Previously he was Group Head, Service Delivery.

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