



Backgrounder

CardLogix Corporation

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SUMMARY

COMPANY: **CardLogix Corporation**

Founded in 1994 as a research company, CardLogix started software development and smart card manufacturing in 1998. The company provides a wide range of platforms for integrating smart cards into information and transaction environments. Smart cards and software supplied by CardLogix improve the security, accuracy and convenience of thousands of applications, from banking to transportation. CardLogix is fully certified as an ISO and ANSI 9001/2000 quality manufacturer. Privately held, the company produces millions of cards and ships to over 30 countries worldwide.

In addition to manufacturing of smart cards, CardLogix has developed patented solutions in smart cards, as well as development, application, and operating system software, which it sells to end-customers and application-specific solution developers. These developers integrate CardLogix smart card technology with their own computing and networking expertise to create solutions for the following markets:

- Security / Identity Solutions
- Healthcare
- Loyalty/Closed Systems
- Internet: Retail, Gaming
- Wireless/Telecom

CardLogix' key achievements have been to produce the industry's highest card densities, design and manufacture multi-component, multi-piece cards and develop award-winning design tools for smart card system development.

PRODUCTS: M.O.S.T.™ Card Family, Vault Cards®, Movie Gold Cards, Health Data Card™ Delos SIM™, Family, CREDENTIALSYS™ Card Family, CryptoVend® Cards, Smart Toolz™ Card Development Kit, CardAppz™ Application Software, Cardplex® API, M.O.S.T. Toolz™, M.O.S.T.™ File Creation Utility, Movie Gold Card API. , Wimplex® and Trakplex® middleware.

SALES CHANNELS: Direct, through authorized sales representatives and through Smart Partners - authorized CardLogix developers and integrators.



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BACKGROUNDER

OVERVIEW

CardLogix develops and manufactures advanced smart card platforms for secure identification, processing, and storage of data and value. These platforms consist of software delivered via smart cards that together make smart card applications easy to develop, configure and use. CardLogix' three-part software platforms consist of: 1). On-card Operating Systems, 2). Operating System configuration management, 3). Software Development Kits/Development Tools, and 4). Middleware, including cryptographic libraries, with software hooks for developers in all major environments.

Smart cards are used globally and have emerged as the most secure and effective method of authenticating individual access to data and value. The smart card is the highest volume electronic product in use globally today. Research firm Dataquest states that smart cards are the world's most common electronic device.

Smart cards contain a solid-state computer chip within the thickness of a credit card. Their processing power and portability makes smart cards ideal where enterprises and individuals transact data and value. Smart cards are replacing magnetic-stripe cards, including credit cards, debit cards, and access cards, throughout the world.

Smart cards are also replacing paper records as a portable extension of computers and data networks. Applications range from single-function, such as GSM phone cards, to highly secure network authentication. Smart cards uniquely provide added security to any transaction, with processing power that authenticates access and encryption that guards against unauthorized access to or use of data.

According to Frost and Sullivan, over 132 million smart cards were shipped into North America in 2005. Frost and Sullivan expects shipments to grow 27% CAGR through the year 2010.

THE NORTH AMERICAN MARKET

Smart cards are becoming more prevalent in the U.S., with both government and business applications constantly emerging. Even with the saturation of certain segments, like GSM/Mobile, new opportunities continue to appear. This is due in large part to the maturation of a market infrastructure, where standards, technology, products, and vendors have spurred application development. General trends that drive this growth include:

- An ever-expanding distribution of data via networks and the Internet
- Accompanying concern for security of financial and other data, especially personal ID and digital identities
- Growing consumer understanding and acceptance of the benefits of smart card technology
- Emergence of completely new and unique transaction markets, such as online gaming
- The standardization of the U.S. Identity smart card with PIV/FIPS 201

MARKET GROWTH - GOVERNMENT

To date, over 4.9 million smart cards have been deployed by the U.S. government. As an indicator of market growth, the Treasury Department is issuing smart cards to 9,000 employees for facility access and network log-on. This is only the initial phase of a \$1.4 million contract issued by the General Services Administration. Various branches of the U.S. armed forces have also deployed smart cards for personnel ID and records management. Programs include HSPD-12 and e-Passport.

All across the U.S., State and Municipal governments have implemented smart card programs for:

- Elections
- Benefits administration
- Parking meters/management
- Transportation: Public transit, airports

The United States Government has unilaterally committed to bolstering security for U.S. citizens and facilities to address concerns about terrorism. Smart cards easily integrate with other identification technologies such as biometrics, to ensure identity verification and identify threats. This addresses virtually all facets of daily life, including:

- Public health: Biohazard control
- Transportation: Airports, shipping
- Immigration
- Facilities: From private buildings to national landmarks
- Public information

Around the world, smart cards have been fundamental to national and local governments for healthcare, finance and transportation for millions.

MARKET GROWTH - COMMERCIAL

Formerly confined to a few select applications such as pre-paid phone cards and set-top TV decoders, smart cards are being implemented in the following key areas throughout North America:

- Wireless: GSM phones and devices
- Healthcare-Informatics & Embedded use
- Retail: Loyalty
- Entertainment: Movie theaters, other venues
- Banking: Online transactions, ATMs, credit cards
- Internet: Security, retail applications
- Physical Access: Department, building, campus
- Gaming: Uniquely addressing regulations on age, geography, hours of operation, revenue

THE CASE FOR SMART CARDS

The GSM mobile market is highly commodity-oriented, with the world's most developed countries virtually saturated with cell phones and SIMs. However, because GSM is the largest and fastest growing smart card segment worldwide, and because margins are improving with lowered chip costs, there is still opportunity in many nations, where only a small percentage of people have phones. Currently, one GSM SIM chip card each is used in nearly three Trillion cell phones worldwide (GSM World). There is virtually no technological distinction between SIM chip card suppliers.

U.S. And Worldwide Market

Mobile/GSM

In the U.S., a primary group of cell phone providers include AT&T, T-Mobile, Rogers, and Telmex. In addition to these, U.S. and worldwide marketing is also done through Mobile Virtual Network Operators (MVNOs). A MVNO does not own its own spectrum and usually does not have its own network infrastructure. Instead, it has a business arrangement with primary mobile operators to resell cellular minutes. MVNOs brand their services and offer special phone and program features to customers.

Additional Markets

Smart cards are a superior alternative to insecure cards that are read-only, versus the secure interactive processing of data. These conventional alternatives include magnetic-stripe, 3-D barcode and proximity cards. The greater processing power and storage capacity of a smart card makes it a clear choice over mag-stripe for even simple applications, such as loyalty points tracking and redemption. As microchip technology increases in functionality and decreases in cost, many more smart card applications become viable. While card applications requiring relatively low security measures continue to account for substantial market growth, the significant value smart cards offers is in applications where security is essential. Smart card security is utilized via the following general aspects:

- **ACCESS CONTROL** manages access rights to sensitive information and is a basic feature of operating system platforms and file systems
- **CONFIDENTIALITY** involves the encryption of data transmissions so that only the intended recipient can access the information
- **DATA INTEGRITY** ensures that data is not compromised or manipulated
- **NON-REPUDIATION** provides undeniable proof that transactions, once committed, are valid, binding, and irrevocable
- **AUTHENTICATION** proves the identity of users and systems on the network

Authentication is a critical component of logical and physical access control. Authentication combined with data integrity and non-repudiation provides secure access to networks or to sensitive information. Network systems, services and applications currently authenticate users with a variety of digital credentials, including passwords and digital signatures. Smart cards are the safest method to store and transport these digital credentials.

SMART CARD SUPPLY CHAINS

These value chains include many different companies and solutions, each supplying a critical link. Many of these links currently overlap in their roles; i.e. Verifone makes card terminals but also supports a large integration group. The basic links in these chains are:

Semiconductor Manufacturers: These companies produce the silicon that is the basis for the industry. Companies include Texas Instruments, Infineon and SST Micro.

Card and Module Manufacturers: This category is further subdivided into three types.

a). Module Manufacturers: These companies package the silicon chips into modules and test. This is their only function in the market. NedCard is an example company.

b). Contract Assemblers: Manufacture smart cards with little or no value-added, as with telephone and dumb memory cards. U.S. companies include CPI and Versatile.

c). Smart Card Platform Providers: Produce smart cards that incorporate software content in and around the card. CardLogix stands alone as the sole U.S. company that fits within this category. Primary foreign competitors in the U.S. are Gemalto, Obethur and Sagem-Orga.

Reader/Terminal Manufacturers: These companies produce a variety of devices that read cards that are tied to a system. Companies include all GSM Handset manufacturers and car-specific readers from SCM, OmniKey and ID Technologies.

Transaction / Back-end Processors: These companies manage the batched data that comes from an off-line transaction system or manage the primary database from which the cards are issued. NPC and First Data are example companies.

Integrators/Software Component Suppliers: Do not manufacture, but add value to smart cards and integrate them into other systems. They are not competitors but usually complimentors. Primary Players include SAIC, EDS, Bearing Point, CardSmart, Spyryus and Saflink-Litronic.

APPLICATION CATEGORIES

Since smart cards add considerable functionality and security to any data or value transaction, it is possible to use them virtually anywhere people make purchases or access information. Considering how often that happens in a typical day, the potential for ubiquitous smart card adoption is significant. There are three basic types of card applications: *Embedded*, *Closed*, and *Open Monetary Systems*.

An **Embedded System** utilizes cards in a wide variety of dedicated single-use functions that are tied to a specific piece of electronic equipment.

A **Closed System** means the card is dedicated to an issuer or group of issuers. The card can create an artificial currency such as in a casino or a college campus.

An **Open Monetary System** refers to use of a card within wider, more varied retail environments, such as a VISA card used anywhere you shop.

CARDLOGIX-BASED APPLICATIONS

CardLogix sells into virtually every application listed above worldwide, working closely with card integrators and customers to foster application development. A trademark of CardLogix technology is providing comprehensive smart card platforms that integrate easily with other technologies and legacy systems. Some notable applications include:

- ID and voting cards for the Democratic National Convention--Year 2000
- Cards for voting systems throughout the U.S. (National, State, County, Municipal) --since 1998
- Hotel, Gaming resorts--since 1998
- National transportation systems--since 1999
- A national healthcare system--since 2000
- A U.S. Treasury electronic payments system (Pilot)
- Movie theater ticketing and loyalty (Worldwide) --since 1998
- Stored value for retail, festivals, conventions and events--since 2001
- Parking Card Systems for several major Cities including San Diego and Santa Monica --since 2002

THE CARDLOGIX MARKET ADVANTAGE

CardLogix provides a distinct technical expertise in smart cards and software that is based upon a deep understanding of chip-level systems. Since complex chip technology is at the core of every smart card solution, this expertise guarantees high-performance and security of any application, weaving physical parameters with complex software issues to meet that guarantee.

PRODUCTS

Smart Cards

DELOS™ SIM Card Family Is a native card operating system and family of cards that meets the requirements of many mobile operators around the world. With full support for GSM 11.11-11.14, SIM Toolkit and 7816 standards the cards are available in densities of 16K to 32k . Full browser and multimedia support is also standard.

CREDENTSYS™ Card Family Designed as a solution set for the Homeland Security Presidential Directive #12 (HSPD12) These cards are designed to be extremely secure identity cards carrying the digital credentials for all government employees and mandated contractors These cards are designed for the rigorous validation of NIST with FIPs 140-2 level 2 and FIPs 201 certifications. These cards also function as a contactless access card for use in government facilities.



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M.O.S.T. Card™ Family For multi-application and high-security applications, these microprocessor-based cards help create a smart card system that supports multiple functions, applications and readers with high security. The cards incorporate various capacities and security features and all contain the M.O.S.T.™ Card Operating System, which supports a variety of security measures. M.O.S.T. Cards are supported by the CardLogix M.O.S.T. Toolz™ File Creation Utility and the Smart Toolz™ smart card Application Development Kit.

Movie Gold™ Card automates movie theater ticket and concession purchases. The card replaces cash and creates additional payment points to ease box office bottlenecks. To encourage more frequent visits and greater spending, the card can include other incentives, such as theater food discounts and retail product offers.

Health Data™ Card Family Featuring capacities up to 8 Megabits, the Health Data Card stores medical data for computerized patient records and insurance. CardLogix Database Management System Software is included with minimum orders and provides on-the-fly data compression, increasing storage capacity.

Loyalty Points and Gaming Card A low-cost smart card for retail purchases that manages user and purchase information for points accumulation and redemption. Designed to build customer loyalty, the card can be tailored to track any combination of products, service, and incentive participation.

CryptoVend Card The CryptoVend Card is a low-cost solution for high-volume vending applications such as public telephones, copy/PC centers, and laundromats. This card replaces coin and cash for frequent transactions and reduces pilfering. The card features include Symmetric Key Processing that prevents unauthorized use.

Custom Engineering

Services include: card design and fabrication, graphics, smart module design, card operating system software, custom programming, and mechanical and interface design. CardLogix also develops custom Card Operating Systems for high-security applications, software development tools and middleware

Software

CardLogix has designed easy-to-use tools and Application Programming Interfaces (APIs) that enable the rapid integration of its smart cards into computing and transaction systems. CardLogix Tools are designed to support a variety of programming environments including Visual Basic, C++ and Delphi. As a result, CardLogix smart cards work across all operating systems, including most versions of Windows, Unix, Linux and terminal environments.

Smart Toolz™ Smart Card Application Development Kit is a complete solution that includes everything needed to design and demonstrate a smart card system. The kit includes the **CardAppz™ Application Software** and **Cardplex™ API**. PC literate users as well as programmers can use the kit.

M.O.S.T. Toolz™ Enables designers of multi-application and high-security smart card applications to create files and set several security options. M.O.S.T. Toolz works with the **M.O.S.T.™ Card Family** of microprocessor-based cards and the **M.O.S.T.™ File Creation Utility** that eliminates low-level on-card programming. M.O.S.T. Toolz has won editorial praise for its ease-of-use and completeness.

Operating Systems

CardLogix has developed its own Card Operating Systems and Cryptographic Libraries that are embedded in the M.O.S.T, CREDENTIALSYS, AND Delos SIM family of microprocessor cards. This OS enables the management of and access to on-card files and applications. In specific card types, the operating system performs sophisticated security functions such as public-private key management, digital signatures, bi-directional authentication, symmetric and asymmetric encryption.

Middleware

Movie Gold™ Card API upgrades a movie theater POS System with smart cards by easing the integration of a stored value **Movie Gold Card** and readers into ticketing and accounting systems.

Trakplex™ API This Loyalty & Gift Certificate API is a foundation upon which a retailer and their IT/POS partner can build a customized program. It is designed to be merged with existing Point of Sale systems. It is designed to function with three different Loyalty Cards that differ in security levels and cost.

Transpo API – is the platform and framework of Automatic Fare Collections systems. Designed specifically for Buses, Taxis and rail systems it supports a variety of card types and reader technologies. And features robust card and reader authentication mechanisms.

MANAGEMENT

Walter Lim - Chairman of the Board

As Chairman of the Board, Walter is highly involved in strategic direction, financial oversight and investor relations for CardLogix. Walter is President and founder of Aerosol Services Company, Inc., which was started 29 years ago. With a current staff of 300 employees, the company fills liquids and aerosols for many leading manufacturers. Aerosol Services produces over eighty million units annually with sales of over \$400 million. Mr. Lim earned a BS in Chemistry from the University of California at Los Angeles.

Bruce Ross - President and CEO

Bruce conducts the overall daily management of CardLogix, including investor relations and funding. In addition, Bruce manages all aspects of marketing, including market and new product development, communications and strategic relationships. He has many years' experience in sales and marketing management with technology companies of all sizes, including Panasonic Semiconductor. In addition to forming E'lan with Emil Nastri, the two men have worked together for over eight years. Bruce attended California State University at Long Beach and majored in Marketing. He holds two U.S. Letters of Patent with two pending.

Arthur Krause - Vice President New Product Research

Principally involved in new product research, Art applies his knowledge of materials and product design to new technical innovations. He has worked with Walter Lim to market new products for various industries, introducing several original concepts that grew from idea to volume sales.

Ken Indorf – Vice President Sales & Marketing

Ken manages sales operations including interface with CardLogix suppliers, customers, sale representatives, and system integrators. He combines an extensive technical background with management expertise to focus customers, sales representatives, and system integrators on solutions for customers. Ken has worked with Emil Nastri and Bruce Ross for several years. He has held management positions including positions with Exar and Siliconix. Ken received a BS degree in Electronics Engineering from Hofstra University.

Bob Merkert- Director of Sales

Bobs primary responsibilities are in the sales of our Identity product offering to Governments around the world. Before joining CardLogix Bob had worked for SCM Microsystems since 1996 as Vice President of Sales for the Americas. Prior to joining SCM Microsystems Bob spent 20 years with DANYL Corporation where he held engineering, marketing and business development management positions. He was a founder of the company and was the Executive Vice President of the firm. DANYL was an early pioneer in the use of smart cards in financial applications, particular for unassisted vending systems.

In addition to his smart card experience with DANYL, Bob also spent approximately two years in sales with AMMI, an American smart card company.

Throughout his career Bob has written over forty papers and articles. In the past several years he has presented twenty-five papers at smart card conferences around the world. On the lighter side he has published numerous articles on collectible smart cards for *MoneyCard Collector*. His bi-monthly column was entitled *The Scoop on Chips*.