Contactless Card Capabilities

The New Horizon
ISO-14443 Standard is in progress, but is not worldwide in application. This standard is primarily focused at microprocessor (µP) based cards not Memory/Logic cards.

µP cards are still evolving with technology advancements. This type of card exhibits: slow operation, large die size, changing operating system horizon, and costly to purchase.

Readers (PCD) need to read/write and comply to three levels of supported Smart Card technology.

The ability to locally encode and distribute cards is necessary.

Whatever smart card is issued, it must be durable, reliable and secure.

Magnetic, Memory/Logic and µP cards will co-exist for years to come.

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**Capabilities Today**

- Transit
- Transit “extensions”
- “Pilot-level” Security
Looking Forward

- Regional Transit
- Financial
- US-wide Security
- World-wide Security (Borders and Ports)
- Interoperability Issues
**Transit**

An End-to-End Solution

**Media** + **Hardware** + **Business Management**

- **Card Technology**
  - Magstripe
  - Disposable Contactless
  - Contactless Memory
  - Dual Interface Microprocessor

- **Open Reader Architecture**
  - Tri-Reader®
  - Micro RTD
  - Master Module
  - SIB
  - Win32 Expandable Memory Environment

- **Access and Biometric Features**

- **Central Computer**
  - Secure and Fast Access
  - Biometric Capabilities

- **Features**
  - Local Reports
  - Table Requests
  - Distributed Processing Solution
  - High Reliability
  - Security
  - Disaster Recovery
  - Reporting Services
  - Smart Card Base Management
  - Cardholder Support

- **Transit An End-to-End Solution**

- **Hardware**
  - Open Reader
  - Architecture
  - Access and Biometric
  - Features

- **Business Management**
  - Local Reports
  - Table Requests
  - Distributed Processing Solution
  - High Reliability
  - Security
  - Disaster Recovery
  - Reporting Services
  - Smart Card Base Management
  - Cardholder Support
Smart Card Technology
Emerging requirements

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Contactless Smart Card Standard
ISO 14443

- Part 1 - Physical Card Characteristics
- Part 2 - RF Power & Signal Characteristics (Type A and Type B)
- Part 3 - Initialization & Anti-collision (Type A and Type B)
- Part 4 - Protocol

Application (i.e., fare collection)
Card OS (Not Included In Standard)
Security (Not Included In Standard)

Draft Submitted. Debates ongoing.
ISO Committee debating this.
ISO Committee vote complete.
# Memory / Logic Cards

## ROM
- 2kB (1kB)

## State Machine Processor
- Card Authentication (Keys)
- Communications

## FRAM™ (EE Memory)

<table>
<thead>
<tr>
<th>Protected</th>
<th>Stored Value</th>
<th>Time Event</th>
<th>Total 2kB</th>
<th>Apps 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>App.1</td>
<td>App.2</td>
<td>FRAM™</td>
<td>1356 MHz</td>
</tr>
</tbody>
</table>

- ~ 0 - 6.5cm (Standard Antenna)
- 13.56 MHz
- 10% AM (100% AM)
- 115 k Baud (106 k Baud)
- Single Carrier (Subcarrier)
- FCC Article 15
- Certified - GO CARD®

Each Application Memory Usage
- 7 User Pages (16 bytes)
- 1 Key and Page Application Type

™ - Ramtron
Contactless Smart Cards

- Provides expanded flexibility over magnetic
- More memory and Higher Security
- Faster Transactions and Lower Maintenance
- Published Standards...Multiple Suppliers
- Better, Cheaper & Faster
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The Production Process

- ASIC/Microprocessor Design
- Semi-Conductor Fabrication
- Wafer Processing
- Module Assembly
- Card Production
The Players

Production Process typically managed by 2 to 3 primary participants:
- Semiconductor House (with or without ASIC designer)
- Card Manufacturer
- Operating Systems Developer
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Leading Semiconductor Houses

- Philips
- ST Microelectronics
- Infineon
- Atmel
- Fujitsu
- Samsung
- Toshiba
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Leading Card Manufacturers

- Schlumberger
- Gieseke & Devrient
- GemPlus
- Orga
- Oberthur
- ASK
- Toppan
Smart Card Technology

Emerging requirements

Leading Operating System Developers

- IBM
- Keycorp
- Schlumberger
- Gieseke & Devrient
- GemPlus
- Mobile Mind
Out-of-system sales
financial services

Cash Collection & Reconciliation

General Accounting

Funds Pool Management

EFTPOS Acquiring

Settlement & Reconciliation

Electronic Funds Transfer
The “contactless” Smart Card eliminates the need for correct change and significantly reduces boarding time.
Experience permits us to meet transport-security needs with a turn-key solution at a regional level

- Smart card technologies at all transit ports
- High-volume access control systems and biometrics at transit buildings
- Central systems updated to support regional access
Regional Integration Process…

- The “End Game” of Fare Policy Evolution.
- A Common Fare media and Fare Product set across Multiple Operators.
- Allows for Seamless Travel and Regional Transportation Planning.
- Provides Consolidated Regional Ridership and Revenue Reporting.
- Allows Linked service Promotional Strategies across Operators.
US Security Market Exploding...

- Federal Buildings
- US Visit / Borders
- Seaports and Airports
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Security Applications

• Transit
• Borders
• Ports
• Hotels
• Office Buildings
U.S. Entry Exit “Enhanced” Credentials For Pedestrians and Vehicles
Faster Security Checks

- Smart Card enabled biometrics provide multiple “layers of personal identification” for the trusted passenger reducing the need for more time-consuming inspections.
Access Security

- Hotel reservations, payment, and office access are all facilitated by fast, secure, reliable contactless cards
Intermodal Port of the Future

Briefing to the
Ship Operations Cooperative Program

Presented by the
Puerto Rico Ports Authority
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Passport Concept

Embedded Contact-less Technology

• Millions in production for transit
• Fast (70 ms)
Next Twelve Months...

- TWIC specifying Port standards for compliance...add contact less to demos
- Border programs consideration of contact less for fast, secure access
- Gov’t RFP’s exist for contact less “Hybrid” cards
- Both finger and face biometrics verified with contact less memory cards
- Transit / USDOT paved the way...continuing with transit extensions for financial and security