HIGH PERFORMANCE
- 32-bit RISC microprocessor
- Large memory capacity
- Low-power consumption

ADVANCED FRAM MEMORY
- Quantum leap in access speed
- Longer chip life span

VERSATILE TOOL KITS
- Softune porting tool kit
- HiPerSIM development and solution set

Give your smart applications the edge with ...
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Multiple Application on One HIFERRON Chip

Citizen Card
- Health care
- Mobile medical records
- Certificate issue service
- Facilities administration etc.

Transportation
- Ticketing
- Automatic payment
- Access

Retail
- e-purse
- Loyalty point
- CRM

Finance
- Credit
- Debit
- Banking

Mobile Data
- Digital signing and key management
- Mobile commerce
- Mobile workforce
- Multiple services on one SIM

Telephony Application
- Subscriber management
- Billing
- Customer services
To stay in front of the competition, issuers and managers of smart card programs demand security and high performance from their smart chips. The HIFERRON chip architecture and advanced features deliver just that.

**32-bit RISC microprocessor**

The proven FR30 32-bit RISC microprocessor can run at a clock speed of 15MHz (3.39 or 3.57MHz@card). The multilevel interrupt, 8/16bits up/down counter/timer, watch dog timer, and DMA controller executes sophisticated system controls.

**Crypto co-processor**

To increase overall throughput, the HIFERRON chip is equipped with a cryptographic co-processor. Efficient signature generation/verification and data encryption-decryption are made possible through high-speed execution of ECC, RSA and DES cryptographic algorithms.

**Large memory capacity**

Non-volatile 64 KB FRAM memory devices have ample space for dynamic loading of multiple applications and large data sets. Functionally rich operating system modules, inner codes and data can be loaded into the 96 KB Mask ROM. The 4KB SRAM cache memory enables fast access to runtime data.

**High-speed contact/contactless modes**

There is no need to limit chip operations to contact mode only. The super-fast write speed of the FRAM memory on the HIFERRON chip’s dual-interface opens up a new world of coexisting contact and contactless applications.

**SOFUNE® development toolkit**

This tool kit enables developers of operating systems and applications to test their codes while viewing the register and memory contents. Simulation tests can be performed using a PC.

**HiPer SIM solution set**

Card manufacturers and application developers may use this suite of operating systems, middleware and application processing components to write, test and execute their applications.

The highlights of HiPer SIM include:

- **Multi-tasking:**
  - Efficient utilization of the CPU and inter-application communication.

- **Memory protection:**
  - Works in conjunction with the HIFERRON hardware to ensure that applications are firewalled from each other.

- **Byte code interpreter:**
  - Enables secure transaction menus and services via remote access to SIM toolkit functionality.

- **TCP-IP:**
  - Further empowers the chip by enabling it to participate in any TCP-IP network (e.g., office LANs).

**Contact:**

ISO 7816, T=0, 9600/19200/38400bps, fck=3.5712MHz (5V)

**Contactless:**

ISO 14443 TypeB, T=CL, 106K/212Kbps, fck=13.56MHz

**Hardware memory protection**

Hardware memory protection can be applied to 12 memory sectors. This ensures that applications are firewalled from each other by the HIFERRON hardware.

**SPEED AND ENDURANCE**

The HIFERRON chip incorporates a 1T1C FRAM memory, which represents a quantum leap in the performance of smart chip memory devices.

- **Read-write speed**
  - FRAM write speed is approximately 30,000 times faster than that of EEPROM. That means no more write speed restrictions on transaction time.

- **Read-write unit**
  - FRAM write speed makes the Block Write mode unnecessary.

- **Life cycle**
  - 10^{10} read-write endurance of FRAM means virtually no life-span limitation. (Endurance of EEPROM is 10^{5} writes)

- **Low power-consumption**
  - Very low energy consumption of FRAM enables greater contactless distance with limited power supply and prolongs mobile device battery life.

**Multiple Application on One HIFERRON Chip**

To further enhance the versatility of the HIFERRON chip, developers can create multiple applications on the same chip, which can be accessed independently. This allows for a variety of applications to be handled simultaneously, expanding the capabilities of smart card systems.

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**Notes:**

- FRAM is a registered trademark of Ramtron International Corporation.
- SOFTUNE is a trademark of Fujitsu Ltd.
- Java is a trademark of Sun Microsystems, Inc.

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**Health care**

Mobile medical records
Certificate issue service
Facilities administration etc.

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Automatic payment
Access
Transportation
Health care
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**Retail**

e-purse
loyalty point
CRM
Retail

**Application Manager**

HiPerSIM Application Programming Interface
Hardware Abstraction Layer
ISO 7816 Fle System Semantics and Security
UICC
Application
File System
Task Manager
Cryptography
Input/Output
USIM
Application
WIM
Application
USAT
Interpreter
USAT
Library

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**Diagrams:**

- DUAL INTERFACE HIFERRON CHIP
- LEAP TO THE FRONT
- Multiple Application on One HIFERRON Chip
- SPEED AND ENDURANCE
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