Features

CPU

- ✓ High-performance 32-bit ARM core
- ✓ 3-stage pipeline
- ✓ Little-endian
- ✓ CPU operating clock could be configured
  - Internal clock : 3.5/7/9/14/28MHz
  - External clock: Contact smart card clock input via C3 (ISO/IEC 7816)

Power Supply

- ✓ Contact smart card power supply via C1 (ISO/IEC 7816)

Memory

- ➢ FLASH
  - ✓ Size: 768 KB
  - ✓ Page size: 256/512 Bytes
  - ✓ Erase and program operation: Page Erase and Page Program
    - Page Erase is mandatory before a Page Program operation (consecutive Page Program is NOT supported)
  - ✓ Typical time: erasing 3ms, programming 2ms
  - ✓ Bit logic: 1b after erasing, 0b after programming to be 0b
  - ✓ Usage: data and code
- ➢ RAM
  - ✓ Size:68 KB
    - 64 KB general RAM
    - 2 KB crypto-RAM (RSA)
    - 2 KB NAND flash controller data buffer
- ➢ OTP
  - ✓ User OTP:491 Bytes
  - ✓ SN: 8 Bytes

Algorithms and Peripherals

- ➢ Symmetric algorithms
  - ✓ DES/T-DES
  - ✓ AES
  - ✓ SM1
  - ✓ SSF33
- ➢ Asymmetric algorithms
  - ✓ RSA
- ➢ Peripherals
  - ✓ CRC: 16-bit CRC-CCITT
  - ✓ TRNG: True Random Number Generator, for secure transactions
  - ✓ Timer: Three 16-bit Timers, one ETU timer, Wake-up timer

THC80F10AC

32-bit Smart Card IC

768KB FLASH

68 KB RAM

Preliminary

- ✓ NAND flash controller
- ✓ DMA: Data block copy or comparison

Interface

- ➢ ISO/IEC 7816-3 serial interface
  - ✓ UART supporting ISO/IEC 7816-3 T=0/T=1 protocol and 11 baud rates: F/D = 11H, 12H, 13H, 18H, 91H, 92H, 93H, 94H, 95H, 96H, 97H
  - ✓ DMA implemented
  - ✓ Independent Master and Slave
  - ✓ Dedicated ETU Counter for transmitting Null byte (e.g., 60H) automatically (Slave only)
  - ✓ Support GSM power consumption standards, including Clock Stop mode
- ➢ Inter-chip USB
- ➢ USB
  - ✓ USB full speed(12Mbps)
  - ✓ 4 endpoints besides control endpoint
- ➢ GPIO
  - ✓ 48 GPIOs
  - ✓ Multiplexed with ISO7816Master and SPI interface
- ➢ SPI
  - ✓ DMA implemented
  - ✓ Max speed 14Mbps
- ➢ SD
- ➢ SWP
  - ✓ Compliant with ETSI TS 102 613 (V8.0)
  - ✓ DMA implemented

Security

- ✓ WDT (Watch Dog Timer)
- ✓ Scrambling data storage
- ✓ High and low voltage detectors
- ✓ High and low clock frequency detectors
- ✓ Clock filter(ISO/IEC 7816 external clock)
- ✓ Security Certification Targeted: EAL4+

Work parameters (Note1)

Symbol	Name	Conditions	Min	Typical	Max	Unit
T_{DES}	Time for Executing 64-bit DES Encryption			17		clock
T_{SE}	Time for Erasing a Page			3		ms
T_{SP}	Time for Program a Page			2		ms
T_{DR}	Data Retention		10			year
N_{SE}	Page Endurance		100 k			Cycle
f_{EXT}	External Clock Freq.		1		5	MHz

f_{INT}	Internal Clock. Freq.		3.5		28	MHz
V_{CC}	Supply Voltage		1.62		5.5	V
I_{CC}	Supply Current (Note4)	VCC= 5.0V			10	mA
		VCC= 3.0V			6（Note2）	mA
		VCC= 1.8V			4（Note3）	mA
I_{SB}	Standby Current (Clock Stop)	VCC= 5.0V			200	μA
		VCC= 3.0V			100	μA
		VCC= 1.8V			100	μA
T_{AMB}	Ambient Temperature		-40		85	°C
V_{ESD}	ESD Protection	HBM	4			kV

- ✓ Note1：This document is a preliminary version, data and descriptions (including this table) cannot be a formal evidence for performance and functions of the IC.
- ✓ Note 2: When operating at external clock or 14MHz (or lower) internal clock.
- ✓ Note 3: When operating at external clock or 9MHz (or lower) internal clock.
- ✓ Note 4: When operating only at ISO7816 interface.

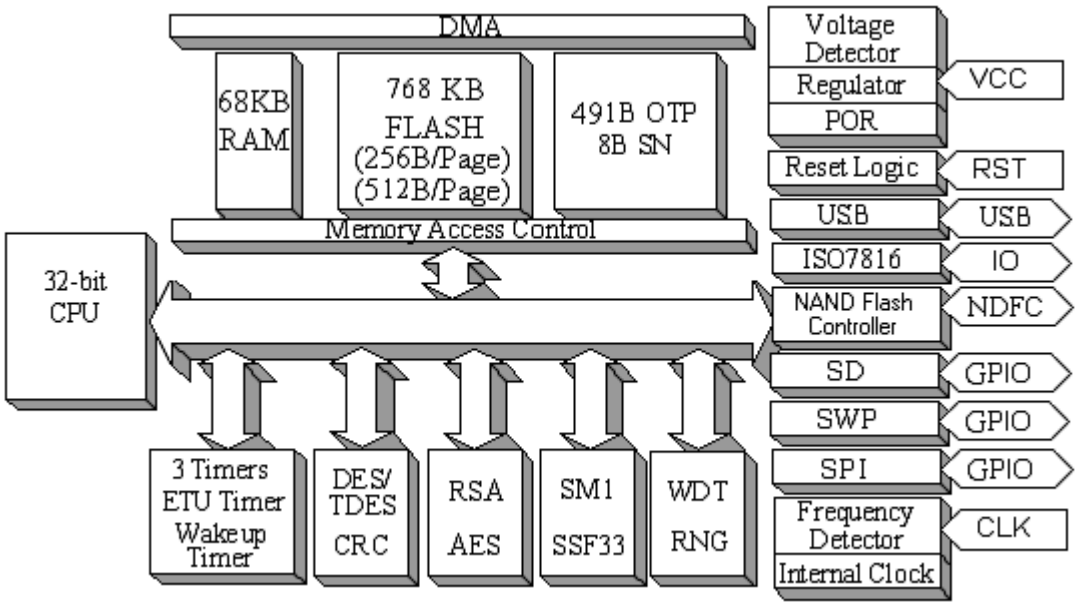
Descriptions

The THC80F10AC is a series of 32-bit ARM CPU contact smart cards, with FLASH memories, voltage and clock frequency detectors, and functional modules like AES, RSA, DES, RNG, CRC, etc.

Compared with similar products in the world's industry, the THC80F10AC series products distinguish themselves in high performance, high security, high endurance, cost-effectiveness, and low power consumption.

THC80F10AC series products are designed for general IC card applications, such as SIM, Banking Card, CA in Pay-TV, Campus Card, City Card, etc.

Structure



Development Toolkits

- ✓ AK100 Emulator
- ✓ TMC Target board
- ✓ IDE: Keil uVision4
- ✓ Demo project with API(Application Programming Interface), FTL and crypto library
- ✓ User Manual and Application Notes
- ✓ The UDVG software tool to generate COS downloading script with customized format

Package and Pin Definitions

Different packages are available, e.g., wafer / module / card, etc.
Listed are pin definitions for a card package.

Signal Name	Function Descriptions	Contact defined in ISO/IEC 7816-2
VCC	Power Supply Voltage	C1
GND	Ground	C5
CLK	Clock Input	C3
RST	Reset Signal	C2
I/O	Data Input/Output	C7
SWP	SWIO contact	C6
ICU-DP	Inter-chip USB D+	C4(Option)
ICU-DM	Inter-chip USB D-	C8(Option)

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Contact Us

Beijing Tongfang Microelectronics Co., Ltd
Address: Floor 18th, Building D, Tsinghua Tongfang Hi-tech Plaza,
No.1 Wangzhuang Road,
Haidian District,
Beijing 100083,
P.R.China
Tel.: +86-10-82351818
Fax: +86-10-82357168
Email: support@tsinghuaic.com