Features

CPU

- ✓ High-performance 32-bit ARM core
- ✓ Little-endian
- ✓ 3-stage pipeline
- ✓ CPU operating clock could be configured
  - Internal clock: 1.875MHz, 3.75MHz, 7.5MHz, 10MHz, 15MHz, 30MHz, 45MHz
  - External clock: Contact smart card clock input via C3 (ISO/IEC 7816)

Memory

- ➢ FLASH
  - ✓ Size: 1280 KB
  - ✓ Page size: 256 bytes
  - ✓ Erase and program operation:
    - Page Erase, Page Fast Erase, Block Erase, Bank Erase
    - Byte Program, Word Program, Consecutive Program
  - ✓ Typical time:
    - Erasing 4ms, Fast Erasing 1ms
    - Byte Programming 51 μs. Word Programming 51 μs
    - Consecutive Programming
      Programming 128 bytes (byte mode):995 μs
      Programming 32 words (word mode): 266 μs
  - ✓ Bit logic: 1b after erasing, 0b after programming to be 0b
  - ✓ Usage: data and code
- ➢ RAM
  - ✓ Size: 36 KB
    - General RAM: 32 KB
    - CCP RAM: 4 KB
  - ✓ Usage: data and code
- ➢ ROM
  - ✓ Size: 32 KB
    - Pre-load Bootloader and CCP Lib
- ➢ OTP
  - ✓ User OTP: 240 bytes
  - ✓ SN: 17 bytes

Algorithms and Peripherals

- ➢ Symmetric algorithms
  - ✓ DES/T-DES
- ➢ Asymmetric algorithms
  - ✓ RSA
- ➢ Digest algorithms

THC80F10BC-V20

32-bit Smart Card IC

1280 KB FLASH

36 KB RAM

Preliminary

- ✓ SHA1

➢ Peripherals
- ✓ CRC: 16-bit CRC-CCITT and 32-bit CRC
- ✓ TRNG: True Random Number Generator, for secure transactions
- ✓ Timer: Three 16-bit Timers(independent clock source), one ETU timer(external clock source)

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
- ✓ Interface DMA implemented
- ✓ Dedicated ETU Counter for transmitting Null byte (e.g., 60H) automatically
- ✓ Transmitting TS byte of ATR (3BH) automatically
- ✓ Support GSM power consumption standards, including Clock Stop mode

➢ GPIO
- ✓ 7 GPIOs
- ✓ Multiplexed with SPI interface
- ✓ Trigger by edge and level

➢ SPI
- ✓ Supported master and slave interface
- ✓ Interface DMA implemented
- ✓ Max speed 15Mbps for master

➢ SWP
- ✓ Compliant with ETSI TS 102 613 (V11.0.0)
- ✓ Interface DMA implemented
- ✓ Communication automatically during ACT stage

Security
- ✓ WDT (Watch Dog Timer)
- ✓ Scrambling , redundancy data storage
- ✓ Logic redundancy
- ✓ External high and low voltage detectors
- ✓ Internal high and low voltage detectors
- ✓ High and low external clock frequency detectors(ISO/IEC 7816 external clock)
- ✓ Clock filter(ISO/IEC 7816 external clock)
- ✓ Low internal clock frequency detectors
- ✓ Light detector
- ✓ Temperature detector
- ✓ Active shield
- ✓ Security Certification Targeted: EAL4+,BCTC

Work parameters (Note1)

Symbol	Name	Conditions	Min	Typical	Max	Unit
T_{DES}	Time for Executing 64-bit DES Encryption			235		clock
T_{SE}	Time for Erasing a Page		1	4	5	ms
T_{SP}	Time for Program a Byte			51		μs
T_{DR}	Data Retention		10			year
N_{SE}	Page Endurance		100000			Cycle
f_{EXT}	External Clock Freq.		1		10	MHz
f_{INT}	Internal Clock. Freq.		1.875		45	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		-25		85	℃
V_{ESD}	ESD Protection	HBM	4			kV

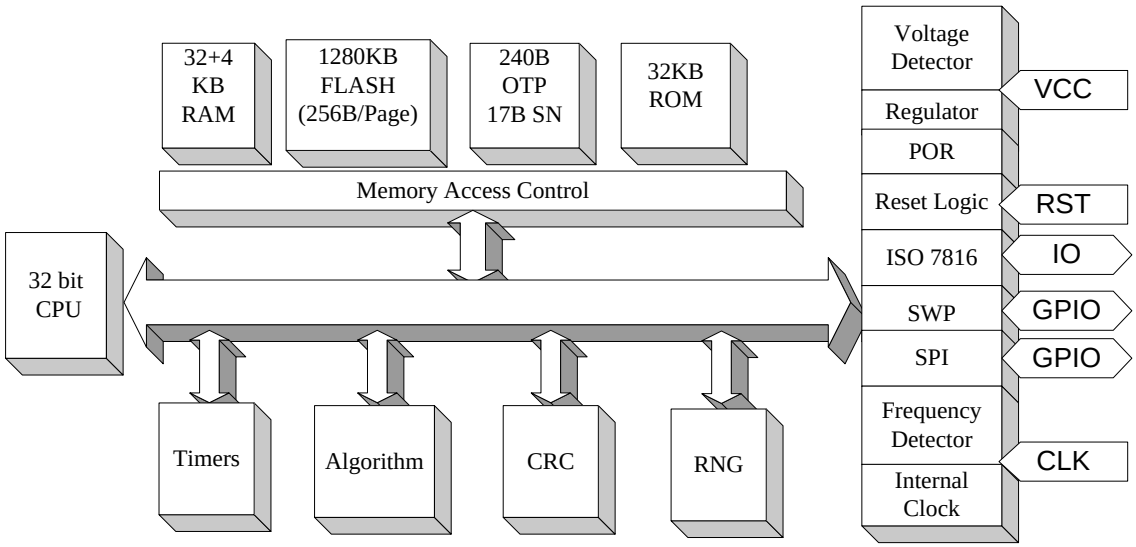
- ✓ Note1：This document is a preliminary version, data and descriptions (including this table) cannot be a formal evidence for performance and functions of the IC.
- ✓ Note 2: When operating at external clock or 15MHz (or lower) internal clock.
- ✓ Note 3: When operating at external clock or 10MHz (or lower) internal clock.
- ✓ Note 4: When operating only at ISO7816 interface without executing algorithm.

Descriptions

The THC80F10BC-V20 is a series of 32-bit CPU contact smart cards based on ARM core, with FLASH memories, voltage and clock frequency detectors, and functional modules like DES/T-DES, RSA, RNG, CRC, etc.

Compared with similar products in the world's industry, the THC80F10BC-V20 series products distinguish themselves in high performance, high security, high endurance, cost-effectiveness, and low power consumption.

Structure



Development Toolkits

- ✓ AK100 Emulator
- ✓ TMC Target board
- ✓ IDE: Keil uVision4
- ✓ Demo project with API(Application Programming Interface)
- ✓ 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
NC	Not Connected	C4, C8

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