AT90SC0802R

PRELIMINARY INFORMATION

CONTACTLESS RFID CHIP WITH AVR® MICROPROCESSOR

FEATURES

- ISO 14443-B, 13.56 MHz RF interface
- Serial-contacted interface
- Atmel 8515 AVR microcontroller core
- 2 kilobyte EEPROM, 8 kilobyte program ROM, 256 bytes of RAM
- Single metal mask programmable ROM for fast turnaround
- 70 pF on-chip tuning capacitor

The AT90SC0802R is based on Atmel's powerful AVR 8-bit RISC microprocessor, which offers single-cycle instruction execution with better code densities than most other eight-bit architectures. The AT90SC0802R is intended for use in ISO/IEC 14443 type B contactless cards and includes all those circuits necessary to build the complete card/tag with the exception of the coil antenna.

The chip includes 8 kilobytes of ROM, 2 kilobytes of EEPROM, 256 bytes of SRAM and 32 registers. It is based on the complete 8515 AVR processor core that supports around 120 instructions. Programs can be executed out of either the EEPROM or ROM. Contact your local Atmel sales office for AVR programming information, as well as compiler, assembler and other development aids. The chip supports a hardware random-number generator as well as memory mapping options for high-security applications.

Corporate Headquarters
2325 Orchard Parkway
San Jose, CA 95131
TEL (408) 441-0311
FAX (408) 487-2600

Europe
Atmel SarL
Route des Arsenaux 41
Casa Postale 80
CH-1705 Fribourg
Switzerland
TEL (41) 26-426-5555
FAX (41) 26-426-5500

Asia
Atmel Asia, Ltd
Room 1219
Chinachem Golden Plaza
77 Mody Road Tsimshatsui
East Kowloon
Hong Kong
TEL (852) 27219778
FAX (852) 27221369

Japan
Atmel Japan KK
Tonetsu Shinkawa Bldg, 9F
1-24-8 Shinkawa
Chuo-ku, Tokyo 104-0033
Japan
TEL (81) 3-3523-3551
FAX (81) 3-3523-7581

Atmel Operations
Atmel Colorado Springs
1150 E Cheyenne Mtn Blvd
Colorado Springs, CO 80906
TEL (719) 576-3300
FAX (719) 540-1759

Atmel Rousset
Zone Industrielle
13106 Rousset Cedex, France
TEL (33) 4 42 53 60 00
FAX (33) 4 42 53 60 01

Fax-On-Demand
North America: 1 (800) 292-8635
International: 1 (408) 441-0732

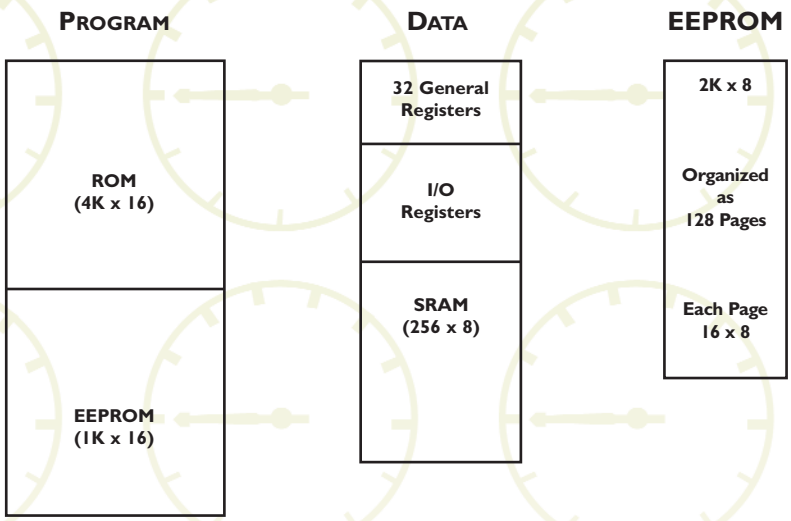
e-mail
RFID@atmel.com

Web Site
http://www.atmel.com

Bulletin Board Service
1 (408) 436-4309

2000A-12/00/10M

The memory map shown below illustrates how these various memories are accessed. The AVR processor core can access the program and data spaces directly.



The mask programmable ROM memory used for the default operating program is organized as 16 bits wide and is programmable via single metal mask updates to expedite orders to reduce the amount of time from order submission to first shipment.

The analog front-end is optimized for communications at 13.56 MHz and is compatible with ISO 14443-2 type B. There is a serial port configurable by processor software that allows a contacted interface. The software communicates with the analog circuitry through a digital interface block. This interface software controls most of the aspects of the I/O protocol, including data encoding for both transmission and reception, anti-collision, error detection/correction and encryption.

The front-end power generation circuitry is designed to generate a maximum current of 5 mA, in order to permit operation of the processor at 3.4 MHz. The chip includes a 70 pF tuning capacitor across the coil input pins—only an antenna coil is needed to make a complete RFID tag. An internal filter capacitor of about 2000 pF is integrated on the chip to smooth noise in the power supply.

In contact mode, the AVR processor speed is equal to one-half the clock speed. Contact mode communications are compliant with ISO/IEC 7816 and include a parity bit after each 8 data bits during both read and write operations. Contact mode VDD is 5.0 volts.

APPLICATIONS

SmartCards: Designed for either contactless or contacted smart cards, this chip enables applications such as e-purse, customer rewards, transit fare collection and smart credit cards where high-security identification and encryption are required.

Remote Sensing Data Collection: RFID built into machinery allows an operator to poll system status, monitor and change calibration values and run built-in self-tests without the need for a connector. This allows data collection from systems in harsh or inconvenient locations. Automotive applications use Atmel RFID to record vital system conditions, enabling an alert before a failure and diagnostics after failure has occurred.

Please email us at **RFID@atmel.com** for further information.