

Features

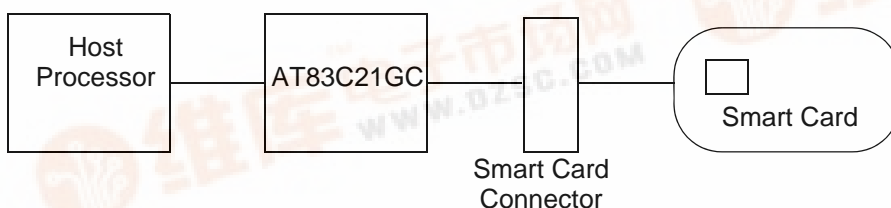
- Smart Card Interface
 - Compliance with Standards
 - ISO/IEC 7816-1, 2, 3 and 4
 - EMV 2000
 - CB
 - Mondex®, Proton, ZKA, Other: Contact Gemplus®
 - Supported Smart Cards
 - Number of Smart Cards Supported: 1
 - Asynchronous Cards: T=0 and T=1
 - Synchronous/Memory Cards Using a Command Interpreter
 - EMV or Non EMV Cards
- Electrical Interface
 - Transmission Speed: 9.6 Kbps to 115 Kbps
 - Card Power Supply: 1.8V/3V/5V
 - ESD Protection On Card Pins: 4 KV - Human Body Model
 - Card Presence or Insertion Detection
 - Short Circuit Current Limitation
- Host Interface
 - Physical Layer
 - Serial Asynchronous Link
 - Programmable Transmission Speed From 1,200 bps to 115,200 bps
 - Format: 8 bits, No Parity, 1 Stop Bit
 - Adjustable Signal Voltage
 - Protocol
 - Gemplus Block Protocol (GBP)
 - GBP Interface Library Kit Source Code
- Chip Power Supply
 - Voltage: V_{CC} 2.85V to 5.4V
 - Consumption: 8 mA Typical, 150 mA Max - Smart Card Powered
 - Power Down Mode
 - 100 μ A Max Power Down Current
 - Power-down/Power-up by Host Command
- Additional Features
 - Operating Temperature Range: 0°C to +70°C (-40°C to +85°C)
 - Package: SS0P24
 - LED Management: The LED is On When the Card is Powered On

Description

AT83C21GC is designed to simplify the integration of smart card interfaces in electronic devices.

It manages the electrical interface and communication with ISO 7816 –1/2/3/4 compatible smart cards and memory cards.

Figure 1. Basic Architecture of a Smart Card Reader



GemCore Serial Lite PRO

AT83C21GC Summary





The connection with the host processor is achieved via a serial asynchronous link; the rate can be selected from a range from 1200 to 115,200 bps.

The software inside the GemCore chip handles a communication protocol with the host system called the Gemplus Block Protocol (GBP).

**A complete set of documentation is available on the Gemplus web site:
<http://www.gemplus.com>.**

A GBP Interface Library Kit can be provided, upon request. It consists of the source code of the GBP communication layer between the host and GemCore. It is written in the C language. See the Gemplus developers' site at www.gemplus.com. Enquiries can also be posted to cardreader@atmel.com.

Ordering information

| Part Number | Temperature Range | Package | Packing |
|--------------------|--------------------|---------|-------------|
| AT83C21GCxxx-ICSIL | Industrial | SSOP24 | Stick |
| AT83C21GCxxx-ICRIL | Industrial | SSOP24 | Tape & Reel |
| AT83C21GCxxx-ICSUL | Industrial & Green | SSOP24 | Stick |
| AT83C21GCxxx-ICRUL | Industrial & Green | SSOP24 | Tape & Reel |

xxx : Firmware version



Pin Description Figure 2. 24-pin SSOP Pinout

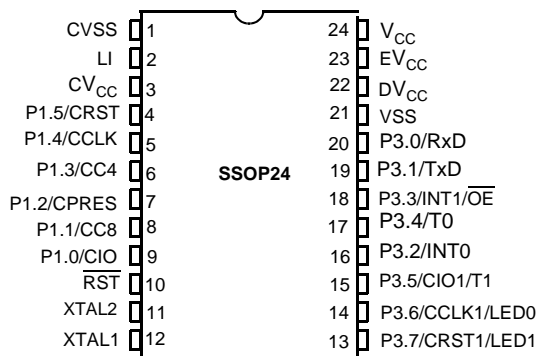


Table 1. Port Signal Description

| Port | Signal Name | Internal Power Supply | ESD | Type | Description |
|------|-------------|-----------------------|------|------|--|
| P1.0 | CIO | CV _{CC} | 4 kV | I/O | Smart Card Interface Function Card I/O – Pull-up medium is lower than 20KΩ |
| P1.1 | CC8 | CV _{CC} | 4 kV | I/O | Smart Card Interface Function Card contact 8 – Pull-up medium must be less than 20KΩ |
| P1.2 | CPRES | V _{CC} | 4 kV | I | Smart Card Interface Function Card presence |
| P1.3 | CC4 | CV _{CC} | 4 kV | I/O | Smart Card Interface Function Card contact 4 – Pull-up medium must be less than 20KΩ |
| P1.4 | CCLK | CV _{CC} | 4 kV | O | Smart Card Interface Function Card clock |
| P1.5 | CRST | CV _{CC} | 4 kV | O | Smart Card Interface Function Card reset – Pull-up medium must be less than 20KΩ |
| P3.0 | RxD | EV _{CC} | | I | UART Function Receive data input |
| P3.1 | TxD | EV _{CC} | | O | UART Function Transmit data output. |
| P3.2 | INT0 | DV _{CC} | | I/O | Input/Output Function P3.2 is a bi-directional I/O port with internal pull-ups. |
| P3.3 | INT1 | EV _{CC} | | I/O | Input/Output Function P3.3 is a bi-directional I/O port with internal pull-ups. |
| P3.4 | | EV _{CC} | | I/O | Input/Output Function P3.4 is a bi-directional I/O port with internal pull-ups. |
| P3.5 | CIO1 | DV _{CC} | | I/O | Alternate Card Function Card I/O: Pull-up medium must be less than 20K |

Table 1. Port Signal Description (Continued)

| Port | Signal Name | Internal Power Supply | ESD | Type | Description |
|------------------|-------------|-----------------------|-----|------|--|
| P3.6 | CCLK1 | DV _{CC} | | O | LED function These pins can be directly connected to the cathode of the standard LED without external current limiting resistors. The typical current of each output can be programmed by software to 2, 4 or 10 mA (LEDCON register). |
| P3.7 | CRST1 | DV _{CC} | | I/O | Input/Output Function P3.7 is a bi-directional I/O port with internal pull-ups. |
| RST | | V _{CC} | | I/O | Reset Input Holding this pin low for 64 oscillator periods while the oscillator is running resets the device. The Port pins are driven to their reset conditions when a voltage lower than V _{IL} is applied, whether or not the oscillator is running. This pin has an internal pull-up resistor which allows the device to be reset by connecting a capacitor between this pin and VSS. Asserting RST when the chip is in Idle mode or Power-down mode returns the chip to normal operation. The output is active for at least 12 oscillator periods when an internal reset occurs. |
| XTAL1 | | V _{CC} | | I | Input to the on-chip Inverting Oscillator Amplifier To use the internal oscillator, a crystal/resonator circuit is connected to this pin. If an external oscillator is used, its output is connected to this pin. |
| XTAL2 | | V _{CC} | | O | Output of the on-chip Inverting Oscillator Amplifier To use the internal oscillator, a crystal/resonator circuit is connected to this pin. If an external oscillator is used, XTAL2 may be left unconnected. |
| V _{CC} | | | | PWR | Supply Voltage V _{CC} is used to power the internal voltage regulators and internal I/O's. |
| LI | | | | PWR | DC/DC Input LI must be tied to V _{CC} through an external coil (typically 4, 7 μH) and provide the current for the pump charge of the DC/DC converter. |
| CV _{CC} | | | | PWR | Card Supply Voltage CV _{CC} is the programmable voltage output for the Card interface. It must be connected to an external decoupling capacitor. |
| DV _{CC} | | | | PWR | Digital Supply Voltage DV _{CC} is used to supply the digital core and internal I/Os. It is internally connected to the output of a 3V regulator and must be connected to an external decoupling capacitor. |
| EV _{CC} | | V _{CC} | | PWR | Extra Supply Voltage EV _{CC} is used to supply the level shifters of UART interface I/O pins. It must be connected to an external decoupling capacitor. This reference voltage is generated internally (automatically or not), or it can be connected to an external voltage reference. |
| CVSS | | | | GND | DC/DC Ground CVSS is used to sink high shunt currents from the external coil. |
| VSS | | | | GND | Ground |



Atmel Corporation

2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 487-2600

Regional Headquarters

Europe

Atmel Sarl
Route des Arsenaux 41
Case Postale 80
CH-1705 Fribourg
Switzerland
Tel: (41) 26-426-5555
Fax: (41) 26-426-5500

Asia

Room 1219
Chinachem Golden Plaza
77 Mody Road Tsimshatsui
East Kowloon
Hong Kong
Tel: (852) 2721-9778
Fax: (852) 2722-1369

Japan

9F, Tonetsu Shinkawa Bldg.
1-24-8 Shinkawa
Chuo-ku, Tokyo 104-0033
Japan
Tel: (81) 3-3523-3551
Fax: (81) 3-3523-7581

Atmel Operations

Memory

2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 436-4314

Microcontrollers

2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 436-4314

La Chantreterie
BP 70602
44306 Nantes Cedex 3, France
Tel: (33) 2-40-18-18-18
Fax: (33) 2-40-18-19-60

ASIC/ASSP/Smart Cards

Zone Industrielle
13106 Rousset Cedex, France
Tel: (33) 4-42-53-60-00
Fax: (33) 4-42-53-60-01

1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906, USA
Tel: 1(719) 576-3300
Fax: 1(719) 540-1759

Scottish Enterprise Technology Park
Maxwell Building
East Kilbride G75 0QR, Scotland
Tel: (44) 1355-803-000
Fax: (44) 1355-242-743

RF/Automotive

Theresienstrasse 2
Postfach 3535
74025 Heilbronn, Germany
Tel: (49) 71-31-67-0
Fax: (49) 71-31-67-2340

1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906, USA
Tel: 1(719) 576-3300
Fax: 1(719) 540-1759

Biometrics/Imaging/Hi-Rel MPU/

High Speed Converters/RF Datacom

Avenue de Rochepleine
BP 123
38521 Saint-Egreve Cedex, France
Tel: (33) 4-76-58-30-00
Fax: (33) 4-76-58-34-80

Literature Requests

www.atmel.com/literature

Disclaimer: The information in this document is provided in connection with Atmel products. No license, express or implied, by estoppel or otherwise, to any intellectual property right is granted by this document or in connection with the sale of Atmel products. **EXCEPT AS SET FORTH IN ATMEL'S TERMS AND CONDITIONS OF SALE LOCATED ON ATMEL'S WEB SITE, ATMEL ASSUMES NO LIABILITY WHATSOEVER AND DISCLAIMS ANY EXPRESS, IMPLIED OR STATUTORY WARRANTY RELATING TO ITS PRODUCTS INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. IN NO EVENT SHALL ATMEL BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE, SPECIAL OR INCIDENTAL DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS, BUSINESS INTERRUPTION, OR LOSS OF INFORMATION) ARISING OUT OF THE USE OR INABILITY TO USE THIS DOCUMENT, EVEN IF ATMEL HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.** Atmel makes no representations or warranties with respect to the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and product descriptions at any time without notice. Atmel does not make any commitment to update the information contained herein. Unless specifically provided otherwise, Atmel products are not suitable for, and shall not be used in, automotive applications. Atmel's products are not intended, authorized, or warranted for use as components in applications intended to support or sustain life.

© Atmel Corporation 2005. All rights reserved. Atmel®, logo and combinations thereof, are registered trademarks, and Everywhere You AreSM are the trademarks of Atmel Corporation or its subsidiaries. Other terms and product names may be trademarks of others.



Printed on recycled paper.