

# ST7GEM microcontrollers

## Single-chip solution for smartcard readers



**STMicroelectronics' (ST) ST7GEM microcontrollers** are designed to be the core of smartcard readers communicating through a serial or USB link. ST7GEM microcontrollers offer a full turnkey solution with pre-programmed software from industry leader GEMPLUS. They are fully EMVCo-compliant and all types of smartcard can be accepted without modification. Available in 24-pin SO or QFN packages, they are perfectly suited for consumer and PC-linked applications:

- Stand-alone PC-linked readers
- POS terminals
- PIN pads
- Mobile phones
- PDAs
- Set-top boxes
- Home routers

### Key features

- Single integrated circuit solution with very few external passive components
- EMVCo certification and PC/SC compliance
- Performance and specifications developed in partnership with industry leader in readers
- Application note and evaluation kit available
- Engineering expertise in system integration and PCB design

### Key benefits

- Optimized PCB space and lower bill of material cost
- Quick EMVCo/EMV2000 type approval process and Microsoft WHQL agreement
- Robust solutions with a proven track record in the market for many years. #1 micro in readers
- Enables fast reader development and rapid time-to-market
- Easy to develop and full turnkey solution supported by a team of experts

## Device summary

Device	Program memory type			Prog (bytes)	RAM (bytes)	Timer functions		Serial interface	LVD levels	I/Os high current	Package	Supply voltage	Special features
	Flash	Fast ROM	ROM			8-bit (IC/OC/PWM)	Others						
24 pins ST7GEME4	•	•	•	16K	768	1(0,0,0)	WDG	USB/ISO7816	1	4	S024/QFN24	4.0 to 5.5V	Smartcard power supply unit, ISO7816, 7 full-speed USB endpoints, ICP, IAP, 4 LED outputs, turnkey firmware

## Technical features

Supported smartcards	Asynchronous	<ul style="list-style-type: none"> <li>Microprocessor cards</li> <li>T=0, T=1 protocols</li> <li>Transmission rate: 2 Kbps to 344 Kbps</li> </ul>
	Synchronous	<ul style="list-style-type: none"> <li>Through a comprehensive API</li> </ul>
Smartcard electrical interface	Smartcard power supply	<ul style="list-style-type: none"> <li>5V/55mA and 3V/50mA and 1.8V/20mA</li> <li>Short circuit current limitation</li> <li>Power up/power down control sequences</li> </ul>
	Smartcard management	<ul style="list-style-type: none"> <li>Card insertion/extraction detection</li> </ul>
	ESD protection on card I/O	<ul style="list-style-type: none"> <li>4 kV Human Body Model</li> </ul>
Drivers	USB and serial versions	<ul style="list-style-type: none"> <li>Microsoft Windows 2000/XP/Server 2003</li> <li>Microsoft Windows CE 4.1/4.2/5.0</li> <li>Linux Red Hat/SUSE/Debian</li> <li>Microsoft Windows XP 64-bit on AMD64 and EMT64</li> <li>Microsoft Windows Server 2003 64-bit</li> <li>Mac OS 10.3/10.4</li> </ul>
	Compliance with class drivers	<ul style="list-style-type: none"> <li>Microsoft Windows 2000/XP/Server 2003</li> <li>Microsoft Windows Vista (beta version)</li> <li>Mac OS 10.3/10.4</li> </ul>
USB host interface	USB 2.0 compliant	<ul style="list-style-type: none"> <li>CCID V1.0</li> <li>Full speed, hub-less</li> <li>Bus powered, low consumption</li> </ul>
Serial host interface	Serial asynchronous link	<ul style="list-style-type: none"> <li>Transmission rate: 9.6 Kbps to 115 Kbps</li> <li>Format: 8-bit, no parity</li> <li>Auto baud rate</li> </ul>
	Communication protocol	<ul style="list-style-type: none"> <li>CCID V1.0 on serial TTL link</li> </ul>
Other features	Temperature range	<ul style="list-style-type: none"> <li>Operating range: 0 to +70°C</li> <li>Storage: -65 to +150°C</li> </ul>
	Environmental standard	<ul style="list-style-type: none"> <li>RoHS compliant</li> </ul>

SO 24 pins



QFN 24 pins  
(under development)



## Development tools and support

Application note available with PCB recommendations and component bill of materials allows a fast time-to-market development for a complete and robust turnkey solution. The evaluation kit developed by GEMPLUS demonstrates ST7GEM features and performance.



ST7GEM complies with the following standards: ISO/IEC 7816-1,2,3,4, Microsoft WHQL, USB 2.0, CCID 1.0 and EMVCo Level1 v4.1.



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China +86 21 52574820; France +33 1 55489569; Germany +49 89 4605454; Italy +39 02 8250449; Japan +81 3 57838216; Singapore +65 6481 5124; Sweden +46 8 58774411; Switzerland +41 22 9292900; United Kingdom and Eire +44 1628 890391; USA +1 781 861 2678

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