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**SWATCH GROUP**  
ELECTRONIC SYSTEMS

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## SEMICONDUCTORS



EM Microelectronic is a semiconductor manufacturer specialized in ultra low power, low voltage integrated circuits for consumer, automotive and industrial applications.

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## CRYSTALS, RTCS, OSCILLATORS



The leader in precise and accurate timing products, Low Frequency Tuning Fork Quartz Crystals, Real-Time Clocks (RTC) and Oscillators.

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## BATTERIES AND RECHARGEABLES



Renata the world-class leader in coin cells from Switzerland, also offers a comprehensive range of rechargeable microbatteries.

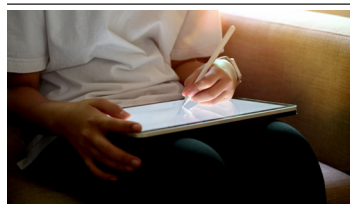
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is a semiconductor manufacturer specialized in the design and production of ultra-low power, low voltage integrated circuits for battery-operated and field-powered applications in the consumer, industrial and automotive markets. From conceptual idea to final product, EM provides on-demand fusion of technologies for tailor-made solutions.



## TIME

Design and production of ultra-low power integrated circuits for highest precision devices. Time accuracy is a key enabler for green, user-friendly IoT applications.



## INTERFACES

Solutions helping humans to easily interact with machines, from watches to computers and industry 4.0 devices. Highest performance wireless mice, smart pens, motion sensing in mobile phones, always-on tactile wearable interfaces and flexible plastic display modules are a few examples.



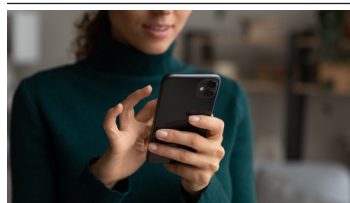
## ENERGY

Optimized solutions to harvest, store and manage energy in battery- or field-powered devices for enabling greener solutions with seamless user experience.



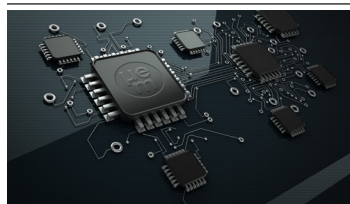
## SENSING

Smartphones, tablets, wearables and drones integrate numerous sensors to determine a device's orientation and motion, while IoT devices need to permanently provide environmental data such as temperature and humidity. EM's solutions combine the output of various sensors to derive highly accurate estimates of a device's orientation, movement and surrounding conditions.



## COMMUNICATION

Creator of the world's smallest Bluetooth chip and the world premiere RAINFC dual frequency RFID tag, EM is a global player in RF and RFID technologies, for markets such as access control, brand protection, animal ID, logistics, road tolling and connected wearables. Coupled with EM's sensing capabilities, such devices deliver powerful context-aware RFID and IoT solutions.



## SMART PROCESSING

Context awareness, user interaction and smart processing are at the heart of every electronic device today. Always focused on ultra-low power for superior device autonomy. EM offers a range of embedded microcontroller solutions, tailored for specific applications where power consumption, small size and performance are not subject to compromise.

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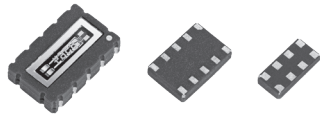
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# MICRO CRYSTAL

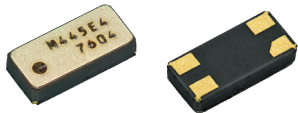


is a leading manufacturer of Miniature Tuning Fork Quartz Crystals (32kHz to 250MHz), Real Time Clock and Temperature Modules, Oscillators and OCXOs for the world's leading manufacturers of mobile phones, consumer products, computers, automobile electronics, watches, industrial controls, as well as medical implantable devices and other high-reliability product applications.



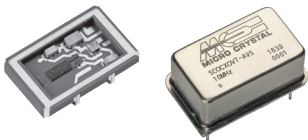
## REAL-TIME CLOCKS

- Lowest power 45 nA
- Highest accuracy  $\pm 0.22$  s/day,  $\pm 2.5$  ppm
- Temperature compensation -40 to +125°C



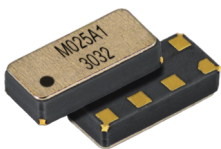
## LOW POWER OSCILLATORS

- 32.768 kHz
- 100.000 kHz
- Lowest power, tuning fork



## MHZ OSCILLATORS

- XO up to 210°C
- VCXO up to 210°C
- OCXO up to 120 MHz



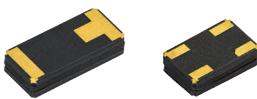
## TEMPERATURE SENSOR MODULE

- Lowest power 160 nA
- High precision and accuracy  $\pm 1^\circ\text{C}$
- Temperature range -40 to +105°C
- Alarm and timestamp functions



## KHZ TF CRYSTALS

- 32.768 kHz
- Tuning fork crystal
- Miniature ceramic SMD



## MHZ AT-CUT CRYSTALS

- Frequency up to 250 MHz
- High temperature up to 200°C
- High-end applications

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Within only a few years, the company became a leading manufacturer and supplier of coin cells for watches and many electronic product areas (medical technology, RFID, radio control, metering, and many more).

Renata lithium batteries meet the highest quality standards and offer excellent reliability. Sufficient inventory as well as a network of dedicated importers and distributors make Renata products readily available world-wide.

	<h2>PRIMARY CELLS</h2>	<ul style="list-style-type: none"> <li>- Silver-Oxide</li> <li>- Lithium</li> </ul>	<p>1.55 V 3.0 V</p>
	<h2>SECONDARY CELLS</h2>	<ul style="list-style-type: none"> <li>- Lithium-Cobalt-Oxide</li> <li>- Lithium-Cobalt-Oxide</li> </ul>	<p>3.7 V 3.85 V</p>
	<h2>THINFILM PRIMARY</h2>	<ul style="list-style-type: none"> <li>- Lithium</li> </ul>	<p>3.0 V</p>
	<h2>BATTERY HOLDERS</h2>	<ul style="list-style-type: none"> <li>- Metal low profile</li> <li>- Thru hole mounted</li> <li>- Surface mounted</li> <li>- Gold plated</li> </ul>	
	<h2>CUSTOMIZED SOLUTIONS</h2>		



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