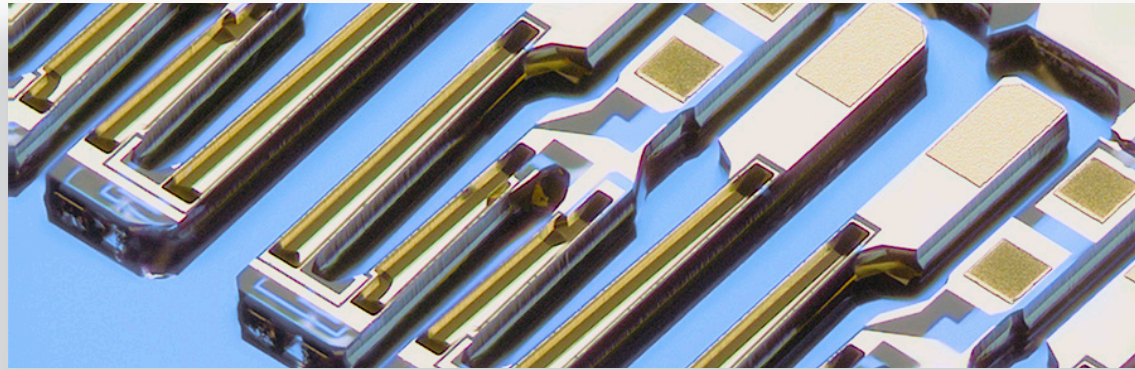


# Micro Crystal



kHz Tuning Fork Crystals

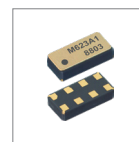
MHz AT-Cut Crystals

Real-Time Clock Modules

Temperature Sensor Module









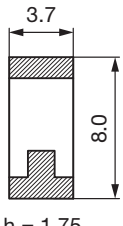
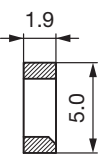
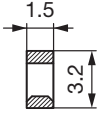
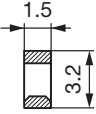

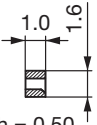
kHz Oscillators

Medical Implantable Products



**Short Form Catalog Q2 2024**

# kHz Tuning Fork Crystals in Ceramic Packages

Crystal Type	30.0 kHz to 2'000 kHz Tuning Fork Crystals							Units
Product Type	<a href="#">CC1V-T1A</a>	<a href="#">CC4V-T1A</a>	<a href="#">CM7V-T1A</a>	<a href="#">CM7V-T1A low ESR</a>	<a href="#">CM8V-T1A</a>	<a href="#">CM9V-T1A</a>		
Dimensions (l x w x h)	8.0 x 3.7 x 1.75	5.0 x 1.9 x 0.90	3.2 x 1.5 x 0.65	3.2 x 1.5 x 0.65	2.0 x 1.2 x 0.60	1.6 x 1.0 x 0.50		mm
								mm
 PCB Symbol, Footprint & 3D Model available on product pages on website								mm
Lid Material	Ceramic	Ceramic	Metal	Metal	Metal	Metal		
Operating Temp. Range TA	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85		°C
Operating Temp. Range TB <sup>1)</sup>	-40 to +125	-40 to +125	-40 to +125	-40 to +125	-40 to +125	-40 to +125		°C

Frequency	F <sub>L</sub>	32.768	32.768	32.768	32.768	32.768	32.768	kHz
Standard Load Capacitance <sup>2)</sup>	C <sub>L</sub>	9 / 12.5	6 / 7 / 9 / 12.5	6 / 7 / 9 / 12.5	6 / 7 / 9 / 12.5	4 / 7 / 9 / 12.5	4 / 7 / 9 / 12.5	pF
Frequency Tolerance @ 25°C <sup>3)</sup>	ΔF/F	±20	±20	±20	±20	±20	±20	ppm
Series Resistance typ./max.	R <sub>s</sub>	40 / 60	50 / 65	50 / 70	40 / 50	55 / 70	60 / 75	kΩ
Motional Capacitance typ.	C <sub>i</sub>	2.0	2.1	3.7	4.7	4.7	6.3	fF
Static Capacitance typ.	C <sub>0</sub>	1.6	1.2	1.2	1.3	1.2	1.4	pF
Drive Level max.	P	1.0	1.0	1.0	1.0	0.5	0.5	μW
Aging max. 1st Year @ 25°C	ΔF/F	±3	±3	±3	±3	±3	±3	ppm
Turnover Temperature	T <sub>0</sub>	25 ±5	25 ±5	25 ±5	25 ±5	25 ±5	25 ±5	°C
Frequency vs. Temperature	ΔF/F	-0.035 ppm/°C <sup>2</sup> (T-T <sub>0</sub> ) <sup>2</sup> ±10%						ppm

1) Also available in -55 to +125°C temp. range (TC).

2) Other load capacitance on request.

3) Tighter and wider frequency tolerances on request.

## Applications

- IoT
- Computing
- Automotive
- Wireless Units
- Smart Metering
- Industrial Control
- Embedded Modules
- GPS and Navigation
- Tablets, Smart Phones
- Security and Access Control
- Wearables, Portable Devices
- Remote Keyless Entry Systems
- High Temperature Range Designs
- Ultra Small Size Devices, Smart Cards
- Healthcare, Medical and Medical Implantable

## Ordering Information

**C M 7 V - T 1 A 0.3 32.768 kHz 12.5 pF ±20 ppm TA QC**

**Ceramic package**

**Package lid**  
C = Ceramic lid  
M = Metal lid

**Package size**  
1 = 8.0 x 3.7 x 1.75 mm  
4 = 5.0 x 1.9 x 0.90 mm  
5 = 4.1 x 1.5 x 0.90 mm  
7 = 3.2 x 1.5 x 0.65 mm  
8 = 2.0 x 1.2 x 0.60 mm  
9 = 1.6 x 1.0 x 0.50 mm

**Tuning fork**

**SMD package**

**Au flashed pads**

**2 pads**

**Frequency F<sub>L</sub>**

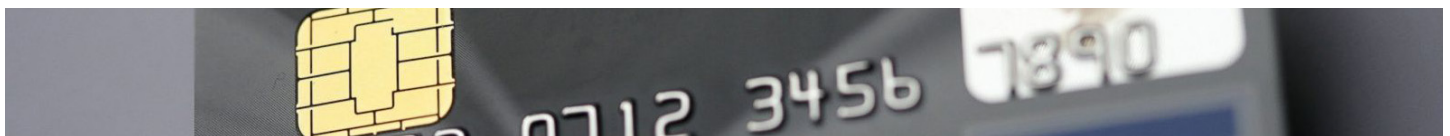
**Load capacitance C<sub>L</sub>**

**Frequency tolerance**









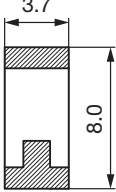
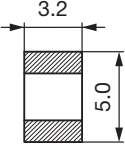
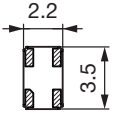
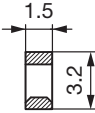


**Temperature range**  
TA = -40 to +85°C (Standard)  
TB = -40 to +125°C

**Qualification**  
QC = Commercial Grade (Standard)  
QA = Automotive Grade AEC-Q200  
QM = Medical Grade (see page 6)

**Special feature**  
0.3 = Lowest profile, 0.35 mm  
Low ESR = 50 kΩ max.



# MHz AT-Cut Crystals in Ceramic Packages

Crystal Type	MHz AT-Cut Crystals					
Product Type	CC1A/F	CC2A	CC6A/F	CC7A	CC8A	CM8A
Dimensions (l x w x h) mm	8.0 x 3.7 x 1.75	5.0 x 3.2 x 1.20	3.5 x 2.2 x 1.0/0.8	3.2 x 1.5 x 0.75	2.0 x 1.2 x 0.60	2.0 x 1.2 x 0.60
			 4 or 2 pads			
 PCB Symbol, Footprint & 3D Model available on product pages on website	 h = 1.75	 h = 1.20	 h = 1.0/0.80	 h = 0.75	 h = 0.60	 h = 0.60

## Standard (Fundamental Mode)

Product Type	Number of pads	Frequency MHz	Operating Temp. °C	R <sub>s</sub> typ. in Ω @ Fmin - Fmax	C <sub>1</sub> typ. in fF @ Fmin - Fmax	C <sub>0</sub> typ. in pF @ Fmin - Fmax	Key Features / Applications
<a href="#">CC1A-T1A</a>	2	8 - 30	-55 to +125	60 - 30	4 - 11	2.0 - 4.0	
<a href="#">CC1F-T1A</a>	2	30 - 250	-55 to +125	35 - 15	4 - 7	2.0 - 4.0	Inverted mesa crystal
<a href="#">CC2A-T1A</a>	2	12 - 70	-55 to +125	60 - 10	3 - 12	2.0 - 5.0	
<a href="#">CC6A-T1D</a>	4	16 - 70	-55 to +125	60 - 20	2 - 5	1.5 - 3.0	
<a href="#">CC6F-T1A</a>	2	70 - 250	-55 to +125	30 - 15	5 - 6	2.4 - 3.2	Inverted mesa crystal
<a href="#">CC6F-T1A F</a>	2	70 - 200	-55 to +125	35 - 15	3 - 3	2.4 - 3.2	Inverted mesa crystal Filter applications - low spurious
<a href="#">CC7A-T1A</a>	2	20 - 50	-55 to +125	40 - 25	2 - 2	0.7 - 0.7	
<a href="#">CC8A-T1A</a>	2	24 - 50	-55 to +125	40 - 20	1 - 1	0.7 - 0.7	Smallest package
<a href="#">CM8A-T1D</a>	4	24 - 50	-55 to +125	40 - 20	1 - 1	0.7 - 0.7	Smallest package

## High Temperature / Harsh Environment (Fundamental Mode)

<a href="#">CC1A-T1A H</a>	2	8 - 24	-55 to +200	100 - 50	4 - 9	2.0 - 3.2	
<a href="#">CC2A-T1A H</a>	2	14 - 40	-55 to +200	70 - 40	5 - 10	2.5 - 4.0	
<a href="#">CC6A-T1D H</a>	4	16 - 40	-55 to +200	80 - 50	2 - 4	1.5 - 2.5	

## Applications

Customer-specific applications such as:

- Filters
- Industrial
- Telemetry
- Animal Tracking
- Optical Network
- Airborne Equipment
- Avionics / Aerospace
- Radio Communication
- Geothermal Equipment
- TCXO, VCTCXO, VCXO
- Downhole and Well Drilling
- Healthcare, Medical and Medical Implantable

## Ordering Information

<b>C</b> Ceramic package	<b>24.000 MHz</b> Frequency F <sub>L</sub>
<b>6</b> Package lid C = Ceramic lid M = Metal lid	<b>20.0 pF</b> Load capacitance C <sub>L</sub>
<b>A</b> Package size 1 = 8.0 x 3.7 x 1.75 mm 2 = 5.0 x 3.2 x 1.20 mm 6 = 3.5 x 2.2 x 1.00 mm 7 = 3.2 x 1.5 x 0.75 mm 8 = 2.0 x 1.2 x 0.60 mm	<b>±50 ppm</b> Frequency tolerance
<b>T</b> Quartz blank A = AT-Cut F = AT-Cut inverted mesa	<b>TC</b> Temperature range TA = -40 to +85°C (Standard) TB = -40 to +125°C TC = -55 to +125°C TD = -55 to +175°C TG = -55 to +200°C TX = Custom
<b>D</b> SMD package	<b>QI</b> Qualification QI = Industrial Grade (Standard) QM = Medical Grade (see page 6) QS = Custom Specification
<b>H</b> Au flashed pads	<b>QI</b> Special feature H = Harsh environment F = Filter applications
<b>1</b> Number of pads A = 2 pads D = 4 pads	







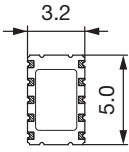
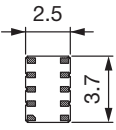
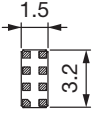



Micro Crystal: MHz Quartz Crystals



www.microcrystal.com

# RTC Modules in Ceramic Packages

Product Type	RV-xxxx-C2	RV-xxxx-C3	RV-xxxx-C7	RV-xxxx-C8
Dimensions (l x w x h) mm	5.0 x 3.2 x 1.2	3.7 x 2.5 x 0.9	3.2 x 1.5 x 0.8	2.0 x 1.2 x 0.7
				
 PCB Symbol, Footprint & 3D Model available on product pages on website	 h = 1.2	 h = 0.9	 h = 0.8	 h = 0.7
Lid Material	Glass	Metal	Metal	Metal

## Standard RTC Modules

Product Type	Interface	Special Feature	Time Accuracy ppm		Supply V <sub>DD</sub> V	Current I <sub>DD</sub> nA	T <sub>OPR</sub> °C	Offset Comp.	Backup Switch	Trickle Charge	Event Input	RAM Bytes	EEPROM Bytes
			@ 25°C	-40 to +85°C									
<a href="#">RV-8263-C8</a>	I <sup>2</sup> C	Ultra-Small	±20		0.9 to 5.5	190	-40 to +85	✓				1	
<a href="#">RV-3028-C7</a>	I <sup>2</sup> C	Lowest Power	±1		1.1 to 5.5	45	-40 to +85	✓	✓	✓	✓	2	43
<a href="#">RV-4162-C7</a>	I <sup>2</sup> C	Small Package	±20		1.0 to 4.4	350	-40 to +85	✓					
<a href="#">RV-8263-C7</a>	I <sup>2</sup> C	Low Power	±20		0.9 to 5.5	190	-40 to +85	✓				1	
<a href="#">RV-8564-C2</a>	I <sup>2</sup> C		±20		1.2 to 5.5	250	-40 to +85						
<a href="#">RV-8564-C3</a>	I <sup>2</sup> C		±20		1.2 to 5.5	250	-40 to +85						
<a href="#">RV-8523-C3</a>	I <sup>2</sup> C	Low Power	±20		1.2 to 5.5	130	-40 to +85	✓	✓				
<a href="#">RV-3032-C7</a>	I <sup>2</sup> C	Highest Accuracy 12-bit T-Sensor		±2.5	1.3 to 5.5	160	-40 to +105	✓	✓	✓	✓	16	32
<a href="#">RV-8803-C7</a>	I <sup>2</sup> C	Highest Accuracy		±3.0	1.5 to 5.5	240	-40 to +105	✓			✓	1	
<a href="#">RV-3129-C3</a>	I <sup>2</sup> C	Highest Accuracy 8-bit T-Sensor		Opt. A: ±6	1.3 to 5.5	800	-40 to +125		✓	✓		8	2
				Opt. B: ±25									
<a href="#">RV-8063-C8</a>	SPI	Ultra-Small	±20		0.9 to 5.5	190	-40 to +85	✓				1	
<a href="#">RV-8063-C7</a>	SPI	Low Power	±20		0.9 to 5.5	190	-40 to +85	✓				1	
<a href="#">RV-2123-C2</a>	SPI	Low Power	±20		1.1 to 5.5	130	-40 to +85	✓					
<a href="#">RV-3149-C3</a>	SPI	Highest Accuracy 8-bit T-Sensor		Opt. A: ±6	1.3 to 5.5	800	-40 to +125		✓	✓		8	2
				Opt. B: ±25									

## Applications

System power consumption can be greatly reduced by using Micro Crystal's small, high-accuracy and low-power RTC Modules for:

- IoT
- Telemetry
- Smart Metering
- POS, SPS Control
- Energy Harvesting Solutions
- Battery Management Systems
- Automotive, GPS and Drive Recorders
- IP Cameras, Alarm and Building Control
- Door Lock and Access Control Systems
- Industrial, Computing, Embedded Systems
- Wearables, Activity Bands, Fitness Trackers
- Healthcare, Medical and Medical Implantable

## Ordering Information

<b>RV - 3129 - C3</b>	<b>Option A</b>	<b>TA</b>	<b>QC</b>
<b>RTC Module</b>			<b>Qualification</b>
<b>Product type</b>			<b>QC</b> = Commercial Grade (Standard)
<b>Package size</b>			<b>QA</b> = Automotive Grade AEC-Q200
<b>C2</b> = 5.0 x 3.2 x 1.2 mm			<b>QM</b> = Medical Grade (see page 6)
<b>C3</b> = 3.7 x 2.5 x 0.9 mm			<b>Temperature range</b>
<b>C7</b> = 3.2 x 1.5 x 0.8 mm			<b>TA</b> = -40 to +85°C (Standard)
<b>C8</b> = 2.0 x 1.2 x 0.7 mm			<b>TB</b> = -40 to +125°C
<b>Time accuracy</b>			
<b>Option A</b> = ±6 ppm @ -40°C to +85°C			
<b>Option B</b> = ±25 ppm @ -40°C to +85°C			

 **Linux Drivers available**

 **Demo Boards available**



Micro Crystal: RTC Modules










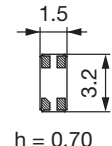
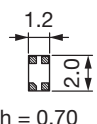
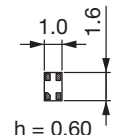
# Temperature Sensor Module in Ceramic Package

## 12-bit Temperature Sensor Module with RTC

Product Type	Dimensions (l x w x h) mm	Accuracy -40 to 85°C	Readable Resolution	Supply V <sub>DD</sub> V	Current I <sub>DD</sub> nA	T <sub>OPR</sub> °C	T-Threshold Alarms	Time Stamps	RTC Time -40 to 85°C	Interface
<b>TS-3032-C7</b> <sup>1)</sup>	3.2 x 1.5 x 0.80	±1°C	0.0625°C	1.3 to 5.5	160	-40 to +105	✓	✓	±2.5 ppm	I <sup>2</sup> C

1) For RTC functionality, see RV-3032-C7 on page 4.

## kHz Oscillators in Ceramic Packages

Product Type	OM-xxxx-C7	OM-xxxx-C8	OM-xxxx-C9
<b>Dimensions (l x w x h) mm</b>	3.2 x 1.5 x 0.70	2.0 x 1.2 x 0.70	1.6 x 1.0 x 0.60
			
 PCB Symbol, Footprint & 3D Model available on product pages on website			
<b>Lid Material</b>	Metal	Metal	Metal

### Standard kHz Oscillators

Product Type	Dimensions (l x w x h) mm	Frequency kHz	ΔF/F @ 25°C ppm	Supply V <sub>DD</sub> V	Current I <sub>DD</sub> nA	T <sub>OPR</sub> °C	Duty Cycle %	CLKOE Input	Δf/V ppm/V	Aging 1Y @ 25°C ppm
<b>OM-7604-C7</b>	3.2 x 1.5 x 0.70	32.768	±20 <sup>1)</sup>	1.2 to 5.5	300	-40 to +125	40 to 60	✓	±1.5	±3.0
<b>OM-7605-C8</b>	2.0 x 1.2 x 0.70	32.768	±20 <sup>1)</sup>	1.6 to 5.5	450	-40 to +125	40 to 60	✓	±3.0	±3.0
<b>OM-7605-C9</b>	1.6 x 1.0 x 0.60	32.768	±20 <sup>1)</sup>	1.6 to 5.5	450	-40 to +125	40 to 60	✓	±3.0	±3.0
<b>OM-0100-C7</b>	3.2 x 1.5 x 0.70	100.000	±20 <sup>1)</sup>	1.2 to 5.5	650	-40 to +85	40 to 60	✓	±1.5	±3.0
<b>OM-0100-C8</b>	2.0 x 1.2 x 0.70	100.000	±20 <sup>1)</sup>	1.6 to 5.5	550	-40 to +85	40 to 60	✓	±3.0	±3.0

1) Tighter and wider frequency tolerances on request.

## Applications

Lowest current, smallest package and high accuracy make Micro Crystal's oscillators ideal for:










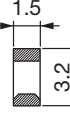
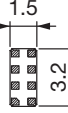
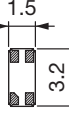
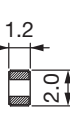
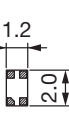
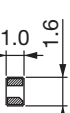
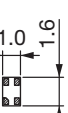
- IoT
- Smart Pens
- Industrial Computing
- Wearables and Activity Bands
- Automotive, Driver Assistance
- Driving Recorders, Camera Systems
- Navigation and Emergency Call Systems
- Bluetooth Low Energy (BLE) Applications
- Tire Pressure Monitoring Systems (TPMS)
- Healthcare, Medical and Medical Implantable

## Ordering Information

<b>O M - 7604 - C7 ±20 ppm TA QC</b>	
<b>Product</b> O = Oscillator	<b>Qualification</b> QC = Commercial Grade (Standard) QA = Automotive Grade AEC-Q200 QM = Medical Grade (see page 6)
<b>Package lid</b> M = Metal lid V = Ceramic lid (see page 6)	<b>Temperature range</b> TA = -40 to +85°C (Standard) TB = -40 to +125°C
<b>Frequency</b> 0100 = 100.000 kHz 7604 = 32.768 kHz 7605 = 32.768 kHz	<b>Frequency tolerance<sup>1)</sup></b>
<b>Package size</b> C7 = 3.2 x 1.5 mm C8 = 2.0 x 1.2 mm C9 = 1.6 x 1.0 mm	



# Medical Implantable Products

Product Type	CC7	RV-xxxx-C7	OV-xxxx-C7	CC8	OV-xxxx-C8	CC9	OV-xxxx-C9
Dimensions (l x w) mm	3.2 x 1.5			2.0 x 1.2		1.6 x 1.0	
							
<b>Full Ceramic Packages</b>  PCB Symbol, Footprint & 3D Model available on product pages on website							
	Crystal	RTC	Oscillator	Crystal	Oscillator	Crystal	Oscillator

## kHz Tuning Fork Crystals

Product Type	Height mm	Frequency kHz	Frequency Tol. @ 25°C
<b>CC7V-T1A Medical</b>	0.90	32 - 100	±20 ppm
<b>CC8V-T1A Medical</b>	0.67	32 - 102.4	±20 ppm
<b>CC8V-T1A Thin Medical</b>	0.48	32.768	±20 ppm
<b>CC9V-T1A Medical</b>	0.55	32.768	±20 ppm

## MHz AT-Cut Crystals

Product Type	Height mm	Frequency MHz	Frequency Tol. @ 25°C
<b>CC7A-T1A Medical</b>	0.75	14 - 50	±30 ppm
<b>CC8A-T1A Medical</b>	0.60	24 - 50	±30 ppm
<b>CC9A-T1A Medical</b> <sup>1)</sup>	0.50	32 - 50	±30 ppm

1) In qualification.

## Low Frequency Clock Oscillators

Product Type	Height mm	Frequency kHz	Supply V <sub>DD</sub> V	Current I <sub>DD</sub> nA
<b>OV-7604-C7 Medical</b>	1.0	32.768	1.2 to 5.5	300
<b>OV-7605-C8 Medical</b>	0.80	32.768	1.6 to 5.5	450
<b>OV-7605-C9 Medical</b>	0.65	32.768	1.6 to 5.5	450
<b>OV-0100-C8 Medical</b>	0.80	100.000	1.6 to 5.5	550

## Real-Time Clock Module

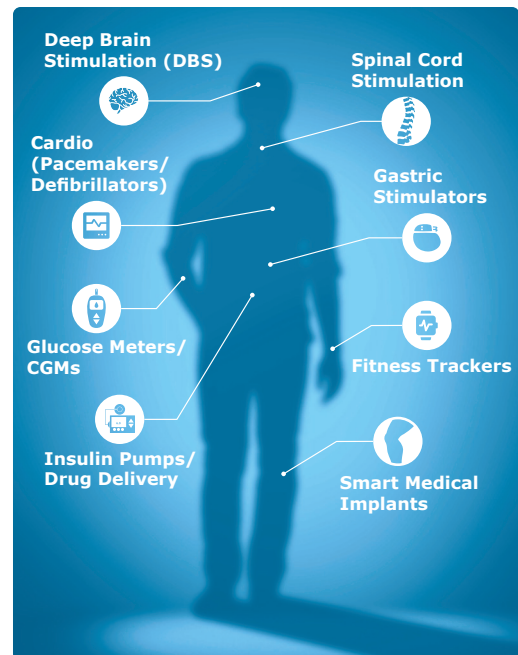
Product Type	Height mm	Time Acc. @ 25°C	Supply V <sub>DD</sub> V	Current I <sub>DD</sub> nA
<b>RV-5028-C7 Medical</b>	1.0	±1 ppm	1.1 to 5.5	45

## Key Features

- Hermetic full ceramic package
- Safe for Helium environment
- Proprietary manufacturing and testing processes
- Full traceability records retained

## Applications

- Pacemakers
- Defibrillators
- Infusion Pumps
- Neurostimulators
- Cochlear Implants
- Smart Orthopedic Implants
- Cardiac Monitoring Devices
- Implantable Drug Delivery Pumps



Micro Crystal: Medical Implantable



# Micro Crystal – The Art of Timing

## Company

Micro Crystal AG is a company of the Swatch Group Inc. Switzerland, the world's leading watchmaker. Micro Crystal applies high-tech Swiss MEMS technology for the manufacture of ultra-high precision Quartz Crystal Resonators, Oscillators and Real-Time Clock Modules. Focused on mass production of high-quality components, Micro Crystal supports not only large volume consumer applications, but also high-reliability automotive and medical implantable components. Using its manufacturing facilities in Switzerland and Thailand, the company produces the smallest available Quartz Crystal Resonators, Oscillators

and Real-Time Clock Modules. Micro Crystal timing devices, offering the world's lowest power consumption, are perfectly suited for today's IoT and wearables applications. Most of its products are AEC-Q200 qualified. Micro Crystal's production facilities are ISO 9001, ISO 14001 and IATF 16949 certified; and comply with all social and environmental regulations.

Micro Crystal, a leading player in this market, offers cost competitive products through its worldwide distribution and customer support networks.

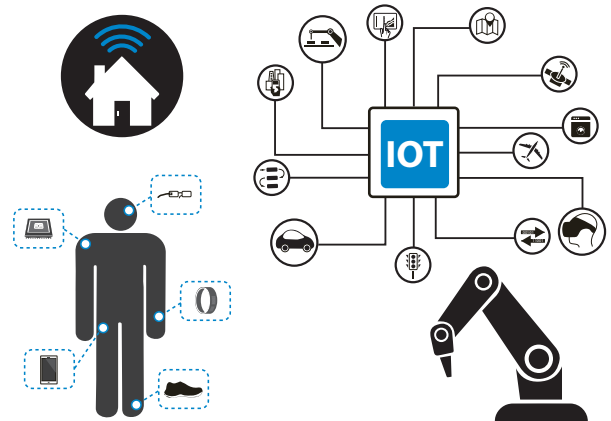


## Applications and Markets

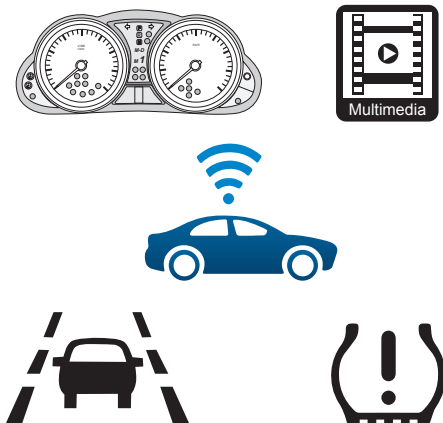
### Telecommunications and Industrial



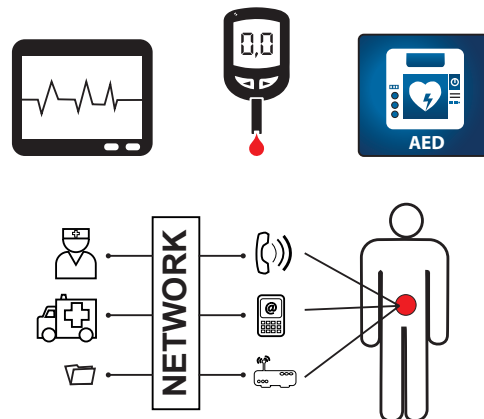
### Wearables and IoT



### Automotive



### Healthcare and Medical Implantable



[Micro Crystal: Company](#)



[Micro Crystal: Applications](#)

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