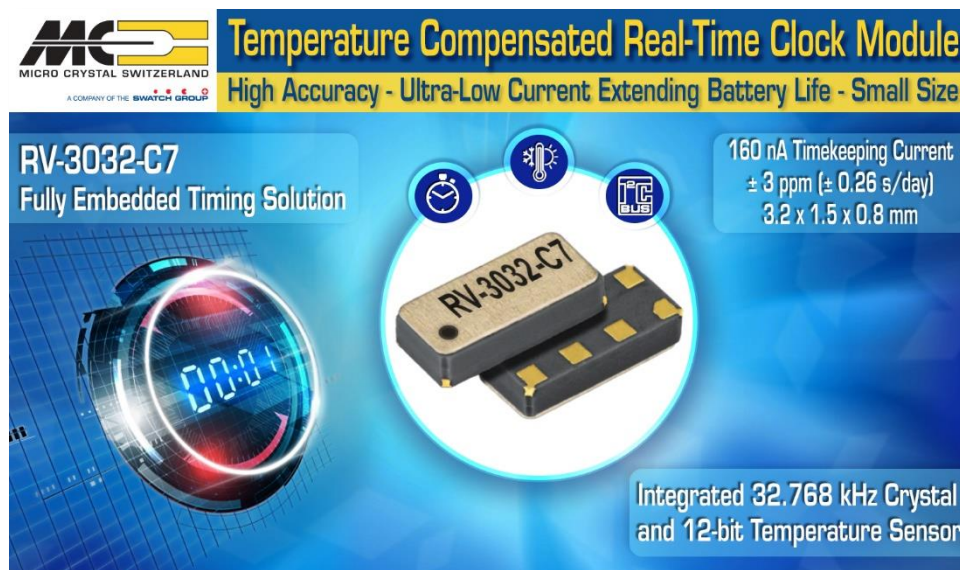# PRESS RELEASE

MICRO CRYSTAL's New RV-3032-C7 High Performance Temperature Compensated Real-Time Clock Module with I²C interface

Grenchen, Switzerland, October 20th, 2020 – Micro Crystal introduces the new RV-3032-C7 Real-Time Clock (RTC) Module, which offers the world's best time accuracy across industrial temperature range at ultra-low current consumption.

This high-performance ultra-compact RTC Module, featuring a custom IC and integrated quartz crystal resonator, sets new standards in **smallest size** (half of the footprint of a uSOP-8 package, no additional external components required), **best accuracy** (±0.26 s/day at -40° to 85°C operating temperature), **ultra-low current consumption** (160 nA timekeeping mode), and unique **power management capabilities**.

The RV-3032-C7 is ideal for applications requiring always-on timekeeping functions, with compliance to stringent clock accuracy over time, wide temperature range, and long battery life. It has been designed with smart metering and other similar industrial or consumer applications, such as wearables and IoT, in mind.

Thanks to its extremely low power consumption and power management features, including wide supply voltage range (1.2 to 5.5 V), automatic backup switch, versatile charge pump, and programmable trickle charger, this device can be coupled with a small sized, low capacity, rechargeable battery, or a low cost coin cell power unit. This reduces the overall dimensions and the manufacturing cost of the end product while optimizing the life of the battery.

"The new RV-3032-C7 Real-Time Clock Module, which includes our state of the art quartz-based DTCXO [1], is the most innovative, benchmark setting device amongst Micro Crystal's product line. The RV-3032-C7 sets new world standards

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in regard to accuracy across temperature, low power, and smallest sized package. The design team has applied their 40 years of frequency control expertise to develop an impressive component where customers' requirements have been identified, thoroughly analyzed and defined, in order to develop and produce this best in class device. Besides all standard RTC's features, it includes multiple extra functions, like data protection through password, and MHz output frequency, now available for the first time in the market in such a tiny device," said Hans-Rudolf Gottier, CEO of Micro Crystal AG.

"Offering solutions to critical design constraints linked to accuracy, power supply, size and battery life, the RV-3032-C7 RTC will definitely help engineers in developing next generations of smart products. The availability of a programmable high frequency clock output to drive the central MCU, and access to the high-resolution thermometer, used for accurate thermal compensation and allows setting temperature threshold alarms with interrupt function, will support numerous unique and new applications, said Roland Haeni, Head of Application Engineering at Micro Crystal AG.

The part is hermetically sealed in a compact reflow solderable DFN [2] ceramic package with the dimensions of 3.2 x 1.5 x 0.8 mm, RoHS/Lead-Free compliant and AEC-Q200 qualified, which facilitates new design-in.

Further information & availability

The RV-3032-C7 RTC Module is available for sampling now. High-volume production quantities will be available Q1 2021. Samples and demo boards can be ordered from the homepage.
Link to website: https://www.microcrystal.com/en/products/real-time-clock-rtc/rv-3032-c7/

Glossary

[1] DTCXO: Digitally Temperature Compensated Crystal Oscillator

[2] DFN: Dual Flat No Leads

About the Company

Micro Crystal AG, a company of the Swatch Group, Switzerland, is a leading manufacturer of 32.768 kHz based timing devices.
With headquarters located in Grenchen, Switzerland, Micro Crystal has more than 40 years of experience in design, manufacturing and sales of quartz crystal solutions.
Our portfolio encompasses crystals, oscillators, OCXOs, and real-time clock modules for the world's leading manufacturers of IoT, wearables, glucose meters, consumer products, GPS modules, automotive electronics, and healthcare products. Micro Crystal is also the leading supplier of timing devices for medical implantable applications, including pacemakers, defibrillators, and neuromodulators, as well as products for other high-reliability applications.
With manufacturing facilities in Switzerland and Thailand, and numerous sales and technical support offices in Europe, United States, and Asia, we stay in close cooperation with our customers worldwide from early design-in activities through mass production.
Micro Crystal stands for leading technology, reliability, and high quality, environmentally responsible production processes.
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Picture:
RTC-Module RV-3032-C7 for IoT and wearable applications

Photos: courtesy of Micro Crystal AG

FACT SHEET   RV-3032-C7   Real-Time Clock

Performances

- Factory Calibrated Temperature Compensation
    - -40° to +85°C
- High Time-Accuracy
    - ± 3.0 ppm (-40° to +85°C)
    - ±1.5 ppm (0° to +50°C)
- Ultra-Low Power Consumption
    - 160 nA @ 3 V & 25°C
- Wide Timekeeping Voltage Range
    - 1.2 V to 5.5 V

Power Management

- Automatic Backup Switchover with Interrupt Function
- Trickle Charger with versatile Charge Pump allowing:
    - VBACK ≥ VDD
    - Use of 1.75 V TDK CeraCharge™
- Supply Voltage Drop Detection (1.2 V) with Interrupt

Tamper Detection / Fraud Protection

- Timestamped External Event Input Detection with Interrupt
- Programmable Password Protection against Hacking
- Configuration EEPROM

Temperature Monitoring

- 12-bit Temperature Sensor:
    - Accuracy: ± 1°C typ.
    - Resolution: (0.0625°C/step)
- Timestamped & Programmable Temperature Window Detection with Interrupt

Standard Interrupt

- Internal Power-On Reset
- Periodic Countdown Timer
- Periodic Time Update (seconds, minutes)
- Alarm for date, hours and minutes

Time & Frequency Functions

- 100th seconds, seconds, minutes, hours, date, month, year and weekday
- Automatic leap year correction
- Programmable EEPROM Aging Compensation
- Programmable Clock Output for peripheral devices:
    - Crystal mode:
        32.768 kHz, 1024 Hz, 64 Hz, 1 Hz
    - High-Frequency Clock mode:
        8192 Hz → 52 MHz
        with 8192 Hz steps and guaranteed output signal integrity

Memory Size

- 16 Bytes of User RAM
- 32 Bytes of User EEPROM

Package

Ultra-Small Footprint and Compact C7 Package Size

- 3.2 x 1.5 x 0.8 mm
- 8 pins

Communication Interface

- I²C-bus Interface (up to 400 kHz)

Reliability/Certification

- AEC-Q200 Automotive Grade
- RoHS/Lead-Free Certified

KEY ADVANTAGES

- **Accurate Clock over Temperature Operating Range:**

  Factory calibrated temperature compensation of embedded crystal resonator provides exceptional ± 3.0 ppm accuracy from -40° to 85°C (±1.5 ppm 0° to 50°C; equivalent to ±0.13 sec/day).

- **Extended Battery Life:**

  In battery backup mode, timekeeping current as low as 160 nA at 3 V and 25°C allows a typical lithium coin-cell battery to cover its 10 years lifetime with a margin factor larger than 2.

- **Smart Power Management:**

  If main power is lost, automatic backup switchover circuit will automatically connect battery backup, and trickle charger with versatile charge pump gives multiple backup source options to designers.

- **Temperature Limits Detection:**

  Accurate high-resolution temperature sensor, combined with programmable temperature window detection interrupt, enables times stamp for temperature alarm event.

- **Tamper Detection and Fraud Protection:**

  External event detection interrupt with time stamp combined with programmable password, offers security solutions against fraud and hacking.

- **Ultra-Small Footprint and Compact Size:**

  3.2 x 1.5 x 0.8 mm ceramic package with reliable vacuum-sealed metal lid provides all advantages of SMT fully integrated and easily implementable device.