

Real-Time Clock/Calendar with Power Manager and Battery Charger

Features

- **Ultra-low power Real-Time Clock (RTC) with power-fail detect and battery management**
- Low power timer and power manager extend run time in battery-powered systems
- **Backup battery charger** controls 4.1V rechargeable micro-batteries and 3.2V rechargeable coin cells and supercaps; no off-chip components required for battery charger
- Buck charge pump supply extends run time on backup battery:
 - **20nA RTC using internal RC oscillator**
 - **50nA RTC using crystal oscillator**
- Counters for hundredths, seconds, minutes, hours, date, month, year, century, and weekdays based on a 32.768KHz crystal oscillator or internal RC oscillator
- **Integrated power switch** reduces system power consumption
- Automatic leap year calculation
- Alarm capability on all counters
- Configurable multi-use outputs for interrupts, output clock, and managing external devices
- 64 bytes of RAM
- Internal temperature measurement with 10-bit ADC enables oscillator temperature compensation
- Advanced crystal calibration to ± 1 ppm
- Ultra-low Iq VIN POR circuit (< 25 nA)
- Fixed indicators for PGOOD, charging current on, and charging disabled
- Temperature range -40°C to $+85^{\circ}\text{C}$
- Serial communication: I²C-bus and SPI options

General Description

The CBC921xx combines a real-time clock (RTC) with a backup battery charger and other power management features. In the event of an outage of the primary power source, automatic switchover to the backup battery enables extended timekeeping and optionally provides power to external devices to maintain their operation during the power outage. The circuit can be used in applications to provide an uninterrupted continuous time clock/calendar with time-based interrupts or alarms for wake-up from sleep to active mode operation with adjustable intervals to save power in the overall system.



3mm x 3mm x 0.55mm 16-pin MLPQ Package

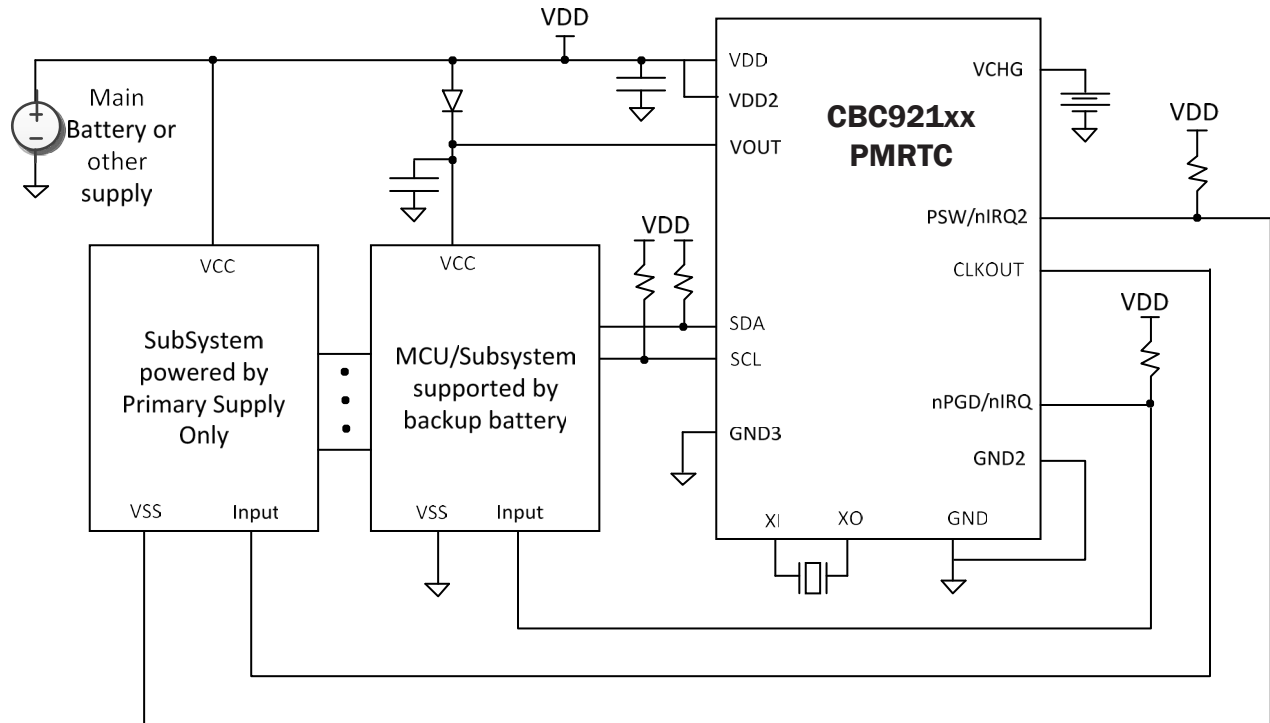
In normal operation the RTC function is supported by a primary power source, which can be a single battery cell, multiple alkaline cells, or a regulated power supply ranging from 2.85V to 5.5V. A backup battery that might be used is charged with a temperature-compensated voltage derived from the primary voltage source. Backup battery charging is done on a configurable schedule and temperature-dependent duty cycle, both of which are designed to increase service life of the backup battery while minimizing power consumption from the main power source.

The power management has a low quiescent current and high efficiency for backup battery charging. The RTC circuit has very low quiescent current and accuracy to ± 1 ppm. An open drain internal power switch is controlled by interrupts and a sleep manager to facilitate power saving by disconnecting main power from external devices according to user-defined schedules. Additional features include an on-chip temperature sensor with 10-bit ADC and VOUT pin to power external devices while in backup mode.

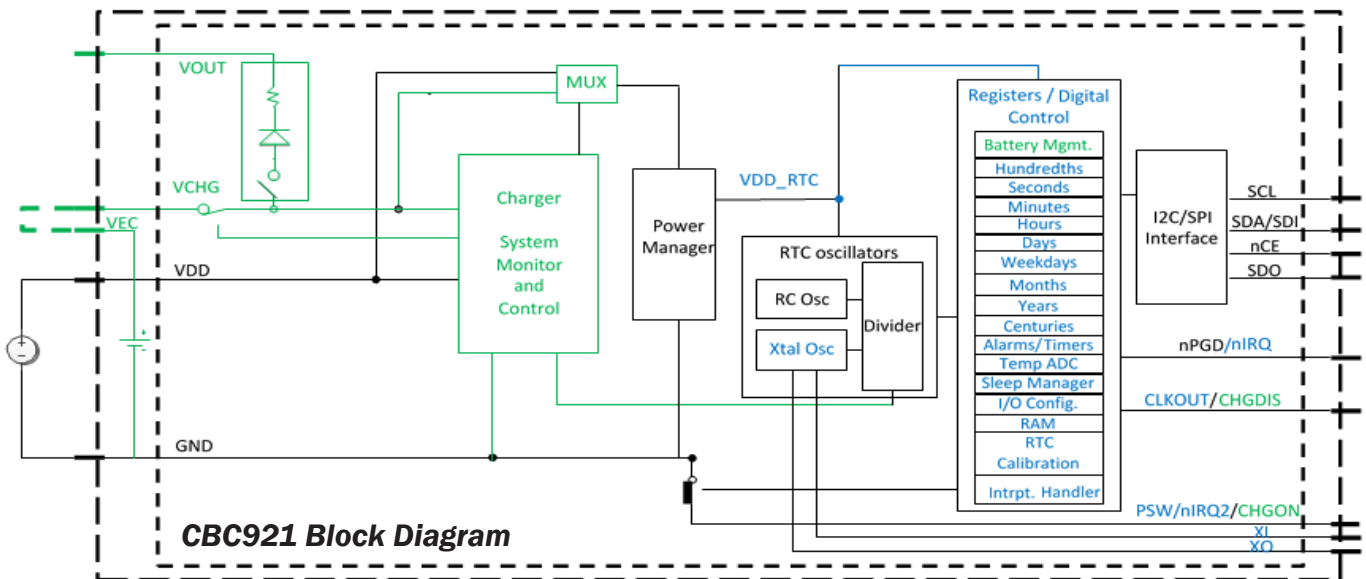
Applications

- **Power bridging** to provide uninterruptible RTC function during exchange of main batteries
- **Consumer appliances** that have real-time clocks; provides switchover power from main supply to backup battery
- **Ultra-Low Power Timer** using only 20nA
- **Wireless sensors and RFID tags** and other powered, low duty cycle applications
- **Business and industrial systems** such as: network routers, point-of-sale terminals, single-board computers, test equipment, multi-function printers, industrial controllers, and utility meters
 - Reliable system timekeeping
 - Battery-powered devices
 - Internet of Things, portable devices
 - Daily alarms

CBC921 PMRTC Typical Application Schematic, Features, and Block Diagram



- **Ultra-low power Real-Time Clock**
 - 50nA with crystal oscillator
 - 20nA with RC oscillator
- **Integrated low-side (VSS) power switch**
- **On-chip temperature sensor with 10-bit ADC**
- **I²C- and SPI-bus options**
- **Battery charger and cutoff circuit**
 - 4.1V option for EnerChips and Li-ion
 - 3.2V option for coin cells and supercaps
- **Programmable charger with auto shut-off minimizes power consumption**
- **Full clock/calendar, alarm, and interrupt functions**

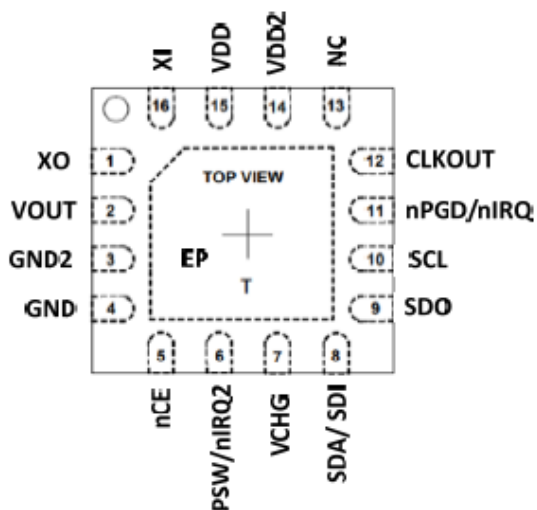




Ordering Information

Part Number	RTC	Power Management	I/F	Charge Voltage
CBC92100C	Y		I ² C	
CBC92100P	Y		SPI	
CBC92032C		Y	I ² C	3.2V
CBC92041C		Y	I ² C	4.1V
CBC92032P		Y	SPI	3.2V
CBC92041P		Y	SPI	4.1V
CBC92132C	Y	Y	I ² C	3.2V
CBC92141C	Y	Y	I ² C	4.1V
CBC92132P	Y	Y	SPI	3.2V
CBC92141P	Y	Y	SPI	4.1V

CBC92XYZ Part Numbering	
X	1=RTC included, 0=no RTC
YY	Maximum battery charging voltage (x10) 00=no battery management included
Z	C=I ² C, P=SPI



Availability and Support

- The CBC921 PMRTC will begin sampling in Q4 2018, beginning with the I²C-bus version and both 4.1V and 3.2V backup battery charge voltage options
- Designer application development will be supported by an evaluation kit, the EVAL-14, which will also be available in Q4 2018
- Contact [Cymbet support](#) for more information and to request samples