Serial Real-Time Clock/Calendar

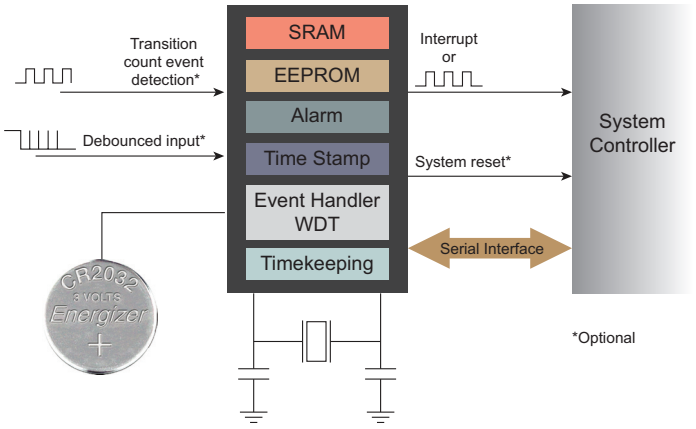
Low-Cost Timekeeping Solution

Summary

Microchip's portfolio of Real-Time Clock/Calendars (RTCCs) offer low-cost system timekeeping solution. Real-Time Clock/Calendars track time with resolutions as small as 1/100th of a second and issue alarms on a wide variety of time conditions.

The RTCC maintains accurate time through system shutdowns by automatically switching over to an external battery back-up source. RTCC's are designed to operate using a 32.768 kHz quartz crystal and can digitally compensate for frequency variance caused by crystal tolerance and temperature. Microchip RTCC's have a I²C™ or SPI interface for configuration, reading and writing the time. Additionally, alarm interrupt requests, square wave output and system reset control signals are available on dedicated pins.

Microchip's RTCCs are available with a range of internal memories including battery-backed SRAM, non-volatile EEPROM and an additional area of protected EEPROM. The protected EEPROM area is only writable after the RTCC receives an unlock sequence and is available pre-programmed with unique EUI-48™ or EUI-64™ MAC address. Custom programming is also available.



Available Reference Materials

- Hardware design guidance
- Circuit schematics and gerber files
- Characterized crystal recommendations
- Code examples
- Migration guides
- Configuration directions
- Debugging guides
- User support forum

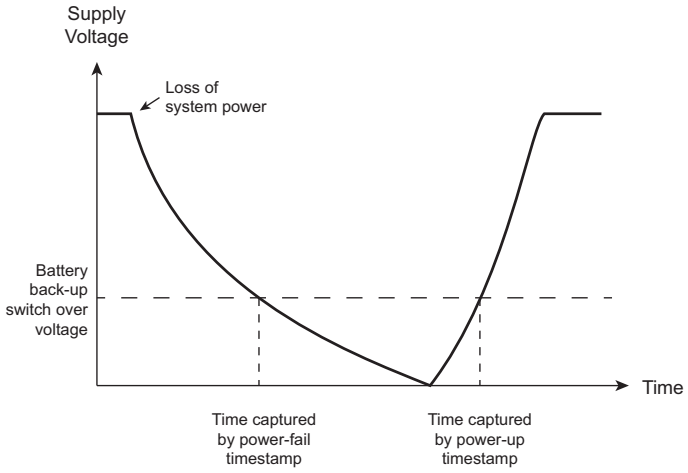
Key Features and Benefits

Features	Benefits
Automated timekeeping	Offload timekeeping tasks, including leap year management to the RTCC
Dual alarms	System controller can attend to other tasks and have the RTCC indicate a specific time has been reached
Battery back-up	Maintain time through system powerdowns and preserve SRAM contents
Time stamp	Capture the time when system power was lost and restored
Versatile clock-out/alarm/output pin	The RTCC can produce a squarewave for the system, or wake a processor from a low-power state on a time match to indicate an alarm has occurred
64-bytes battery backed SRAM	Unlimited endurance non-volatile data storage for data that needs to be maintained through a shutdown
Digital oscillator trimming/calibration	Adjust for crystal frequency tolerance and drift to maintain accurate time
Up to 128-bit protected EEPROM area	Robust non-volatile storage. Only writable after an unlock sequence
Pre-programmed EUI MAC ID	Unique identifier in every device which can be used as a serial number or as a network MAC ID. Using a pre-programmed MAC ID avoids the expense of purchasing an ID block and serialized programming
Up to 2 Kb general purpose EEPROM	Long-term storage of parameters, system modes, calibration information and data through shutdowns
Watch-dog timer	Guards against the controller software getting trapped in a loop or awaiting an event
Debounced input event detect	Places the system controller in a low-power state and has the RTCC detect a true event from a noisy sensor
Transition count event detect	The RTCC can alert the system once it records a specific number of logic-level transitions on a signal, allowing monitoring to be delegated to the RTCC

Low-Cost Real-Time Clock Calendar Portfolio

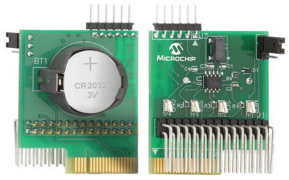
Product	Pins	Interface	Battery Back-up	Protected EEPROM Area (bits)	Protected EEPROM Contents	General Purpose EEPROM (Kbits)	Watchdog Timer and Event Detects
MCP7940M	8	I²C™	–	–	N/A	–	–
MCP7940N	8	I²C	✓	–	N/A	–	–
MCP79400	8	I²C	✓	64	–	–	–
MCP79401	8	I²C	✓	64	EUI-48	–	–
MCP79402	8	I²C	✓	64	EUI-64	–	–
MCP79410	8	I²C	✓	64	–	1	–
MCP79411	8	I²C	✓	64	EUI-48	1	–
MCP79412	8	I²C	✓	64	EUI-64	1	–
MCP79510	10	SPI	✓	128	–	1	–
MCP79511	10	SPI	✓	128	EUI-48	1	–
MCP79512	10	SPI	✓	128	EUI-64	1	–
MCP79520	10	SPI	✓	128	–	2	–
MCP79521	10	SPI	✓	128	EUI-48	2	–
MCP79522	10	SPI	✓	128	EUI-64	2	–
MCP795W10	14	SPI	✓	128	–	1	✓
MCP795W11	14	SPI	✓	128	EUI-48	1	✓
MCP795W12	14	SPI	✓	128	EUI-64	1	✓
MCP795W20	14	SPI	✓	128	–	2	✓
MCP795W21	14	SPI	✓	128	EUI-48	2	✓
MCP795W22	14	SPI	✓	128	EUI-64	2	✓

Power-Fail Time-Stamp



Development Tools from Microchip

To support our Real-Time Clock/Calendar products, we offer two PICtail™ daughter boards, each with a characterized crystal oscillator circuit and an on-board coin cell battery for use as a back-up supply. Compatible code development platforms include the PICDEM™ PIC18 Explorer Board (DM183032) and the Explorer 16 Development Board (DM240001).



MCP79410 RTCC PICtail Plus Daughter Board (AC164140)

MCP795XX RTCC PICtail Daughter Board (AC164147)

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www.microchip.com/clock

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Microchip Technology Inc. · 2355 W. Chandler Blvd. · Chandler, AZ 85224-6199

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