Analog Devices DS3231 :: Real-Time Clock & Calendar

The Analog Devices DS3231 is a low-cost, highly accurate I2C real-time clock (RTC) with an integrated temperature-compensated crystal oscillator (TCXO) and crystal. The device has a battery input and ensures accurate time measurement even when the device's main power supply is interrupted. The integration of the quartz resonator improves the long-term accuracy of the device and reduces the number of components in the production line.

The RTC stores information on seconds, minutes, hours, day, date, month, and year. The date at the end of the month is automatically adjusted for months with fewer than 31 days, including corrections for leap years. The clock operates in either 24-hour or 12-hour format with an AM/PM display. Two programmable alarms and one programmable square wave output are available. Address and data are transmitted serially via a bidirectional I2C bus.

The software is architected with long-term maintainability, portability across MCU platforms, and adherence to high software quality standards as core design principles.

✅ Layered architecture with clear HAL abstraction
✅ Conforms to ISO C99 standard
✅ Portable across multiple MCU platforms
✅ Supports both RTOS and bare-metal environments
✅ CMake build system for scalable integration
✅ Seamless integration with GCC toolchain
✅ Statically analyzed for MISRA, CERT, and CWE compliance

Initialization Interface

```
ds3231_result_t ds3231_init( ds3231_handle_t*, ds3231_attr_t )
```

Configuration Interface

```
ds3231_result_t ds3231_set_alarm( ds3231_handle_t*, ... )
ds3231_result_t ds3231_unset_alarm( ds3231_handle_t*, ... )
```

Data Retrieval Interface

```
ds3231_result_t ds3231_get_datetime( ds3231_handle_t*, ... )
```

Operation Interface

```
ds3231_result_t ds3231_process_alarm( ds3231_handle_t* )
```

☆ DRV_AD_DS3231 PUBLIC   ✔ Passed

Last analysis: 20 seconds ago • 653 Lines of Code • C

| A 0 | A 0 | A 4 | A — | ◯ 84.7% | • 0.0% |
| Security | Reliability | Maintainability | Hotspots Reviewed | Coverage | Duplications |

Communication Interface:
I²C