MAX31343 Shield
Software User Guide

Rev 0; 8/20

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General Description

This document provides the necessary information to program and evaluate the MAX31343 real-time clock (RTC) on the MAX31343 shield board using the provided graphical user interface (GUI) software.

The MAX31343 shield is a fully assembled and tested PCB to evaluate the MAX31343, a low-cost, extremely accurate, real-time clock with an I^{2}C interface. The shield operates from a single supply, either from USB or external power supply, and the integrated micro-electromechanical systems (MEMS) resonator enhances long-term accuracy and eliminates the external crystal requirement in the system. This device is accessed through an I^{2}C serial interface provided by the MAX32625PICO board.

Requirements

- MAX31343 Shield
- PC with Windows® 7 or later
- USB Cable
- MAX32625PICO board

MAX31343 Shield

The MAX31343 shield is shown in **Figure 1**. It contains the MAX31343 IC soldered onto the board with test points for V_{CC}, VBAT, GND, INT, SQW, CLKO, SDA, and SCL. A programmed MAX32625PICO board should be connected as shown in **Figure 1**.
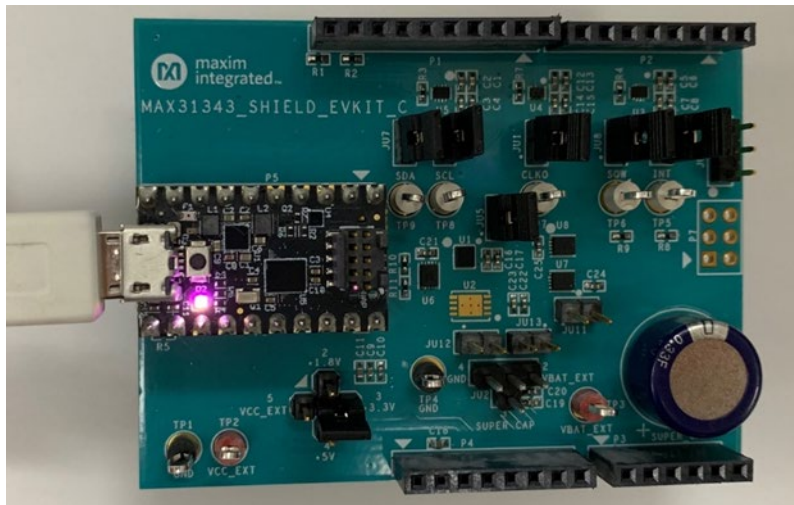

Figure 1. MAX31343 Shield with MAX32625PICO

Windows is a registered trademark and registered service mark of Microsoft Corporation.

MAX31343 RTC Shield Software—Standalone GUI Application

Maxim provides a standalone application to communicate with and program the device registers.

The application runs on Windows 7 or later and provides a user-friendly approach to understand, program, and test the various functions of the device. The following sections explain this in detail.

Functional Description and Programming

Menu Status and Information

The application offers File, Device, and Help menus in the menu bar at the top of the window as shown in **Figure 2**.

The File menu has options to Save Configuration and Load Configuration information. This stores all the device register values to an .ini file that can be loaded later to restore the device state. The Device menu allows the user to reconnect to the shield.

The Status bar at the bottom of the window shows information about the software's current mode of operation and the current shield board connection status. The Status Log keeps track of all actions performed by the user and the outcome of these actions such as success or failure. These messages can also be logged to an external file by selecting the Log to File checkbox.

Configuration & Time Tab

The window has four tabs in total, with two more static group boxes to the right of the tabs. The Configuration & Time tab has options to configure the device and clocks, program the date and time, set the power management mode, and configure temperature measurement settings as shown in **Figure 2**. This is the default tab that shows when the software is launched. If the device is connected to the PC at the time of software launch, all fields are populated with the current values read from the device.
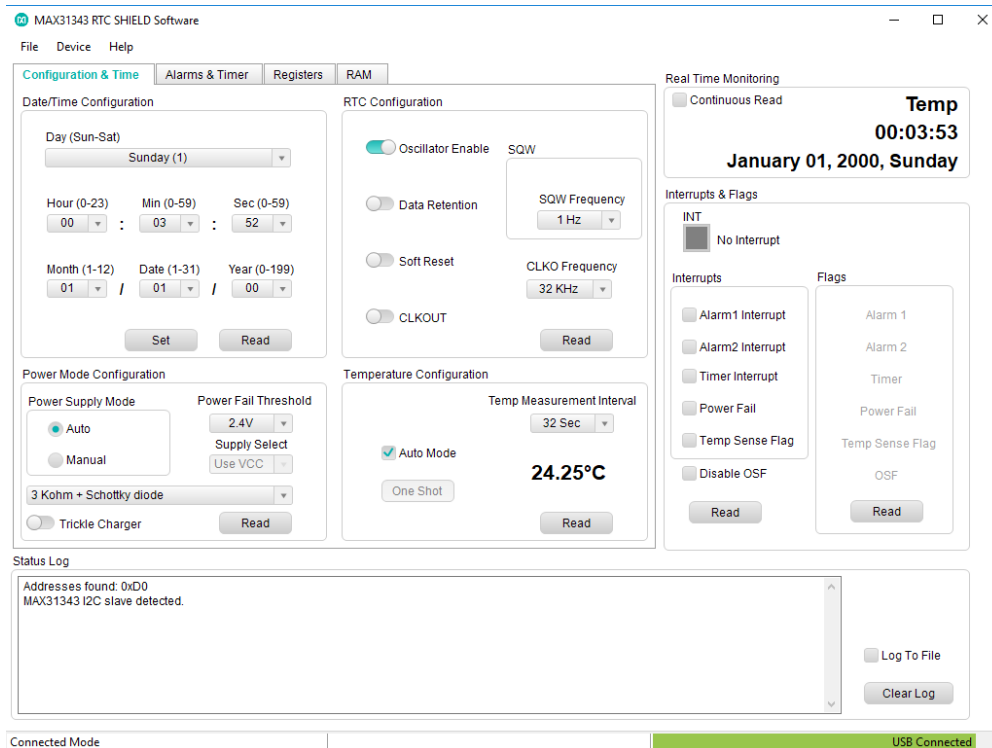

Figure 2. Configuration & Time Tab

Date/Time Configuration

This group box provides the drop-down lists for Hour, Min, Sec, Month, Date, Year, and Day selections.

Set: The user needs to enter the desired date and time values by selecting valid values in all drop-down lists in this group box and click on the Set button to program these values to the device. The Status Log indicates when the write operation is completed. This action starts the device's internal oscillator if it was not already running.

Read: The current date and time values can be read from the device using the Read button in this group box. The Status Log indicates when the read operation is completed and all elements are updated.

RTC Configuration

Oscillator Enable: This toggle switch can be used to enable or disable the internal oscillator.

Data Retention: This toggle switch can be used to enter or exit data retention mode. After exiting data retention mode, oscillator enable is automatically toggled for the date/time to resume ticking.

Soft Reset: This toggle switch can be used to toggle the device between reset and normal modes. When enabled, the device goes through a digital reset. To perform any other task, disable this setting to bring the device back to normal mode.

CLKOUT: This toggle switch can be used to enable or disable the CLKOUT pin. The CLKOUT Frequency drop-down list can be used to select the desired CLKOUT frequency.

SQW: The SQW Frequency drop-down list can be used to select the desired square wave frequency.

Read: The current configuration and settings can be read from the device using the Read button in this group box. The Status Log indicates when the read operation is completed.

Power Mode Configuration

Power Supply Mode: This radio button can be used to select either Auto or Manual power management mode.

Power fail threshold: This drop-down list can be used to select the desired switchover supply voltage level. It is only available when the Auto power supply mode is selected. Otherwise, if Manual power management mode is selected, this drop-down list is disabled.

Supply select: This drop-down list can be used to select the desired supply between Use VCC and Use VBAT. It is available only when the Manual power supply mode is selected. Otherwise, if the Auto power management mode is selected, this drop-down list is disabled.

Trickle Charger: This toggle switch can be used to enable or disable the trickle charge circuit. The drop-down list above this switch can be used to select the components in the trickle charging path.

Read: The current configuration and settings can be read from the device using the Read button in this group box. The Status Log indicates when the read operation is completed.

Temperature Configuration

Auto Mode: This checkbox can be selected to enable automatic temperature measurement at a fixed interval.

Temp measurement interval: This drop-down list can be used to select the desired temperature measurement interval. This feature is only available if Auto Mode is selected.

One Shot: This button can be used to take one temperature measurement at the moment the One Shot button is clicked. It is available only when the Auto Mode box is not selected. Otherwise, if Auto Mode is selected, this button is disabled.

Read: The current configuration and settings can be read from the device using the Read button in this group box. The Status Log indicates when the read operation is completed.

Real-Time Monitoring

Continuous Read: When this checkbox is selected, the software reads the date, time, and temperature from the device at one second intervals and updates the date/time/temperature labels in this group box. When not selected, no further reads happen and the date/time/temperature labels remain static.

Interrupts & Flags

INT: The label and color of the interrupt indicator indicate the current state of the INT pin of the RTC. By default, this is grey and reads "Disabled". When any of the interrupts are enabled and the INT pin is not asserted, the label reads "No Interrupt". When an interrupt happens and the pin is asserted, the label reads "Interrupt Available" and turns green. The user can use this as an indicator to read the flags.

The jumper setting should be made on the shield for this feature to work correctly: JU3:1-2.

Interrupt Checkboxes: The Alarm1 Interrupt, Alarm2 Interrupt, Timer Interrupt, Power Fail, and Temp sense flag checkboxes can be used to enable or disable the corresponding interrupts. The Disable OSF checkbox can be used to enable or disable the OSF (oscillator stop flag) functionality.

Read: The Read button in the Flags group box can be used to read the flag's register and display the current status of all flags. Any flag that is asserted is displayed with a green highlight. Unasserted flags are greyed out.

The Read button outside the Flags group box can be used to read the current status of the interrupt enable bits and the DOSF bit.

Alarms & Timer Tab

The Alarms & Timer tab covers the remaining device functions Alarm1 configuration, Alarm2 configuration, and Timer configuration as shown in Figure 3.
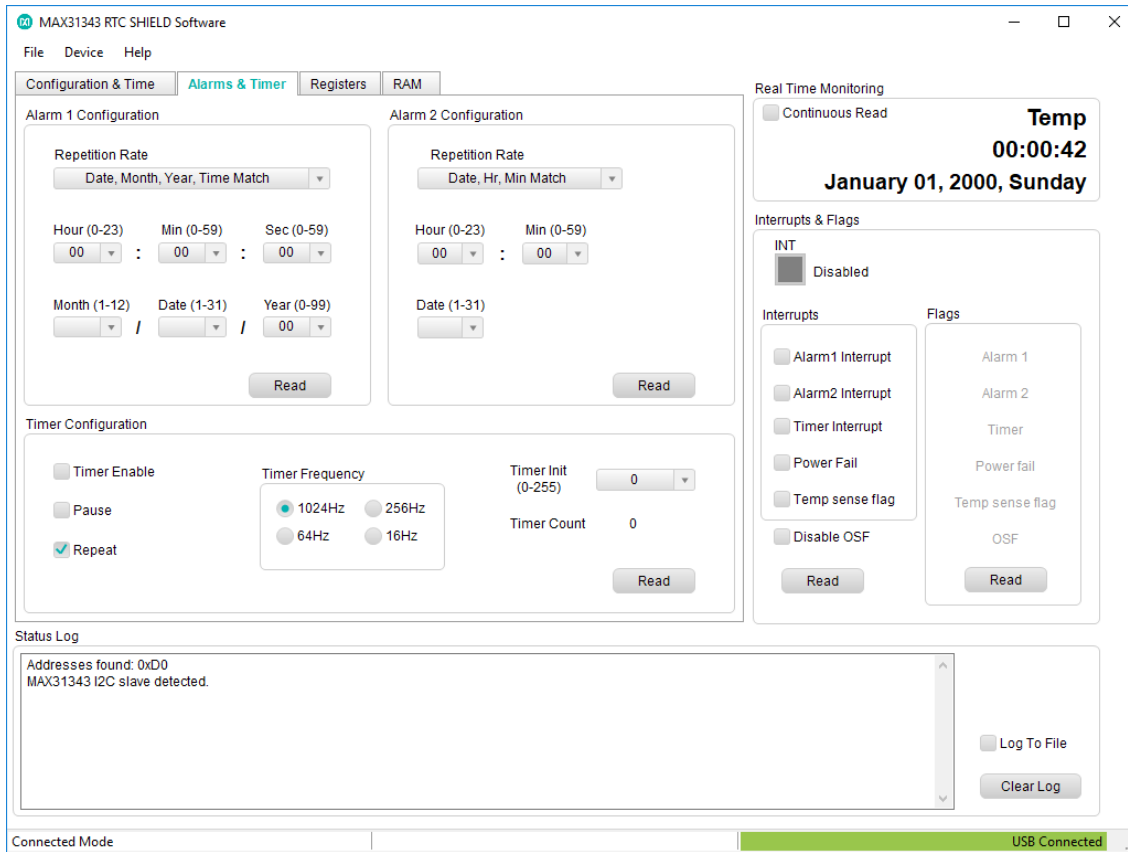

Figure 3. Alarms & Timer Tab

Alarm1 Configuration

Repetition Rate: This drop-down list can be used to select the alarm repetition rate. Perform this step first when configuring the alarm.

Date and Time Selections: Based on the repetition mode selected, some or all remaining options in the drop-down lists in this group box are enabled. The exact alarm match condition can be selected using these drop-down lists.

Read: The Read button can be used to read the current Alarm1 values from the device.

Alarm2 Configuration

Repetition Rate: This combo box can be used to select the alarm repetition rate. Perform this step first when configuring the alarm. Alarm2 offers fewer repetition rates than Alarm1.

Date and Time Selections: Based on the repetition mode selected, some or all remaining options in the drop-down lists in this group box are enabled. The exact alarm match condition can be selected using these drop-down lists.

Read: The Read button can be used to read the current Alarm2 values from the device.

Timer Configuration

Timer Enable: This checkbox can be used to start and stop the timer. When selected, the timer starts counting down. When not selected, the timer is reset.

Pause: When selected, the timer pauses at its current count. When not selected, the timer resumes counting. This can only be used when Timer Enable is selected.

Repeat: When selected, the timer reloads its last initial value and restarts counting when it reaches zero. When not selected, the timer stops after counting down to zero.

Timer Frequency: Select the frequency of the timer clock with the available radio buttons.

Timer Init: This combo box can be used to select the timer initial value. This is an 8-bit field (0-255) and the timer starts counting down from this value when enabled.

Timer Count: This read-only field displays the current timer count and is updated only when the Read button is clicked.

Read: This button can be used to read the current values of all timer fields from the device and display them in this group box.

Registers Tab

Figure 4. Registers Tab

The Registers tab provides access to all device registers.

To read registers, select the corresponding checkboxes and click Read.

To write to registers, enter the desired 8-bit value in hex format (e.g., 0xAB), select the corresponding checkboxes, and click Write.

The Status Log indicates the success or failure of the register read or write action.
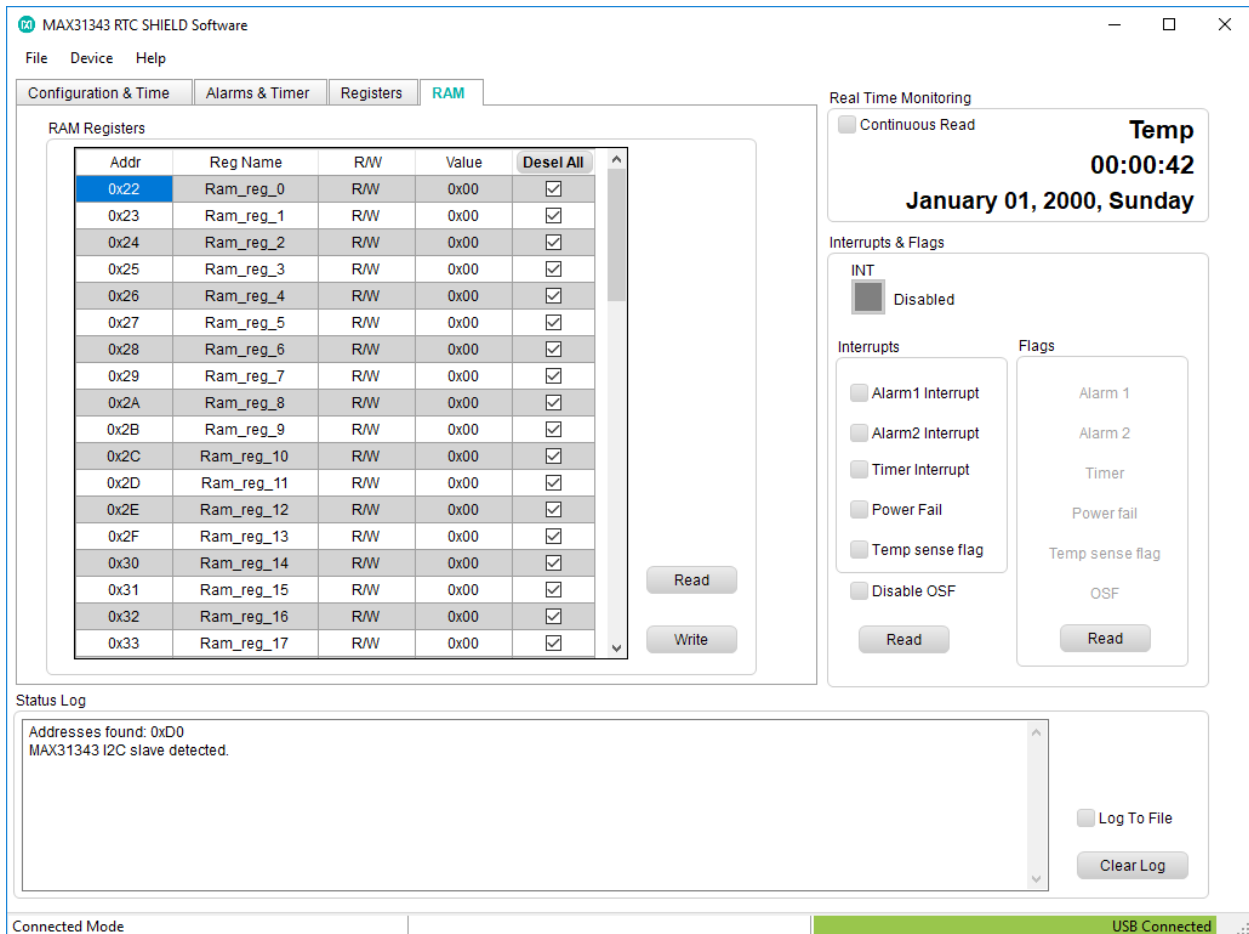
RAM Tab

Figure 5. RAM Tab

The RAM tab provides access to all device RAM registers.

To read registers, select the corresponding checkboxes and click Read.

To write to registers, enter the desired 8-bit value in hex format (e.g., 0xAB), select the corresponding checkboxes, and click Write.

The Status Log indicates the success or failure of the register read or write action.

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	8/20	Initial release	—