MAX17044K-Custom

Low-Cost 2S Host-Side Fuel Gauge with Low Battery Alert Evaluation Kit

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FEATURES

- Demonstrates the capabilities of the MAX17044 Low-Cost 2S Host-Side Fuel Gauge with Low Battery Alert, including:
  - Estimation of available capacity for Li+ cells
  - 2-Cell Voltage measurement
  - Low Battery Alert
- Interfaces to the USB Port of a PC running Windows OS that supports USB operation

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EVALUATION KIT CONTENTS

1 pc. Evaluation Board
1 pc. DS9123O USB Adapter
1 pc. RJ-11 Cable

EQUIPMENT NEEDED

1. A PC running Windows OS with a CD ROM drive and an available USB port.
2. Cables with mini-grabber style clips or the ability to solder directly to connection pads.
3. A Lithium-Ion battery and a power supply and/or load circuit.

INTRODUCTION

The MAX17044K Evaluation Kit makes performance evaluation, software development, and prototyping with the MAX17044 Low-Cost 2S Host-Side Fuel Gauge with Low Battery Alert easy. The evaluation board interfaces to a PC through a DS9123O USB Adapter and RJ-11 cable connection.

The MAX17044K evaluation software gives the user complete control of all functions of the MAX17044 as well as the ability to load a custom model into the Model Gauge. Separate control tabs allow the user access to view real-time updates of all monitored parameters. The software also incorporates a data-logging feature to monitor a cell over time.

The evaluation board circuit is designed to provide the MAX17044 with accurate parameter measurements. Kit demonstration boards will vary as they are improved upon over time.

NOTE: For best results, please contact Maxim to optimize the settings of the MAX17044 for the specific cell being used.

SETUP AND INSTALLATION

BOARD CONNECTIONS

Connections to the TDFN demonstration board are best made either by soldering directly to the pads or by using cables with mini-grabber clips. Communication to the TDFN board can be accomplished either through the RJ-11 jack by connecting the provided standard six conductor RJ-11 cord or by wiring directly to the SDA, SCL and BAT- pads. To utilize the demonstration software, the required communication lines must be connected to the DS9123O communication brick using either of the two methods described.

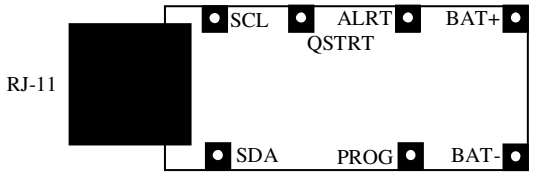


Figure 1: Communication Connections

Figures 2a and 2b show the recommended circuits to simulate charging and discharging. The Lithium-Ion cell is connected between the BAT+ and BAT- pads. The battery charger/power supply or circuit load is also connected between the BAT+ and BAT- pads. The evaluation software can be run in either configuration as long as 1 cell is connected between the BAT+/- terminals providing a minimum of 2.5 volts to power the MAX17044.

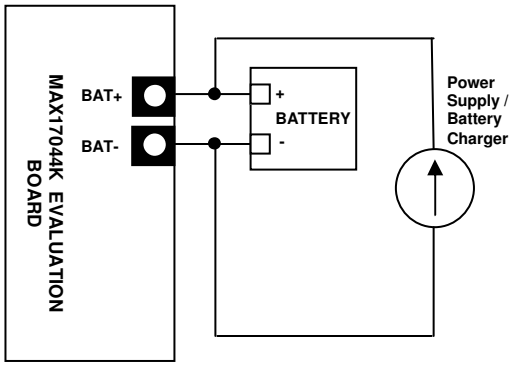


Figure 2a: Charging Circuit

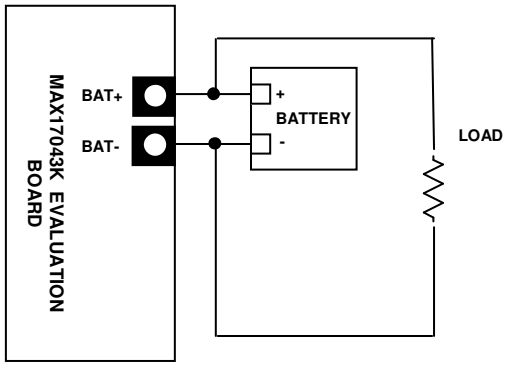


Fig 2b: Discharging Circuit

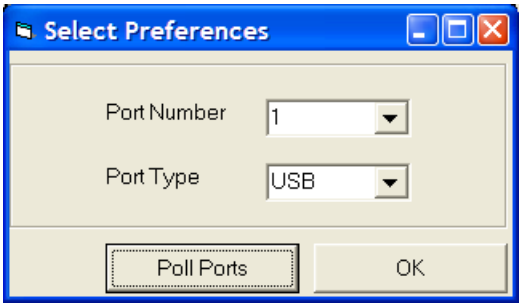
SOFTWARE INSTALLATION

To install the MAX17044K Custom software, exit all programs currently running and insert the MAX17044K software CD into your computer's CD ROM drive. Double click the SETUP.EXE icon and the installation process begins. Follow the prompts to complete the installation. The MAX17044K Custom software can be uninstalled in the Add/Remove Programs tool in the Control Panel. After the installation is complete, open the MAX17044K Custom folder and run MAX17044K CUSTOM.EXE or select MAX17044K CUSTOM from the program menu. A splash screen containing information about the evaluation kit appears as the program is being loaded.

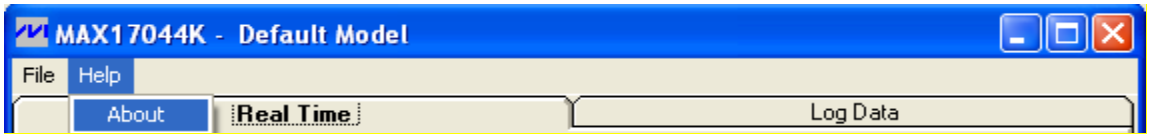
SELECTING THE COMMUNICATION PORT

If the DS9123O is connected when the MAX17044K is started, the software will start up automatically. If it is not connected, the Select Preferences window will open.

In this window, select either serial port or USB communication and the port number; then hit OK. The MAX17044K software saves this port selection and automatically uses the selection each time the program starts. To attempt to automatically locate the DS9123O or DS9123, click the Poll Ports button. Warning - automatically polling for the DS9123 can disrupt other devices connected to your computer's COM ports.



HELP MENU

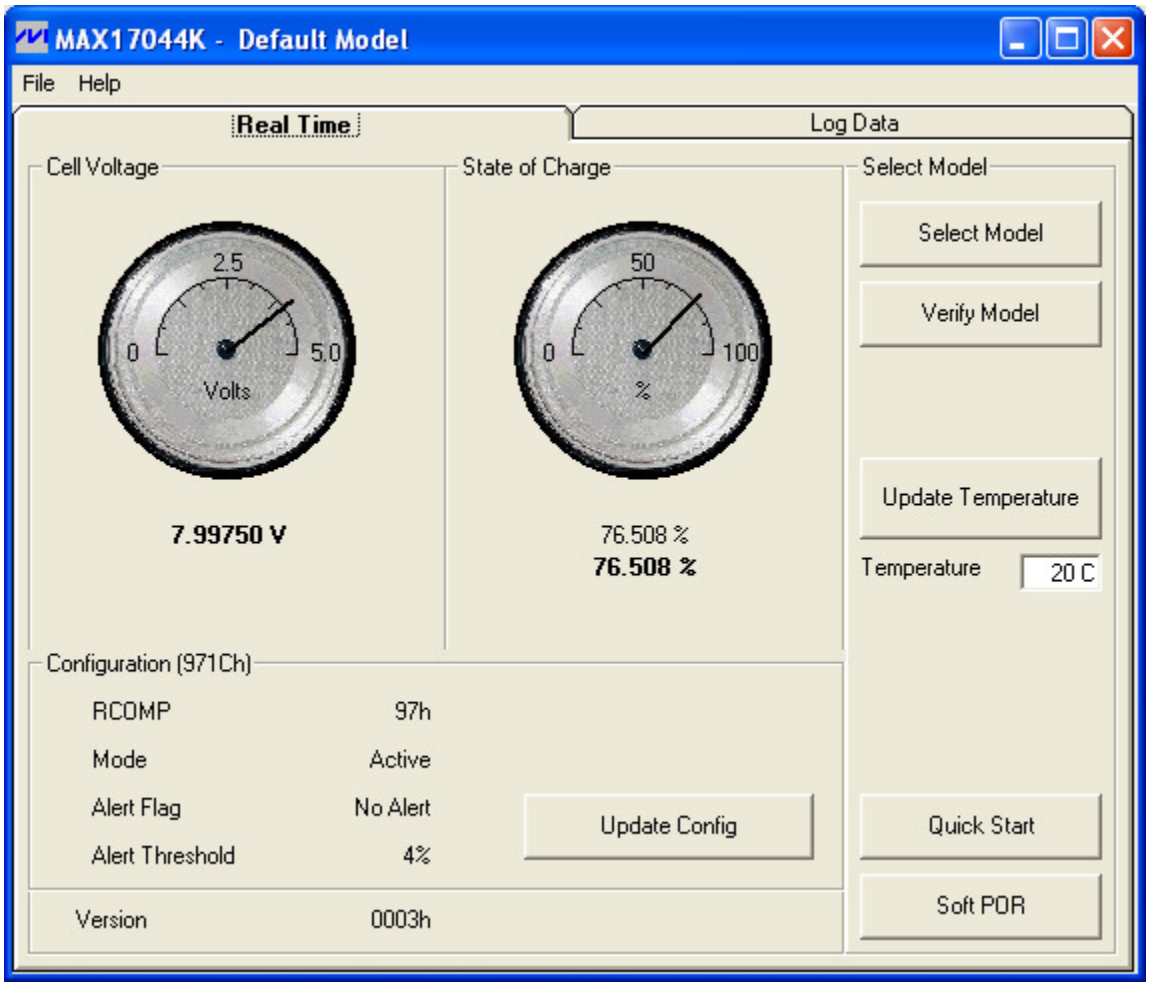


Selecting the About topic from the Help Menu will open a window containing information about the current revision of this program and Maxim Integrated Products.

PROGRAM TABS

All functions of the program are divided under two tabs in the main program window. Left click on the appropriate tab to move to the desired function page. Located on the Real Time tab is all of the information measured and calculated by the MAX17044. The Data Log tab allows the user to store all real time information to a file and view the data in a graphical form.

REAL TIME TAB



When the MAX17044K starts, the user is prompted to load the correct custom model for the cell being evaluated into the device. Simply then navigating to the Custom Model INI file that was provided by Maxim. The Custom Model INI file contains information used by the evaluation kit software to load the model to the device and set the RCOMP value appropriately for optimized performance. If the model is properly loaded and verified, the customer's name will appear in the Title bar. If there is an error loading the model, the user will be prompted to reload the model. The software will not read the device until a custom model has been loaded.

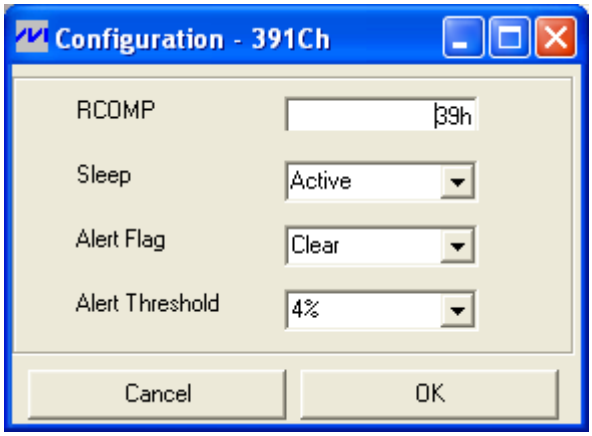
A different custom model can be at a later time by clicking on the Select Model button and navigating to the desired Custom Model INI file.

Once the model is loaded into the device, it cannot be read back. The MAX17044K software provides a method to verify if a model is loaded into the device. Simply click the Verify Model and navigate to the Custom Model INI file and the software will display if the model was verified or not.

Additionally, Maxim may provide a Default Model INI file that will allow the software to load the default model into the device with the optimized RCOMP values for use with the default model. This is provided so that the customer can view the improved performance of the custom model over the default model. In most cases, if Maxim has recommended a custom model, it is recommended that the customer NOT use the default model with the device.

The Real Time Tab displays the latest real-time measurements of cell voltage and state of charge with both analog meter readouts and digital values. The State of Charge value is the value that is read directly from the device. The Displayed SOC value indicates what value should be displayed on the end software, taking into account any adjustments to the Full or Empty points that may be needed for optimized performance. If the SOC and Displayed SOC values are the same, that indicates that no Full or Empty Adjustments were needed for the cell.

CONFIGURATION REGISTER



The Configuration Register can be modified by clicking on the Update Config button. The user can modify the RCOMP value, set or clear the Sleep bit, clear the Alert Flag, and set the Alert Threshold.

The RCOMP value can be updated by entering the desired RCOMP value into the text box. The Sleep bit, Alert Flag and Alert Thresholds are set by using the drop down lists. The entire Configuration Register is written when the user clicks OK. The user can cancel any changes that were made by clicking the Cancel button to close the window.

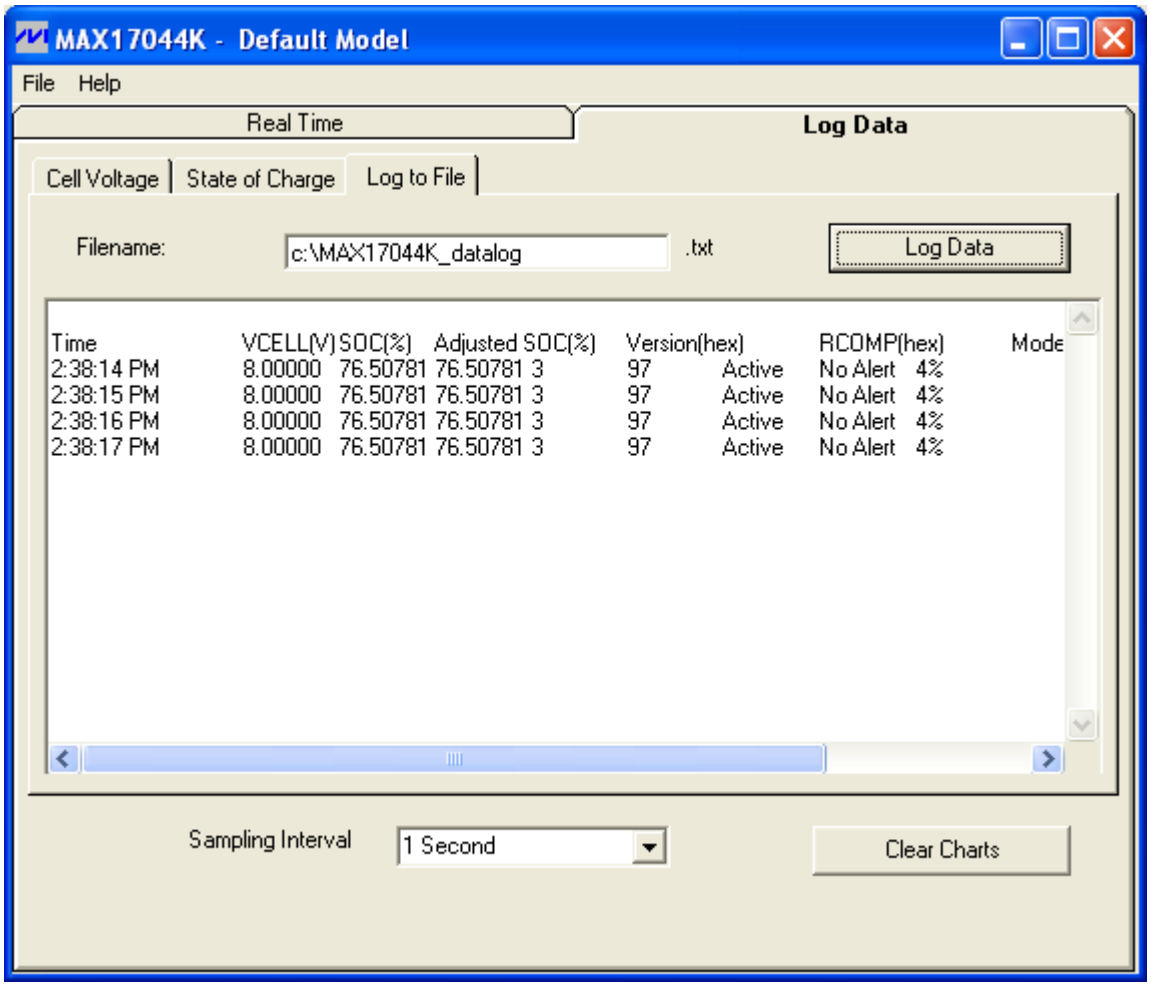
UPDATE TEMPERATURE

The RCOMP register needs to be adjusted for changes in temperature. The MAX17044 does not read the temperature, but it relies on the host system to calculate the correct RCOMP value for the present temperature. The software can adjust the RCOMP value for variations over temperature by the user entering the temperature of the cell and clicking the Update Temperature button. The software will then calculate the correct RCOMP value for the cell model used by the software and write it to the device.

QUICK START/SOFT POR BUTTONS

Left clicking on the Quick Start button or the Soft POR button sends the command to force the MAX17044 to perform a Quick Start or a Software Power on Reset. These commands should not be sent if the cell has experienced any loads greater than c/5 for the last 10 minutes.

LOG DATA TAB



The Log Data tab allows the user to see the MAX17044's real time measurements graphed over time. There are separate sub-tabs for voltage and state of charge. Each graph displays the last 500 data points collected by the MAX17044K software. The sampling interval can be adjusted from as fast as possible to 15 minutes and can be adjusted from the Sampling Interval Menu at the bottom of the window. The Clear Graphs button will clear all data from all four graphs, but does not reset the log to file function. When the Fastest sampling interval is selected, the graphs will not be updated, only the data logging is enabled.

The Log to File Sub Tab contains control information for storing all data to an ASCII file. The default filename is c:\ MAX17044_datalog.txt, but can be modified in the filename text field. The Log Data button toggles data logging off and on. Data will be stored at the same interval selected for updating the graphs in the tab-delimited format of

Time<*tab*>VCELL(V)<*tab*>SOC(%)<*tab*>AdjustedSOC(%)<*tab*>Version<*tab*>RCOMP<*tab*>Mode<*tab*>AlertStatus<*tab*>AlertThreshold

for easy import into a spreadsheet. The most recent 50 samples are displayed in the window for observation. Warning - The Log Data function overwrites previous file information. Data previously stored in the file will be lost.