19-4844; Rev 11/09

DS2745EVKIT
Low-Cost I²C Battery Monitor Evaluation Kit

www.maxim-ic.com

FEATURES

- Demonstrates the capabilities of the DS2745 Low-Cost I²C Battery Monitor, including:
  - Temperature measurement
  - Voltage measurement
  - Current measurement
  - Current accumulation
- Interfaces to the USB of a PC running Windows® XP or older operating system

EVALUATION KIT CONTENTS

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

EQUIPMENT NEEDED

1. A PC running Windows XP or older operating system 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

INDEX

Evaluation Kit Contents
Equipment Needed
Introduction
Setup and Installation
    Board Connections
    Software Installation
    Selecting the COM Port
Program Menus
    Register Windows
Program Tabs
    Real Time Meters
    Data Logging
    User Memory

ORDERING INFORMATION

PART	TYPE
DS2745EVKIT+	EV Kit

+Denotes lead(Pb)-free and RoHS compliant.

Windows XP is a registered trademark of Microsoft Corp.

INTRODUCTION

The DS2745 evaluation kit (EV kit) makes performance evaluation, software development, and prototyping with the DS2745 Low-Cost I²C Battery Monitor easy. The evaluation board interfaces to a PC through a DS9123O USB Adapter and RJ-11 cable connection.

The DS2745 EV kit evaluation software gives the user complete control of all functions of the DS2745. Separate control tabs allow the user access to all RAM memory locations, all control registers, and 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 DS2745 with accurate parameter measurements and protect the DS2745 from ESD damage.

SETUP AND INSTALLATION

BOARD CONNECTIONS

Connections to the TSSOP demonstration board are best made either by soldering directly to the pads or by using cables with mini-grabber clips. Communication to the TSSOP 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 P- pads. In the latter case, the size of the board can be reduced by snapping off the RJ-11 jack along the break line, see Figure 1. To utilize the demonstration software, the SDA, SCL and P- lines must be connected to the DS9123O communication brick using either of the two methods described.

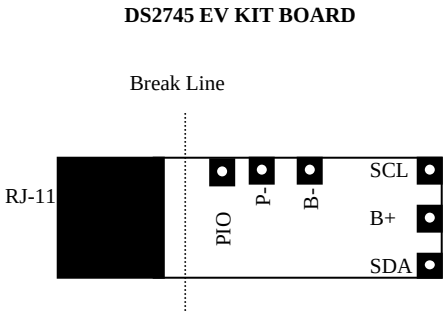


Figure 1: DS2745 EV Kit Board – PD020705

Figures 2a and 2b show the recommended circuits to simulate charging and discharging. The Lithium-Ion cell is connected between the B+ and B- pads. The battery charger/power supply or circuit load is connected between the B+ and P- pads. The evaluation software can be run in either configuration as long as a cell is connected between the B+ and B- terminals providing a minimum of 2.5 volts to power the DS2745. Leaving the PIO pin unconnected does not interfere with the operation of the demonstration board. Refer to the datasheet for the operation of this pin.

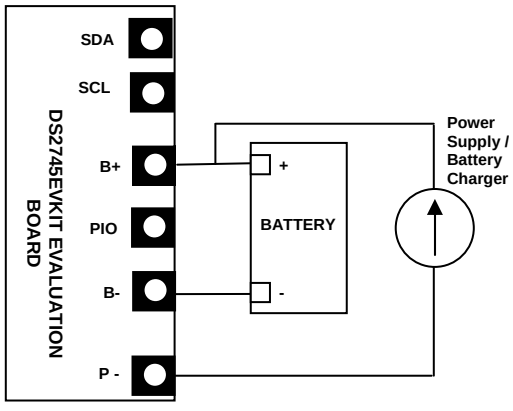


Figure 2a: Charging Circuit

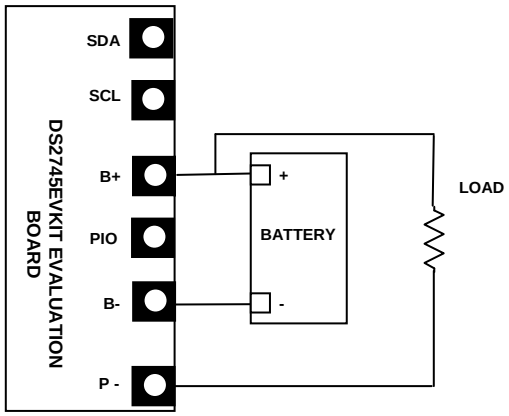


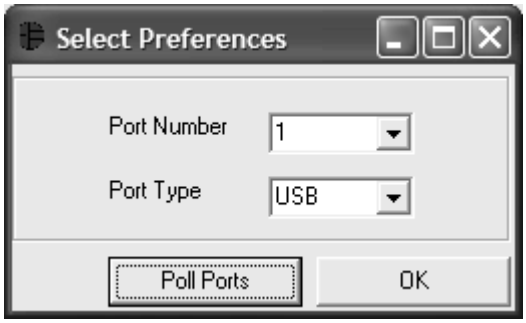
Fig 2b: Discharging Circuit

SOFTWARE INSTALLATION

To install the DS2745 EV kit software, exit all programs currently running and download the latest version at www.maxim-ic.com. Unzip the compressed file and run SETUP.EXE to begin the installation process. Follow the prompts to complete the installation. The DS2745 EV kit software can be uninstalled in the Add/Remove Programs tool in the Control Panel. After the installation is complete, open the DS2745K folder and run DS2745K.EXE or select DS2745K from the program menu. A splash screen containing information about the evaluation kit appears as the program is being loaded.

SELECTING THE COM PORT

The first time the software runs, the Select Preferences window may appear. In this window, select either serial port or USB communication and the port number; then hit OK. The DS2745 EV kit software saves this port selection and automatically uses the selection each time the program starts. To change the port later, click the Preferences option on the menu bar, select Edit Preferences, and then select the appropriate port. To attempt to automatically locate the DS9123O, click the Poll Serial Ports button. Warning - automatically polling for the DS9123O can disrupt other devices connected to your computer's COM ports.



MENUS

Several pull down menu options have been provided to simplify use of the DS2745 EV kit software for the user. Their functions are individually detailed below.

FILE MENU



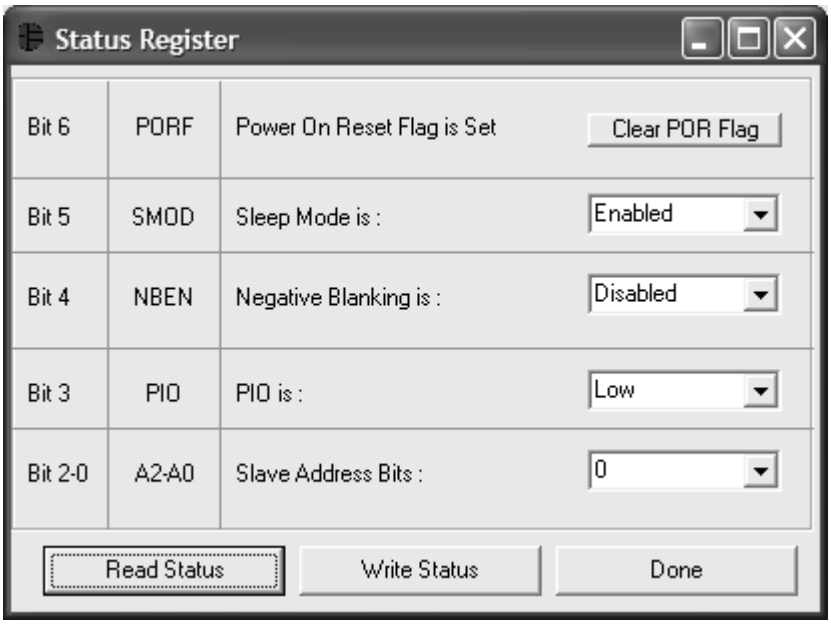
The File Menu allows the user to exit the program and close all communication.

REGISTERS MENU



The Registers Menu gives immediate access to the status register of the DS2745. Selecting the Status Register will open an individual control window giving the user a description of each register bit and the ability to read or write it. See the status register window example.

STATUS REGISTER



The present state of all register bits are displayed immediately upon opening the register window. The PORF can be cleared by clicking on the Clear POR Flag button. Other R/W locations contain a selection field to allow the user to determine their state. Pressing the Write button will automatically update the Status Register inside the DS2745. If the user selects to change the Slave Address bits of the Status Register, the software will automatically change the Slave Address that is used for communication.

PREFERENCES MENU



The Preferences Menu allows the user to change COM port settings at any time. Edit Preferences opens the Select Preferences window. See Selecting the COM Port above.

HELP MENU

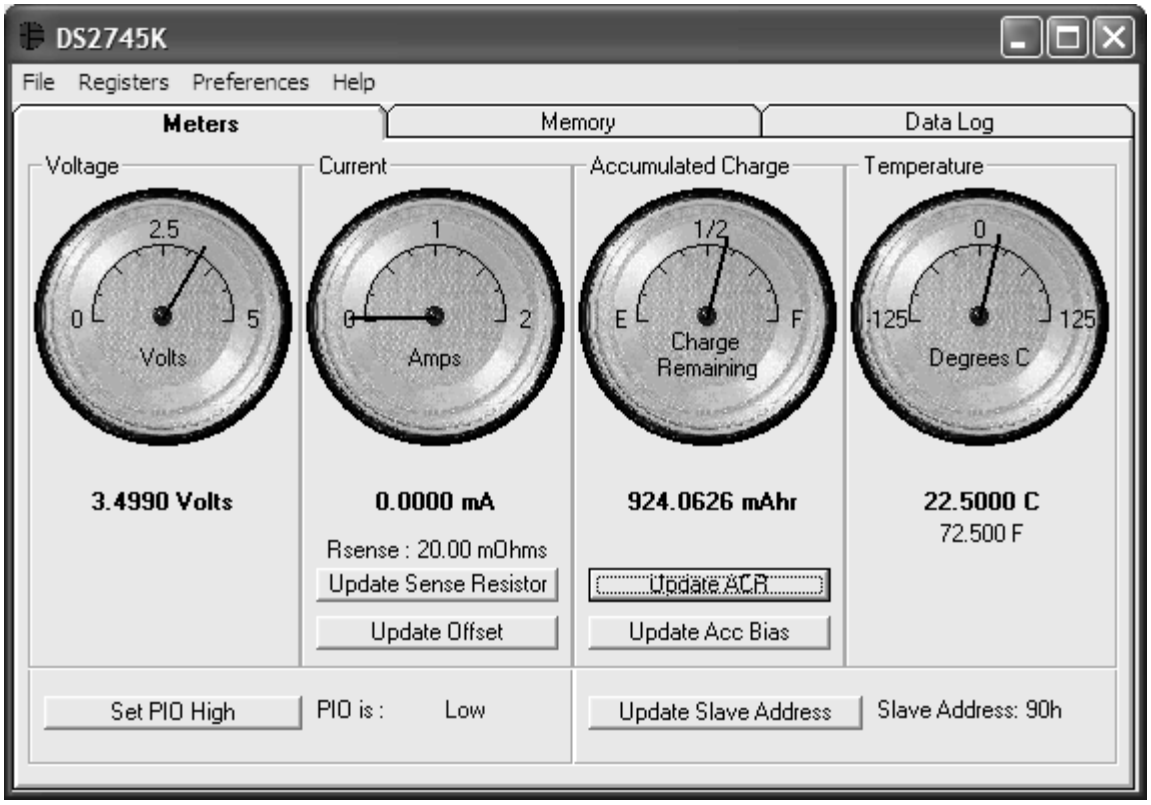


Selecting the About topic from the Help Menu will open a window containing information about this program and Dallas Semiconductor.

PROGRAM TABS

All functions of the program are divided under three tabs in the main program window. Left click on the appropriate tab to move to the desired function page. Located under the Meters tab is all information on real-time updates measured by the DS2745: voltage, current, accumulated charge, temperature, and the status of the PIO pin. The Memory tab displays the contents of every register and memory location inside the DS2745 and allows the user to alter the data that is writable. The Data Log tab allows the user to store all real time information to a file.

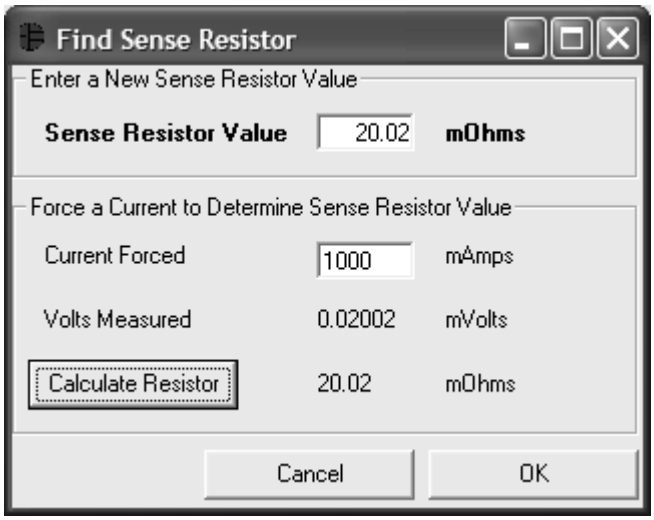
METERS TAB



The Meters Screen displays the latest real-time measurements of cell voltage, temperature, current and accumulated current with both analog meter readouts and digital values. The sense resistor value used to calculate the current reading is shown in the current section. Left click on the Update Sense Resistor button to open the Find Sense Resistor window shown below to edit the value. The Current Offset Bias Register, Accumulation Bias Register, Accumulated Current Register and Slave Address can all be updated by left clicking on the appropriate button.

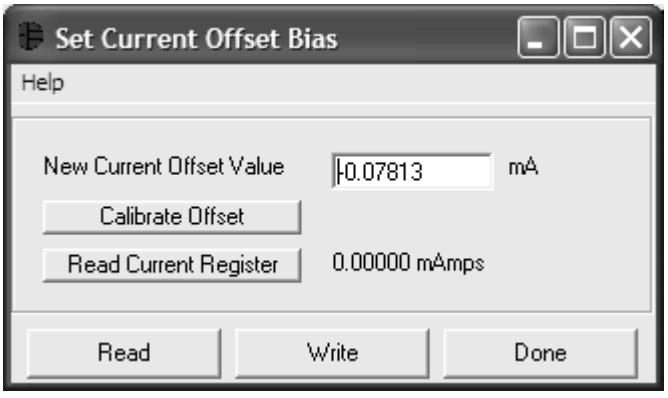
The present state of the PIO bit is shown at the bottom of the window. The user can toggle the value of the PIO bit by left clicking on the associated button

FIND THE SENSE RESISTOR



The Update Sense Resistor button opens the Find Sense Resistor window. The user can input a sense resistor value into the Sense Resistor Value text box, or the user can determine the resistance by forcing a known current and measuring the voltage drop with the DS2745. The resistance value is stored in software and the program uses this value to convert the voltage difference from the VSS and SNS pins into milliamps. If this value does not match the value of the external resistor, current measurements will be inaccurate.

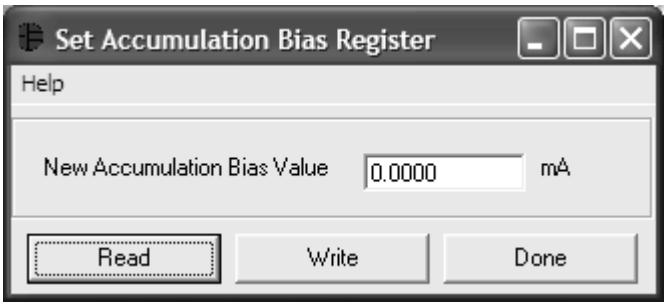
SETTING THE OFFSET



The user can bring up the Set Current Offset Bias Register window by left clicking the Update Offset button of the Meters Tab. The Calibrate Offset button allows the software to auto-detect the appropriate Current Offset Bias Register value based on the Current Reading. The auto-detection should be performed while the pack is disconnected and there is no current flow. The process takes approximately

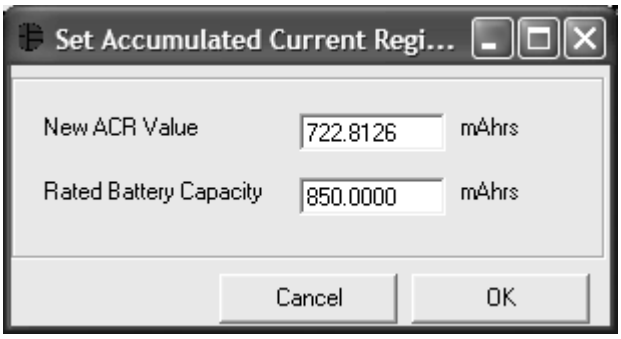
10 seconds. This new value will be added to the Current Register and Accumulated Current Register on each conversion cycle.

SETTING ACCUMULATION BIAS



The user can update the Accumulation Bias Register by left clicking on the Update Acc Bias button on the Meters Tab. That will open up the Set Accumulation Bias Register window. When the user left clicks the Write button the value that is entered into the New Accumulation Bias Value text box will be written to the Accumulation Bias Register. This new value will not be added to the current register but will be added to the ACR.

SETTING ACCUMULATED CURRENT REGISTER



The user can bring up the Set Accumulated Current Register window by left clicking the Set ACR button of the Meters Tab. This window allows the user to enter values for the Accumulated Current Register and Rated Battery Capacity in mAH. Rated Battery Capacity is used to determine full-scale range on the Accumulated Charge Meter. This value is stored in software only and does not affect the Fuel Gauging data.

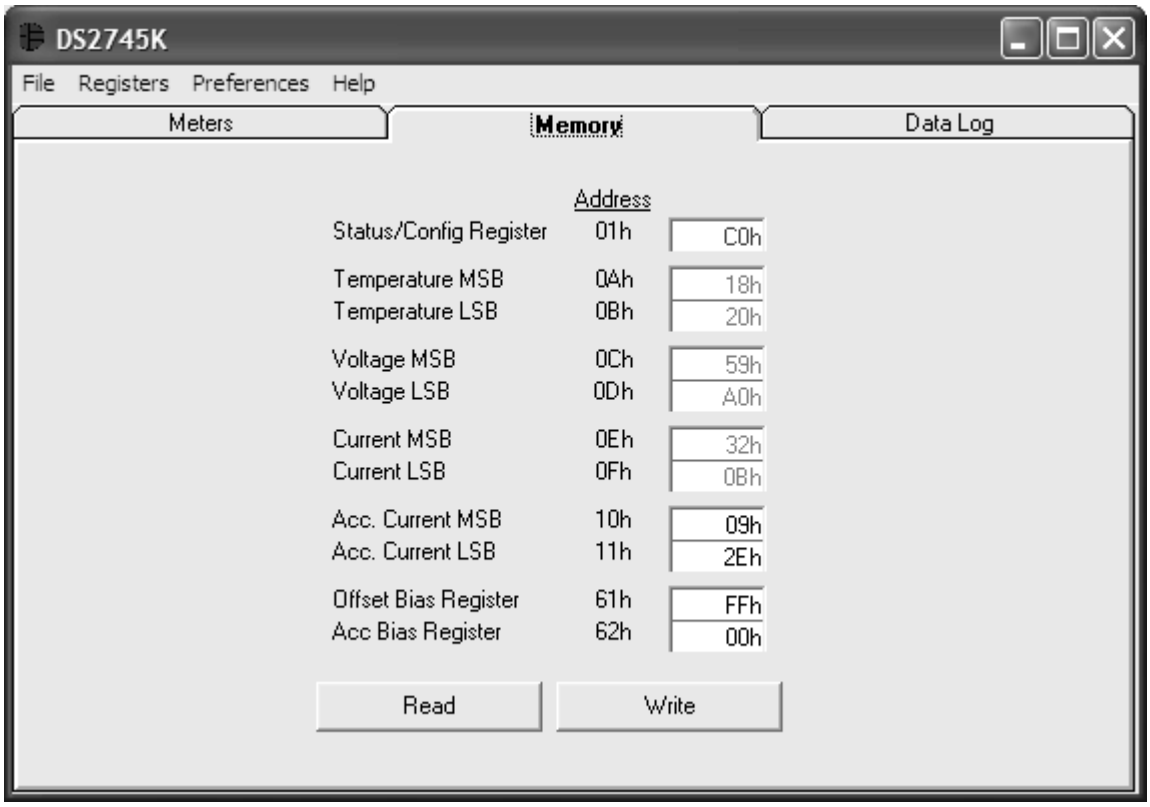
UPDATING THE SLAVE ADDRESS



The user can bring up the Update Slave Address window by left clicking the Update Slave Address button of the Meters Tab. This window allows the user to enter a new Slave Address that the software uses for communication, find the first Slave Address that has a responding device on the 2 Wire bus, or

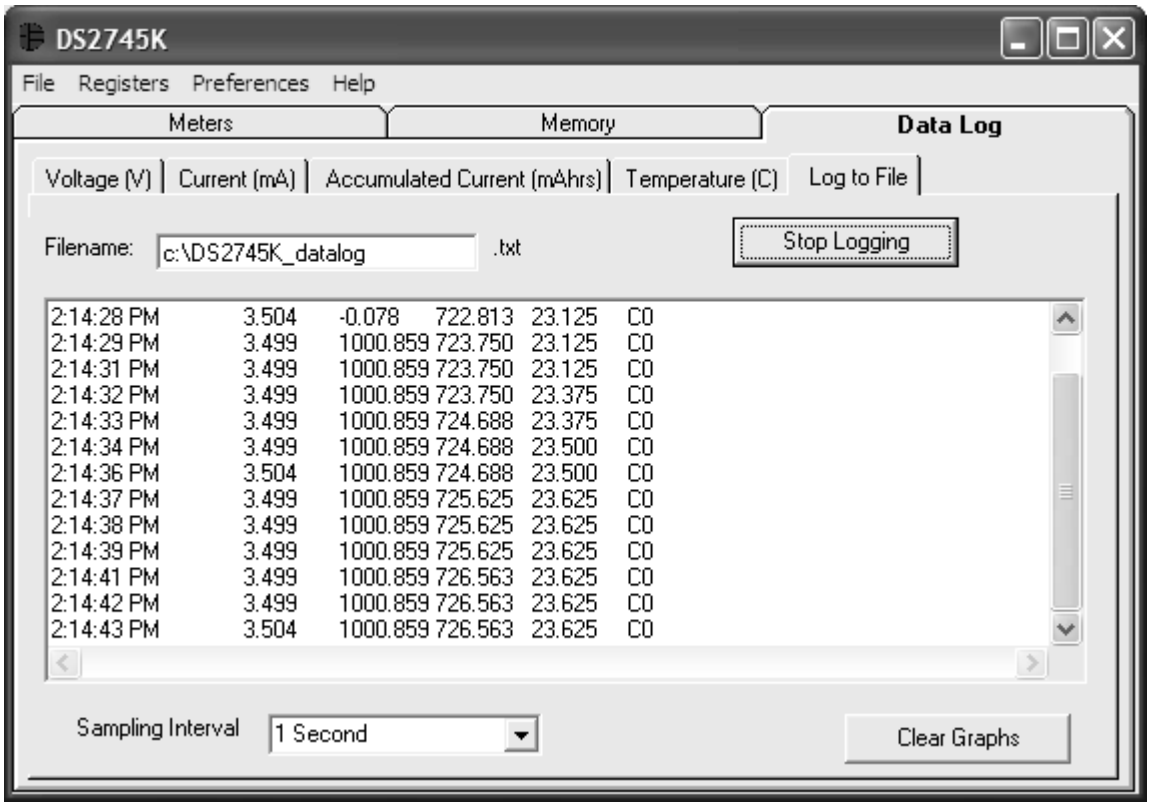
Read and Write the Slave Address bits of the Status Register. The Slave Address of the DS2745 can be changed from 90h to 9Eh, even numbers only.

MEMORY TAB



The Memory Tab gives the user access to all 11 bytes inside the DS2745. The WRITE button will write the Status Register, the Accumulated Current Register, the Offset Bias Register and the Accumulation Bias Register. The Read button reads all of the bytes shown.

DATALOG TAB



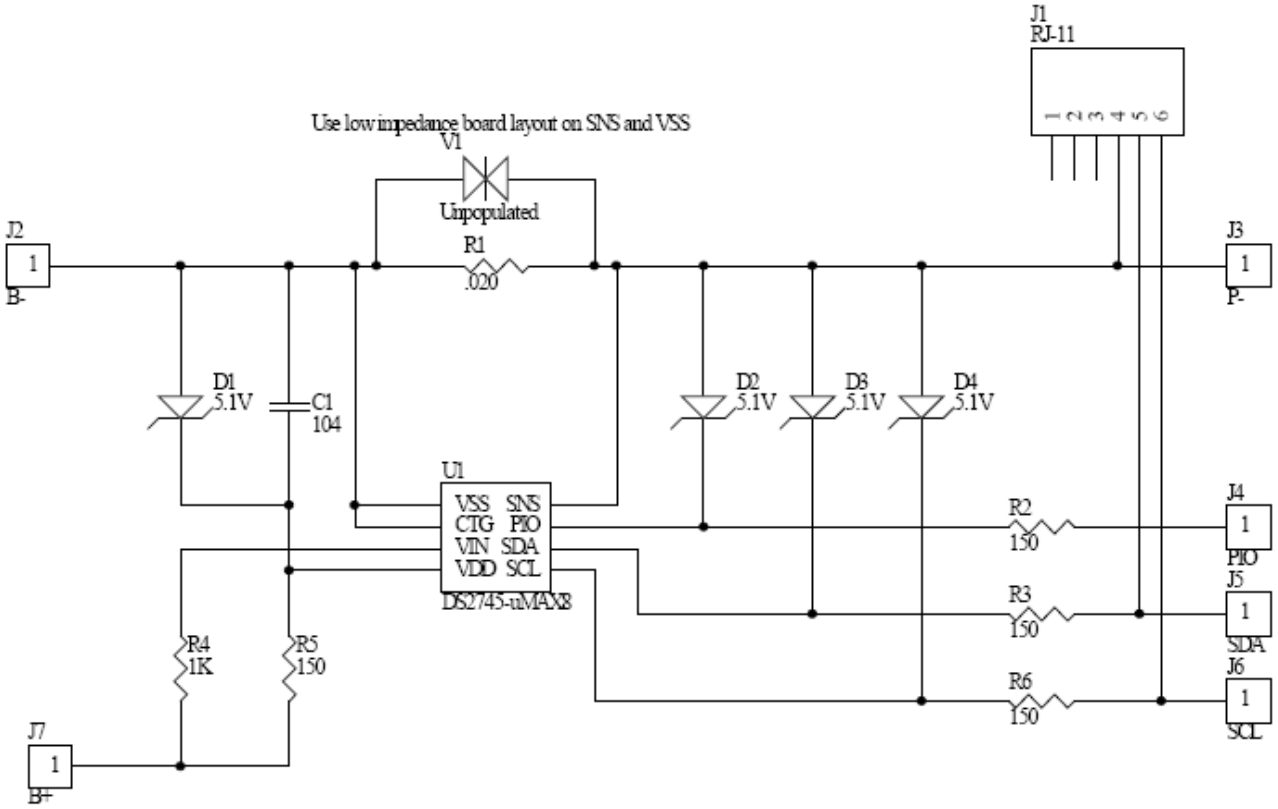
The Data log tab allows the user to see the DS2745's parameter measurements graphed over time. There are separate sub-tabs for voltage, current, temperature, and accumulated charge. Each graph displays the last 500 data points collected by the DS2745 EV kit software. The sampling interval can be adjusted from 1 second 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.

The Log to File sub-tab contains information for storing all log data to an ASCII file. The default filename is c:\DS2745K_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*>Voltage<*tab*>Current<*tab*>Temperature<*tab*>ACR<tab>Status"

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.

DS2745 EV KIT SCHEMATIC



REVISION HISTORY

REVISION DATE	DESCRIPTION	PAGES CHANGED
11/09	Changed the part number from DS2745K to DS2745EVKIT.	All