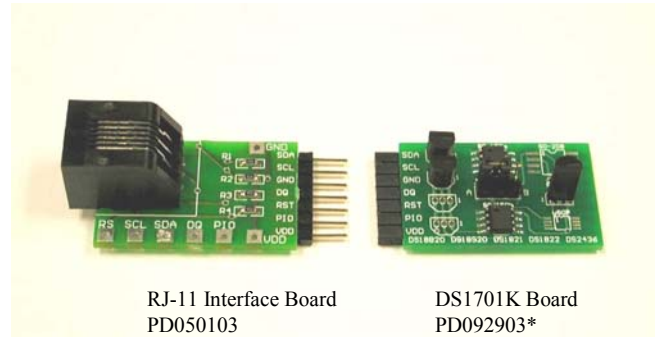


FEATURES

- Demonstrates the Full Features of the Dallas 1-Wire[®] Thermal Devices, Including the:
 - DS18B20
 - DS18S20
 - DS1821
 - DS1822
 - DS2436
- Complete Read/Write Access to All Registers Within the Devices
- Measures Temperatures from the Full Range of the Devices -55°C to +125°C. Fahrenheit Equivalent is -67°F to +257°F.
- Measures Voltage from 2.4V to 5.5V Using the DS2436.
- Interfaces to the Serial Port of a PC Running Windows[®] 95 or Newer

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EVALUATION KIT CONTENTS

- 1 pc. DS1701K 1-Wire Board
- 1 pc. DS9123 Serial Port Adapter
- 1 pc. RJ-11 Interface Board
- 1 pc. RJ-11 Phone Cable
- 1 pc. DS1701K CD containing:
 - DS1701K Evaluation Software
 - DS1701K Related Data Sheets

EQUIPMENT NEEDED

1. A PC running Windows 95 or newer with a CD ROM drive and an available serial port.
2. A battery or a power supply with output between +3.0V and +5.5V.

*Kit demonstration boards will vary as they are improved upon over time.

*1-Wire is a registered trademark of Dallas Semiconductor.
Windows is a registered trademark of Microsoft Corp.*

INTRODUCTION

The DS1701K evaluation kit makes performance evaluation, software development, and prototyping with the Dallas 1-Wire thermal devices easy. The evaluation board interfaces to a PC through a DS9123 Serial Port Adapter and RJ-11 cable connection. The provided CD-ROM contains all related data sheets along with the evaluation software, which can be run under Windows 95 or newer.

The DS1701K evaluation software gives the user complete control of all functions of the Dallas 1-Wire thermal devices. Separate control tabs allow the user to view the real-time updates of the temperature at the desired resolution as well as access to all scratchpad and EEPROM memory locations. The software incorporates a data-logging feature to monitor a device over time. Additionally the software provides the ability to select and read various devices on the 1-Wire bus.

SETUP AND INSTALLATION

BOARD CONNECTIONS

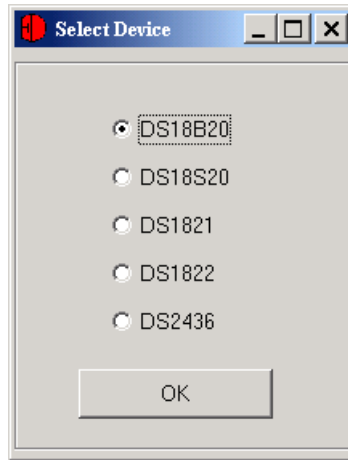
Communication to the board can be accomplished by connecting the DS9123 serial port adapter to an available serial port on a PC. Then connect the RJ-11 interface board to the DS9123 serial port adapter with the provided 6 conductor cable. Finally, connect the DS1701K board to the RJ-11 interface board. The DS1701K Software can communicate with the Dallas 1-Wire thermal devices without a power supply being connected to the RJ-11 interface board. However, temperature readings will not be performed unless the device is configured in parasite power mode (see device data sheets for information on parasite power mode.)

SOFTWARE INSTALLATION

To install the DS1701K software, exit all programs currently running and insert the DS1701K software CD into your computer's CD-ROM. The user can run SETUP.EXE from the setup directory and the installation process begins. Follow the prompts to complete the installation. The DS1701K software can be uninstalled in the Add/Remove Programs tool in the Control Panel. After the installation is complete, open the DS1701K folder and run DS1701K.EXE or select DS1701K from the program menu. A splash screen containing information about the evaluation kit appears as the program is being loaded.

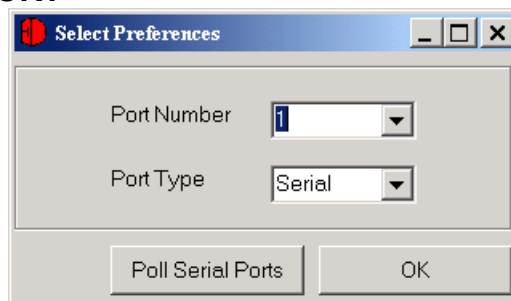
The Documentation directory, also located on the CD, contains all relevant data sheets and application notes on the DS18B20, DS18S20, DS1821, DS1822, DS2436, and DS1701K. They are stored in Adobe Acrobat format for easy viewing.

SELECTING THE DEVICE



The user will be prompted to select which Dallas 1-Wire thermal device the DS1701K should expect to find on the DS1701K board. If more than one device is connected, simply select which device will be initially communicated with, and that selection can be changed while the program is running if necessary by accessing the Select Device option on the menu bar.

SELECTING THE COM PORT

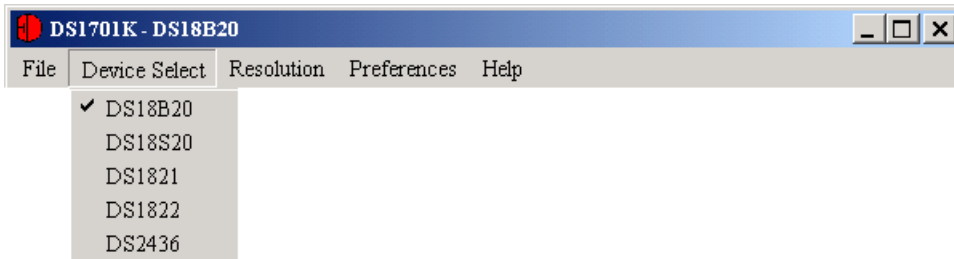


The first time the software runs the Select Preferences window appears. In this window, select the Port Number to which the DS9123 is attached and the type of port that is being used; then hit OK. The DS1701K software saves this port selection and automatically uses the selection each time the Edit Preferences, and then select the appropriate port. To attempt to automatically locate the DS9123, click the Poll Serial Ports button. Warning—automatically polling for the DS9123 can disrupt other devices connected to your computer's COM ports.

MENUS

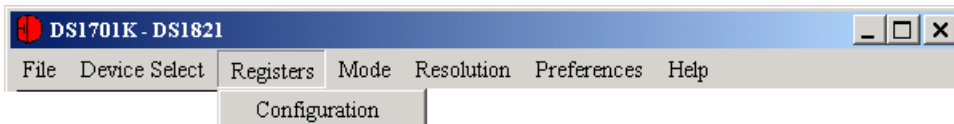
Several pull-down menu options have been provided to simplify use of the DS1701K software for the user. Their functions are individually detailed below.

DEVICE SELECT

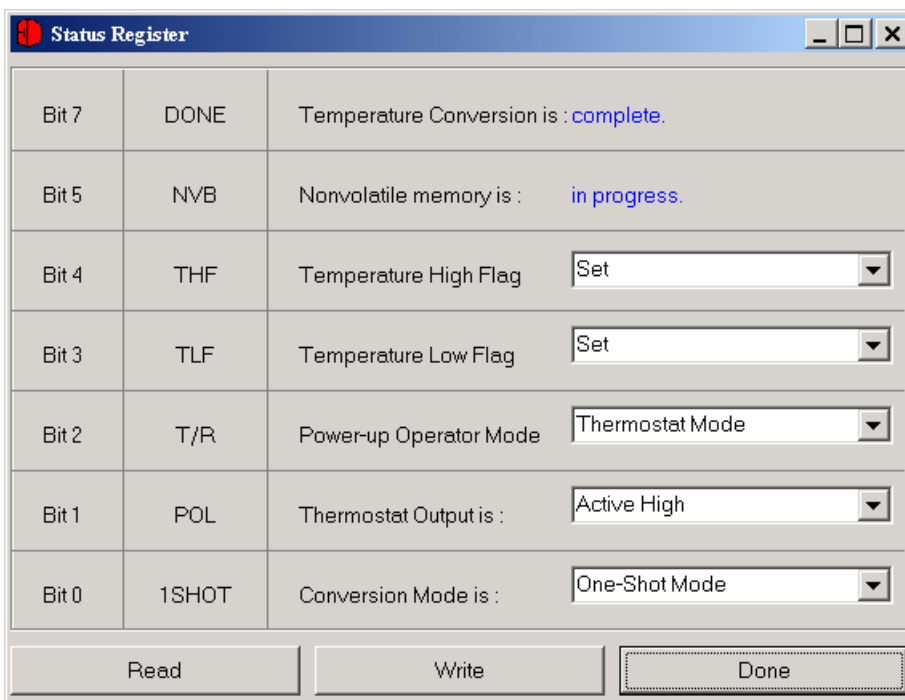


The Device Select Menu allows the user to select which type of Dallas 1-Wire thermal device will be read. When one of the devices is selected from the menu, the program will find a device that matches the ROM Code of the selected device type and begin reading and making calculations based on the new device selection.

REGISTERS

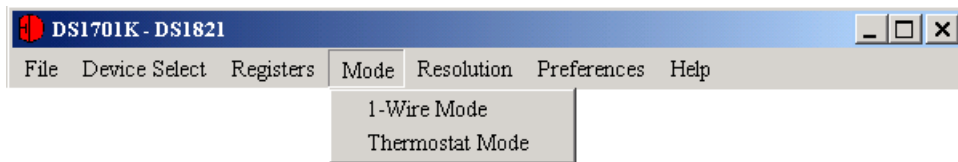


When the DS1821 is the device selected, the Registers Menu appears and gives immediate access to the status/configuration register. See the Status Register window example.



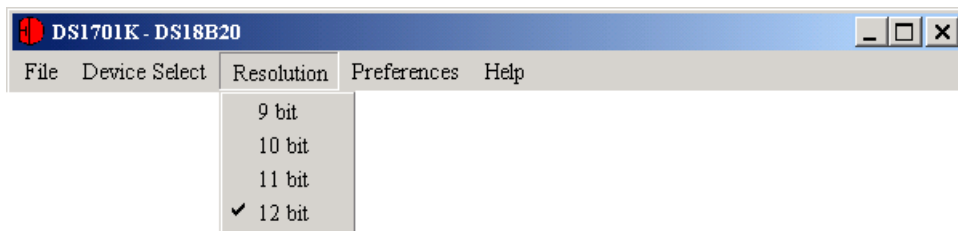
The present states of all register bits are displayed immediately upon opening the register window. R/W locations contain a selection field to allow the user to determine their state. Pressing the WRITE button will write the register with the new value.

MODE



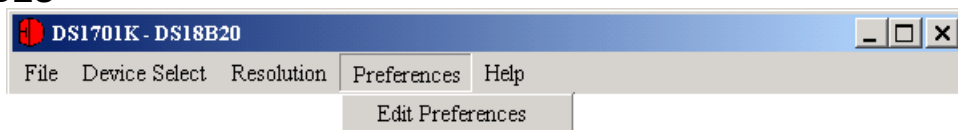
The Mode Menu is also only visible when the DS1821 is selected. This allows the user to switch between the 1-Wire Mode and Thermostat Mode of the DS1821. When entering the Thermostat Mode, the software will automatically set the Power-up Operating Mode bit of the Status Register and then prompt the user to “Set V_{DD} to 0V”. When V_{DD} is set to 0V, click OK, and the DQ line will be pulsed 16 times in order to temporarily enter Thermostat Mode as outlined in the DS1821 data sheet. When exiting Thermostat Mode, the program will prompt the user to again “Set V_{DD} to 0V”. When that is done, click OK and DQ will be pulsed 16 times to temporarily enter the 1-Wire Mode and the Power-up Operating Mode bit of the Status Register is cleared. In order to power-up in the new mode, DQ and V_{DD} should be low for approximately 10 seconds.

RESOLUTION



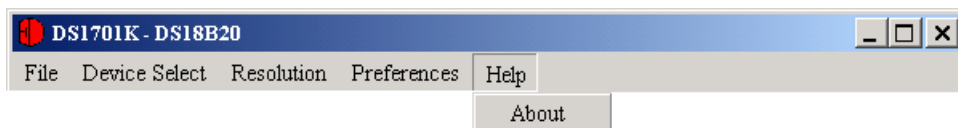
The Resolution Menu allows the user to select the resolution of the temperature conversion. The DS18B20 and DS1822 will produce temperature results in 9-, 10-, 11-, or 12-bit resolution. The DS18S20 allows for 9-bit or a High-Resolution mode. The DS1821 allows for 8-bit or a High-Resolution mode. When the resolution is changed for the DS18B20 or the DS1822, the resolution bits of the configuration register will be updated. When the High Resolution mode is selected for the DS18S20 or the DS1821, the additional steps, as outlined in the device datasheets, will be taken to appropriately read the Count Remaining and Count Per $^{\circ}\text{C}$ registers and make the required calculations.

PREFERENCES



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

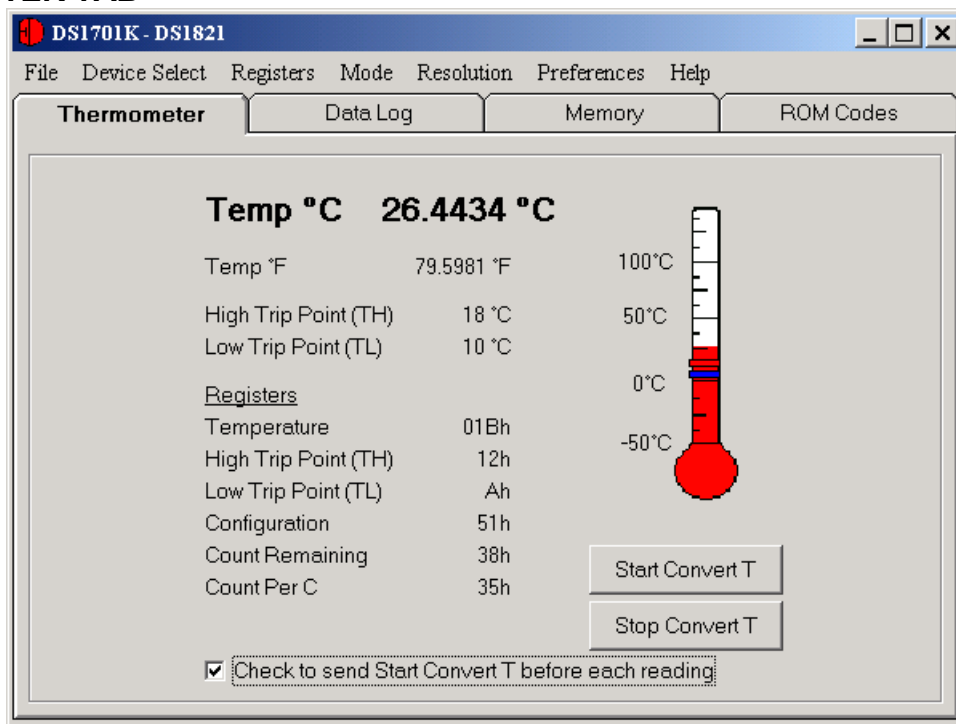


Selecting the About topic from the Help Menu will open a window containing information about this program and Dallas Semiconductor.

PROGRAM TABS

All functions of the program are divided under four tabs in the main program window. Left click on the appropriate tab to move to the desired function page. Located under the Thermometer tab are all of the real-time updates of all the registers and the calculated results. The Data Log tab allows the user to log the data to a file. The Memory tab displays the contents of every register and memory location inside the Dallas 1-Wire thermal devices and allows the user to alter the data. The ROM Code tab gives the user the ability to read all 1-Wire devices on the 1-Wire bus and read any devices with an Alarm condition set.

THERMOMETER TAB

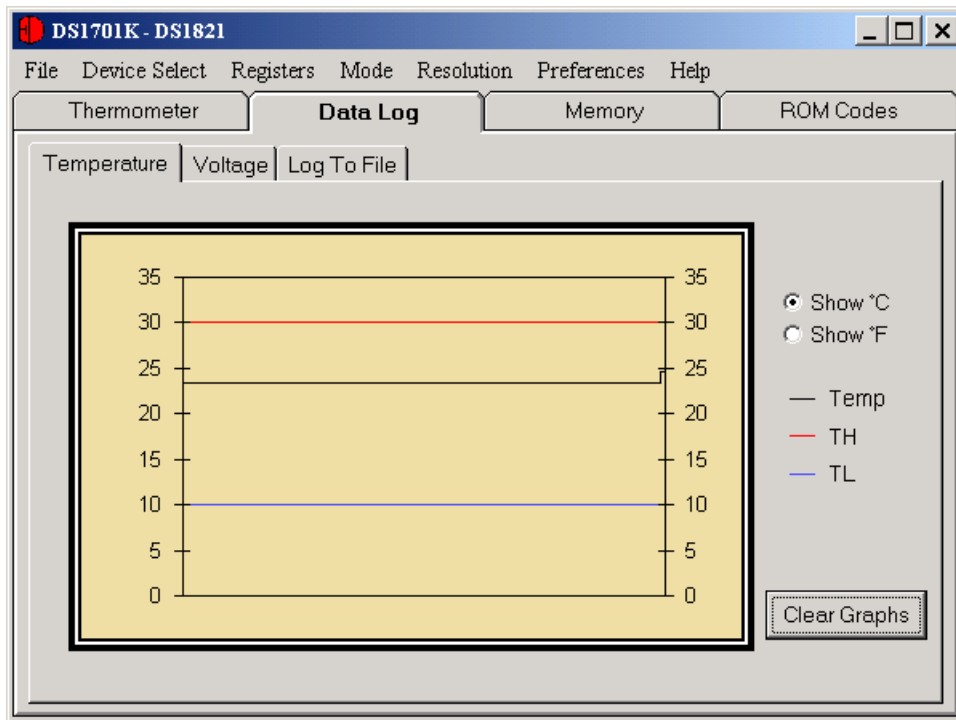


The Thermometer Screen displays the latest real-time temperature measurement and the TH and TL values with both analog thermometer readout and digital values. All registers are read and displayed on this screen. To edit any of the values that can be modified by the user, left-click on the associated label and the program will go to the Memory Tab where the values can be read and written to the Scratchpad and EEPROM. For the DS1821, left clicking on the Configuration register label will open the Status/Configuration Register window.

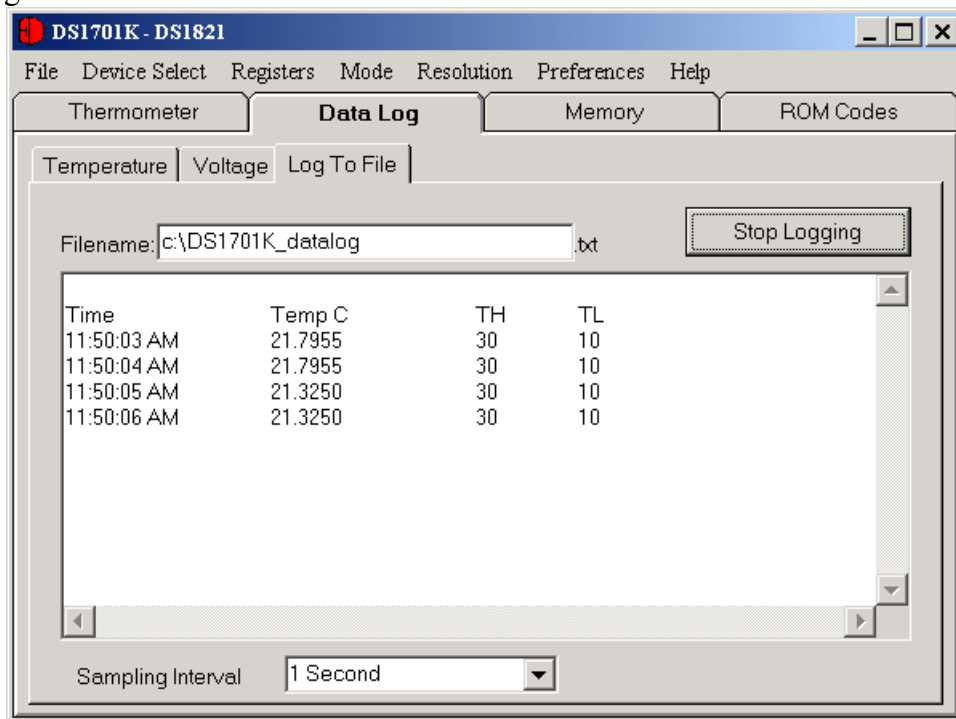
For the DS18B20, DS18S20, and DS1822, the user can check the box at the bottom of the window to perform an Alarm Search routine during each loop to check for any alarm flags that are set by any devices on the bus. If the selected device has an alarm condition, the Alarm LED will be lit. Any devices with an Alarm condition will have its ROM Code displayed on the Alarm Search sub-tab of the ROM Codes Tab.

For the DS1821, a Start Convert T command is required to start a temperature conversion. If the device is in Continuous Mode, sending one Start Convert T command will allow the device to continuously monitor the temperature in 8-bit resolution. If the device is in 1-Shot Mode, one temperature conversion, in either 8-bit or high resolution, will be performed for each Start Convert T command that is sent. Since the device cannot continuously monitor temperature in high resolution, a check box has been included so that a Start Convert T command will be automatically sent prior to reading the temperature.

DATALOG TAB



The Data Log tab allows the user to see the temperature, TH and TL points (and voltage for the DS2436) graphed over time. The graph displays the last 500 data points collected by the DS1701K software and can be displayed in either °C or °F. The Clear Graphs button will clear all data from the graph, but does not reset the log to file function.



The Log to File sub-tab contains control information for storing all log data to an ASCII file. The default filename is c:\DS1701K_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 interval selected in the tab-delimited format of

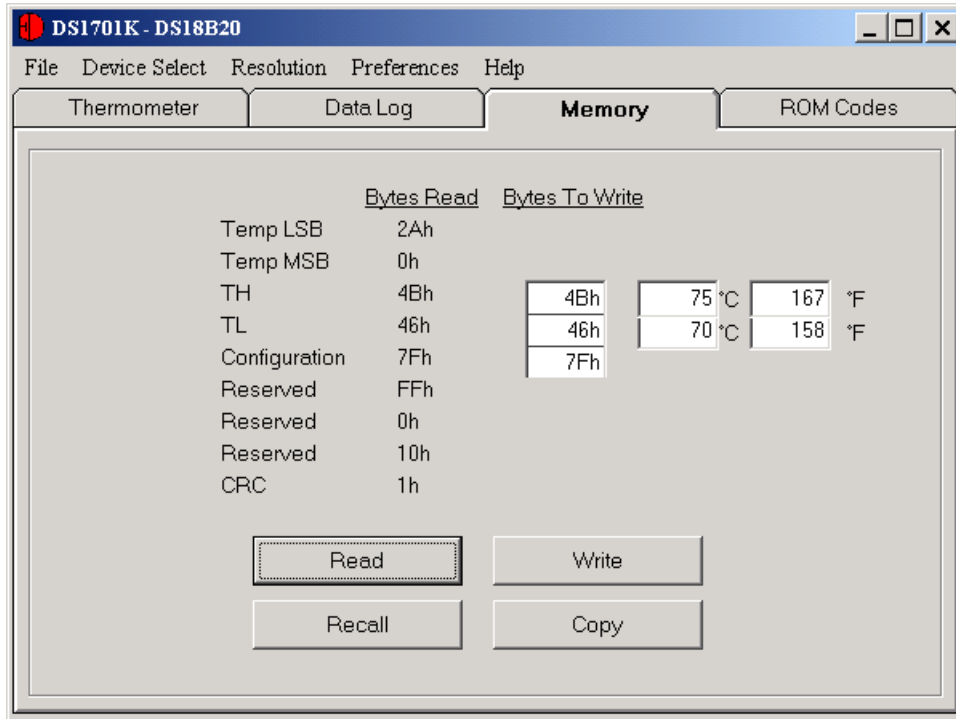
“Time<tab>Temperature<tab>TH<tab>TL<tab>Alarm Status”

for all devices except the DS2436 so that the data can be easily imported into a spreadsheet. The DS2436 will log data in the format of

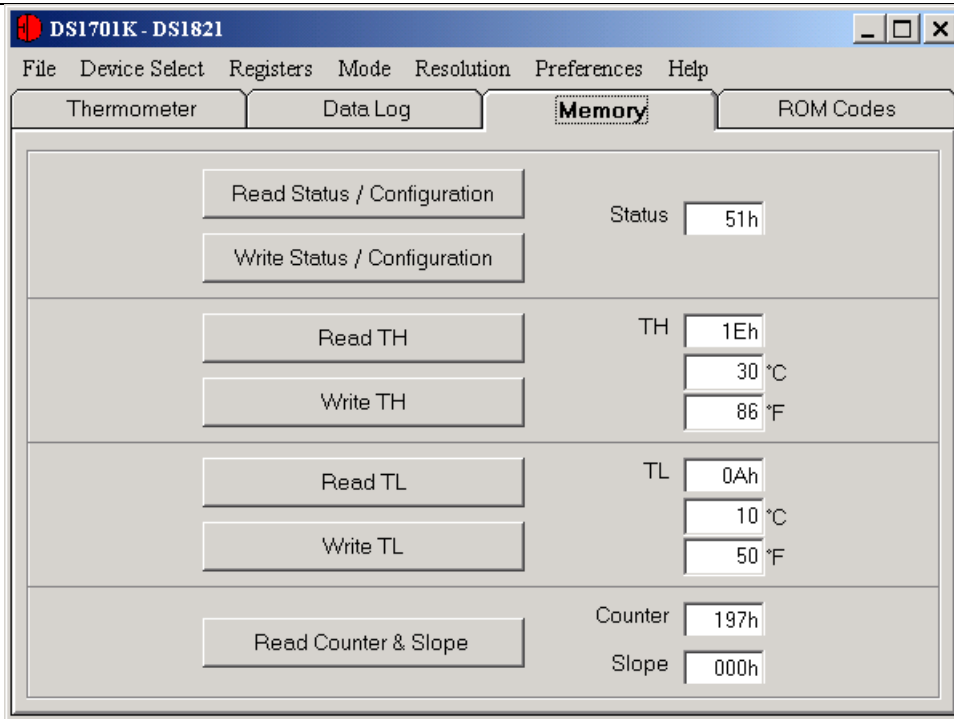
“Time<tab>Temperature<tab>Voltage<tab>Status<tab>Cycle Count”

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 unless you change the filename. The sampling interval can be set from 1 second to 15 minutes and can be adjusted from the Sampling Interval Menu at the bottom of the window.

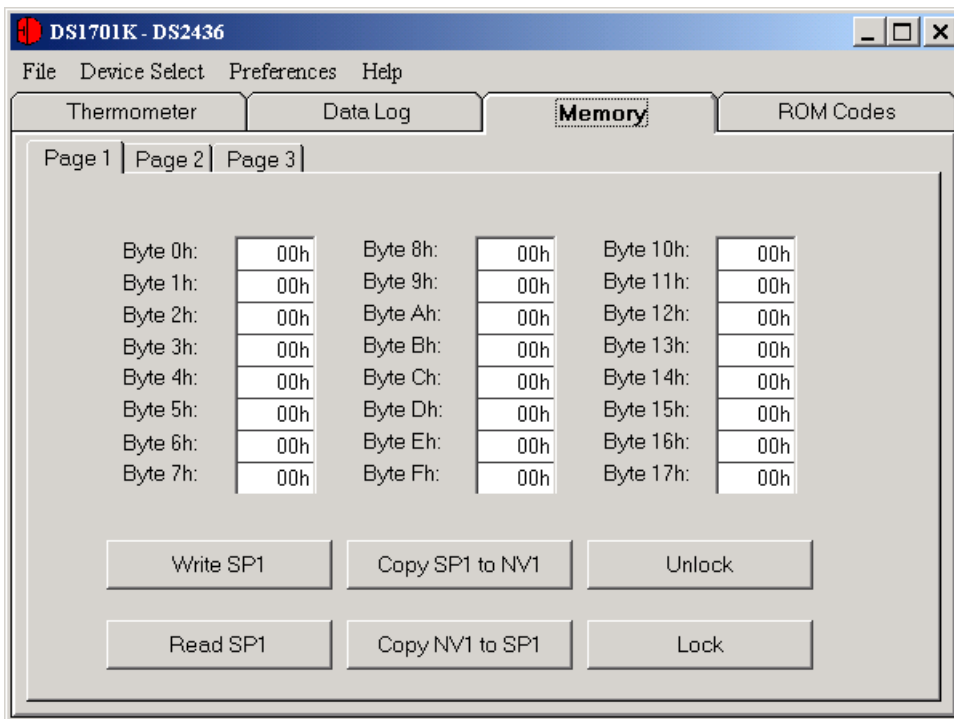
MEMORY TAB



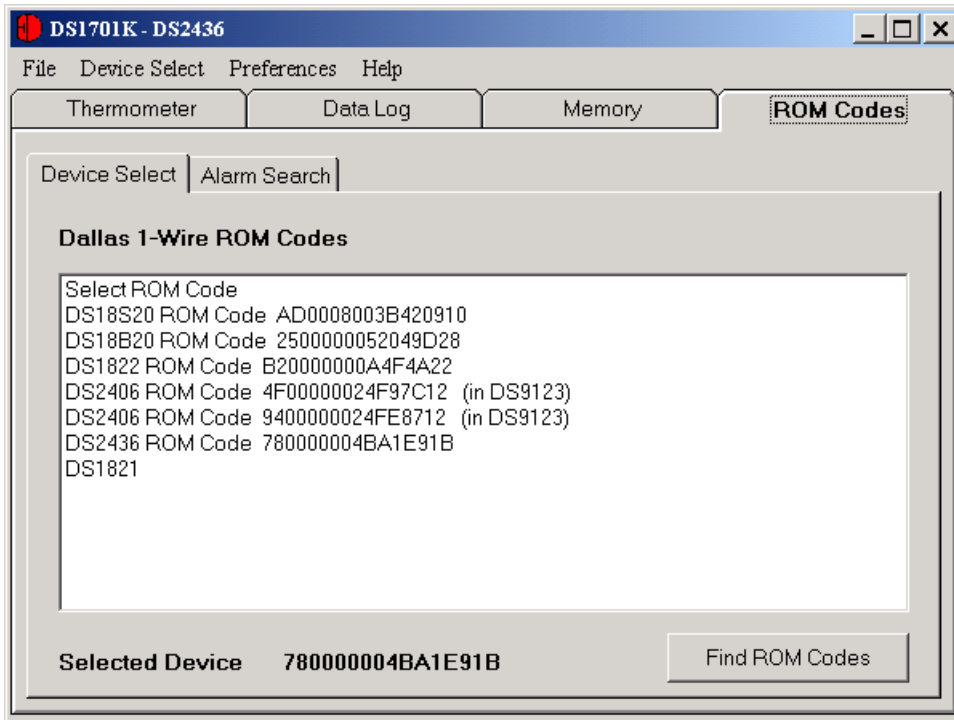
The Memory Tab allows the user to see all 9 bytes that are read from the DS18B20, DS18S20, and DS1822. The user also can modify and write the 2 user bytes (TH and TL) and the configuration register. By left-clicking on the WRITE button, the scratchpad will be modified with new data, but the EEPROM values are not updated until the COPY button is pressed. The user can change the TH and TL registers in one of three formats: in hexadecimal form, in degrees C, or in degrees F. The program will detect which text box was the last one updated, and write that value to the device.



For the DS1821, the Memory Tab allows the user to read and write the Status/Configuration, TH and TL registers. The Counter and Slope registers, which are used in calculating the high-resolution temperature, can also be read.



For the DS2436, the Memory Tab also allows the user to access all 40 bytes of the User Bytes.

ROM CODES TAB

All of the 1-Wire ROM Codes found on the 1-Wire bus will be displayed in this window. The user can request a new Search ROM routine by left-clicking on the FIND ROM CODES button in order to find any new or removed ROM Codes on the bus. The user also can select a specific ROM Code to read by left clicking on the desired ROM Code. In that event, the program will identify which type of device is selected and make the appropriate readings and calculations.