



Thermochron Viewer

The Thermochron (temperature recorder) Viewer is a tool to initialize and download the temperature data from a DS1921 Thermochron iButton.

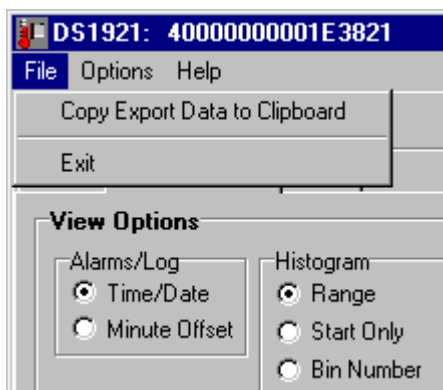
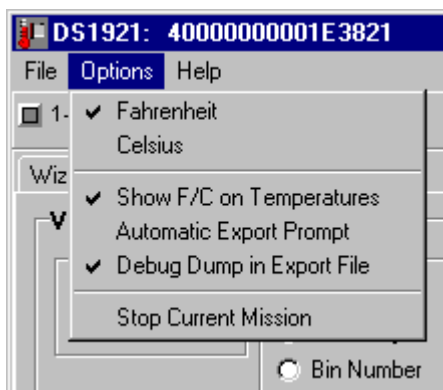
Initializing the DS1921 is referred to as sending it on a 'mission'. There are several options when starting a mission. To go through each of these options, the Thermochron viewer incorporates a 'Mission Wizard'. If the device is not currently on a mission, then the Thermochron viewer defaults to display the wizard first.

The viewer has two other main tabs: 'Mission Results' and 'Status'. 'Status' will display the current settings in the DS1921 such as if a mission is in progress, the number temperature readings taken, etc. The 'Mission Results' will contain the log of temperature readings and histogram. The bottom of the viewer contains a status message describing the current operation being performed.

If 'Auto Save Size/Position' is checked in the main iButton Viewer options, then the state of the Thermochron Viewer is saved and restored on the next invocation. This includes the size, position of the window, choices in the mission wizard, and display options.

Menu Options

There are several menu options available. They can be accessed by clicking on the menu groups at the top of the viewer.



File / Copy Export Data to Clipboard

The Copy Export menu option will take mission status and results and copy it to the Windows clipboard in the form of text. This may be more convenient than saving the data to a text file before importing it into another program.

File / Exit

The Exit menu option will close this viewer and any open quick graphs.

Options / Fahrenheit and Celsius

The temperature mode options select whether all of the temperatures in this viewer are displayed as Fahrenheit or Celsius. Click on the desired format. This format will also be used in all graphs and export data.

Options / Show F/C on Temperatures

The Show F/C option toggles whether the temperatures displayed throughout the viewer have the F or C appended to indicate the temperature display mode. It is sometimes desirable to not have the letter displayed for easier import into other applications.

Options / Automatic Export Prompt

When checked, the 'automatic export prompt' will automatically prompt for an output text file immediately after the mission data has been downloaded. This could be used in combination with the iButton Viewer's 'Auto Viewer Start' and 'Auto Viewer Close' options to quickly download the results of ThermoChron missions.

Options / Debug Dump in Export File

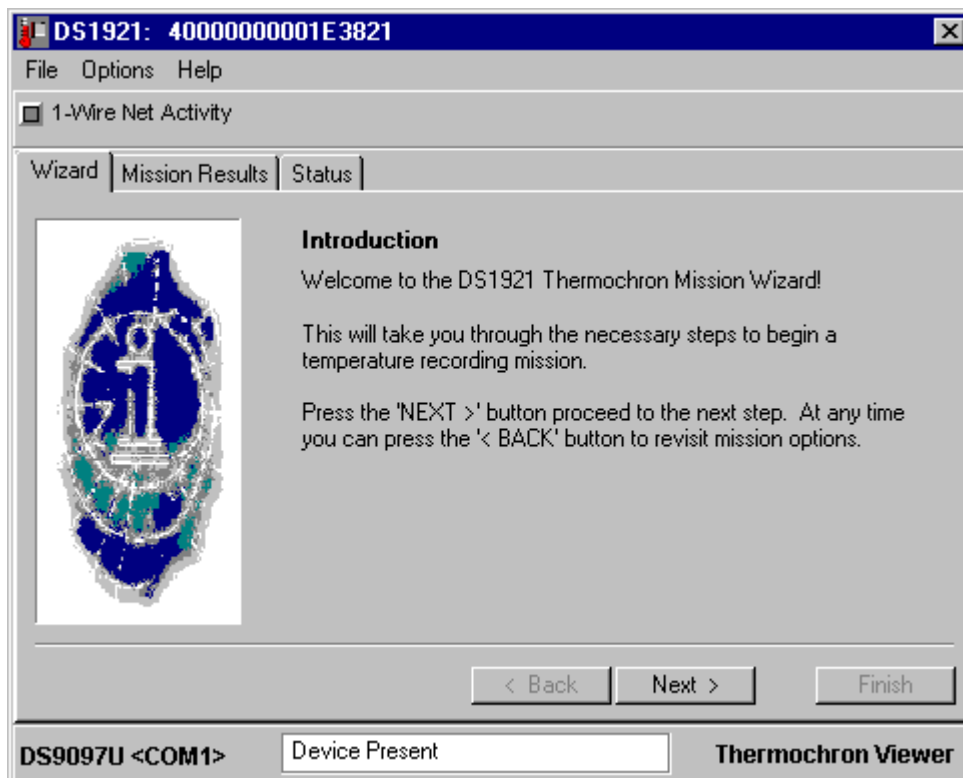
When checked, the 'Debug Dump' option will automatically copy the raw dump of the DS1921 memory pages into the export file or clipboard.

Options / Stop Current Mission

The 'Stop Current Mission' menu option will end a mission if one is currently in progress. It does not, however, stop the real-time clock.

'Mission' Wizard

The Mission Wizard can be started at any time by clicking on the 'Wizard' tab and proceeding through the options by clicking on 'NEXT >' button. At any time, previous options can be re-addressed by clicking on the '< BACK' button.



Real-Time Clock Set

The next Wizard screen will optionally set the DS1921's real-time clock from the PC clock. To help with this decision, the current device and PC clock time is displayed. The time display will be updated approximately every 3 seconds. The time is displayed in 24-Hour format. Clicking on the check box at the bottom will toggle whether the time will be set from the PC.

Time Alarm

The time alarm will select the time at which the DS1921 will start responding to a conditional search. The conditional search is a way to service only the device's that need attention in a multi-device network. The alarm can occur weekly, daily, hourly, minutely, or every second. The top drop-down box will select the mode. The lower drop-down boxes will select the relevant times. Some of the lower drop-down boxes will not be visible in some alarm modes. For example the 'Day' drop-down will not be visible when alarming hourly. The bottom check-box selects whether the device will respond to a conditional search when a Time alarm has occurred. Since the Time alarm cannot be disabled, selecting the alarm mode of 'none' will set a 'Weekly' alarm. The check-box at the bottom selects whether the device responds to a conditional search when a Time alarm occurs.

Mission Start Delay

The DS1921 can delay a specified number of minutes before it begins taking temperature readings. This feature can be used to prevent needless readings before the target time frame or to space several DS1921's at staggered intervals. As a convenience, drop-down boxes are used to select a number of days, hours, and minutes. The total minutes delay is displayed. The DS1921 has a maximum start delay of 65536 minutes or about 45.5 days. The drop-down boxes allow a maximum selection of 44 days, 23 hours, and 59 minutes giving a total of 64799 minutes.

Sample Rate

The Sample Rate specifies the number of minutes between each temperature reading. The DS1921 can store 2048 time stamped temperature readings. Setting the sample rate will affect how long it takes for the memory to fill up or optionally roll over. The sampling rate can be from 1 to 255 minutes.

Temperature Alarms

Certain temperature extreme readings can be tracked by the DS1921 even after the 2048 time-stamped temperature readings have already been done. The start and duration of the violation of temperature bounds is recorded. The maximum duration for each event is 255 readings. The device can accommodate 12 separate high events and 12 low events. The check box at the bottom selects whether device responds to a conditional search when a High or Low temperature alarm occurs.

Roll-Over

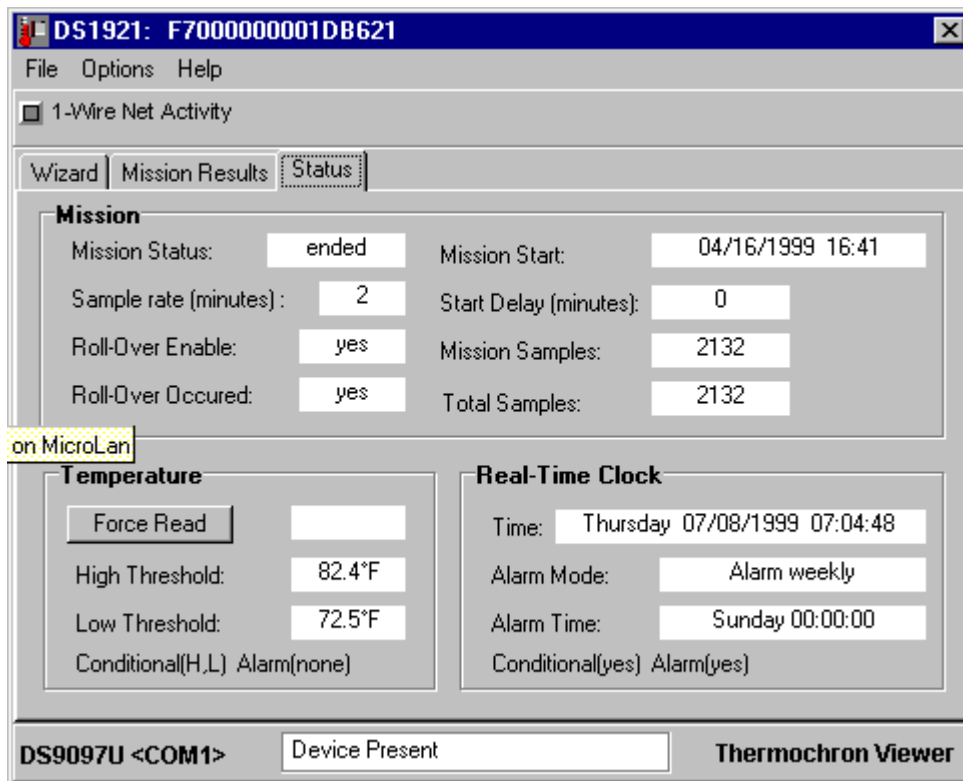
There is a maximum of 2048 time-stamped temperature readings. This Wizard panel indicates the amount of time it will take to fill up this memory, depending on the sample rate. The behavior of the DS1921 can optionally be set to begin overwriting the early readings when the memory is filled. If this sample period is too small, use the '< BACK' button to go back to the sample rate selection and pick slower sample rate. Note that any readings beyond 2048 are still recorded in the histogram data.

Finish

The final panel of the Wizard displays all of the options selected. If any of these settings is not desired, use the '< BACK' button to revisit the different options. The box at the bottom of the panel may not be able to display all of the options. Use the scroll bar to view all of the options. When satisfied, click on the 'FINISH' button. The mission settings will then be written to the DS1921 and the mission will begin. To show the state of the new mission, the viewer will automatically switch to the 'STATUS' tab.

Status Display

The Status Tab displays the current DS1921 status.



Mission Status

The Mission Status will indicate ‘in progress’ if a mission is currently running. It will display ‘ended’ if there is no mission.

Mission Start

The Mission Start is the date/time stamp of the beginning of temperature readings. Note that this is the start time after the start delay has expired and the first reading has been taken. While the start delay is counting down the Mission Start will be displayed as ‘not started yet’. The mission start is displayed in 24-hour format.

Sample rate (minutes)

The Sample Rate is the number of minutes between samples.

Start Delay (minutes)

The Start Delay is the current delay count down value in minutes. For example, if in the mission Wizard a start delay of 10 was selected, then the initial value viewed in this box would be 10. After a minute it would decrement to 9 and then to 8 and so on. When the start delay goes to 0, then the mission sampling will begin.

Roll-Over Enabled

Roll-Over Enabled will say ‘yes’ if the device has been missioned to overwrite early readings after the 2048 time-stamped readings have been done. It will say ‘no’ if roll over is not enabled.

Mission Samples

The Mission Samples indicates the number of temperature samples that have been taken during the current mission.

Roll-Over Occurred

Roll-Over Occurred will say ‘n/a’ for not-applicable if roll-over is not enabled. If roll-over is enabled, then this box will display ‘yes’ if more then 2048 readings have been made, or ‘no’ if the number of readings is less then 2048.

Total Samples

Total Samples indicates the total number of temperature samples that have been taken on the

device.

Force Read

If there is no current mission, the Force Read button is enabled. Clicking this button instructs the DS1921 to read the current temperature. The temperature will be displayed to the right of the button after a few seconds. The Force Read button is disabled if a mission is currently running.

High Threshold

High Threshold indicates the upper bound temperature maximum. If during a mission the temperature reading goes above this value, an alarm event will occur and the time and duration of this event will be recorded.

Low Threshold

Low Threshold indicates the lower bound temperature minimum. If during a mission the temperature reading goes below this value, an alarm event will occur and the time and duration of this event will be recorded.

Temperature Threshold Status

The Temperature Status below the 'Low Threshold' will indicate the settings and the state of the temperature threshold violations. There are two parts to the statement: 'Conditional' and 'Alarm'. The 'Conditional' part indicates the settings for the device to respond to a conditional search on an alarm condition. A value of (H,L) indicates both High and Low thresholds will enable a conditional search response. 'H' indicates High threshold is used and 'L' the Low threshold. 'none' indicates that neither of the thresholds will cause a response to a conditional search. In the same manner, the 'Alarm (H,L)' indicates if there is currently an alarm condition with either threshold.

Time

Time displays the current real-time-clock value from the DS1921. This value is updated every 3 seconds, except during the download of the mission results. It is displayed in 24-hour format.

Alarm Mode

The Alarm Mode indicates the period at which the time alarm can occur. The possible alarm modes are: 'Alarm weekly', 'Alarm daily', 'Alarm hourly', 'Alarm minutely', and 'Alarm every second'. If no alarm mode was selected in the Wizard then the default mode is 'Alarm weekly'.

Alarm Time

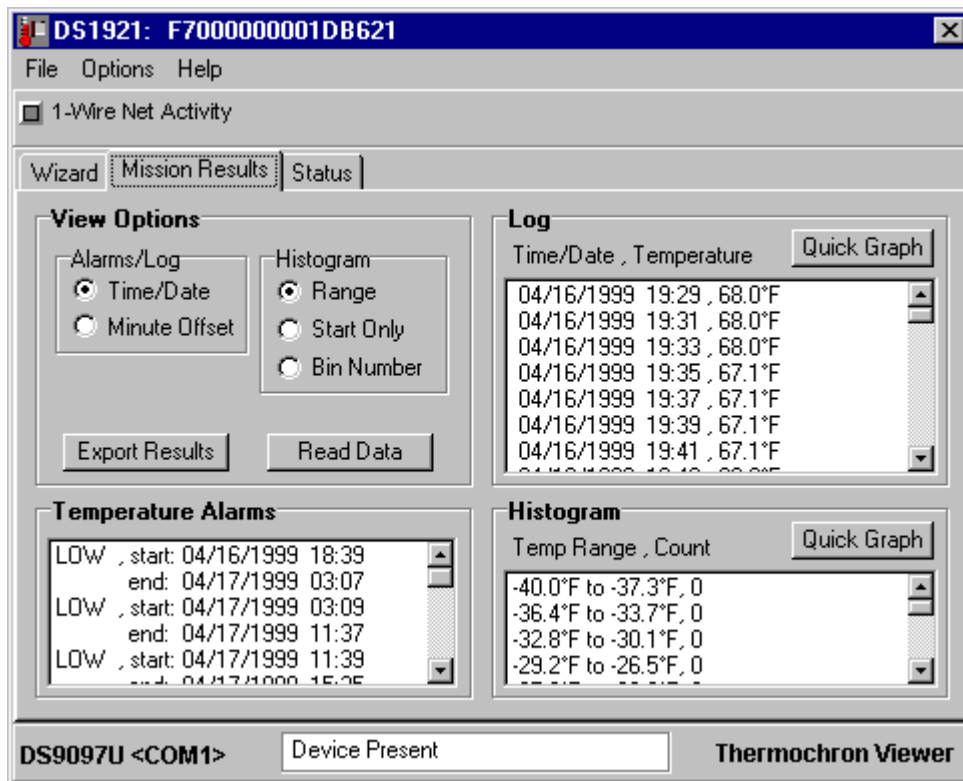
The Alarm Time will indicate the relevant time in the alarm mode when the time alarm will occur. The format of this will depend on the alarm mode.

Alarm Time Status

The Alarm Time Status below the 'Alarm Time' will indicate the settings and the state of the conditional search on a time alarm. There are two parts to the statement: 'Conditional' and 'Alarm'. The 'Conditional' part indicates the settings for the device to respond to a conditional search on an alarm condition. A value of (yes) indicates the device will respond to a conditional search on an alarm event. (no) indicates that it will not respond to a conditional search. In the same manner, the 'Alarm (yes)' part indicates in the same format if there is currently a time alarm condition.

Mission Results

The Mission Results tab displays the temperature reading results from the current or last mission. The mission results are automatically downloaded when the ThermoChron Viewer is started if there is a mission running. If the mission has been ended, then results can still be downloaded using the 'Read Data' button. The 'Read Data' button can also be used to refresh the result contents if the device has been connected long enough for a mission reading to take place.



View Options

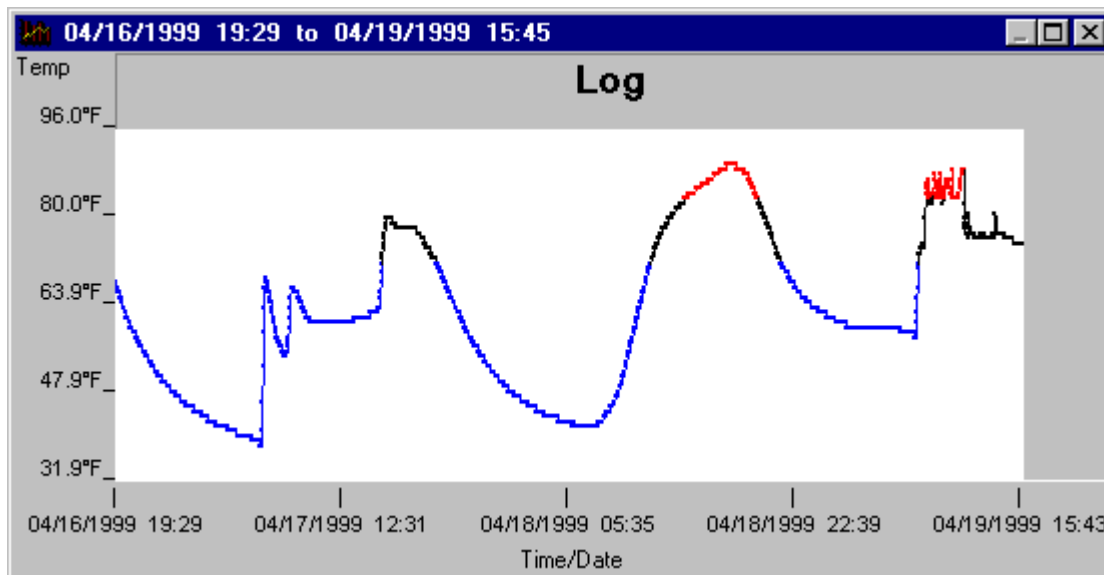
The View Options modify how the temperature reading results are displayed. The 'Alarms/Log' radio control selects displaying a true time/data or a minute offset from the beginning of the mission. This option affects the Log and Temperature alarms results. The 'Histogram' radio control selects the histogram display options. The 'Range' option shows a temperature range for each bin in the histogram. 'Start Only' displays only the starting value for each bin. 'Bin Number' displays a number 0 to 55 to indicate the bin number. The View options will be used in the export file and quick graphs.

The 'Export Results' button prompts for a text file to export all of the mission results and status. Note that there is a menu option to copy the same contents to the clipboard.

The 'Read Data' button will force the viewer to re-read the mission results. This can be used to refresh the result data if a mission is currently running and it has made new measurements.

Log

The Log displays the time-stamped temperature readings in a Listbox. The format for the entries is displayed above the Listbox (see View Options). The 'Quick Graph' button in the Log box will display a quick line graph of the data collected. The line graph is color coded to indicate values above (red) or below (blue) the temperature thresholds. For more sophisticated graphs it is recommended to use the data export features to import the data into another application with advanced graphing capabilities.



Temperature Alarms

The Temperature Alarms box displays the temperature alarm events. An alarm event is created when the temperature read during a mission goes outside the specified thresholds. There can be up to 12 high and 12 low alarm events. Each event lists the event type (High, Low) and the start and end time. A time/date stamp or minute offset will represent the time range depending on the view options.

Histogram

The Histogram box displays the temperature history as defined by 56 bins. Each bin represents a temperature range. When a temperature reading is made, the associated bin is incremented. Each bin can hold up to 65536 readings. The 56 bins are listed in a Listbox in the format specified by the view options. The 'Quick Graph' button displays the bar graph of the histogram data. The labels on the bar graph are in the format specified by the view options.

