

Scanning Devices Thermochron Application for Palm OS Users Guide

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Starting the Application

The *Application Start Screen* offers five large functions buttons. The small "i" in the top right corner of the screen displays a help page describing the button functions. In addition, tapping the Palm Menu icon displays action selections for reader tests, preference display/selection and about information.

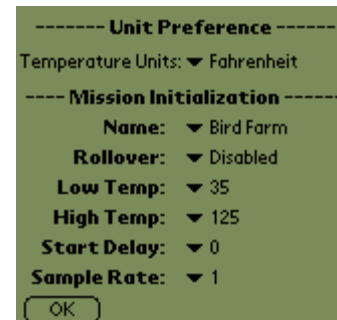


First things First - Set your preferences

To setup your Palm application, access the preferences from the Start screen. Tap menu, then Preferences, then Set Preferences. You should see the screen picture to the right.

You can select temperature units and mission initialization settings. Tap the items to show the current settings and edit them if you wish.

Preferences are used to setup missions with required information and to select temperature units for display. Tap OK when you have edited the preferences.

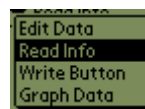


You can also use the palm menu from the Start Screen to test your iConnection to insure that it is attached and working and to identify its model and version.

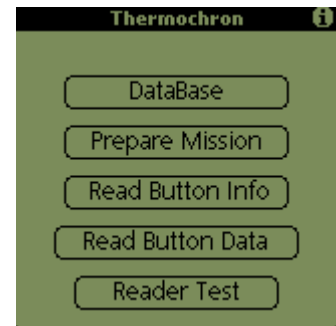
What You Can Do – Four Application Functions

The Palm application has four separate functions:

1. Editing Data
2. Reading from the Thermochron iButton
3. Writing to the iButton
4. Graphing Data



Four of the buttons on the start screen select function. Tapping any of the buttons selects your function and takes you to a screen to select the mission to perform the function. (Think of it like clicking File-Open on a word processor and seeing a list of documents to open.)



1. **Database** allows you to edit mission information. Tapping the database button takes you to the Database list form to allow you to select the mission to edit. Select a mission from the list or tap "New" to make a new database entry. Don't forget to SAVE your data when you are finished editing. For other operations, iConnection and an iButton must be attached.

2. **Prepare Mission** makes a new record. Tapping the Prepare Mission button takes you to a small screen to select how you want to fill in the new record. Select one of three ways:

1. Your preferences, accessed from Menu-Preferences, allow you to set mission name, temperature units, alarm ranges and start time. These are the minimum required parameters to start a mission. You can add more information to the mission table before starting the mission.
2. Your database - you can keep a new mission template in your database, edit it, start a mission, read the mission back and save it. Tip: read the mission back as NEW to create a new record and avoid overwriting your template.
3. The setup wizard takes you through a series of screens to collect mission data. Try the wizard a few times to understand what data is required.

After completing the process, mission data will be displayed and ready to edit. Make any changes to the displayed information. Don't forget to tap Save to save your changes. Then use the pop-up list at the top to select Write Button function. Then START to start the mission. If STOP is displayed, a mission is already running in the iButton and must be stopped to start a new one. Press STOP then START.

3. **Read Button Info** - Tapping the Read Button Info takes you to the Database List Screen with your function set to Read Button. Select a mission from the database or NEW to make a new entry. Make sure you have an iButton attached to the iConnection probe. Then press READ to read and display information from the attached iButton, SAVE to store it in the database.

4. **Read Button Data** - Tapping the Read Button Data takes you to the Database List with your function set to Graph Temperature Data. Select a mission from the database or NEW to read a new one. Make sure you have an iButton attached to the iConnection probe. Then tap READ to read and graph temperature data. On first read, every 16th point is graphed. Tap on Zoom IN <->, Zoom OUT -><-, Left <-, Right -> symbols to move around the graph. Upper right field displays frequency and range. Initial display is 16 0-2048 indicating that every 16th sample is displayed starting at 0 and ending at 2048. INFO button switches display to mission info.

(The fifth button on the start screen tests the iConnection reader attached to your Palm.)

Application Screens

Most application work is done from three screens:

1. **Database List** - shows you a list of the thermochron iButtons in your Palm Database. Tap one on the list to display its information. Tap new to make a new record. Or tap Search to find all records for the attached thermochron iButton. The application reads the iButton serial number, then lists all the matches for the serial number found in your database.



2. **Mission Data** - displays information about the mission: name, number, when it started, sample rate, projected time when 2048 samples will be collected, time of the last reading, number of samples collected at the last reading.

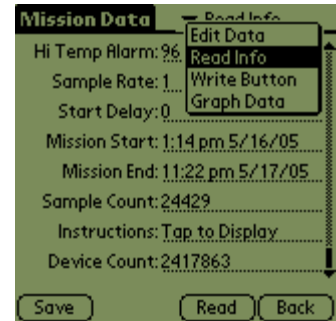


The display in the upper right corner of the Mission Data Form lists your current function. *Editing Data* is shown in the picture to the right.

Tapping on the display pulls down a menu and lets you change the function:

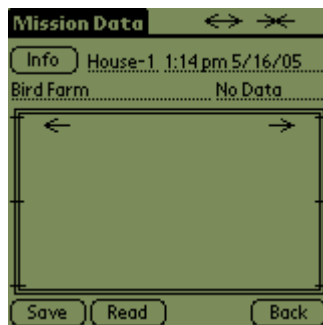
Read Info, Write Button or Graph Data.

Tap the display to drop down a menu and select from that menu to change the function.



If you select Graph Data you are taken to the Temperature Graph Screen.

3. **Temperature Graph** - generates a graph of temperature data read from iButtons or from temperature data retrieved from the Palm database.



When you access the Temperature Graph Screen with your function set to Read Data, the screen is blank and the *Read* Button is displayed as shown to the left. Tap this button to read temperature data from the attached iButton and display it, as shown to the right.



After reading, the application generates its initial display with every 16th point graphed in order to display the full range on one screen. Tap Zoom IN <->, Zoom OUT -><-, Left <-, Right -> symbols to move around the graph. Upper right field displays the interval (1 of 16, 8, 4, 2, 1) and range. Initial display is 16 0-2048 indicating that every 16th sample is displayed starting at 0 and ending at 2048. Mission information and mission start date and time are also displayed for reference.

When you access a database record with your function set to Graph Data, this screen does just that, draws a graph using temperature data from your database.

Tap on the screen in the area of the graph and a window will open to display the date, time and temperature reading. The window will remain displayed as long as you hold your stylus on the screen.

Tapping the *Info* button takes you to the display to **Mission Data** screen.

Don't forget to tap the Save Button to save data read from the iButton.

Starting a Mission

Missions are started from the **Mission Data** Form. Use this procedure:

1. Fill in and check required and optional fields. See below for details.
2. Select *Write Button* Function from drop-down menu in the upper right corner of the screen.
3. Make sure an iButton is attached to the probe.
4. If the *Start* button is visible, tap it. The application will attempt to start a new mission in the attached iButton using the information displayed in the **Mission Data** Form.

If the *Stop* button is visible, a mission is still running in the iButton. It must be stopped before a new mission is started. Make sure that you have saved any data from the attached iButton as stopping and starting will overwrite data in the iButton. Then tap *Stop*. The application will attempt to stop the mission and display the *Start* button.

5. After the mission is started, the application reports the event and switches the function to Read.

Tap Read and Save to save the data in the Palm database.

Required Fields

Enable and Rollover Selection

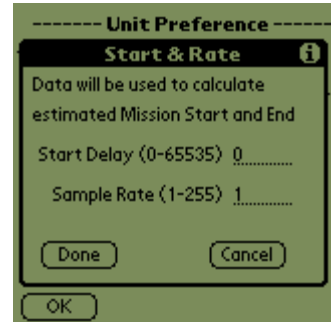
1. Enable - must be checked to log temperature.
2. Rollover - check Rollover to continue logging beyond 2048 samples.. If checked, after 2048 samples, new samples overwrite (*roll over*) the oldest samples. The temperature data is the latest (most recent) 2048 samples If unchecked, logging stops after 2048 samples.

Make these selections by tapping the Time Alarm field in the **Mission Data** Form. The Setup Wizard takes you through this selection form.



Sample Rate and Start Delay

- 3. Sample Rate is the interval between measurements.
 - 4. Start Delay is time in minutes. After "Starting" the mission by writing to the iButton, temperature logging will start this period of time later.
- You can set these parameters in one of two ways.



If you set a specific start delay, temperature logging will start at a time depending on when you write the start command to the iButton.

If you specify a specific start date and time using the Palm Calendar, temperature logging will start at that date and time as long as you issue the start command to the iButton before the specified date and time (We can't make time run backward. An error message will be displayed if you are late for the start.)



If you set a specific sample rate using the Start & Rate screen shown above, that setting will be used to determine the interval between samples.

Alternately, if you use the Palm calendar to select Mission Start and Mission End as shown to the right, the application will calculate the sample rate necessary to collect 2048 samples in the interval between selected Mission Start and Mission End. Be careful using this method as fractions of a minute are not allowed, a limitation which may effect your selections for small intervals.

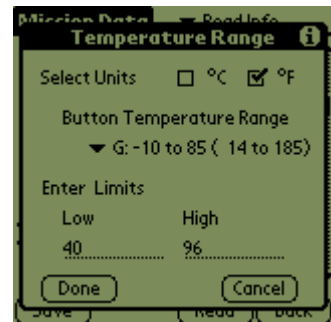


5. Temperature Units, Range and High/Low Alarms

Access the **Temperature Range** screen by tapping the High or Low Temp Alarm fields in the **Mission Data** Form. The Setup Wizard takes you through this selection form.

Check Fahrenheit or Centigrade *Units* to display temperature data.

The application supports 3 *Temperature Ranges*, one for each iButton type in use. Select the range and then select the high and low temperature alarms. Your selection is subject to rounding, as the temperatures are discrete integers, not continuous. The iButton models and temperature ranges are:



- G: -10 to 85 degrees C (14 to 185 degrees F) in .5 degrees C increments
- H: 15 to 46 degrees C (55 to 114 degrees F) in .125 degrees C increments
- Z: -5 to 26 degrees C (23 to 78 degrees F) in .125 degrees C increments

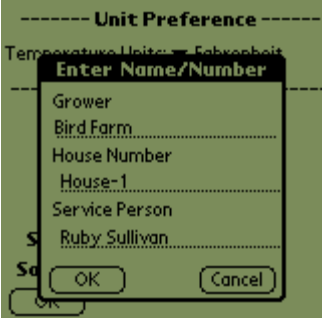
High and Low Limits

You can specify an acceptable temperature range with a high and low limit. If an out-of-range temperature is logged, a high alarm or low alarm flag will be checked on reading. This flag is displayed on the same form that the Enable and Rollover selections are made.

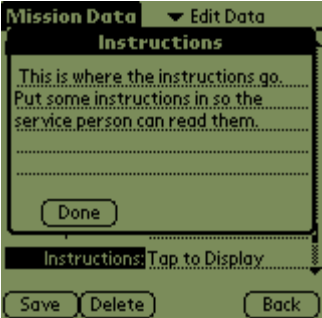
When you issue the start command, the application will check the iButton serial number to insure that the temperature range you have selected is consistent with the iButton model. If it is not, an error message will be displayed.

Optional Fields

1. *Mission Name* and *Number* - while not required, these are helpful to identify missions. Data may be entered using the Setup Wizard, from your Application preferences, or edited directly in the Mission Data Form. When you start your mission, name and number are written to the iButton. Mission name and number are listed and visible in the Database form, helping to select missions from the database.



2. *Instructions* (or other text data). The application allows you to enter a text information (up to 128 characters) which will be written to the iButton and labeled Instructions. This is useful as a note or message, recorded at the time the mission is started and read at a later time.



After completing required fields and selecting optional fields, press the start button

Other Read-Only Fields

1. *Status* - updated when the iButton is read. It records and displays if a mission is running or stopped, if alarms have been recorded. Status is displayed on a pop-up screen when the Status field is tapped in the **Mission Data** Form.

2. *Button Time* - time is set when the mission is started using the Palm clock as the data source. When you read data, this field records the current button time. You can interpret it as the time of the reading.

3. *iButton ID* - each iButton has a unique serial number. The application uses this serial number for many purposes: to make sure an iButton is attached to the probe, to determine if it is a thermochron iButton (there are other non-temperature types), to learn the iButton model and temperature range. The serial number is displayed in the mission data form and saved in the Palm database.

4. *Mission Sample Count* - shows the number of samples collect in the current mission.

5. *Device Sample Count* - shows the number of samples this iButton has collected (cummulative of all missions).

Reading Mission Information and Graphing Temperature Data

Just a few taps are required to read a mission. Tap Read Info from the start Screen. This takes you to the database list to identify the mission you are attempting to read. Make sure there is an iButton attached to the probe.

Tap Search to read the serial number of the attached iButton and look for it in the database.

Or tap New to open a blank iButton record and then Read to populate it with data from the iButton.

Or if you recognize the mission as listed and want to update it with new data from the iButton, tap it and then tap the read button to read mission info. Be careful as this procedure updates database information with new information read from the iButton. It does not create a new record. This displays name, number, iButton ID and time, alarms, number of samples.

Drop down the function menu and select Graph Data. This takes you to the Temperature Graph Screen.

Tap Read to get temperature data from the iButton and graph it on the screen. Tap on Zoom IN <->, Zoom OUT -><-, Left <-, Right -> symbols to move around the graph.

Tap Save to store data read from the iButton in the Palm database.

iConnection Testing and Information

The menu accessible from the Start Screen launches test and information functions.

Reader Check issues a command to the reader and checks its response to insure that it is connected.

Reader Info reads and displays the reader model and version.



Other Functions

Beaming Temperature Records.

Individual Mission Records and the Complete database can be beamed from one Palm Handheld to another using the menus in the Database List Screen and the Mission Data Screen. This is a convenient way to consolidate data from several Palms into one.

The application supports sending and receiving individual records or complete databases. Beaming data is equivalent to copying from one Palm to another. Beamed data remains on the originating Palm.

Searching

The application supports the Palm Lookup function for text data in the Mission Name, Mission Number and iButton Serial Number fields.

Screen by Screen and Button by Button

Here is some detail on what you can do from each screen and with each button.

1. The Application Start Screen

DataBase sets the function to Edit Data and takes you to the database list form with the intention to edit an existing record or create a new one. You can do this without an iButton or iConnection attached.

Prepare Mission sets the function to Write Data. It gives you three options on how you want to prepare the mission: Select it from a database item that you have previously prepared as a template; use your preferences to build a new mission item or use the Wizard to take you through a series of setup screens.

After your preparation, you will see your mission setup information displayed.

Read Button Info sets the function to Read Data. It takes you to the database list with the intention of reading and displaying mission information (not temperature data) from the iButton.

Read Button Data sets the function to Graph Data. It takes you to the database list with the intention of reading and displaying mission temperature data in graphic form.

Why are there two separate methods to read an iButton? Reading Information about a mission is a fast operation. Reading temperature data takes more time. You can read the information quickly first, look it over to see if you want to or need to read the temperature data.

Reader Test performs a check to see if the iConnection is attached properly. It issues a command to the iConnection and waits for its expected response. You should see a message to tell you if it got the right response. If not, you may have to re-seat your Palm in the iConnection socket.

The small ‘i’ in the top right corner is an information icon. Tap on it and you will see a page describing the actions you can take from this screen. Most ThermoChron screens have an information icon.



2. Database List Form

Each mission in your Palm database is listed in one line. The line consists of the iButton serial number, the mission number you have assigned and the mission name you have assigned.

If you tap on the line, you will “open” this item and display its mission information or temperature data graph. Which one you display depends on the current function setting that was made on the Application Start Screen.



Three buttons give you other choices:

New – makes a new database item with your preferences and displays the mission information or temperature data graph, depending on the current function setting.

Search – reads the attached iButton serial number and looks for it in the database. It lists all the mission items that match the serial number. There is a lot in that last sentence.

First, you should have an iButton and iConnection attached or the application will respond with a “No Button or Wrong Button found” message.

Second, you might have more than one item stored for a unique iButton serial number. If you have a habit of reading and saving mission information and temperature data using **New**, then you will be accumulating many items from the same iButton.

Consider this method: When you come upon an iButton to read, use **Search** to check if it is in your database already.

If not, then you will see “No matching items found” as the only entry in the list. Then use **New** to make a new item.

If you see one or more, consider opening one of the listed items and update it with new information or temperature data from the iButton.

Back – returns to the Application Start screen.

3. Mission Information Form

This form is organized as a table with *information labels* on the left side and *mission information* on the right. It also has seven buttons, although no more than 4 can be displayed or are active at any one time. It also shows the current function selection in the top right corner.



Here is what you can do from this form:



Select you function - tap in on the Edit Data and you will drop down a list of the four application functions. Select the one you want by tapping on it. Buttons appear and disappear depending on your selection.

If your function is:

1. Edit Data – you can change any data by tapping on the mission information on the right side. Either editing is done by pop-up form or in-place using Palm editing techniques. Pop-up forms are used for entering and editing specific information elements that the application checks for consistency. Text fields such as mission name and mission number use Palm editing including graffiti or the on-screen keyboards.

Editing data does not change any information in the iButton. It works only on data in the Palm database. Select the Write Button function to change data in the iButton.

Three buttons are displayed:

Save – takes information from the screen and updates the current item in the database. If you got to this display by making a new item, it saves it as the first item in your database.

Don't forget to save your data after editing as it is not automatic. If you attempt to leave this screen with unsaved data, you will see a reminder.

Delete – does just what it says, deletes the current item from your database. You will be asked to confirm the delete. Be careful because there is no un-do for the delete after you confirm.

Back – takes you back to the Database list form.

2. Read Info – you can read from the iButton. You can read in several ways.

Tap in the field - If you tap on the information label or on the mission information displayed, the application reads that data element from the iButton. For example, if you

want to see the current iButton time setting, tap on it and the application will read it from the iButton and display it. No other information will be read or changed.

Tap the read button – this reads and updates all the information fields on the screen (including the fields that have been scrolled out of view). Information updates only the screen. Don't forget to tap Save if you want to keep it.

Three buttons are displayed:

Read – Reads all the information fields from the iButton and displays them on the screen.

Save – takes information from the screen and updates the current item in the database. If you got to this display by making a new item, it saves it as the first item in your database.

Back – takes you back to the Database list form.

3. Write Button – this function takes information from the screen and writes it to the iButton. While you might think that this should be a simple operation, there are several complications. Read on.

Three buttons are displayed. Save and Back are always displayed, but the third depends on the status of the iButton's mission.

Stop - If the iButton's mission is running, then writing mission information may cause it to stop. In this case, the Stop button is displayed. Use the stop button to stop the mission without loss of data.

Start - If no mission is running, then the Start button is displayed. Use the start button to start a mission. It generates the proper sequence of commands to start the iButton mission using the information displayed on the screen.

Starting a Mission

Use this method to start a new mission in an iButton:

If a mission is running, (you will see the stop button or check the status information), select the *Read Info* and then *Graph Data* functions to read the mission information and graph temperature data from the iButton.

Save information and temperature data from the running mission if you want.

Select the *Write Button* function. The Stop button appears.

Tap Stop. You will see a message that the mission has been stopped and the Start Button appears.

Don't tap start yet! Update the display with the information you want to use to start the new mission, either from your database template item, using your preferences or the Application Wizard. You may have to change the function to Edit Data or go back to the application start screen to startup the Wizard.

When the information is set for the new mission, then tap Start. You will see a confirming message.

Updating information in the iButton when a mission is running.

Three text fields may be updated when a mission is running: Mission Name, Mission Number and Instructions.

When the Write Button function is selected, tapping the information label (left side of the palm screen) for these items writes the information displayed (right side of the palm screen) to the iButton without effecting the status of the mission. A confirming message will be displayed. Instructions are edited in a pop-up form and then written to the iButton.

4. Graph Data – Selecting this function displays a screen for graphing temperature data.

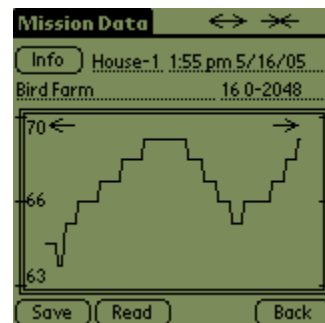
The screen has four buttons, four sets of arrows for navigating the screen and four display fields in addition to the graph area.

If you have reached this screen while making a new item or by selected an item from your palm database with no saved data, then you will initially see a blank graph as show to the right.



Tap the Read button to read temperature data from the attached iButton and generate the graph.

If you have reached this screen by opening an item from your database and if that item has saved temperature data, the data will be graphed automatically as shown to the right.



The Info button in the upper left corner changes the function to Read Info and takes you back to the Mission information display for this iButton. It reads information from the attached iButton on its way.

The Save and Back buttons are the same as on the other screens:

Save – takes information from the screen and updates the current item in the database. If you got to this display by making a new item, it saves it as the first item in your database.

Back – takes you back to the Database list form.

The four display fields identify the mission by its information: Mission Number (upper) and Mission Name (lower) in the upper left, Mission Start Time in the upper right. The field below the Mission Start Time describes the temperature data points being displayed.

About the graph:

The Palm screen allows 128 data points to be displayed at any time. Since there are 2048 temperature points in the data read from the iButton, the application compresses it and gives you several options.

On the initial read and display, 1 of every 16 points is displayed in order to get the full range on the horizontal axis of the graph. The vertical scale is adjusted to provide the maximum span within the range of points displayed. The “16 0-2048” displayed in the field just above the graph on the right indicate the 16 point interval and the range of the points displayed.



The \leftrightarrow and $\rightarrow\leftarrow$ symbols change the compression interval. Tapping \leftrightarrow repeatedly expands from an interval of 1 of every 16, to 1 of 8, to 1 of 4, to 1 of 2 and finally to every point. Tapping $\rightarrow\leftarrow$ repeatedly takes you back the other way. The display updates to show the range of points displayed.

Remember only 128 points can be displayed at any one time. So four taps on \leftrightarrow will display points 1-128. To change the range within an interval selection, use the \leftarrow and \rightarrow symbols within the boundaries of the graph. Tapping \leftarrow moves 128 points to the left. Tapping \rightarrow moves 128 points to the right.

Each time you change the interval or range, the vertical axis is re-scaled to show the maximum resolution of temperature within the range of points.

To identify a specific point, tap on in the graph area. A window will open with a display of the date, time and temperature of the point.

Don't forget to save your data if you have read new data from an iButton. Only temperature data is saved. The application does not save the interval or range settings selected when the Save button is pushed. The graph always starts with the interval set at 16 and the range set at 0-2048. The temperature axis is always scaled to maximize temperature resolution.