

Scanning Devices ThermoChron Application for Window Mobile Users Guide

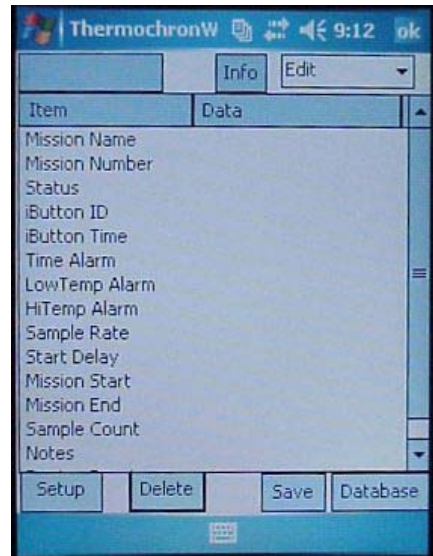
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Starting the Application

This document assumes that Windows Active Sync (or equivalent) has been installed on the PC, the application has been installed on the Handheld, the Handheld’s Bluetooth Manager has been paired with the 3307 Wireless iConnection, and a Bluetooth Shortcut has been established. These four tasks are described in the PTL5 Installation Guide and should be completed before attempting to use the ThermoChron22WM Handheld Application. Screen photos have been taken using a HP iPAQ Model 211 Handheld and Windows Mobile Version 6. Screens on other handhelds using other Windows Mobile Versions may differ.

Where is the application program? It is in the Handheld’s “My Documents” folder. Navigate from the WM Start Screen by tapping File Explorer and (if necessary) My Documents. The Application is: ThermoChron22WM. Tap on the application name or icon to start.

Where is the data? Data is in the Handheld’s My Documents folder in the file named: “Mission22data.tcf”. ThermoChron iButton mission data is saved sequentially as read in this file. Once opened, the application accesses the file through the “Database” button on the opening screen, shown in the picture to the right, listing each iButton mission record as a line on the database display.



The application starts in Edit mode with the *Application Start Screen* data table blank. Think of this as starting a word processor with a blank page. The wireless link to iConnection is not established. From this screen you can do several things using the buttons and menus on the screen:

Setup – Set preferences including the Bluetooth virtual comport (very important), pre-loaded mission identification and parameters, iConnection timeout values and more.

Database – access the thermchron database to display records on file and load one (like accessing a document using your word processor).

Info – establish a Bluetooth link to the iConnection to display identifying information.

Select a different function from the drop-down list in the upper right – four are available:

Edit (shown in the photo above), *Read*, *Write*, *Graph Data*

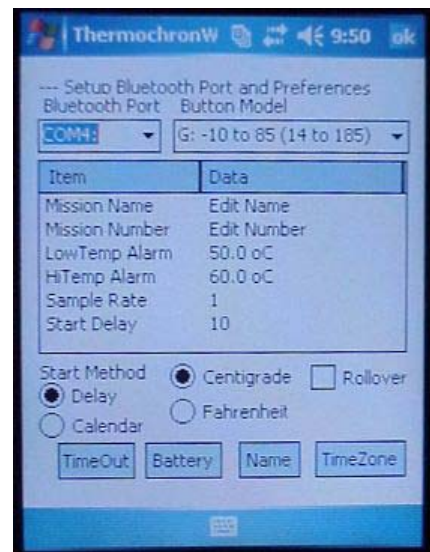
First things First - Set your preferences

If you have not already done so during installation, setup your application preferences now. Tap the Setup button in the lower left corner of the start screen to open the Setup Screen.

The setup screen presents eleven selection and editing items.

1. Very Important - ComPort - select the same com port that you chose in handheld Bluetooth setup. Drop down the list of available com ports and highlight one to select it.

2. Default iButton Model - this ThermoChron application version supports three iButton models in the DS1921, DS1922 and DS1923 series. The three vary by temperature range and resolution. When you open a new mission for editing, the default model selected here is the starting point for preparation. Model G selection is shown in the figure to the right. Drop down the list to make a selection.



3. Six parameters for missions: Name, number, low and high temperature alarm limits, sample rate and start delay. These can be edited on the setup screen. They provide the starting point for constructing new missions. Tap on the identifying label "Mission Name" for example, to open an editing screen for that value. Editing may also be done from the start screen when in edit mode.

4. Start Method - relative (Use Delay) or absolute (Use Calendar). The relative selection starts logging the number of minutes in the start delay variable after loading the iButton. Absolute uses the date and time you select. When to use each? If you want to start logging now, set start delay at zero and select the "Use Delay" option. As soon as you load an iButton, logging starts (at the next minute transition of the iButton clock). If you have a number of iButtons that you want to start at the same time, "Use Calendar". Load them all with the same date and time. They will start in unison.

5. Temperature Units - select your preferred units for data display.

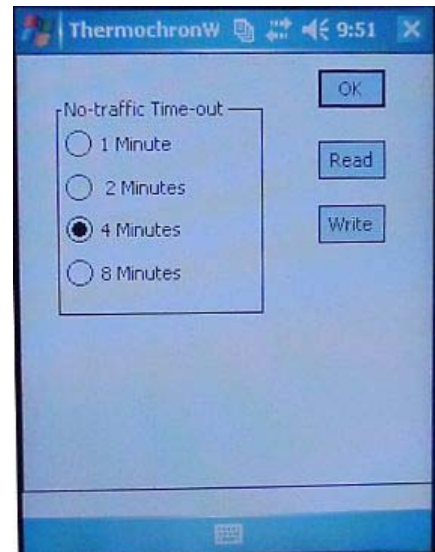
6. Rollover - the iButton memory capacity for saving samples is specified by the iButton model and measurement parameters. When the memory is full, a check in the Rollover box instructs the iButton to continue logging, saving new samples by replacing the oldest. Sample memory contains the most recent data. Leave the Rollover box unchecked and the iButton stops logging when the sample memory is full.

Additional Setup Screens

Time Zone - Windows Mobile devices do not all support time the same way. In order to synchronize time with your PC, you must specify your time zone and use of daylight savings time. Windows PC's use a combination of Greenwich Mean Time (GMT), time zone and daylight savings time as the time base. This selection synchronizes the handheld with your PC.

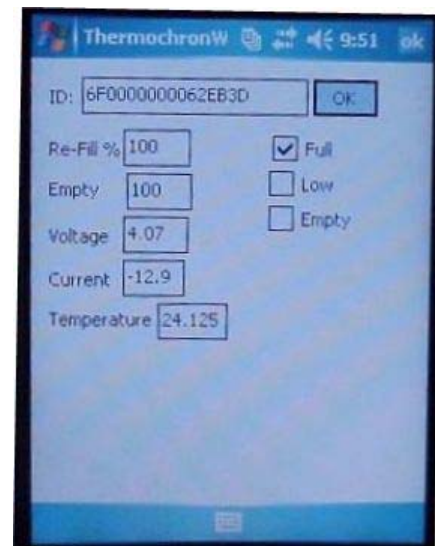


Timeout - To preserve its battery life, the iConnection has a timer that measures the duration in which no wireless traffic is observed. If the iConnection timer reaches a preset programmable time, 1, 2, 4, or 8 minutes without traffic, the iConnection will be powered down. You can set this timeout period from the Setup Menu.



Battery - interrogates the iConnection battery and provides a status display. This battery status screen warns of low battery conditions in the iConnection or other out of limits conditions. The 3307w includes a 110 VAC wall transformer charger that plugs into the iConnection mini-panel connector. When charging, the iConnection is disabled. An optional 12 VDC Automotive charger (Part # 3395a) is available from Scanning Device Inc. with a connector compatible with automotive cigarette lighters or comparable power outlets. .

When you close the Setup Screen with the OK in the upper, your preference selections are saved in the handheld.



Navigating the Application – Four Application Functions

The ThermoChron application has four separate functions:

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

Function is selected by the drop-down menu on the start screen as shown in the figure to the right.

1. **Edit** allows you to edit and update on-screen mission information. You can access a mission record from the handheld database, a blank record for editing or a new record populated with your preference data from the setup screen.

After editing, you can save the screen data in the database.

The Delete button purges the on-screen record from the database.

Tapping the database button, lower right corner, takes you to the Database screen to allow you to select the mission to edit.

The Database screen offers a search button – read the serial number of the attached iButton and list all database records that match – a handy feature if you have numerous iButtons and want to locate a specific one.

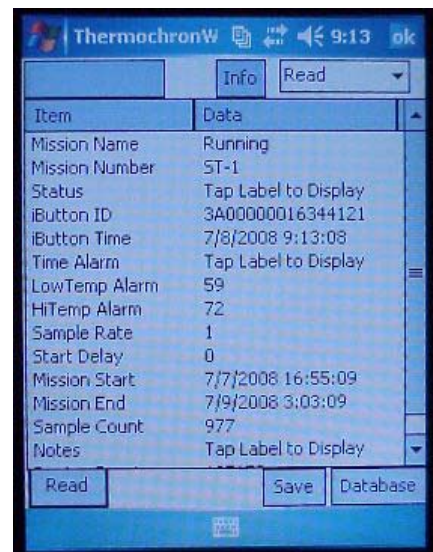
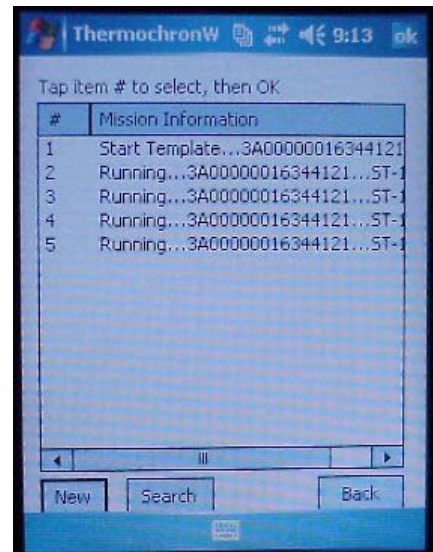
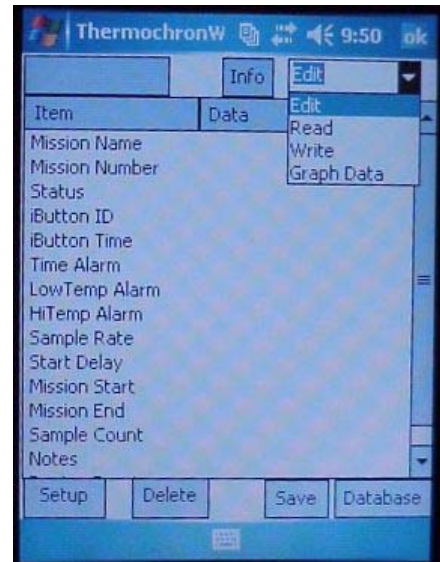
Tap the item # in the left column to select a record. The record will then be loaded into the display screen.

2. **Read** – Selecting the Read Function displays the Read Button in the lower left corner of the screen.

Tapping the read button generates a command to iConnection and transmits it over the wireless link.

If the wireless connection is not established, the application opens the serial port selected in Bluetooth setup and attempts to establish a connection. The iConnection must be powered up (start button pushed) and ready (green LED on).

When a connection is established, the Blue LED is on, indicating that the iConnection is ready to receive a command.



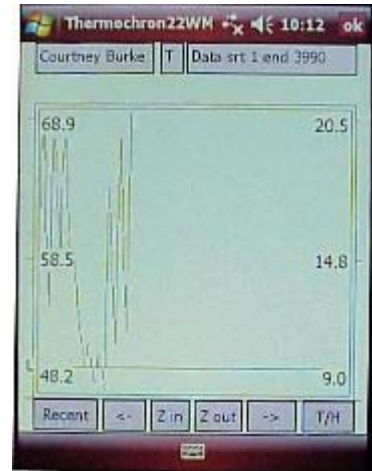
iConnection responds by reading the contents of the attached iButton and returning the data to the application. All thermochron mission parameters and data are read with a single tap on the Read button.

If successful, the data is displayed in the data table.

The Read operation does not save the data in the handheld database. That task is left to the save button. The user should examine the data to see if it is as expected and then make a decision to save or take some other action.

3. Graph Data – Temperature data is read along with the mission parameters shown in the figure above. To show a time/temperature graph, select the graph data function from the drop-down menu. This opens the graph screen.

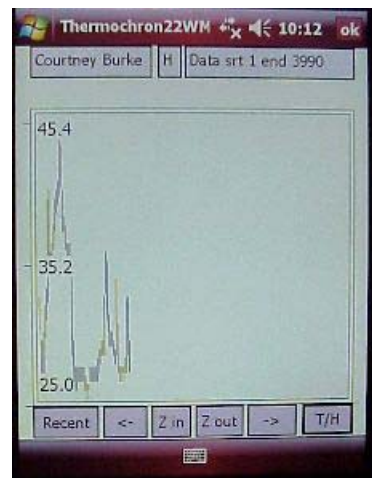
The graph consists of a series of vertical lines representing temperature samples in a given time period. The line is drawn between the minimum and maximum temperatures recorded in the period. The number of samples depends on the zoom level selected. The screen accommodates 128 vertical lines. The initial display is built a variable number of samples per vertical line calculated as (iButton capacity)/128. The horizontal axis is not labeled. The mission name and the starting data point (left most data point) is referenced at the top of the display.



The vertical axis is labeled with temperature (°F on the left, °C on the right). The display is scaled vertically to the minimum and maximum measurement values, displaying the range of values in the full vertical range. If temperature or humidity limits have been established and if they fall within the display, a horizontal line labeled with “L” or “H” is drawn at the limit.

Zoom In to display a smaller number of samples per line and a smaller region of the time axis. Zoom Out to display a larger number of samples per line and larger region of the time axis.

Move to the right or left within the graph with the arrow keys. If using the DS1923 iButton with both temperature and humidity logging enabled, two displays are available. The button in the lower right corner switches the display between temperature and humidity. The small box in the top center shows “T” or “H” to indicate the data being displayed.



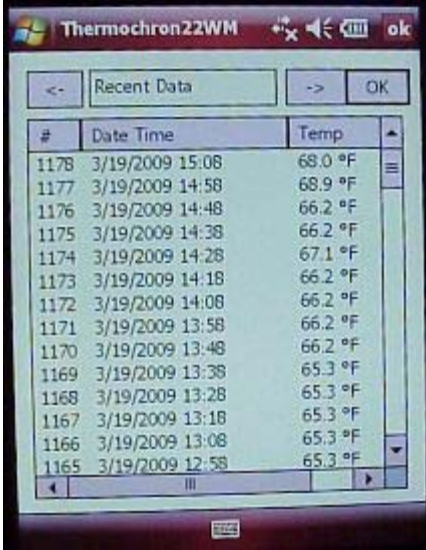
Tap and hold in the graph area to open a display screen with the date/time, temperature and index of the samples that make up the vertical line at the point of your tap. Alternately tap the “Recent” button in the lower left corner to display the most recent measurements.

Use the “Recent Data” right and left arrows to display tabular data from the next vertical line in the graph.

Tap OK in the upper right to return to the graph screen.

The graph screen has no facility to read data from an iButton or save data. It operates as a display only for data previously read.

Close the graph screen and return to the main screen by tapping on the OK in the upper right corner.



The screenshot shows a handheld device screen titled "ThermoChron22WM". At the top, there are navigation icons and an "OK" button. Below the title bar, there is a "Recent Data" header with left and right arrow buttons and another "OK" button. The main area contains a table with three columns: "#", "Date Time", and "Temp". The table lists 14 rows of data, with the most recent entry at the top (row 1178) and the oldest at the bottom (row 1165). The temperature values range from 65.3 °F to 68.0 °F.

#	Date Time	Temp
1178	3/19/2009 15:08	68.0 °F
1177	3/19/2009 14:58	68.9 °F
1176	3/19/2009 14:48	66.2 °F
1175	3/19/2009 14:38	66.2 °F
1174	3/19/2009 14:28	67.1 °F
1173	3/19/2009 14:18	66.2 °F
1172	3/19/2009 14:08	66.2 °F
1171	3/19/2009 13:58	66.2 °F
1170	3/19/2009 13:48	66.2 °F
1169	3/19/2009 13:38	65.3 °F
1168	3/19/2009 13:28	65.3 °F
1167	3/19/2009 13:18	65.3 °F
1166	3/19/2009 13:08	65.3 °F
1165	3/19/2009 12:58	65.3 °F

4. Write – The write function sends screen data to the iButton. There are three variations on the write function depending on the status of the iButton and the type of data.

When selecting Write, the application attempts a limited read operation to determine the status of an attached iButton. If the wireless link is not established, the application attempts to make a connection. When selecting the write function, make sure that the iConnection is powered up and ready and that there is a ThermoChron iButton attached.

A. *Text Data* - the Write function allows text data, Mission Name, Mission Number and Notes, to be sent to an iButton without affecting the status of a running mission. Create or update text data while in Edit mode. Save if necessary. Switch to Write Mode. Tap on the table label, “Mission Name” or “Notes” to write the text data to the iButton. The application displays a indication that data was written successfully.

Updating text while running may be a useful feature to update notes or other text with observations or other information.

B. *Stop* - If the iButton mission is in process, the application displays a Stop button. This indicates that continuing the write sequence may result in a loss of data. Check the status of the iButton to be sure that you want to continue. Tapping the Stop button halts the mission. If the operation is successful, the Stop button is hidden and the Start button is displayed. An indication of success is also displayed.

C. *Start* - Tapping Start sends the mission parameters from the screen to the iButton and starts a mission. An indication of success is displayed. A more detailed procedure for starting missions is described below.

Starting a Mission

Missions are started from the **Main Screen**. Use this procedure:

1. Start in the *Edit* Function. Fill in and check required and optional fields. See below for details.
2. Make sure an iButton is attached to the probe.
3. Select the *Write Button* Function from drop-down menu in the upper right corner of the screen.
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 on the **Main Screen**.

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

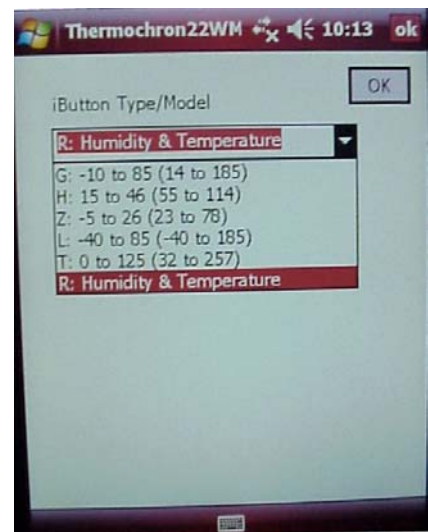
Logging setup depends on the iButton Model.

1. *Select the model iButton in use:*

Tap on the “Type/Model” label to open the selection screen. Drop down the menu and highlight the model in use. Tap OK to return to the main screen with your selection.

The application supports 6 *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 degree C increments
- H: 15 to 46 degrees C (55 to 114 degrees F) in .125 degree C increments
- Z: -5 to 26 degrees C (23 to 78 degrees F) in .125 degree C increments
- L: -40 to 85 degrees C (-40 to 185 degrees F) in .5 or .062 degree C increments
- T: 0 to 125 degrees C (32 to 257 degrees F) in .5 or .062 degree C increments
- R: -20 to 85 degrees C (-4 to 185 degrees F) in .5 or .062 degree C increments
plus relative humidity logging



2. *Select the logging function.* Tap the “Setup” label to open the selection screen. The iButton type that you selected in step 1 will be displayed.

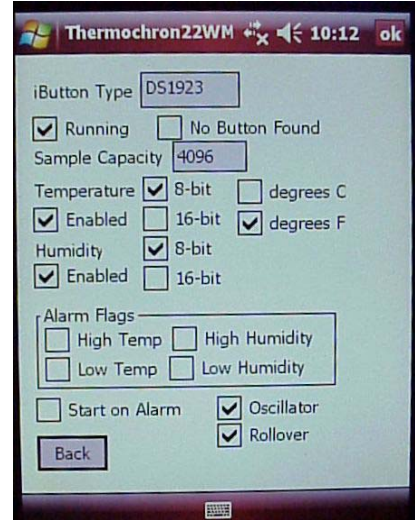
Check boxes to enable temperature logging, precision (fixed on DS1921, selectable on DS1922 and DS1923).

Alarm flags are not used in setup, they report status of data read from iButtons.

Oscillator must be checked to enable logging. This selection may be used to stop the iButton’s oscillator to preserve battery life for long term storage when not in use.

Rollover - check Rollover to continue logging beyond 2048 samples. If checked, after filling the iButton’s memory capacity with measurements, new measurements overwrite (*roll over*) the oldest measurements. Temperature or humidity data is the latest (most recent) measurements. If rollover is unchecked, logging stops after memory capacity is filled.

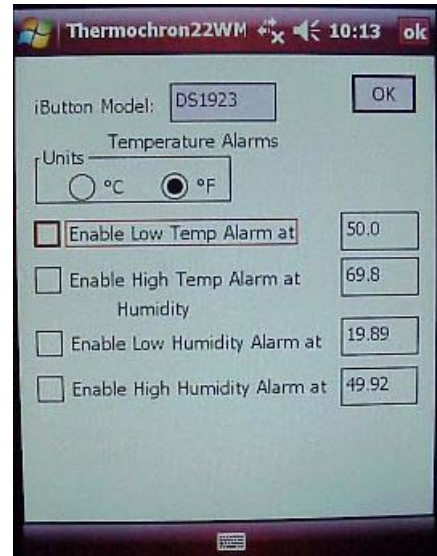
Tap OK to return to the main screen with your selections.



3. *Alarm Selection* - Tap the High or Low Alarm label to open the selection screen.

This screen allows you to select the temperature units, enter and enable alarm limits for temperature and (for DS1923) humidity.

Tap OK to return to the main screen with your selections.

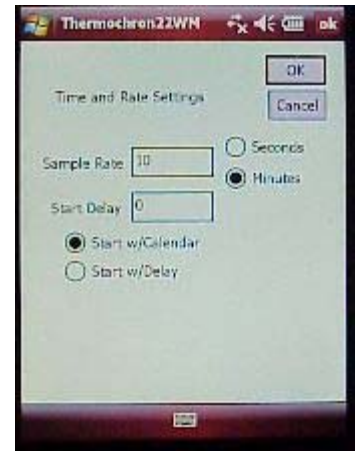


4. *Start and Sample Rate Settings* – Tap on the Start Delay or Sample Rate Labels to make these selections.

The combination of *Sample Rate* and *Start Delay* determine the period during which measurements will occur and data will be available.

The value in the *Sample Rate* box indicates the time between samples in minutes or (optionally for DS1922 and DS1923) seconds. Select a sample rate large enough to span the time period of interest while small enough to capture short duration variations in data.

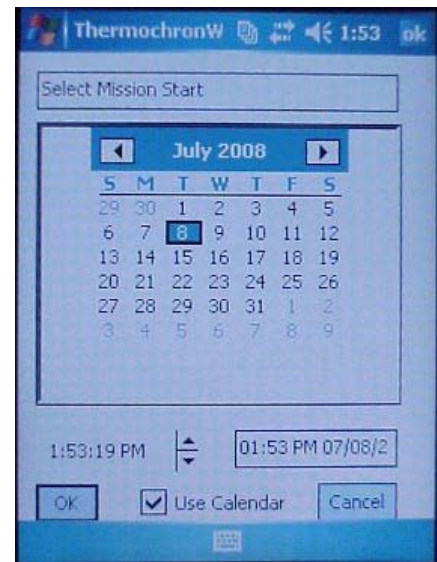
Start Delay is a time period during which the iButton waits to start logging after loading with the start command. As shown in the photo to the right, the Start Delay is 0, indicating that measurements will be taken at the next clock minute after start. (As selected in the photo, measurements are taken on the minute.)



The select of *Start Method* is absolute (start w/calendar) or relative (start w/delay). The relative selection starts logging the number of minutes in the start delay variable after loading the iButton. Absolute uses the date and time you select.

Alternate Delay and Rate Selection – use the handheld’s calendar to make the selections.

Tap in the “Mission Start” and “At Capacity” items in the main screen. The date/time selector shown to the right will be displayed. Select a start date and time to start. Repeat for at capacity (end time if rollover is not selected, see item 2, logging selection, for details. The application will compute a start time and sample rate to satisfy your selections, then adjust them at the time you issue the Mission Start command to the iButton.



With these four selections, you have filled the minimum fields necessary to begin logging.

Optional Fields

There are optional fields that you may find valuable.

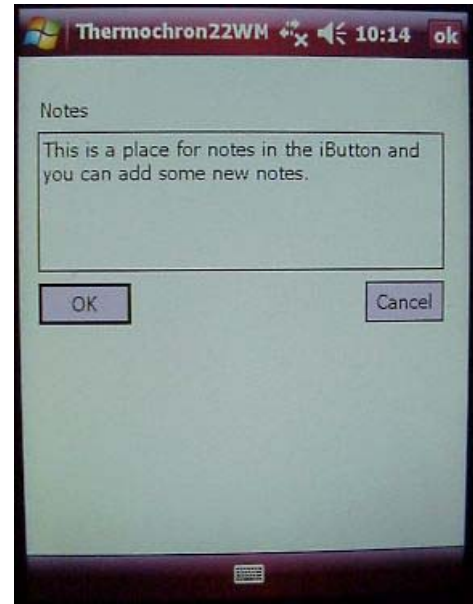
5. *Mission Name and Number* – identifying fields that will help to cross reference the data with the location or function of the iButton. Data may be entered from your Application preferences or edited directly in the Mission Data Form. When you start your mission, name and number are written to the iButton. Mission name and number are listed and visible in the Database form, helping to select missions from the database.

Tap the Name or Number Labels to Edit these fields.

6. *Notes* – free form text data that you may save in the iButton (up to 128 characters). This short notes field allows you to enter anything pertinent to the iButton activity. It is written and read when the iButton is written or read and is saved in the handheld database when iButton data is saved.

Access the notes editor by tapping on the Notes label on the main screen.

Name, Number and Notes can be edited and written to an iButton while a mission is underway without affecting the mission performance.



Application preferences may be used to populate required and optional fields. Access the database and select “New”, followed by “Use Preferences”. This sequence loads mission variables from your preference file. Edit the preference values as required.

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 on the Main Form.

2. *Button Time* - time is set when the mission is started using the Handheld’s 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

From the Main Screen - Just a few taps are required to read a mission. Select the Read function from the Main Screen drop-down box. This displays the Read Button. Make sure there is an iButton attached to the iConnection probe, then tap the read button. The application creates a Bluetooth link to the iConnection, reads the iButton and displays data on the Main Screen.

Tap Save to save iButton data in the handheld database.

From the Database Screen- Tap “Search” to read the serial number of the attached iButton and look for it in the database. If the Bluetooth link is not in place, the application creates it.

Or tap “New” to return to the Main Screen with a blank iButton record and then Read to populate it with data from the iButton.

Or if you recognize the mission as listed in your database 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 on Zoom IN, Zoom OUT, Left <-, Right -> symbols to move around the graph.

iConnection Testing and Information

The Info Button at the top of the Main Screen issues a test command to the iConnection. No iButton need be in place. The iConnection generates identifying information: Model number and software version. The application displays information on a pop-up screen, indicating that the iConnection and Bluetooth link are working properly.

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