Using the Fluke 5000A-RH/T with MET/CAL V6.11

Introduction

MET/CAL V6.11 includes support for the *Fluke 5000A-RH/T* Precision Humidity and Temperature Data Logger.

The *5000A-RH/T* is manufactured for Fluke by Veriteq, Inc. of Vancouver, BC, Canada. The *5000A-RH/T* has a recommended one-year calibration cycle. Calibration, repair, and warranty services are provided by Veriteq. *MET/CAL V6.11* supports only the *5000A-RH/T*. It does not support logger units purchased directly from Veriteq.

When you purchase a *Fluke 5000A-RH/T*, the package includes the logger unit, an RS-232 cable and connector, Veriteq's *Spectrum* configuration and charting software, and a 3-point NIST-traceable calibration certificate.

For simplicity, this document will refer to the *Fluke 5000A-RH/T* as the **RHT**.

Three software components are required to use the **RHT** with *MET/CAL V6.11*:

- *Spectrum* software included with the **RHT**.
- The *MCRHT Logger Program* included with *MET/CAL V6.11*.
- The *MET/CAL V6.11 Run Time* application.

The purpose of using the **RHT** with *MET/CAL* is to be able to automatically log temperature and humidity values with each calibration performed using the *MET/CAL Run Time* application. *MET/CAL* logs a single temperature value, and a single humidity value, with each calibration.

On a standalone, non-networked *MET/CAL* system a single **RHT** may be configured on an available serial port.

In a networked *MET/CAL* system one or more **RHT**s may be configured. Each MET/CAL workstation may have at most one **RHT**. Any *MET/CAL* client workstation may be configured to use any configured **RHT** in the system. In particular, two or more client workstations may share a single **RHT**.

Veriteq's *Spectrum* software consists of the *Spectrum* application software and the *Spectrum* dynamic link library, *spectrum.dll*. *The MCRHT Logger Program* requires *spectrum.dll*, but the *Spectrum* application software does not. Tracking of historical temperature and humidity data in a calibration laboratory may be done using the *Spectrum* application software. This is not related, however, to using the **RHT** with *MET/CAL V6.11*.

Overview

The following overview gives a brief description of the essential steps required to set up an **RHT** for use with *MET/CAL V6.11*. The overview may be adequate for getting started, however, if time permits, or if you encounter problems or points of confusion, please read the remainder of this document.

Here are the basic steps required to configure your MET/CA L V6.11 system to use an RHT:

1. Connect the **RHT** and install the *Spectrum* software.
   - Follow the instructions included with the **RHT.**
   - An available serial port is required on the PC to which you intend to connect the **RHT.**
   - Please make sure the *Spectrum* software can communicate with the **RHT** before attempting to use the **RHT** with *MET/CAL.*
2. Install the *MCRHT Logger Program.*
   - Perform a *MET/CAL* client install on the PC where the **RHT** is connected.
   - Choose the *MCRHT* checkbox in the client installation.
3. Run the *MCRHT Logger Program.*
   - Choose a name for the **RHT** data file. This is where *MCRHT* writes the temperature and humidity data.
   - On a networked system locate the **RHT** data file on a server PC.
   - Specify the serial port to which the **RHT** is connected.
   - Specify the sampling time interval.
   - Specify the temperature scale.
   - Choose the *Test* button to make sure *MCRHT* can communicate with the **RHT**.
   - Choose the *Sampling* button to initiate sampling.
   - Minimize the *MCRHT* application (optional).
4. Configure the *MET/CAL Run Time*.
   - Choose *Humidity and Temperature Sensor* in the *Configure* menu.
   - Browse to select the **RHT** data file.
   - Pick the **RHT** serial number from the dropdown list.
   - Enable *Run Time use of RHT*.
   - Enable *Time Limit* with default 30 minutes.
   - Enable *Temperature Delta* with default 5 °C.
   - Enable *Humidity Delta* with default 10%.
   - Choose *OK* to accept changes and close configuration dialog.
   - Verify that your pre-prompt file, *promptdb.txt*, includes the lines:
     - *Temperature in °C :: TEMP$ 2311*
     - *Relative Humidity in % :: RH$ 2312*

This completes the required configuration. Each time you run a procedure the temperature and humidity values read from the **RHT** and logged by *MCRHT* will appear in the *Run Time* pre-prompt dialog. The user simply chooses *OK* to close the pre-prompt dialog and accept the temperature and humidity values. The temperature and humidity values will be saved in the database calibration summary table when the *Run Time* saves results to the database at procedure termination.

The steps outlined above are explained in greater detail in the following sections.

Connecting the **RHT** and Installing the *Spectrum* Software

To connect the **RHT** and install the *Spectrum* software follow the instructions provided with the **RHT**. Please make sure you have successfully connected the **RHT** and used the *Spectrum* application software before attempting to use the **RHT** with *MET/CAL*. The *Spectrum* application software and the *MCRHT Logger Program* both use the *spectrum.dll* library to

communicate with the **RHT**. If it is not possible to communicate with the **RHT** using the *Spectrum* application software, *MET/CAL* will not be able to communicate with the **RHT** either.

Running the *MCRHT Logger Program*

The *MCRHT Logger Program* is a Windows application which periodically reads temperature and relative humidity data from an **RHT** and stores the values in a specified data file. On a networked system the data file must be accessible to all *MET/CAL* clients which wish to use data from the **RHT**. In a typical networked *MET/CAL* system the data file would be placed on the *MET/CAL* server with the *MET/CAL* executables.

The *MCRHT Logger Program* must be executed on each workstation on which an **RHT** is configured. The *MCRHT Logger Program* is a low-overhead application designed to run continuously. Once the initial configuration of the *MCRHT Logger Program* has been completed, the program may be easily stopped and restarted at any time. You may wish to include the *MCRHT Logger Program* in your Windows startup group so that the *MCRHT Logger Program* is automatically restarted when the workstation is rebooted.

The *MCRHT Logger Program* is installed as part of the *MET/CAL* client installation. When the client installation is performed a dialog appears which allows the user to choose the MET/CAL applications to be installed on the workstation. Select the *MCRHT* checkbox to install the *MCRHT Logger Program.* The *MCRHT Logger Program* is not a database application. No license is required. Successful installation of the *MCRHT Logger Program* on a workstation creates an entry called *Fluke 5000A RH/T* under *Fluke Metrology Software* in the Windows *Start* menu.

In a networked system in which two or more **RHT**s are configured all **RHT**s may be set up to write to the same data file. Data values in the data file are keyed to a specific **RHT** serial number, so there is no confusion between values from different **RHT**s. The diagram below shows an example of a networked system in which two *MET/CAL* client workstations share a single **RHT**. In this example, the **RHT** is connected to *COM1* on the first client. The **RHT** data file, here named *RHT.ini*, is located on the server where it is accessible to both client PCs.
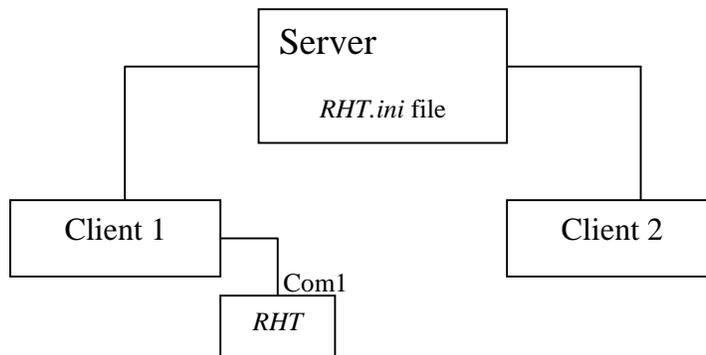
The data file written by the *MCRHT Logger Program* is a text file which conforms to the standard Windows initialization file (.ini) format. Here's an example of a data file written by the *MCRHT Logger Program*:

```
[00122294]
temperature = 23.95 C
humidity = 30.70 RH
timestamp = 992997000
rht_port = COM1
scale = C
sample_interval = 10000

[00122052]
temperature = 23.21 C
humidity = 43.59 RH
timestamp = 992998000
rht_port  =COM2
scale = C
```

The data file in the example above is being used to log the data from two **RHT**s. The serial numbers of the **RHT**s are 00122294 and 00122052. The temperature and humidity values are the most recent logged data values for each **RHT**. The *timestamp* parameter specifies the time at which those data values were logged. (The *timestamp* is specified in elapsed seconds since January 01, 1970. This value is used by the software to do comparisons and checks. It is not intended to be used directly by the user.) The *rht_port* parameter specifies the serial port on which the **RHT** is configured. The *scale* parameter specifies the temperature scale (C for Celsius, F for Fahrenheit). Using an **RHT** with MET/CAL does not require the user to directly edit or access the data file written by *MCRHT Logger Program.* The example shown above is simply intended to explain the operation of the system.

To set up your system to use an **RHT**, use the *MCRHT Logger Program* to configure the data file, the serial port, the logging interval, and the temperature scale. These configuration steps are shown in detail below.

Important Note:

> After completing the configuration steps described below, you must choose the *Sampling* button to initiate sampling.

The top-level window of the *MCRHT Logger Program* is as shown below in *Figure 1*.
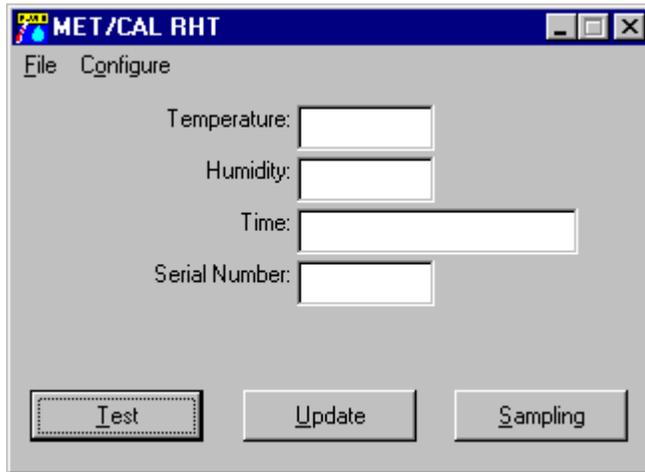
Figure 1

To set up the data file to be used with the **RHT** choose the *Choose Data File* item in the top-
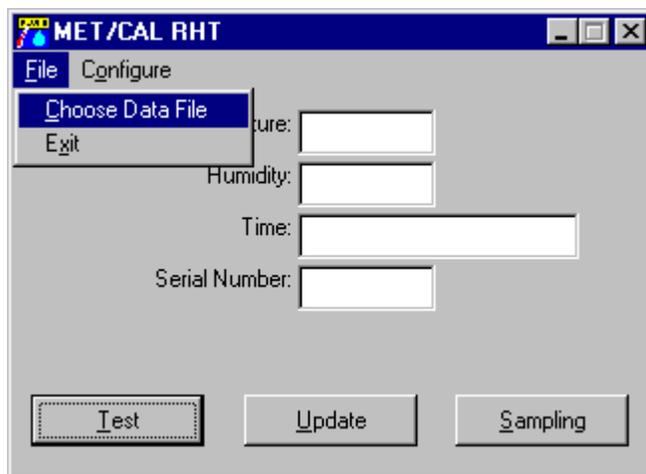
Figure 2

level *File* menu as shown in *Figure 2*.

The *Save As* dialog box will appear, as shown in *Figure 3*.   Enter the name into the *File name* edit box or browse to choose an existing file. Only files with the extension *.ini* are shown. If you specify a new file name, the *.ini* extension is added automatically.
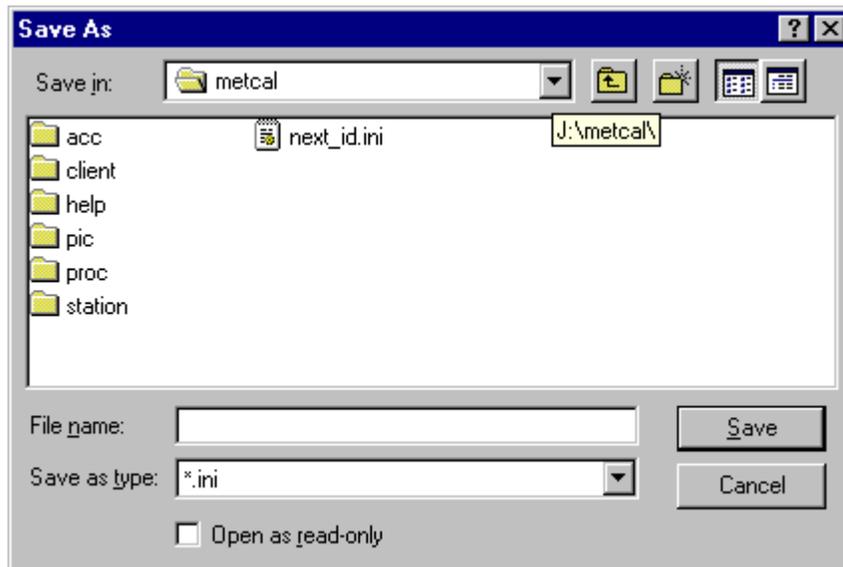
Figure 3

To specify the serial port on which the **RHT** is configured choose *Port...* in the top-level *Configure* menu. Choose *COM1*, *COM2*, *COM3*, *COM4*, or *None*, as shown in *Figure 4* below. Choosing *None* prevents communication between the *MCRHT Logger Program* and the **RHT**. Low-level serial configuration, in which the baud rate, parity, start bits, stop bits, and so on, are specified, is not performed using the *MCRHT Logger Program*. The Veriteq library, *spectrum.dll*, handles all low-level communications issues. If you first install the Spectrum software successfully, *MCRHT* will be able to communicate with the **RHT** as long as it knows which serial port the **RHT** is connected to.
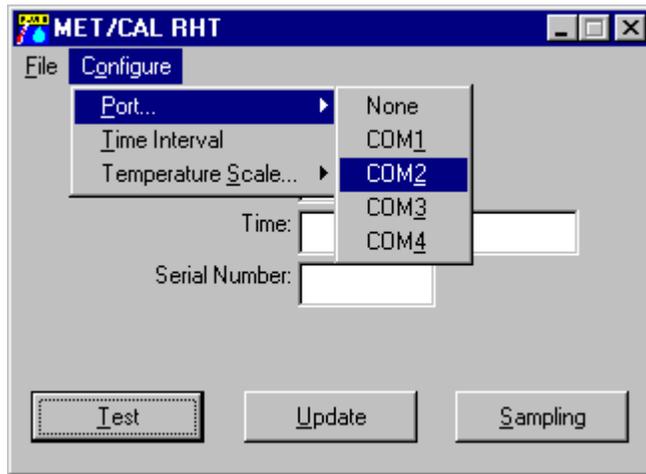
Figure 4

To specify the logging time interval choose *Time Interval* in the top-level *Configure* menu, as shown in Figure 5 below.
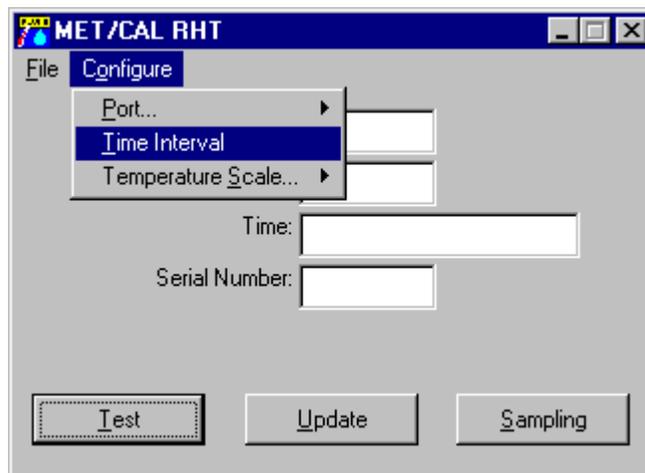
Figure 5

The popup *RHT Sensor Time Interval Setup* dialog is used to set the time interval, as shown in *Figure 6*. The time interval is the sampling interval used by *MCRHT* to query the **RHT** for new data values. The maximum time interval is 24 hours and the minimum interval is 1 second. Specifying a short time interval (for example, less than 5 minutes) increases the amount of communication with the **RHT** and may shorten **RHT** battery life. To enter data values in the *RHT Time Interval Setup* dialog box you may directly type numeric values in the *Hour*, *Minute*, and *Second* fields, or you may use the up and down arrows associated with each field to choose the desired value. After specifying the desired interval, choose *OK* to accept the value.
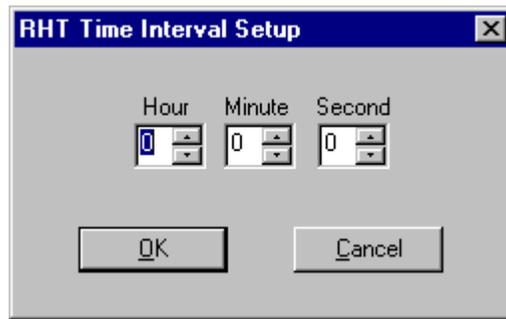
Figure 6

The last required configuration step in setting up the *MCRHT Logger Program* is to specify the temperature scale. Choose *Temperature Scale...* in the top-level *Configure* menu, and select either *Celsius* of *Fahrenheit*, as shown in *Figure 7* below.
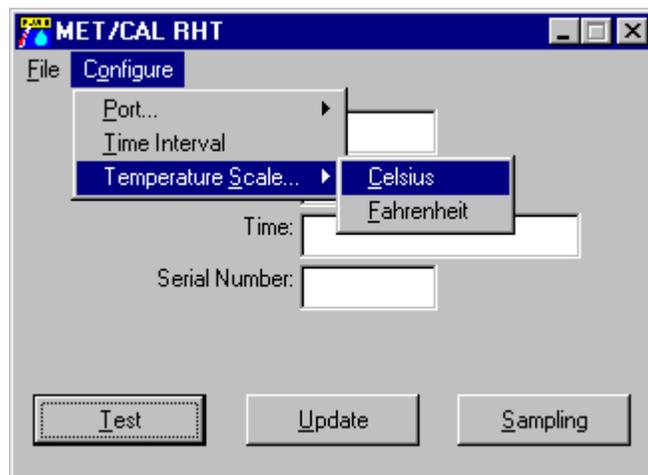
Figure 7

After configuring the *MCRHT Logger Program*, as described above, click on the *Test* button. *MCRHT* will read the serial number, the current temperature, and the current humidity from the **RHT**. These values, together with the current time and date, are displayed in the main window of the application. The *Test* function is used to verify communication with the **RHT** – it does not update the data file. The serial number shown should match the serial number on the back of the RHT. See *Figure 8* below for an example of the appearance of the *MCRHT* main window after the *Test* button has been chosen.
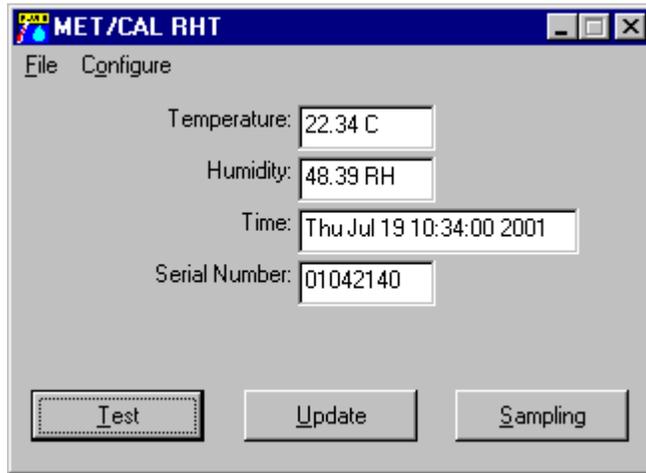
Figure 8

The *Update* button is the same as the *Test* button, except that it causes the data file to be updated as well. Although choosing *Update* causes current temperature and humidity values to be written to the data file, it does not reset the times of scheduled future samples. For example, suppose you have configured a 30-minute sampling time interval. If you choose *Update* 20 minutes after the last automatic sample was taken, the data file is updated immediately with the current values, but the next automatic sample will be taken in 10 minutes, which is 30 minutes after the previous automatic sample.

The final step is to initiate sampling. To initiate sampling choose the *Sampling* button. The *MCRHT Logger program* will immediately take the first sample, and display the configured sampling interval in grayed-out text above the *Update* button in *MCRHT* main window. See *Figure 9* below for an example of the appearance of the *MCRHT* main window with the sampling interval set to 10 minutes.

Please Note:

> **If you do not see the grayed-out text showing the sampling interval, you have not initiated sampling and no samples will be written to the data file.**

After sampling has been initiated, the *MCRHT* main window will show updated temperature, humidity, and time values as each new sample is acquired from the **RHT**.

There are two ways to turn off sampling. The first method is to set the sampling time interval to zero and then choose the *Sampling* button. The grayed-out text showing the sampling interval will disappear when the sampling interval is set to zero. The second method is to simply exit from the *MCRHT Logger Program*.

After all configuration steps have been performed and sampling has been initiated as described above you may minimize the *MCRHT Logger Program* application. The program will continue to acquire data values at the scheduled times based on the programmed sampling interval.
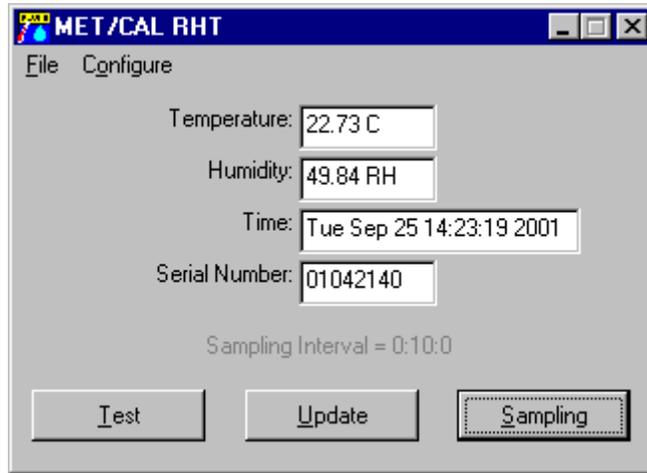
Figure 9

Configuring **the *MET/CAL Run Time* Application**

The information above presents an overview of the support for the Fluke 5000A RH/T in *MET/CAL V6.11*, and explains how to configure the *MCRHT Logger Program* and initiate sampling. This section shows how to configure a *MET/CAL* client workstation so that the *Run Time* application automatically acquires **RHT** temperature and humidity values with each calibration.

There are two basic steps involved in configuring the *Run Time* to use the **RHT:**

1. Use the *Run Time*'s *Relative Humidity / Temperature Sensor* configuration dialog to set up *Run Time* usage of the **RHT.**

2. Set up the pre-prompt file as needed so that **RHT** temperature and humidity values are automatically written to the appropriate database fields in the calibration summary table.

Step 1 is described in detail in the remainder of this section. Step 2, setting up the pre-prompt file, is discussed in the following section.

The *Run Time* provides a dialog-based interface used to configure the use of an **RHT** on a *MET/CAL* workstation. As mentioned in the introduction, in a networked system the **RHT** need not be attached to the same workstation on which it is used.

To access the *Relative Humidity / Temperature Sensor* configuration dialog, shown in *Figure 10* below, choose the *Humidity and Temperature Sensor* menu item in the top-level *Configure* menu of the *Run Time* application. The following description explains each parameter in the dialog.
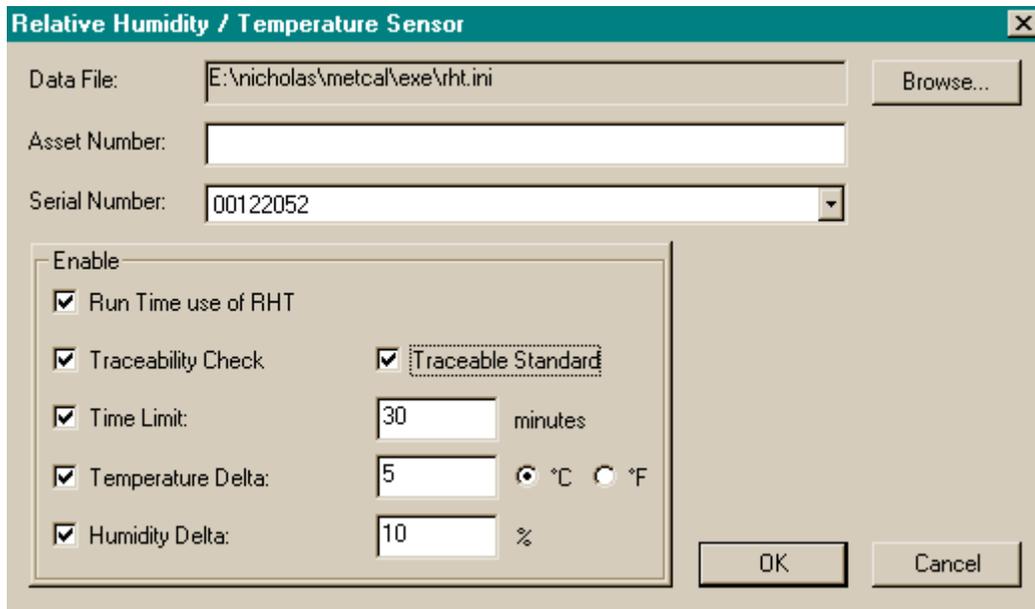
Figure 10

Data File

> Data File is the full path name of the data file you specified when you configured the *MCRHT Logger Program*. Assuming that the *MCRHT Logger Program* configuration has been completed, the data file will already exist and you can browse for the data file by choosing the *Browse...* button in the *Relative Humidity / Temperature Sensor* dialog.

Asset Number

> *Asset Number* is the asset number of the **RHT**. The asset number of the **RHT** need not be specified unless you choose to regard the **RHT** itself as a traceable asset for each calibration performed by the *Run Time*. Refer to the descriptions of the *Traceability Check* and *Traceable Standard* checkboxes below for additional information.

Serial Number

> *Serial Number* specifies the serial number of the RHT. *Serial Number* and *Data File* are the two pieces of information which tie a *MET/CAL* workstation to a particular **RHT**. After you have specified a data file the dropdown list associated with the *Serial Number* edit control will automatically include all **RHT** serial numbers contained in the specified file. If you have only one **RHT** the dropdown list will show only a single serial number.

Run Time use of RHT

> The *Run Time use of RHT* checkbox allows the usage of the **RHT** to be enabled or disabled on the workstation. If the *Run Time use of RHT* checkbox is not checked the *Run Time* will make no use of the **RHT** data. Temperature and humidity values will not be associated automatically with each calibration event. When you disable usage of an **RHT** *MET/CAL* does not discard configuration information. (Parameter values are saved in the *MET/CAL* initialization file, *metcal.ini*.)

Traceability Check

The *Traceability Check* checkbox is used to indicate whether or not the *Run Time* should verify that the **RHT** is in calibration before starting procedure execution. If the *Traceability Check* checkbox is selected, the asset number of the **RHT** must also be specified, and asset information for the **RHT** must be maintained in the *MET/CAL* database.

If traceability checking of the **RHT** is enabled, and the **RHT** is out of cal, a message is displayed before procedure execution. If the workstation is configured to disallow calibration with standards which are out of cal, the message is an error message and procedure execution is terminated. If the workstation is configured to allow calibration with out of cal standards, the message is a warning message, and the user is presented with the choice of either continuing or aborting the procedure.

Traceable Standard

The *Traceable Standard* checkbox controls whether or not the **RHT** is included in the list of standards for a calibration event. If the *Traceable Standard* checkbox is checked, the asset number of the **RHT** must be specified, and the *Traceability Check* checkbox must also be checked. In other words, you cannot require that the **RHT** be included in the list of traceable standards for a calibration unless you also require that the traceability check of the **RHT** be performed to verify that the **RHT** is in cal. The *Traceable Standard* checkbox is grayed-out unless the *Traceability Check* checkbox is selected.

Time Limit

The *Time Limit* parameter specifies the maximum time allowed between the most recent temperature and humidity readings and the current time (at the start of the calibration).

The *Time Limit* is specified in minutes. The value must be between 1 and 1440 minutes. The specified value cannot be less than the sampling interval for the chosen **RHT**.

If *Run Time* use of the **RHT** is enabled, and the *Time Limit* check is enabled, the *Run Time* application acquires the most recent temperature and humidity values from the designated data file. The values are read from the data file just before the start of procedure execution. The timestamp associated with the values is compared to the current time. If the difference between the current time and the timestamp associated with the data values exceeds the specified *Time Limit* a warning prompt is generated. The user is presented with the choice of continuing or aborting the procedure. If the user elects to continue, the temperature and humidity values are logged with the calibration event in the usual way.

The *Time Limit* check may be enabled or disabled by choosing the *Time Limit* checkbox. If a check appears in the checkbox, as shown in *Figure 10* above, the *Time Limit* check is enabled.

Temperature Delta

The *Temperature Delta* is the maximum allowed temperature deviation between the beginning and the end of the calibration.

Legal values for *Temperature Delta* are 0 to 25 degrees C, or 0 to 45 degrees F. Choose the °*C* radio button to specify the *Temperature Delta* value in degrees Celsius. Choose the °*F* radio button to specify the *Temperature Delta* value in degrees Fahrenheit.

The *Temperature Delta* check is performed at the termination of procedure execution. If the temperature change exceeds the specified *Temperature Delta* value a warning prompt is displayed. The user is presented with option of aborting or continuing the procedure.

The *Temperature Delta* check may be enabled or disabled by choosing the *Temperature Delta* checkbox. If a check appears in the checkbox, as shown in *Figure 10* above, the *Temperature Delta* check is enabled.

Humidity Delta

The *Humidity Delta* is the maximum allowed humidity deviation between the beginning and the end of the calibration.

Legal values for *Humidity Delta* are 0 to 100 %.

The *Humidity Delta* check is performed at the termination of procedure execution. If the humidity change exceeds the specified *Humidity Delta* value a warning prompt is displayed. The user is presented with option of aborting or continuing the procedure.

The *Humidity Delta* check may be enabled or disabled by choosing the *Humidity Delta* checkbox. If a check appears in the checkbox, as shown in *Figure 10* above, the *Humidity Delta* check is enabled.

After all information has been specified in the *Relative Humidity / Temperature Sensor* dialog, as described above, choose *OK* to accept the information, or *Cancel* to discard your changes.

The *MET/CAL Editor* application may also be used to configure the *Run Time* usage of the **RHT.** This has exactly the same effect as using the *Run Time* to do the configuration.

Setting up the *Run Time* Prompt File

The final step involved in setting up the *Run Time* application to automatically acquire and save **RHT** temperature and humidity data for each calibration event is to appropriately set up the pre-prompt file used by the *Run Time* application.

The pre-prompt file must contain appropriate entries to cause the temperature and humidity values to be displayed in the *Run Time* pre-prompt dialog and then written to the appropriate database fields.

The default name of the *MET/CAL Run Time* pre-prompt file is *promptdb.txt*. The name of the pre-prompt file is configurable, however. The *prompt* parameter in the *[Startup]* section of the *MET/CAL* initialization file, *metcal.ini*, is used to specify the name of the pre-prompt file.

The pre-prompt file should include the following, or similar, entries:

Temperature in °C **::** TEMP$ 2311
Relative Humidity in % **::** RH$ 2312

Figure 11 below shows an example of how the *Run Time* pre-prompt screen would appear if the pre-prompt file contained only the two entries above.
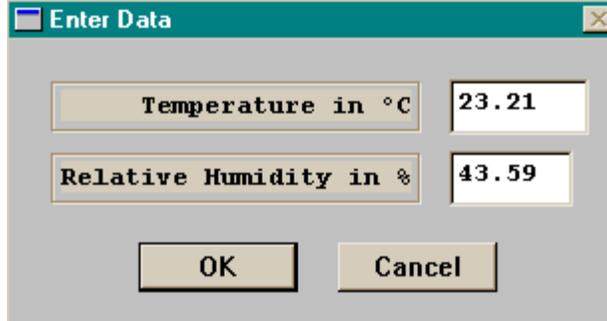
Figure 11

Fields 2311 and 2312 in the calibration summary table are designated as the fields which store the temperature and humidity, respectively, associated with a calibration event. The prompt strings in the pre-prompt dialog may be customized as desired. If you would like the values shown in the pre-prompt dialog to be read-only, specify an 'R' between the colons:

Temperature in °C **:R:** TEMP$ 2311
Relative Humidity in % **:R:** RH$ 2312

New *MATH FSC* Functions to Access **RHT** Data

MET/CAL V6.11 also includes several new *MATH FSC* functions which may be used to access **RHT** data under procedure control. These functions are optional, and are not needed to automate the collection of temperature and humidity data as described in preceding sections of this document.

The following functions are available:

RHT_HUMIDITY

> *RHT_HUMIDITY* returns the most recent relative humidity value, in percent.

RHT_TEMP

> *RHT_TEMP* returns the most recent temperature value. The temperature units are either °C or °F, depending on how the **RHT** is configured. Refer to the section above on setting up the *MCRHT Logger Program* for information on configuring the temperature units selection.

RHT_TIME

RHT_TIME returns the most recent **RHT** timestamp. The timestamp value represents elapsed seconds since midnight January 1, 1970 UTC (coordinated universal time).

UTIME

UTIME returns the current time as a timestamp value. Like *RHT_TIME*, the *UTIME* return value represents elapsed seconds since midnight January 1, 1970 UTC (coordinated universal time).

Fluke Corporation
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