Using the Hart 1620 and Fluke 5020A Thermo-Hygrometers with MET/CAL

Introduction

MET/CAL supports the following thermo-hygrometers:
- Hart 1620-H
- Hart 1620-S
- Fluke 5020A
- Fluke 5020A-S

MET/CAL V6.11 or later is required.

Each thermo-hygrometer may be configured with one or two temperature/humidity sensors. For *MET/CAL*'s purposes, each sensor may be regarded as a separate instrument.

For simplicity, this document refers to the thermo-hygrometer as the **RHT**.

Two software components are required to use the **RHT** with *MET/CAL*:

- Log*Ware* III software.
- The *MET/CAL Run Time* application.

Log*Ware* III may be purchased separately or as part of a kit including the **RHT,** the sensors, and the Log*Ware* III application.

The purpose of using the **RHT** with *MET/CAL* is 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 either sensor on any **RHT** in the system. In particular, two or more client workstations may share a single **RHT** sensor.

Overview

The following overview gives a brief description of the essential steps required to set up an **RHT** for use with *MET/CAL*. 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/CAL* system to use an **RHT**:

1. Connect the **RHT** and install the Log*Ware* III 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 Log*Ware* III software can communicate with the **RHT** before attempting to use the **RHT** with *MET/CAL.*

2. Configure Log*Ware* III to write to the **RHT** data file.
   - Add the **[METCAL]** section to the *LogWare3.ini* file.
   - Add *UpdateINIFile = True* to the **[METCAL]** section in *LogWare3.ini.*
   - Add *INIFileName* = <name of **RHT** data file> to the **[METCAL]** section in *LogWare3.ini.*
   - Create an empty **RHT** data file. Log*Ware* III does not automatically create the data file.

3. Run Log*Ware* III.
   - Follow instructions in the Log*Ware* III manual to configure and start a real-time log session using the desired sample interval.
   - On a networked system locate the **RHT** data file on a server PC.
   - Minimize the Log*Ware* III 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** sensor 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 the 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 specified **RHT** sensor and logged by Log*Ware* III 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 Log*Ware* III

To connect the **RHT** and install the Log*Ware* III software follow the instructions provided with the **RHT** and Log*Ware* III. Please make sure you have successfully connected the **RHT** and used the Log*Ware* III application software before attempting to use the **RHT** with *MET/CAL.*

Running **Log*Ware* III**

Log*Ware* III is a Windows application which, among other functions, may be configured to periodically read temperature and relative humidity data from an **RHT** and store 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.

Log*Ware* III must run continuously on each workstation on which an **RHT** is configured if the **RHT** is to be used with *MET/CAL*. You may wish to include Log*Ware* III in your Windows startup group so that Log*Ware* III is automatically restarted when the workstation is rebooted.

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** sensor or base unit serial number, so there is no confusion between values from different **RHT**s, or different sensors attached to the same **RHT**. 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.
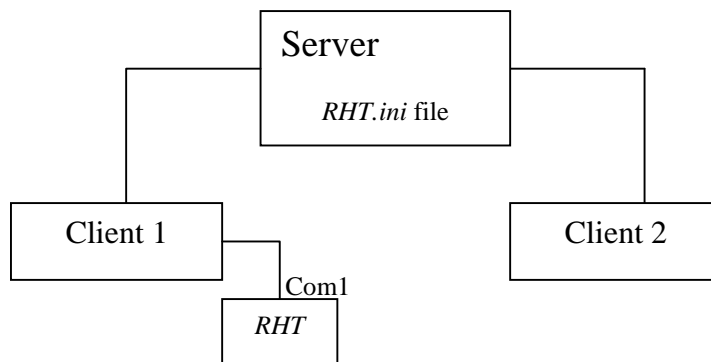
The data file written by Log*Ware* III is a text file which conforms to the standard Windows initialization file (.ini) format. Here's an example of a data file written by Log*Ware* III:

        [A3A023]
        temperature = 23.95 C
        humidity = 30.70 RH
        timestamp = 992997000

        [A3A031]
        temperature = 23.21 C
        humidity = 43.59 RH
        timestamp = 992998000

The data file in the example above contains data from both sensors of a single **RHT**. The serial numbers of the sensors are A3A023 and A3A031. The temperature and humidity values are the most recently logged data values for each sensor. 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.) Using an **RHT** with MET/CAL does not require the user to directly edit or access the data file written by Log*Ware* III. The example shown above is intended only to explain the operation of the system.

To set up your system to use an **RHT**, the Log*Ware* III initialization file, *LogWare3.ini* must first be modified using a text editor. Examples of suitable editors are *Notepad*, *Wordpad*, and the *MET/CAL Editor*. The configuration steps are shown in detail below.

To modify *LogWare3.ini* and create the **RHT** data file perform the following steps.

- If Log*Ware* III is running, close the application.
- Locate *LogWare3.ini*. The normal location is the folder in which Log*Ware* III is installed.
- Start a text editor and open *LogWare3.ini*.
- Add the following lines to the file:
     [METCAL]
     UpdateINIFile = True
     INIFileName = *name*
- Here *name* represents the full path name of the **RHT** data file. For example, if the **RHT** data file is on a server mapped as the M: drive one might have:
     INIFileName = m:\rht.ini
- To cause Log*Ware* III to use the serial number of the base unit, plus a "-1" or "-2" suffix to identify the sensor, as the section name in the **RHT** data file, also add the line:
     UseLoggerSerial = True
- Save the changes and exit from the text editor.
- Create the **RHT** data file. Log*Ware* III does not create the file. Two suggested methods for creating an empty file are:
    - Use *NotePad*. Start the application, choose *Save As*, specify the file name, and close the application.
    - An alternate method for creating an empty file is to open a *Command Prompt* window, then enter:
         type NUL > *filename*
      For example, if the **RHT** data file you have chosen is *h:\rht.ini*, enter:
         type NUL > h:\rht.ini
- Restart Log*Ware* III.

Note:

As distributed, *LogWare3.ini* contains the lines:

> *[General]*
> *DebugOutput=False*
> *DebugComm=False*
> *LastUserName=LogWare*
> *AutoClose=True*
>
> *;[METCAL]*
> *;UpdateINIFile=False*
> *;INIFilename=C:\METCAL\RHT.INI*
> *;UseLoggerSerial=True*

Therefore, rather than adding new lines to *LogWare3.ini* as described above, simply modify the provided file to produce:

> *[General]*
> *DebugOutput=False*

DebugComm=False
LastUserName=LogWare
AutoClose=True

[METCAL]
UpdateINIFile=True
INIFilename=<name of your RHT data file goes here>
UseLoggerSerial=False

Additional Information on the *UseLoggerSerial* parameter:

If *UseLoggerSerial* is not specified, or is set to *False*, the section names in the **RHT** data file are based on the sensor serial numbers, rather than the base unit serial number. It's a matter of preference only – either method works with *MET/CAL*.

For example, suppose the **RHT** has the serial number **A3A003**, and suppose there are two sensors with serial numbers **A3A023** and **A3A031**. If *UseLoggerSerial* is set to *True* the section names in the **RHT** data file will be *[A3A003-1]* and *[A3A003-2]*. If *UseLoggerSerial* is set to *False*, or not specified, the section names in the **RHT** data file will be *[A3A023]* and *[A3A031]*.

After the configuration steps described above have been performed and sampling has been initiated as described in the Log*Ware* III manual, you may minimize the Log*Ware* III application. The program will continue to acquire data values at the scheduled times based on the programmed sampling interval.

Configuring the *MET/CAL Run Time* Application

The information above presents an overview of the support for the Hart 1620 and Fluke 5020A thermo-hygrometers in *MET/CAL*, and explains how to configure Log*Ware* III for use with *MET/CAL*. 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.

Note:

When you configure a *MET/CAL* workstation to use an **RHT**, you are actually configuring it to use a sensor attached to the **RHT** base unit. If two sensors are attached, one or the other, not both, must be identified as the one from which the workstation will obtain temperature and humidity data.

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 Log*Ware* III software. Assuming that the Log*Ware* III software 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.

The asset number, if specified, may be the asset number of the temperature/humidity sensor or the asset number of the **RHT** base unit. For most purposes, the sensor should be regarded as the traceable device, not the base unit. However, the decision is left to the user.

Serial Number

Serial Number specifies the serial number of the RHT sensor. *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** base unit, the dropdown list will show one serial number if you have only one sensor, and will show two serial numbers if you have two sensors.

As described earlier in the section on configuring Log*Ware* III, if the *UseLoggerSerial* parameter is set to *True*, the dropdown list will show serial numbers constructed from the base unit serial number with "-1" or "-2" appended to distinguish between the sensors.

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** sensor is in calibration before starting procedure execution. If the *Traceability Check* checkbox is selected, the asset number of the **RHT** sensor must also be specified, and asset information for the **RHT** sensor must be maintained in the *MET/CAL* database.

If traceability checking of the **RHT** sensor is enabled, and the **RHT** sensor 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** sensor is included in the list of standards for a calibration event. If the *Traceable Standard* checkbox is checked, the asset number of the **RHT** sensor must be specified, and the *Traceability Check* checkbox must also be checked. In other words, you cannot require that the **RHT** sensor be included in the list of traceable standards for a calibration unless you also require that the traceability check of the **RHT** sensor be performed to verify that the **RHT** sensor 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.
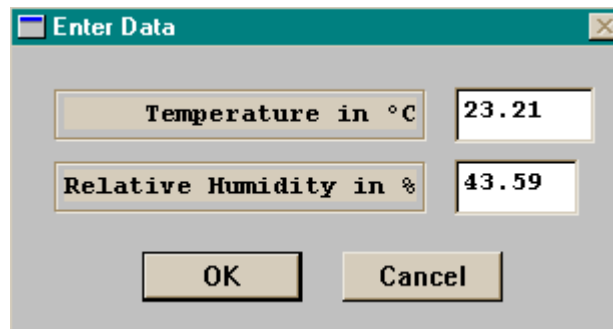

Figure 11

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 also includes several *MATH FSC* functions that 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 *LOGWARE 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
December 17, 2003