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1. BEFORE YOU START

Ensure you have an Android phone or tablet with NFC (Near Field Communication) – a list of NFC enabled phones is available here: <http://www.nfcworld.com/nfc-phones-list/#available>

If you have a barcode scanner app on your phone you can use it to download the RFID Logger app from Google Play by scanning the QR Code to the right or visit:

<https://play.google.com/store/apps/details?id=com.jt.isb.nfc.app>

Ensure that the NFC is turned on. You can do this under **Settings** → **Wireless & Networks** (You may have to select the “More..” option) → **NFC**. Check the box to enable NFC.



Remove any case on your phone or tablet that may interfere with the NFC communication – specifically any case that has metal or carbon in it.

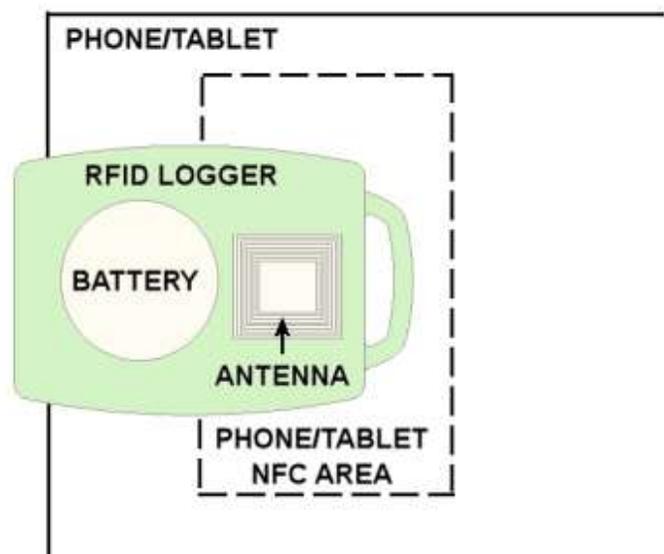
Know where the NFC antenna is on your device. On some devices it is critical that the RFID Logger be placed exactly in the NFC antennae for reliable communication. If you do not know the location you can find it using the trial and success method by moving the Logger around the back of your phone or tablet until you hear the NFC connect tone from your device (Ensure your volume is turned up). You may have to fine tune the location to get reliable communication. See [below](#).

2. READING AND WRITING

The logger uses near field communication (NFC) to communicate with Android devices that have NFC capability. Near field communication is a form of low-power radio communication that is effective only when the devices are in close proximity to one another (touching). The logger has a small antenna that needs to be within the field of the companion device. Communication is position dependent.

The antenna coil in the logger is between the button and the loop handle at the top of the device. You need to know where the antenna coil is on your phone/tablet, and ensure that the logger antenna coil is **within** that coil.

Keep the logger close to your Android device with the logger antenna coil in the NFC Area of the Android device. If possible keep the logger battery away from the NFC field as it may interfere with the communications. See diagram to the right.



3. STARTING THE APPLICATION

The application is started by pressing the icon shown right. This will bring up the opening window



If this is the first time use the user preferences should be selected by tapping the settings button (The three squares in the top right corner). When the "Settings" button pops up, press it to bring up the settings window shown below.



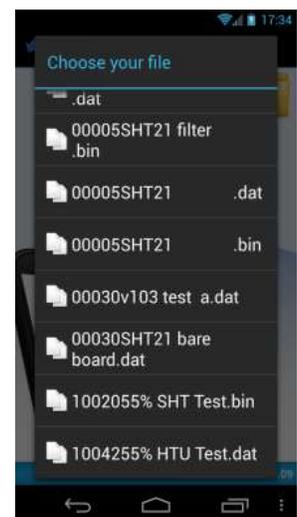
Choose your preferred Time Zone, Time Format (12 or 24 Hours), Engineering Units for Temperature (Fahrenheit or Centigrade), the Date Format and select a Language. What are shown above are the install defaults. Press the OK (✓)

button to accept or "X" to cancel.

You are now ready to load data. This can be directly from the logger or you can load a previously saved file using the "Load File" icon shown above. In this case you will be presented with the file manager (right) and you can navigate to the file you want to load. Note that it must be a file of type .dat.

If you load a file in this manner skip to [Section 4](#).

If you are loading data directly from the logger, hold the logger in the NFC antenna area. Refer to [Section 2](#) above. You will hear the detection noise and then see a message that indicates "Reading.." If the software fails to read it will indicate this. If you get a "Unknown Device" message the logger is not properly centered over the antenna. Move the logger away and then try again.



If the read is successful (Typically it takes around 2 seconds to read) you will be presented with the summary screen shown below.

4. SUMMARY TAB

Once data has been loaded or read from the logger, the following Data Summary screen opens. Note that only the minimal amount of data needed is uploaded from the logger.

This is the Data Summary page. This page shows an overview of the data and the state of the logger. It identifies the logger type and Unit Tag, a name provided by the user, and the serial number which is set at the factory. It shows the time the recording started, the time of the last sample taken, which may not be the end of the recording.

It also shows the number of samples in memory and the Record Status. Record status can be On (still recording) or Off. If the Record Status is Off and there is **no** Last Sample value, it means the unit is waiting to start, either on delay or button press. If the Record Status is Off and there is a Last Sample value, the recording is complete.

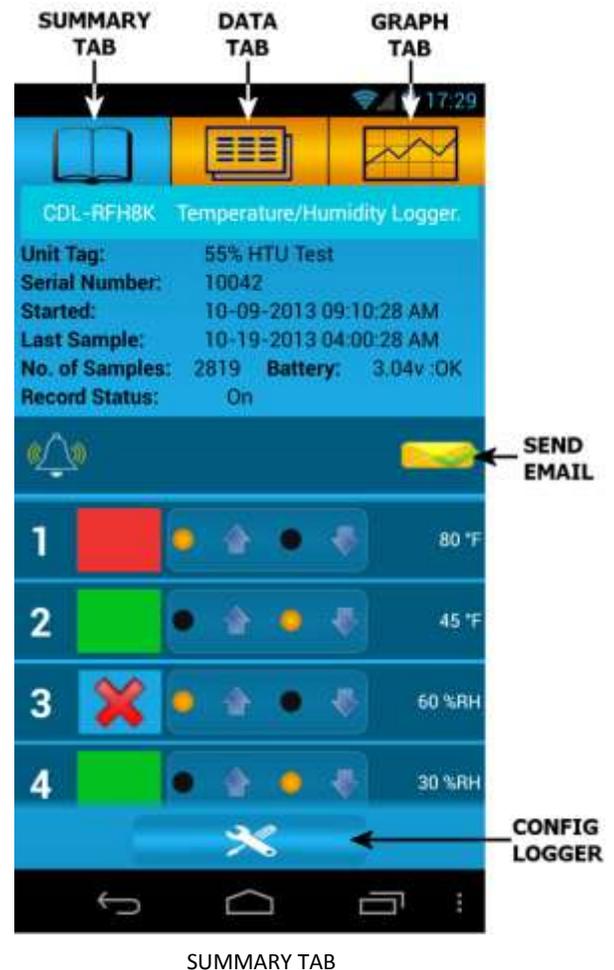
There is also an overview of the Alarm Status. A **RED** box next to the Alarm number (1,2,3 or 4) indicates that alarm condition was exceeded. A **GREEN** box indicates that alarm condition did not occur. If there is a box with an "X" in it, this indicates the alarm is not active. (Alarm 3).

The alarm is indicated as High  or Low  with the value to the far right. So in this example, Alarm 1 which was a high alarm of 80°F was exceeded. Alarms 2 and 4 did not occur and Alarm 3 was not active.

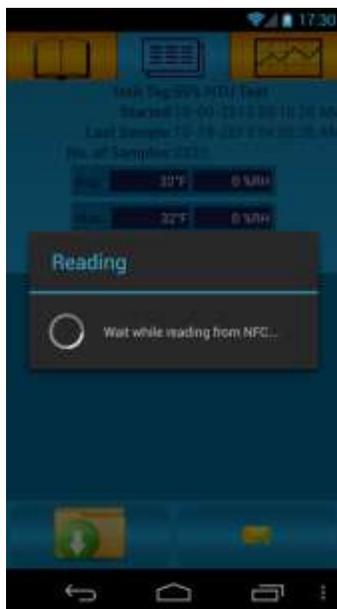
The User has the choice at this point to load **all** the data by selecting the **Data Tab** or the **Graph Tab**. In either case the logger needs to be held in the NFC antenna area for the duration of the read which will be around 8 to 10 seconds.

If no alarms occurred the user can choose to NOT load the data. The summary information can be emailed to a remote location by pressing the SEND EMAIL icon shown above. This will attach a .bin file which contains this summary information to the email. This file can be read on a PC using the available PC software.

The logger can be reconfigured and set for a new recording by pressing the CONFIG LOGGER icon at the bottom of the page. See [Section 7](#).



5. DATA TAB



Pressing the DATA TAB will cause the application to read ALL the data from the logger if it has not already done so. The logger needs to be held in the NFC antenna area for the duration of the read which will be around 8 to 10 seconds. Once reading starts the “Reading” window pops up (left) until the data is read and processed. The data is then displayed in tabular format as shown below.

There is a data overview area which shows the Average, Maximum and Minimum of all the data. In the case below this is shown for both channels, Temperature and Humidity.

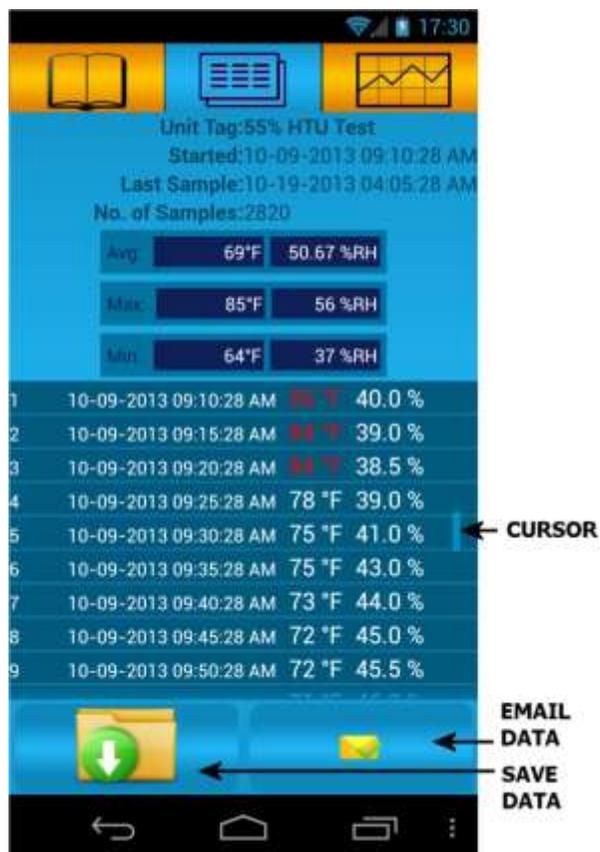
The data table has the sample number followed by the date/time stamp and the actual data value. Any data point which exceeded an alarm is shown in red. In the figure below there are two columns of data – temperature and humidity as this is from a dual channel logger.

Data can be scrolled by using your finger to swipe the tabular data up or down. Once data starts to scroll a cursor appears. You can drag the cursor to accelerate the flow of data.

Data can be saved to the device memory or SD card by tapping the SAVE DATA icon. The file manager will pop up and can be used to navigate to an existing folder, create a new folder and name the file to be saved. The file must have a .dat file type extension.

Data can be emailed to a remote location by tapping the EMAIL DATA icon. The email will contain an attachment which is the data file named “serial number unit tag”.dat where serial number and unit tag are from the logger. This file can be read on a PC using the available PC software.

Return to the [Summary Tab](#) to proceed to logger configuration.



DATA TAB

6. GRAPH TAB

Pressing the GRAPH TAB will cause the application to read ALL the data from the logger if it has not already done so. The logger needs to be held in the NFC antenna area for the duration of the read which will be around 8 to 10 seconds. Once reading starts the “Reading” window pops up as [above](#) until the data is read and processed. The data is then displayed as a graph as shown below.



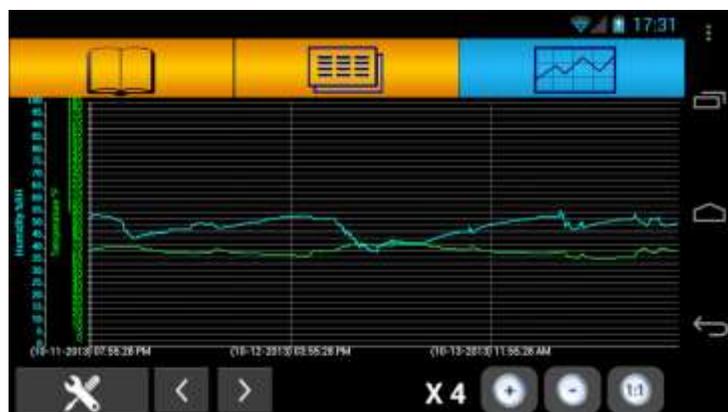
The graph will contain 1 or more traces depending on the logger type with the Y axes scales on the left. The default graph shows all data (X-Axis zoom = x1 as shown by the Zoom Indicator) with no zoom in the y-Axis.

6.1. Zoom the X-Axis:

The X-Axis can be zoomed up to 16 times in powers of 2 (1,2,4,8,16) by pressing the X-Axis Zoom “+” button. Pressing the X-Axis Zoom “-” button will zoom out. Any time the X-Axis is zoomed in, the navigation buttons “<” and “>” will appear. By pressing these buttons you can move back and forward through the data.

The RESTORE TO ORIGINAL button “1:1”

will return the X-Axis and Y-Axis to the default (as loaded) condition. Note: This will not affect the Y-Axis if it is set to Auto-scale. See below



6.2. Zoom the Y-Axis:

The Y-Axis scaling can be customized using the GRAPH SETUP button . Pressing this button will pop up the Graph setup window shown below

The content of this window depends on the type of logger being used. The Y-Axis for each channel can be manually customized by selecting the maximum and minimum values from the drop down menus. The graph will be scaled accordingly.

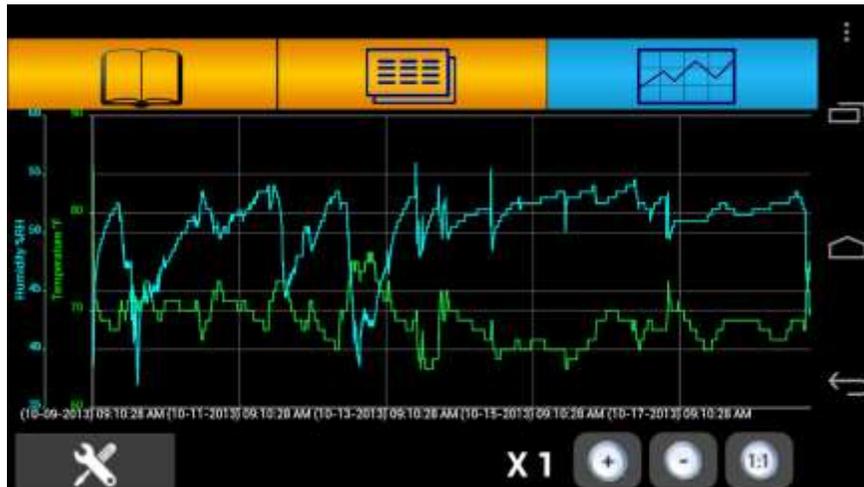
By checking the **Y-Axis Auto Scale** radio button, the graph will always scale the Y-Axis so that the trends fill the 80% graph from top to bottom as shown below. Note that if the X-Axis is zoomed, as you scroll through the data the Y-Axis will change to suit the section of graph being displayed. If you want to zoom the Y-Axis and have it remain constant you need to manually zoom it.



GRAPH SETUP WINDOW

There is an X-Axis Scale dropdown menu which allows the user to set the X-Axis zoom. This has the same function as the X-Axis zoom buttons described [above](#).

Press the OK (✓) button to accept or “X” to cancel.



SAME TRENDS AS ABOVE WITH AUTO SCALED Y-AXIS

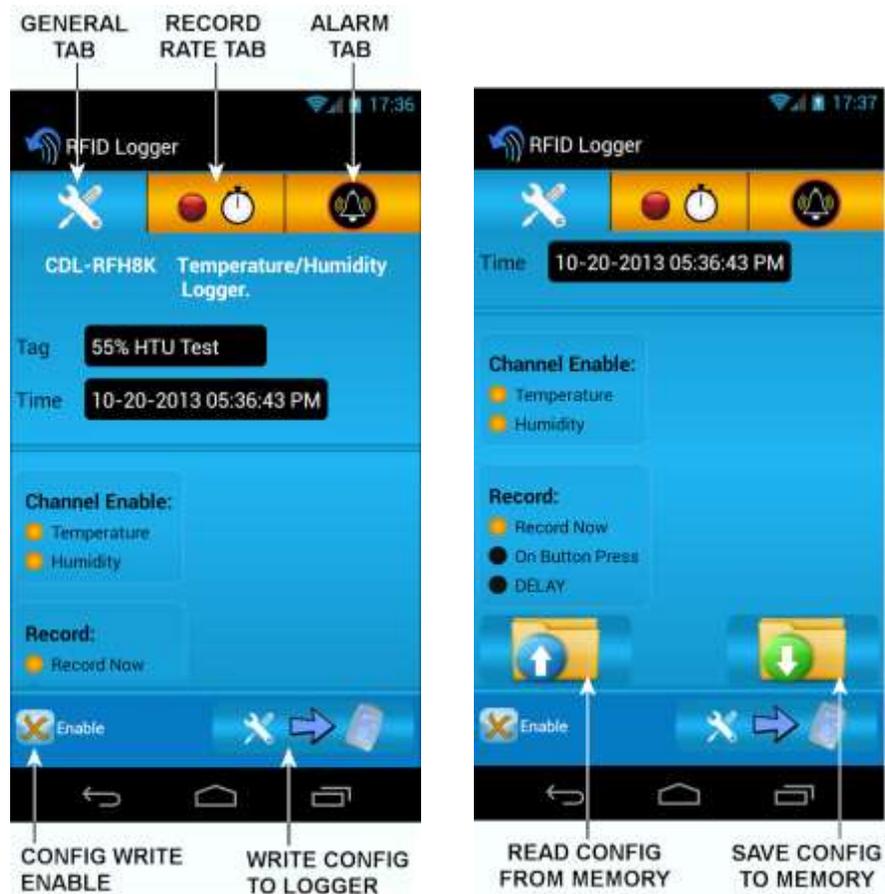
The graph image can be saved to memory at any time by using the standard Android screen capture button combination on your device. (On Android 4.0+ press and hold the Volume Down and Power buttons at the same time until you see the screen shot has been taken)

Return to the [Summary Tab](#) to proceed to logger configuration.

7. CONFIGURATION

The logger can be configured for use by pressing the CONFIG LOGGER button on the [Summary Tab](#).

This will take you to the configuration page shown below. Note that on a phone you will need to use your finger to drag the screen so you can see the lower half of the page.



CONFIGURATION WINDOW

The Configuration window is used to set up the logger for operation. The configuration options depend on what type of logger you are using. These examples are for a Dual Channel Temperature/Humidity device.

If you do not need to make any changes to the way the logger operates you can simply write the configuration to the logger as it was read. This will restart the logger with the existing configuration.

Notes:

- Writing the configuration to the logger will restart it, this will **CLEAR ALL DATA** within the logger and start over. If you read the logger part way through a recording and wish to continue with that recording **DO NOT WRITE** the configuration to the logger.
- You can write the same configuration to more than one logger of the same type. You cannot write the configuration to a different type of logger.
-

- You can load a previously saved configuration from your Android device memory and write this to a logger of the same type. Use the READ CONFIG FROM MEMORY button shown above. This will bring up the file manager allowing you to select a file. The file extension must be .bin.
- You can save a configuration to your Android device memory for later use or to program “new” loggers. Use the SAVE CONFIG TO MEMORY button shown above. This will bring up the file manager allowing you to select a file location and name the file. The file extension must be .bin.

7.1. GENERAL CONFIGURATION

Refer to the [CONFIGURATION WINDOW](#) above. The General options are under the GENERAL tab and include the following:

7.1.1. Tag

This is the unit tag or name which allows the User to uniquely identify the logger. You can enter up to 20 alphanumeric characters.

7.1.2. Time

This is the date time stamp of the Android device and is used to synchronize the logger when a configuration is written. It cannot be modified by the user.

7.1.3. Channel Enable

Only present if the logger being used has more than one channel. In the above case the User can select whether to record both Temperature AND Humidity or just one of these. It is not possible to disable both channels. If the radio button is checked that channel is enabled. Note – a two channel unit will record for twice as long if only one channel is enabled.

7.1.4. Record

This determines when the logger will start to record data. There are three possibilities which are mutually exclusive. Select the radio button of the required option:



Record Now – The logger will start recording the instant the configuration is written.

On Button Press – The logger will start to record when the operator does a long press (>3 seconds) of the button (on demand). Note that in this mode, if the logger recording has been started, a second long press will stop the recording. The recording can only be restarted by writing a new configuration.

DELAY – If this radio button is checked the HOURS and MINUTES block will appear. The user can enter the delay time, up to 999 hours. The logger will wait from the time the configuration is written until the entered time has elapsed before recording starts. Note that a delay time of 000:00 is equivalent to “Record Now”

Once the General Configuration has been set the User can choose to set the [Record Rate](#) and the [Alarms](#) before [Writing the Configuration](#) to the logger.

7.2. SETTING RECORD RATES

The record rate settings are found under the RECORD RATE tab shown right. This will bring up the Record Rate window shown below. This is the simple setting window – note the [advanced](#) radio button is not checked.



7.2.1. Record Rate

Set the logger Record Rate which is the rate at which the logger takes a sample and stores it in the logger memory. Select the Record Rate from the drop down menu. Choices are from 10 seconds to 60 minutes.

Record Time - is the length of time the logger will record for based on the Record Rate selected. It is also a function of the number of channels in the logger and which of those channels is enabled. See [above](#). This cannot be modified by the User.

Time – This is the date time stamp of the Android device and is used to synchronize the logger when a configuration is written. It cannot be modified by the user.

7.2.2. Sample Rate

If you check the **Advanced** radio button the Advanced options will be shown. This allows the User to choose a sample rate, which is the rate at which the logger takes a sample of whatever it is recording e.g. Temperature. This sample rate is independent of the Record Rate described above. The sample rate is always less than or equal to the record rate. For this example the **Record Rate** is set to 5 minutes, so every 5 minutes a value is stored in memory, however the **Sample Rate** is set at 10 seconds, so every 10 seconds the logger takes a sample. That means after 5 minutes the logger will have taken 30 samples. The Sample rate allows the User to take more data than is recorded which saves memory space. How these samples are processed depends on the **Sample Mode** below.

7.2.3. Sample Mode

Tap the radio button alongside the Sample Mode you wish to use.

Instantaneous – The Sample rate is the same as the Record rate which is equivalent to deselecting Advanced.

Average – All samples collected between Record Rates are averaged (it is a rolling average) and then stored in memory.

Maximum - The maximum value of all samples taken is stored in memory at the Record rate. This is useful if you are looking for a high alarm while recording at a slower rate.

Minimum - The minimum value of all samples taken is stored in memory at the Record rate. This is useful if you are looking for a low alarm while recording at a slower rate.



RECORD RATE TAB – NO ADVANCED



WITH ADVANCED OPTION

Press the OK (✓) button to accept or "X" to cancel.

7.3. SETTING ALARMS

The logger has alarms which are dependent on the type of logger being used. To view or set the Alarms select the ALARM tab shown right. This will bring up the Alarm window shown below.



This is the Alarm window from a Temperature/Humidity logger. It has two alarms per channel. The alarms are numbered 1 and 2 for Temperature and 3 and 4 for Humidity.

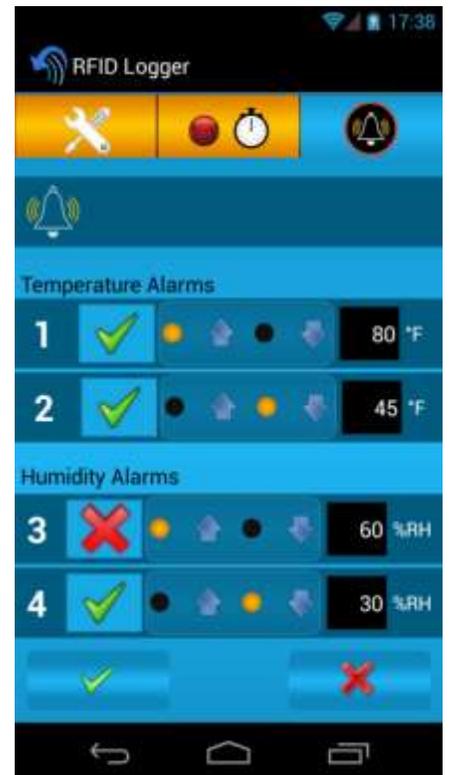
Alarms can be enabled or disabled by tapping the  (ENABLED) or  (DISABLED) icons. Each tap will change the state of the alarm

Alarms can be High  or Low . Check the radio button to the right of the arrow to select.

The value of the alarm can be set by tapping the text window. This will pop up the numeric keypad (shown below) allowing the number to be entered or edited. Note that if you enter illegal values they will not be accepted. Also a LOW alarm cannot be higher than a HIGH alarm and vice versa.

Temperature Alarms in °F are rounded to the nearest 1° and are then converted to °C before being saved to the logger. Similarly the alarm value is read from the logger in °C and converted to °F. This may result in a slight rounding error which means the value entered in °F could be different to what is displayed by $\pm 1^\circ\text{F}$. This is also the accuracy of the Alarm. The temperature engineering units can be set before reading the logger or loading data. See [STARTING THE APPLICATION](#) above.

Press the OK (✓) button to accept or "X" to cancel.



ALARM TAB

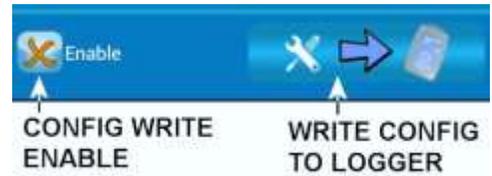


7.4. WRITING THE CONFIGURATION

Once all your configuration settings have been set, or you simply want to use the existing setup, you need to start the logger by writing this information to the logger. To do this you need to be in the configuration GENERAL tab shown right.



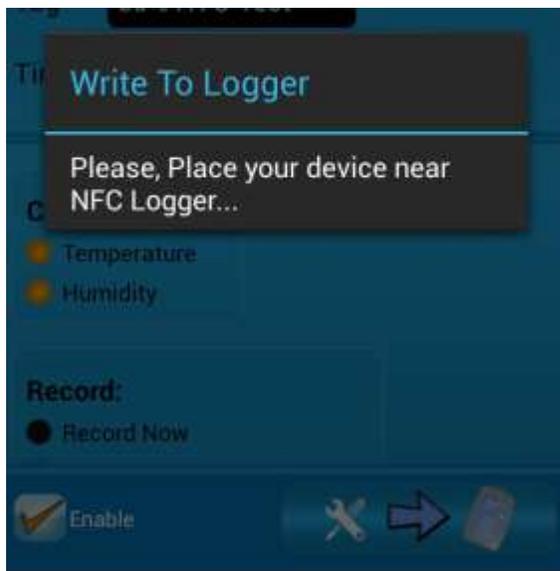
The write configuration button is at the bottom of the page. In order to write to the logger you must **MOVE THE LOGGER AWAY FROM THE PHONE** or tablet.



Tap the CONFIG WRITE ENABLE button which will enable the write operation. This is indicated as shown below:



Now tap the WRITE CONFIG TO LOGGER button
This will pop up the following message:



Move the logger close to your phone/tablet in the NFC antenna area. The program will start writing to the logger once it is detected. Follow the instructions. The process takes less than 3 seconds.

Note

- Once the information is written, it is automatically read back to compare and ensure the data was written correctly.
- You will not be able to write the configuration for one type of logger to a different type of logger.

If the write fails, move the logger away and repeat the process, ensuring that the logger is properly positioned in the NFC antenna area.

Once the write is completed – tap the “OK” button. Use the Android back button  to return to the [start screen](#) to service a new logger.