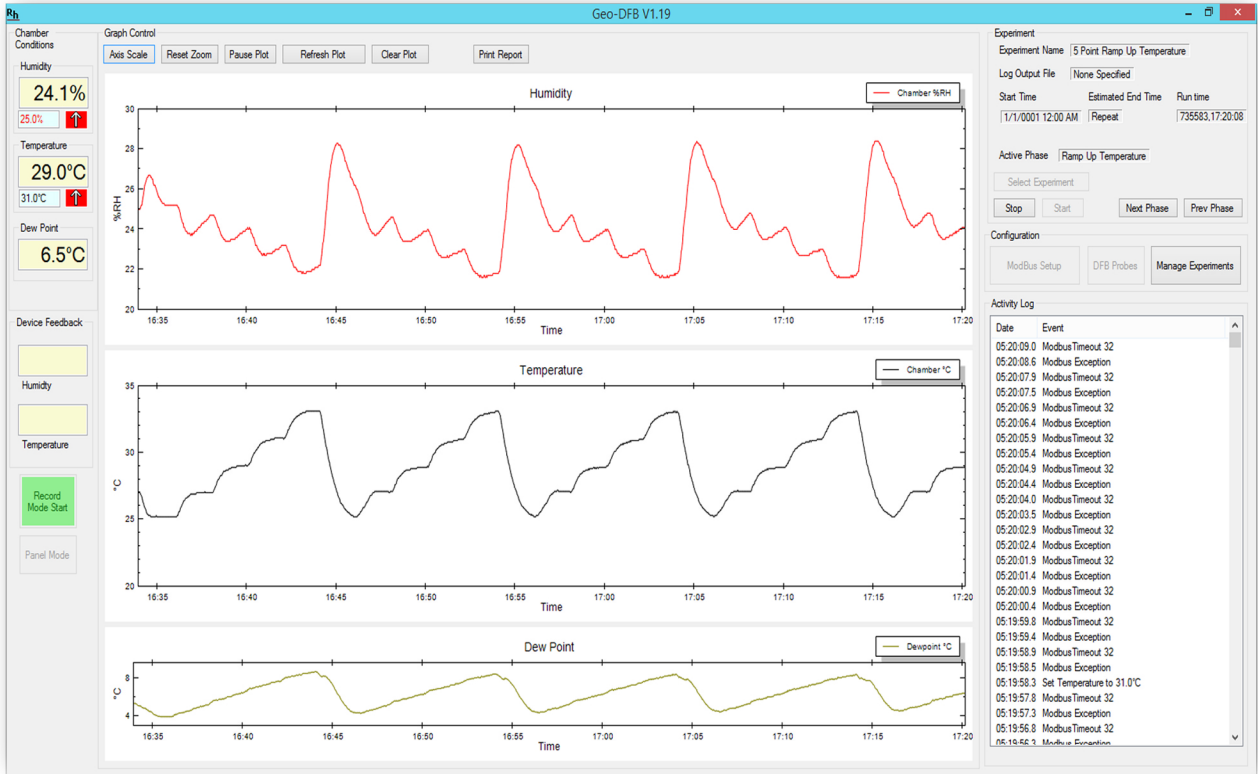# GEO-DFB Application Usage

Main Screen

Figure 11 Main PC operational screen

The Main screen of the GEO application is pictured above.

The left hand area labeled *Chamber Conditions* shows the current environmental conditions in the chamber. The large display shows the current readings, while the smaller values indicate the current set points.

The left hand area labeled *Dew Point* indicates the current dew point within the chamber.

The left hand area labeled *Device Feedback* indicates the current device feedback channel readings.

In the center of the screen is a graphical representation of the environmental conditions over time. The top plot is the humidity graph it shows the chamber and the DFB humidity channels over time. The center plot is shows the chamber and DFB channel temperature plots. The bottom plot shows the chamber dew point over time. The plot control if done via the 5 buttons above the plots.

In the right hand portion of the screen in the area labeled *Experiment* is a display of the current experiment being run and which phase of the experiment is currently active and controls which allow the experiment to be started/stopped. The user may also manually proceed to the next phase of the running experiment or rewind to the beginning of the previous phase of the current experiment.

In the center area of the right portion of the screen in the area labeled *Configuration* is where the user may perform initial configuration of the GEO-2000SP-DFB-11 , manage the experiments database and select the DFB probe types.

In bottom area of the right hand portion of the screen in the area labeled *Activity* Log is a textual representation of the current activity of the GEO-DFB software and informational messages.

Experiments

The GEO DFB software allows the user to create experiments. An experiment is defined by a sequence of one or more phases each of which independently control the chamber conditions. The user may define any number of experiments and each may have any number of phases. Each experiment has a *Title* which is the displayed name of the experiment. Each experiment may be logged to a Comma Separated Values file (CSV) which Is compatible with excel and numerous other 3rd party data analysis tools. The logging is optional and the rate at which logging is to be done is configurable by the user. The experiment may also be configured to *loop forever* which will cause the experiment to repeat once the final phase has completed.

Phase

A phase defines the environmental conditions of the chamber for a period of time. Each phase has a name multiple phases may have the same name. Optionally each phase may be logged independently to the experiment log into its own CSV file at its own data collection rate. Each phase has a total time to run. Once that time has completed the next phase in the experiment will be started. The user may define each phase to generate a report upon completion. For each phase the user may define the chamber temperature and humidity behavior independently. Each variable (temperature and humidity) behavior during the phase is defined by a starting point, end point , increment and an update rate. Once the phase is started the system will set the environmental conditions to the values in start, it will increment the value at a rate specified by increment. Note the increment may be negative for downward sloping behavior or may be set to zero to have the variable not change during the phase. The increment will continue until the end value is reached or the total time for the phase has been exceeded. This gives the user maximum flexibility. In the sample screen below the current phase 'Ramp Up Humidity' is defined to keep the temperature at a constant 23° C and ramp humidity from 25% RH to 35% RH in 2% RH increments every 2 minutes. This will happen for 20 minutes since the phase run time is set to 00:20:00.
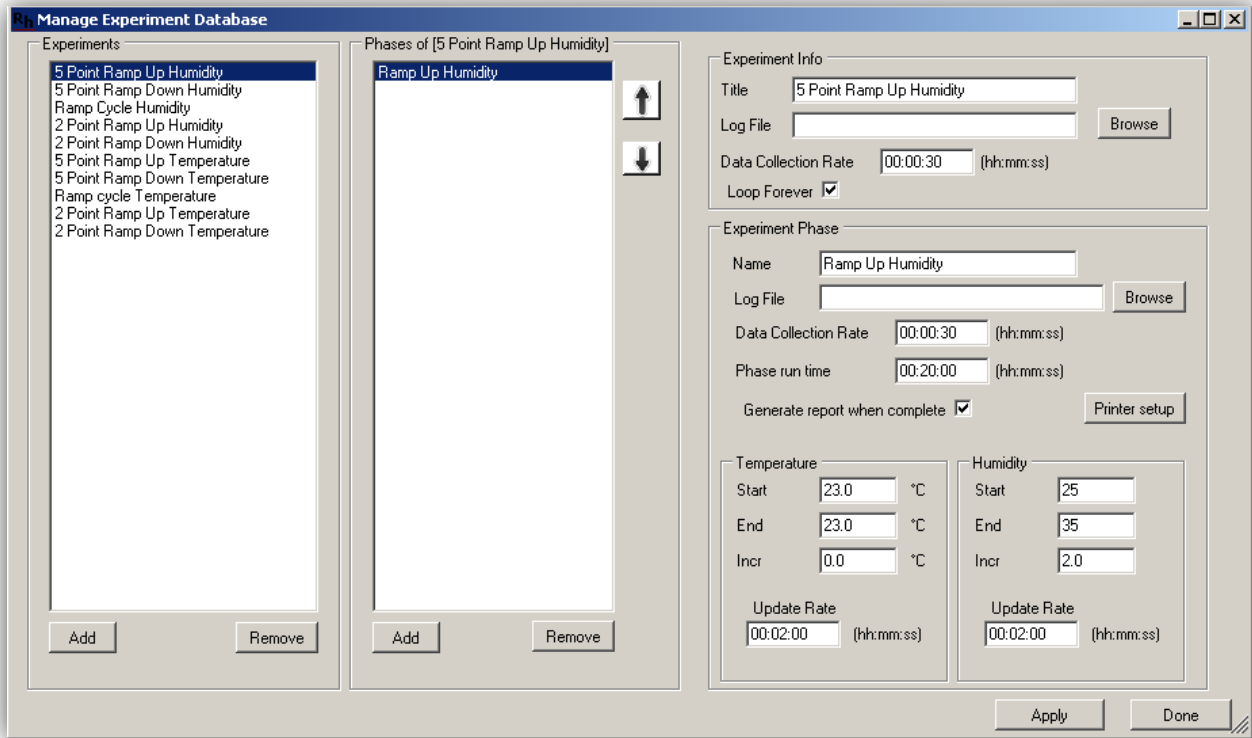
Figure 12 Experiment and phase definition

DFB Probe

The GEO2000SP-DFB-11 has flexible configuration of the Device Feedback probe types. The probe type menu is accessed from the main screen 'Probes' button. The system is shipped with generic probe definitions for both voltage and current loop type probes. The user may define their own custom probe types. To selects the current active DFB probe type from the menu highlight the desired configuration and press select.
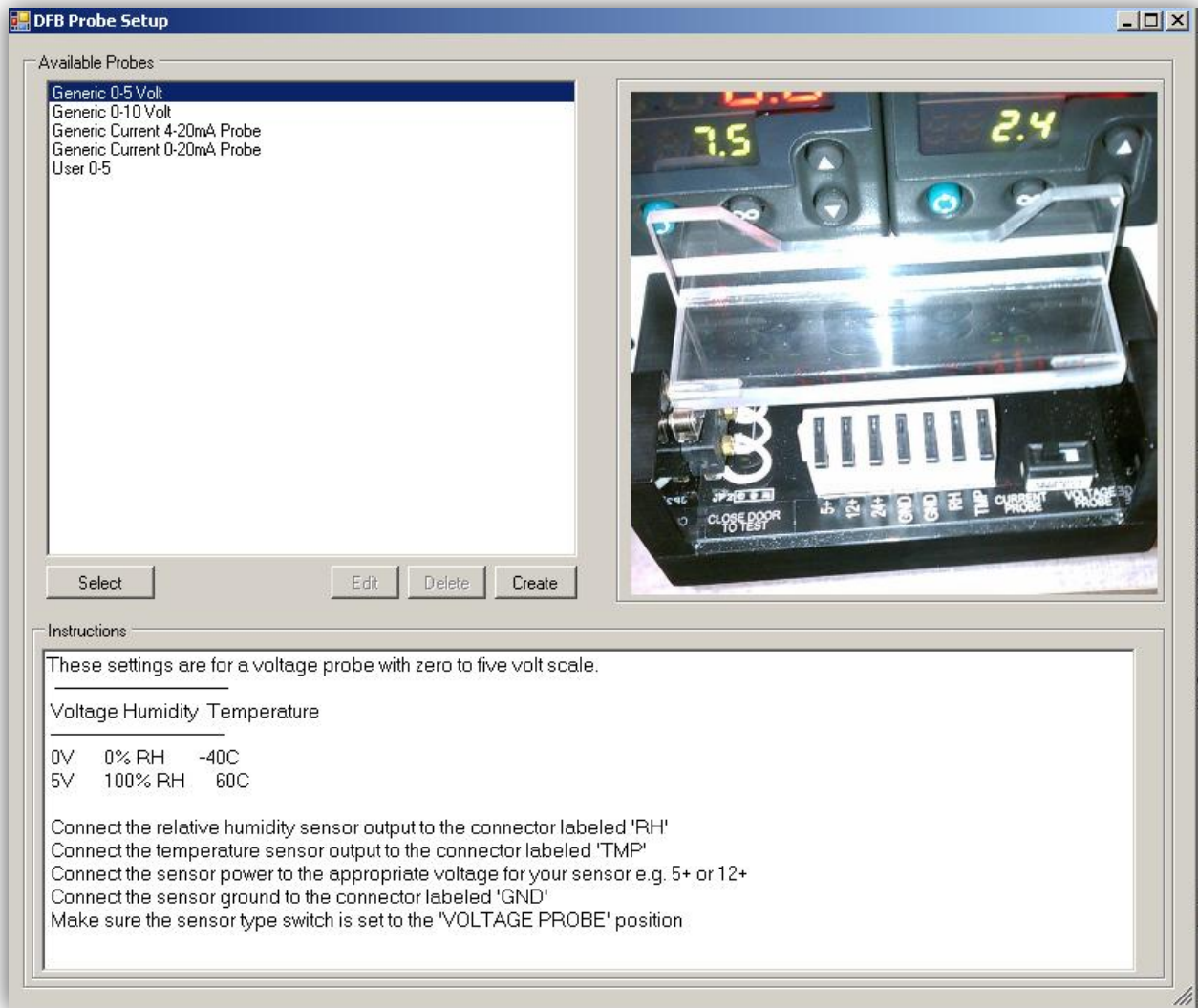
Figure 13 Selecting a Device Feedback probe

User defined DFB probe configuration

Custom user definable probe type is defined by pressing the 'Create' button on the DFB probe selection screen. The probe definition selects the supply voltage of the probe and the mapping of probe output voltage or current to the physical temperature and humidity values. In the example above a custom probe that requires 12V is defined. The probe provides a 0 to 5V output for humidity where 0 V is equivalent to 10% RH and 5V indicates 90% humidity. The temperature prove also operates from 0 to 5V where 0 volts indicate a temperature of 0°C and 5V corresponds to a temperature of 100°C. Each user defined probe may have additional instructions to the operator and a name which will appear in the DFB probe selection screen.
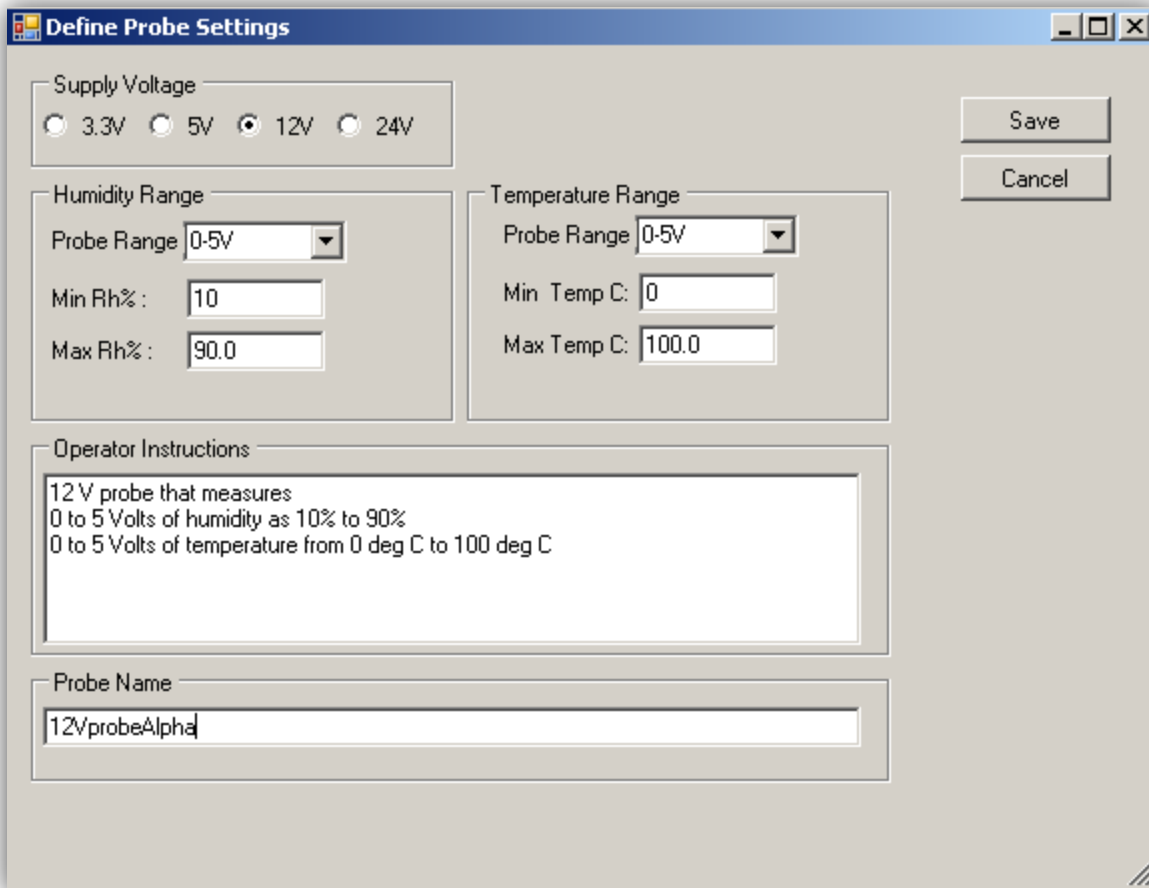
Figure 14 User probe definition

Modbus Initial setup

The GEO2000SP-DFB-11 uses the modbus protocol over the USB/RS232 interface. First time the application is installed the communication port to which the unit is connected must be found. If the system is powered on pressing the 'Auto Configure' button will cause the GEO-DFB application to find the communication port that the unit is connected to. This needs to be done only once during installation or the device drivers are reinstalled or updated.
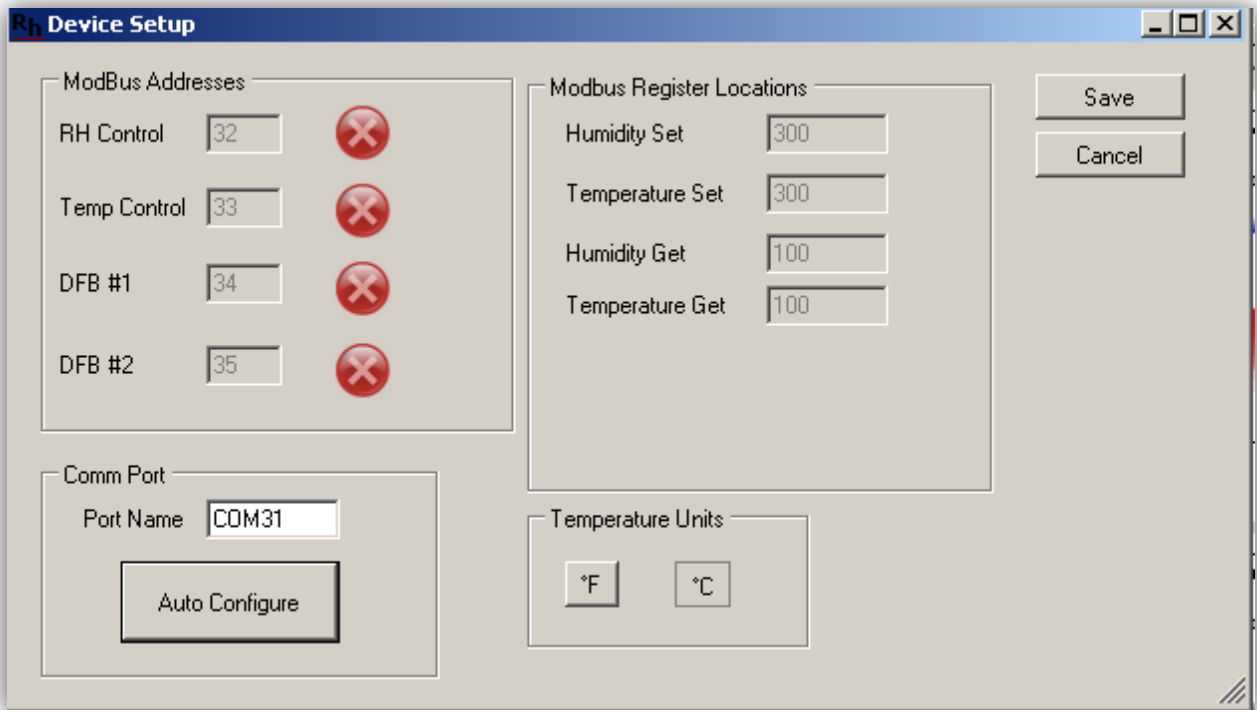
Figure 15 Modbus device setup

Panel Mode

Panel mode is accessed from the main screen button labeled 'Panel Mode'. Panel mode is only available if an experiment is not currently running. In Panel mode the user may manually control the environmental conditions with the chamber.
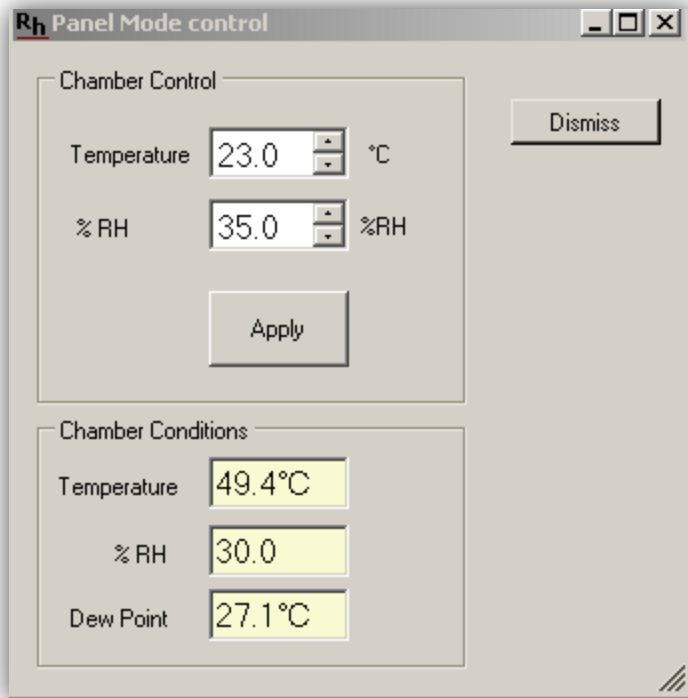
Figure 16 Panel mode control

Plot control

The plot area allows the user to control the scale range, line plot color and to zoom in and out of particular areas of interest. The screen that sets auto scaling and plot line color is shown below. To zoom the display to a particular area of interest the use should pause the plot updates by pressing the 'Pause Plot' button and then drag the cursors on either the temperature or humidity plot to the area of interest. The user may zoom in multiple times. To return to the total time views press the 'Reset Zoom' button.
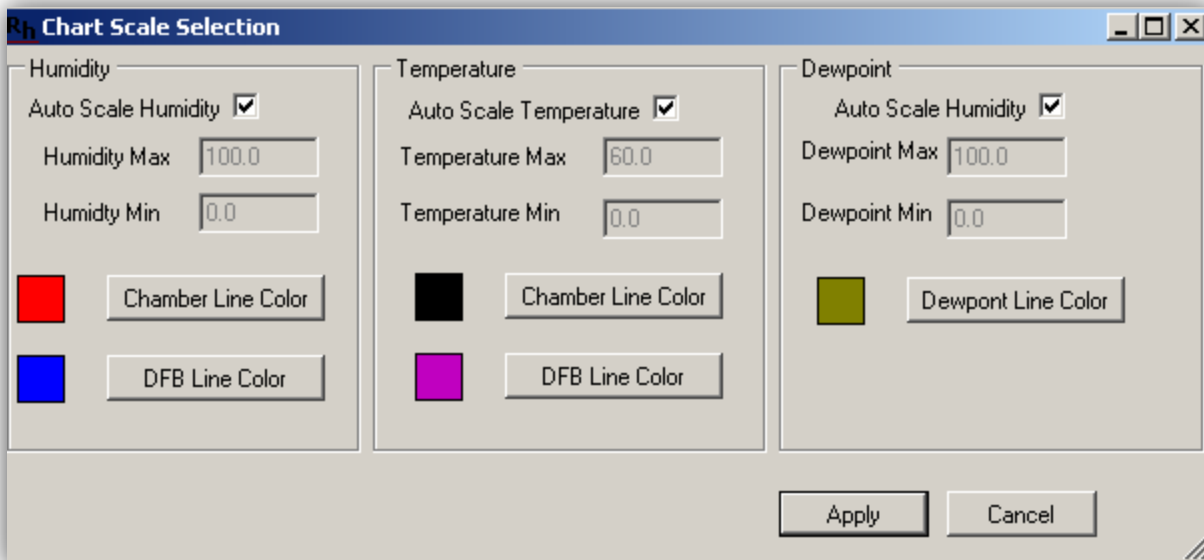
Figure 17 Axis range and color selection

Reports

At any time the user may request a report to be printed on the currently collected information. To print a report press the 'Print Report' button from the main screen. The user will be prompted for their name, title, employee ID and any additional notes. The user must select a printer to which to send the report and select print when ready.

Record Mode

The 'Record Mode' button on the main screen allows the user to record the chamber and DFB channel behavior without defining an experiment. During record mode the system will log the raw collected data to the CSV file entered by the user. The Record Mode is meant for diagnostic or free form data collection. Note that record mode will generate a large amount of data as the environmental conditions are logged at a fast rate. So ensure that there is sufficient disk space where the log file is to be stored.