Document History

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Safety

The following safety icons are used in this manual:

Warning

Warnings alert qualified personnel working on BioChambers equipment that a given procedure may injure or kill. The warning appears before the dangerous step, as follows:

	WARNING **Electrical Hazard** Ensure power to circuit AB is disconnected before continuing.

Caution

Cautions alert qualified personnel working on BioChambers equipment that a given procedure may damage equipment or tools. The caution appears before the risky step, as follows:

	CAUTION Prying open the BB Panel may keep the panel from fitting, and will mar the surface finish.

Note

Notes provide extra information and appear as follows:

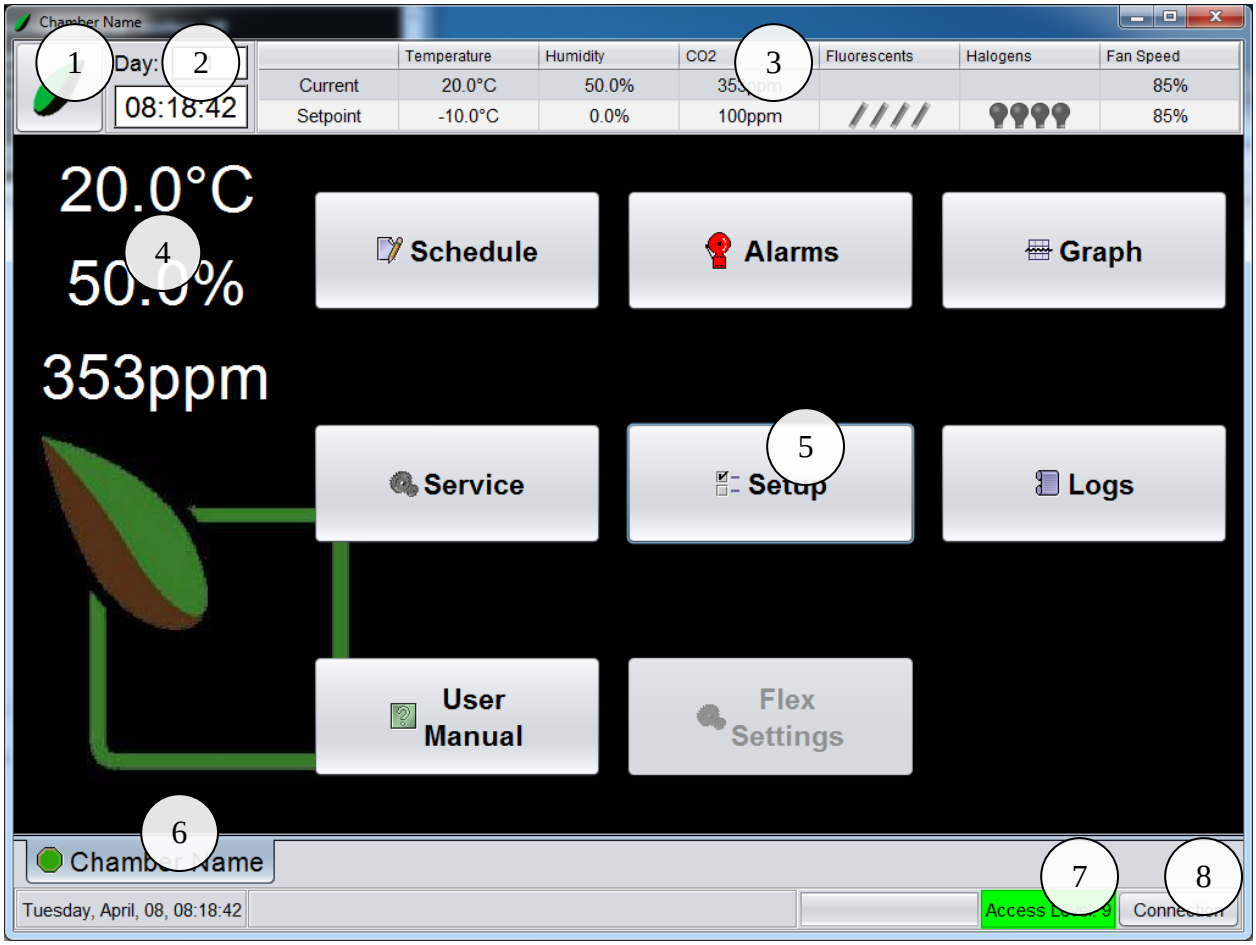
Note	To remove the panel, loosen each corner.

Introduction

This section introduces the BioChambers VNet 4 software.

Main Screen

Below is the home screen of BioChambers VNet 4 with an explanation of the features.



1. **Home** button

   Accesses the home screen

2. *Day and Time*

   Displays the day and time of the currently running schedule in BioChambers VNet 4

3. *Schedule Line*

   Displays the current setpoints and readings of the BioChambers equipment

4. *Real Time Readings*

   Displays the current readings of the BioChambers equipment

5. Home screen buttons

   Used to access the features and functions of BioChambers VNet 4

6. *Name and Status*

   Status and name of chamber

7. *Access Level*

   Displays the security access level of the current BioChambers VNet 4 user

8. **Connection** button

   Accesses the connection functions of BioChambers VNet 4

Opening BioChambers VNet 4

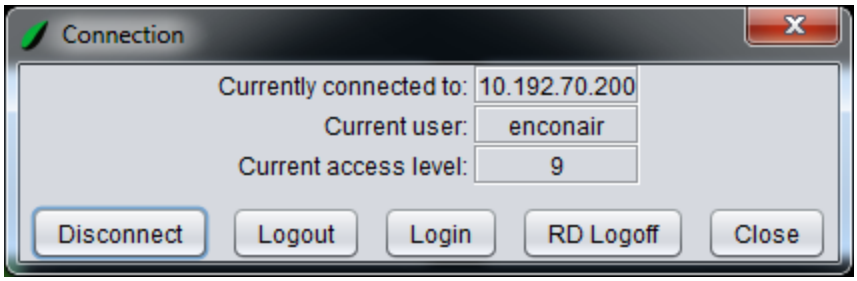
BioChambers VNet 4 should open as soon as the chamber computer starts. If the software is not running follow this procedure:

1. Click on the **Start** button at the bottom left.
2. Click on the **BioChambers VNet 4** shortcut.

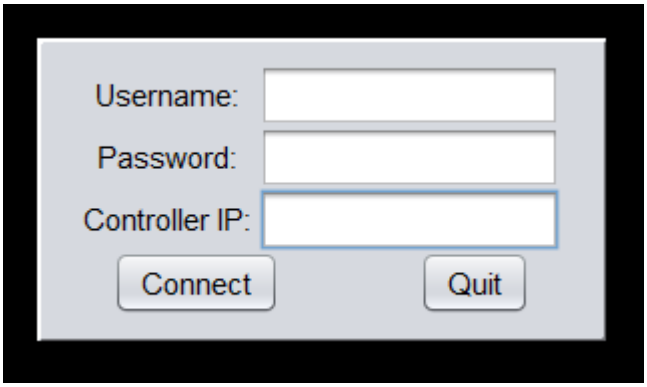
Exiting BioChambers VNet 4

To exit BioChambers VNet follow this procedure:

1. Click on the **Connection** button at the bottom right. The following window will appear:



2. Click on the **Disconnect** button. The following window will appear:



3. Click on the **Quit** button.

Users and Access Levels

Introduction

BioChambers VNet 4 allows for multiple users, each at their own access level. This gives access to only the features required for each type of user. There are 5 access levels to BioChambers VNet 4: Level 1, Level 3, Level 6, Level 8 and Level 9. BioChambers VNet 4 comes with 5 default users, one for each access level.

Username	Access Level	Password
level1	1	level1
researcher	3	researcher
admin	6	admin
service	8	-
enconair	9	-

*Level 8 and 9 are reserved for BioChambers technicians

The higher the access level the more functions available to the user. Below is a list that details the functions accessible to each user level:

- Level 1 (all users)
  - Alarms
    - View alarms only
  - User manual
  - Scheduling
    - View schedule only
  - Graphing & Logging
    - Chamber and alarm logs only
  - Service
    - **Statistics** tab
    - **Limits/Monitors** tab
    - **About** tab
    - **Defrosting** tab
- Level 3 (researcher)
  - All Level 1 functions
  - Scheduling
    - Full access
- Level 6 (administrator)

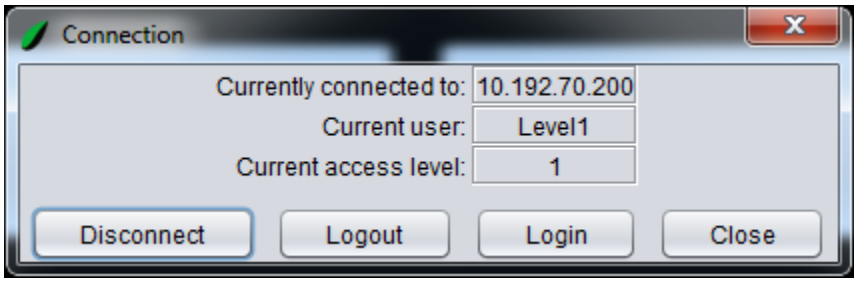
- All Level 3 functions
- Alarms
  - Full access
- Graphing & Logging
  - Service logs
- Setup
  - **General Settings** tab
    - **Details/Time** tab
      - Equipment Details
      - Time Settings
    - **Email** tab
  - **Chambers** tab
    - **One – Four** tab
      - **General** tab
        - General Settings
        - Startup Delay
        - Lamp Loft Settings
      - **Limits** tab
        - Setpoint Limits
      - **CO2 Control** tab
        - **Disable CO2 Sensor** checkbox
  - **Logs** tab
    - Logging Setup
  - **Admin** tab

- Level 8 (diagnostics)
  - All Level 6 functions
  - Setup
    - **General Settings** tab
      - **Alarms** tab
        - General Alarm Bypasses
    - **Chambers** tab
      - **One – Four** tab
        - **Alarms** tab
          - Chamber Alarm Bypasses
    - **Logs** tab
      - Full access
    - **Network** tab
- Level 9 (super-administrator)
  - All functions

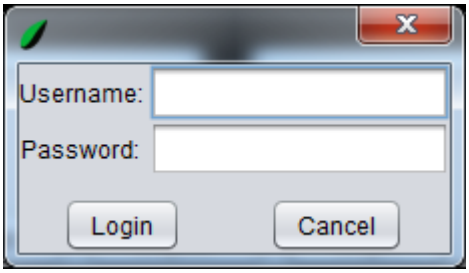
Logging In

To access certain BioChambers VNet 4 functions the user must log in and obtain a higher access level. The following procedure explains how to log in as a different user:

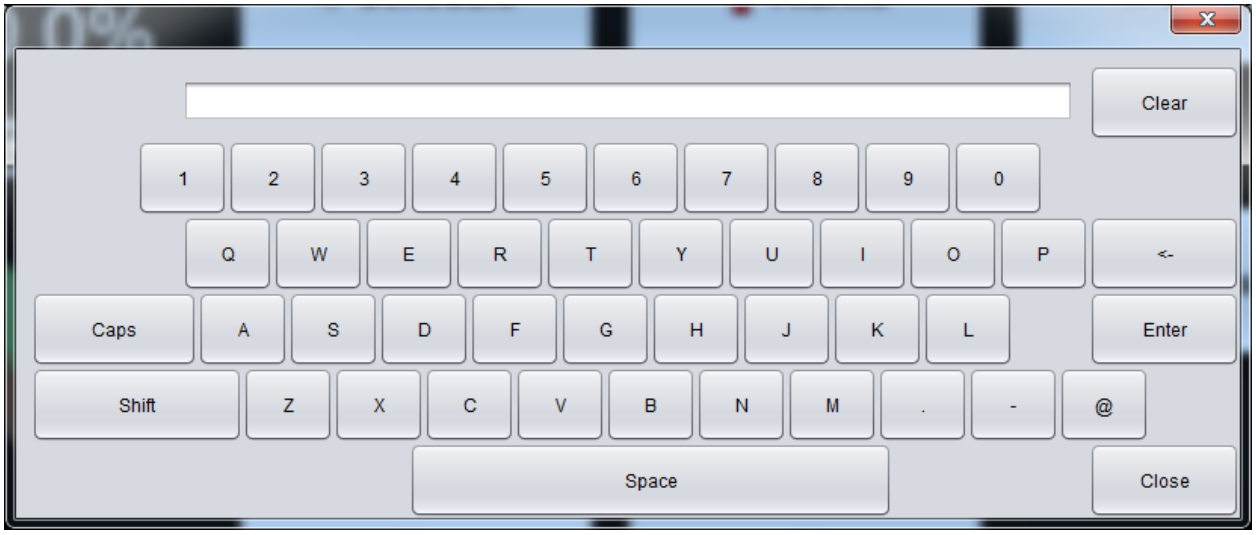
1. Click the **Connection** button at the bottom right. The following window will appear:



2. Click the **Login** button. The following window will appear:



3. Click the textbox next to *Username*. The onscreen keyboard will appear:



4. Use the onscreen keyboard to enter the username and click **Enter**.

5. Click the textbox next to *Password*.
6. Use the onscreen keyboard to enter the password and click **Enter**.
7. Click on the **Login** button.

The log in process is complete. The access level can be verified by checking the *Access Level* on the home screen:

Logging out

When done using BioChambers VNet 4 a user should log out to prevent unauthorized individuals from using BioChambers VNet 4. The following procedure describes how to log out:

1. Click on the **Connection** button.
2. Click on the **Logout** button.

The log out process is complete. The logout can be verified by checking the *Access Level* on the home screen:

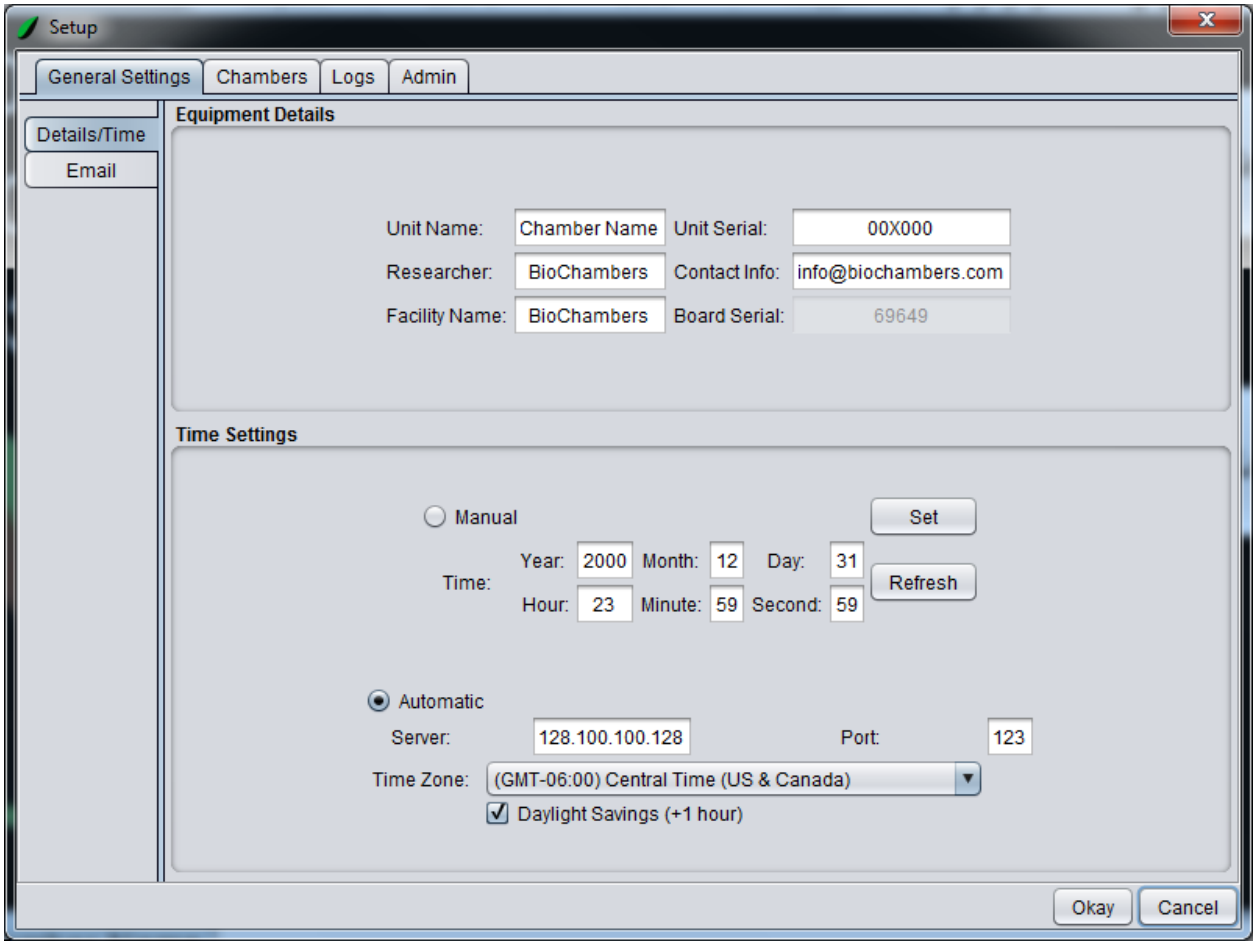
Managing Users

An administrator can add, delete and modify users in BioChambers VNet 4. In order to access user management the user access level must at least Level 6.

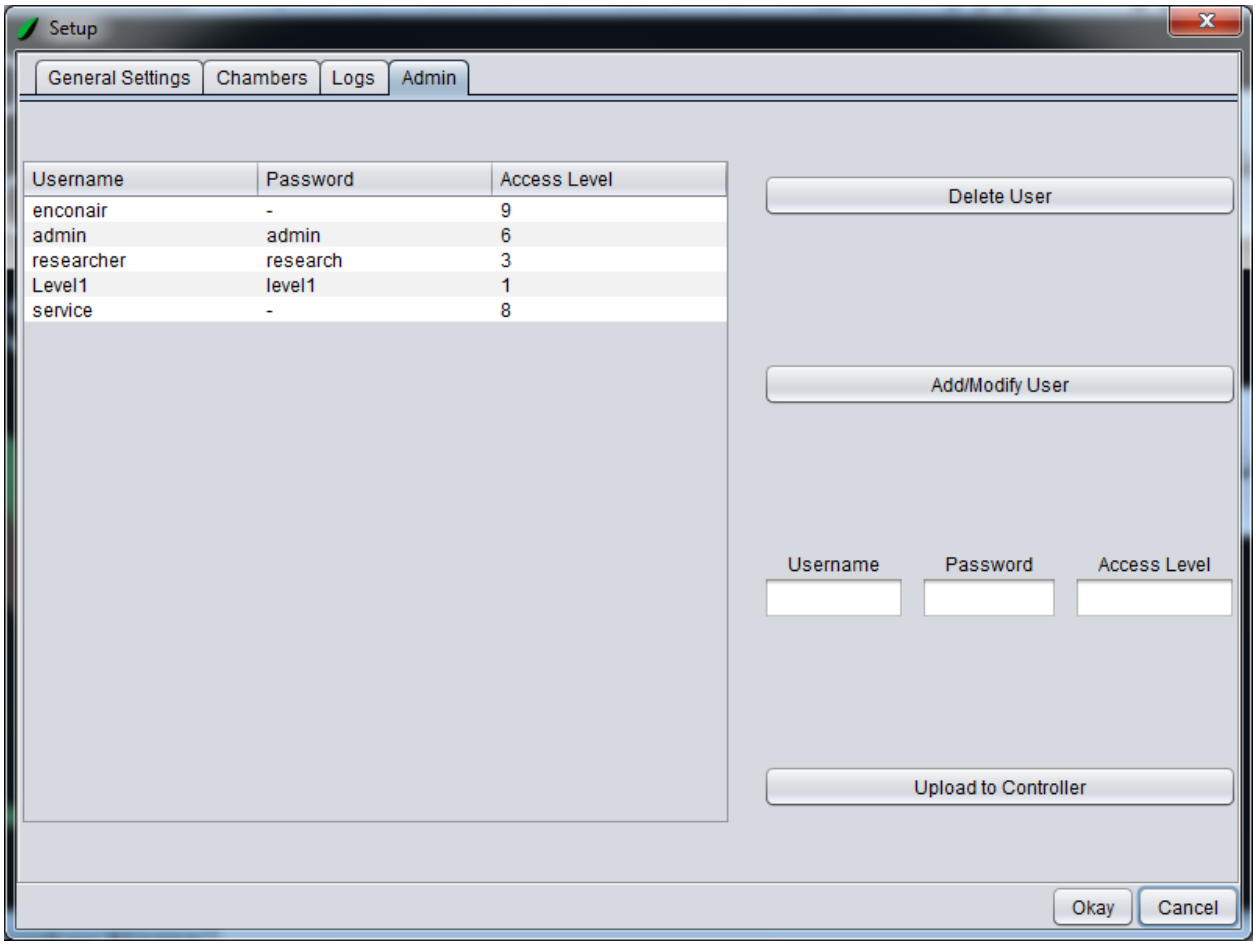
Adding a User

To add a user to BioChambers VNet 4 follow this procedure:

1. Click on the **Setup** button on the home screen. The following window will appear:



2. Click on the **Admin** tab. The following window will appear:



3. Click on the textbox below *Username*.
4. Use the onscreen keyboard to enter the desired username and click on the **Enter** button.
5. Click on the textbox below *Password*.
6. Use the onscreen keyboard to enter the desired password and click on the **Enter** button.
7. Click on the textbox below Access Level.
8. Use the onscreen number pad to enter the desired access level and click on the **Enter** button.

Note	You may only add users up to the access level you are currently logged in as.

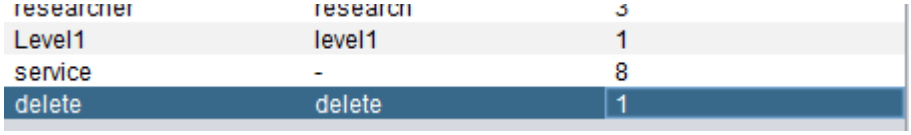
9. Click on the **Add/Modify User** button.
10. Repeat for each user to be added.

11. When all desired users are added click on the **Upload to Controller** button.

Deleting a User

To delete a user from BioChambers VNet 4 follow this procedure:

1. Navigate to the **Admin** tab as in above procedure. Click on the username to be deleted.



2. Click on the **Delete User** button.

Note	You may only delete users up to the access level you are currently logged in as. The current user cannot be deleted.

3. Repeat for each user to be deleted.
4. When all desired users are deleted click on the **Upload to Controller** button.

Modifying a User

To modify a user from BioChambers VNet 4 follow this procedure:

1. Navigate to the **Admin** tab as in above procedure.
2. Click on the username to be modified.
3. Click on the *Username*, *Password* and/or *Access Level* fields and make the desired modifications.
4. Click on the **Add/Modify User** button.

Note	You may only modify users up to the access level you are currently logged in as.

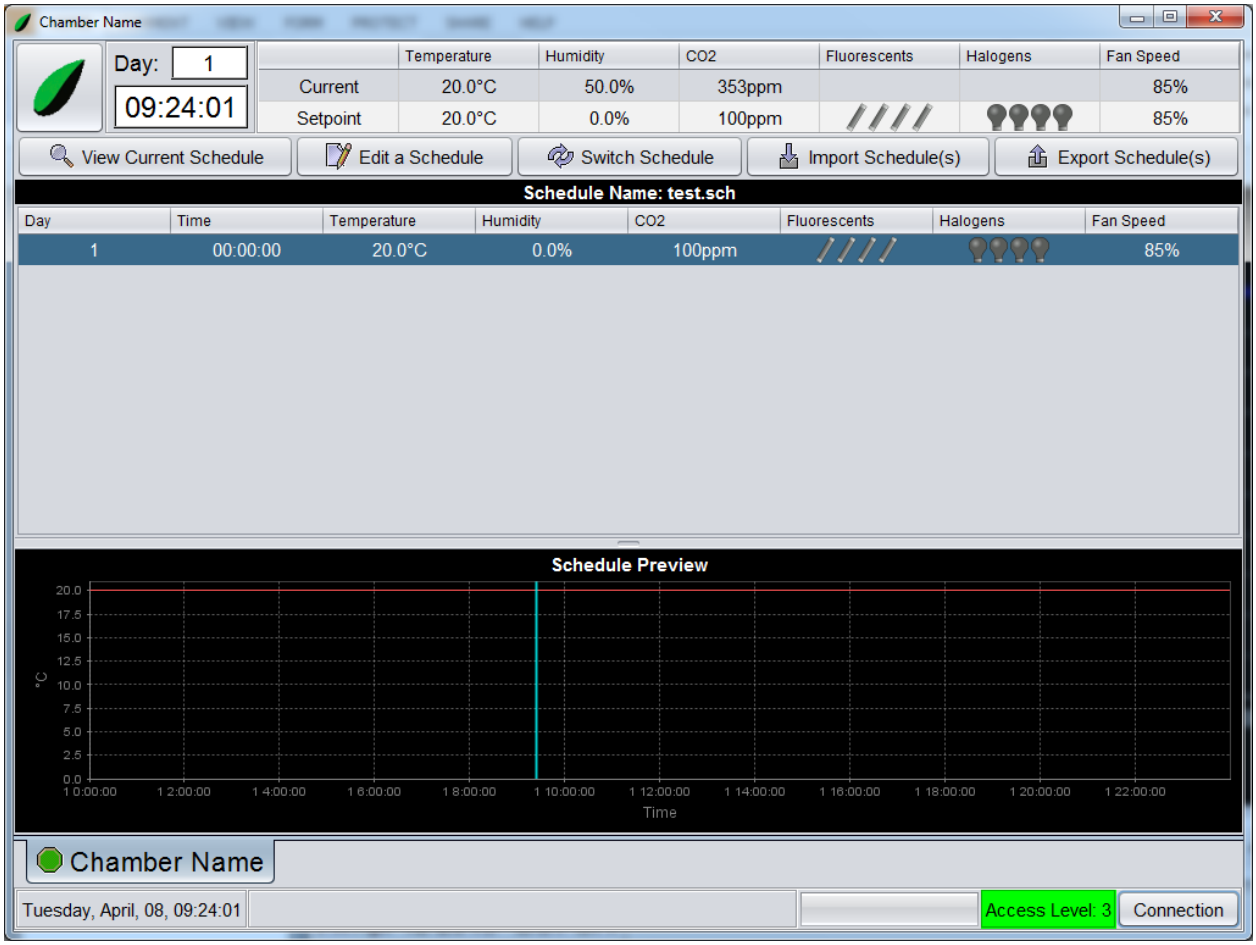
5. Repeat for each user to be modified.
6. When all desired users are modified click on the **Upload to Controller** button.

Schedules

BioChambers VNet 4 uses schedules to control the parameters of the equipment. This section will cover all the schedule functions and examples on how to write schedules.

Schedule Functions

All the schedule functions for BioChambers VNet 4 are located in the schedule screen. This can be found by clicking on the **Schedule** button on the home screen. When the schedule window is opened it will show the current schedule by default. Viewing the schedule requires Level 1 access while all other schedule functions require Level 3 access.



To return to the home screen click on the **Home** button.

View Current Schedule

When the schedule window is opened it will display the current schedule by default. The current schedule can be displayed at any time by clicking the **View Current Schedule** button.

Editing a Schedule

To create a schedule or edit an existing schedule click on the **Edit a Schedule** button. This will open edit mode.

1. *New Entry*

   Used to edit the various variables of the schedule. To edit a variable simply click on the field to be changed.

2. **Delete Entry** button

   Used to delete a selected schedule line from the schedule.

3. **Add Entry To Schedule** button

Used to add the schedule line from the New Entry area into the schedule.

4. **Repeat Entry** button

   Used to repeat a selected schedule line in the schedule.

5. Schedule Lines

   Shows the schedule lines.

6. *Schedule Preview*

   Shows a preview of the schedule temperature in a graph as well as the current schedule time within the schedule.

7. **Save** button

   Used to save the schedule. If the schedule has no name it will do a Save As operation.

8. **Save As** button

   Used to save the schedule under a new name.

9. **Delete Schedule(s)** button

   Used to delete schedules from the controller memory. Must have access level 6 to use.

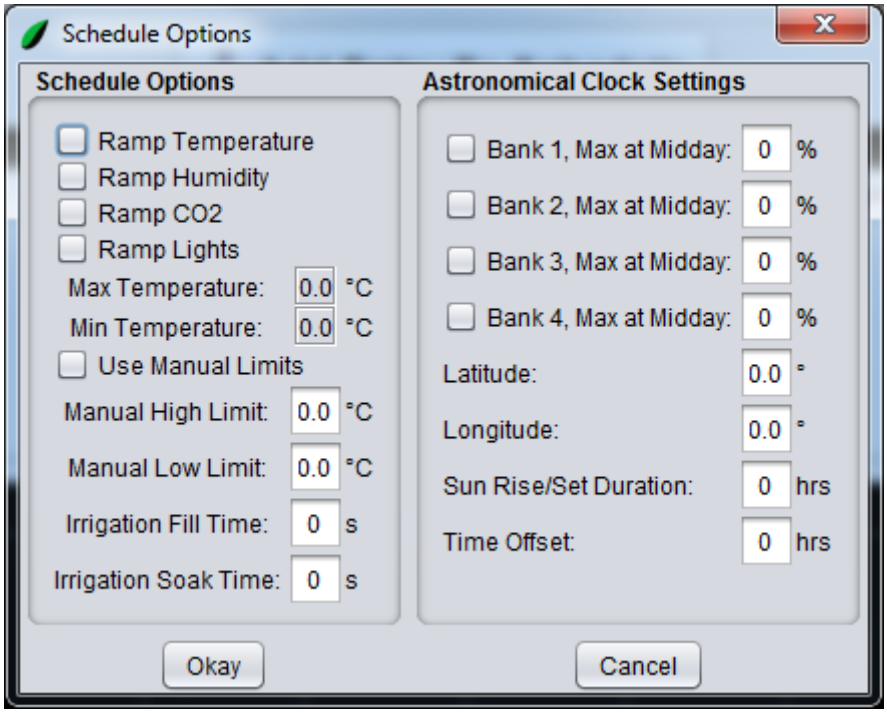
10. **Schedule Options** button

    Used to set options for this schedule.

Examples of how to use these functions to create common schedules are at the end of this section.

Schedule Options

BioChambers VNet 4 scheduling has many features, some of which must be accessed in the schedule options. Below is a description of each of these features. Examples of how to write schedules using these features is described in the Schedule Examples section.



Note	Schedule options work on a per schedule basis. Changing the schedule, will change the schedule options.

Ramping

BioChambers VNet 4 schedules can be programmed to ramp setpoints from one value to another over a period of time. For example if a schedule has 2 schedule lines, one with 20°C at 8:00am and another with 25°C at 12:00pm, the temperature setpoint would ramp up from 20°C to 25° between 8:00am and 12:00pm. Conversely between 12:00pm and 8:00am the next day the temperature would ramp down from 25°C to 20°C.

Note	Not all variables can be ramped. Non-dimmable lamp banks, for example, will not be ramped with the Ramp Dimmers function. Fan speed also cannot be ramped.

Manual Limits

BioChambers VNet 4 uses smart limits to ensure the control is functioning within set parameters. A description of how smart limits function is found in Appendix 1.

In addition to smart limits, manual limits can be used by activating them in the schedule options. By activating the manual limits, the chamber will use these limits in addition to the smart limits in determining whether or not to turn the chamber off based on the temperature in the chamber.

Irrigation

BioChambers VNet 4 can be configured to use scheduled irrigation. If so an irrigation column will be in the schedule. Using the schedule options the irrigation fill and soak times can be set in the schedule options.

The irrigation fill time is the amount of time the irrigation solenoid will be active, putting liquid into the chamber. This may be the only setting required for certain equipment. Other equipment uses a drain or siphon to allow soak time before draining the water from the chamber. The soak time can be adjusted in the schedule options as well.

The Astronomical Clock

BioChambers VNet schedules can be programmed to use an astronomical clock to control lighting. The goal of this feature is to simulate sunrise and sunset anywhere in the world, from day to day.

The astronomical clock uses the specified location and the schedule clock to simulate real sunrise and sunset times.

- *Latitude/Longitude*
    - The location you wish to simulate. Enter values in decimal form up to 2 decimal places. Northern and eastern hemispheres are positive values while southern and western hemispheres are negative.

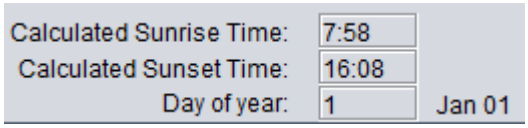
- *Sun rise/set duration*
    - Used to specify the amount of time (in hours) that the schedule should take to ramp from full darkness to full brightness. A zero setting will turn on the lights to maximum specified intensity at sunrise and off at sunset without ramping.
- *Time Offset*
    - Used to move the sunrise/sunset times to a more convenient time of day. For example you could move a 6:00am sunrise to 10:00am by entering a value of 4 hours.
- *Max at Midday*
    - Controls the light intensity during the day period. The values you enter here depend on the type of lighting system.

Lighting System	Behavior	Example
Control (µmol)	Control lighting uses both the maximum lamps settings and the schedule setpoint to determine the lighting setpoint throughout the day.	Schedule setpoint = 500µmol Maximum Lamps = 50% @ 50% sunrise, setpoint = 125µmol
Dimmable (%)	Dimmable lighting uses the maximum lamps settings to determine the lighting setpoint throughout the day.	Maximum Lamps = 50% @ 50% sunrise, setpoint = 25%
Non-dimmable, 4 Levels	Non-dimmable lighting uses the maximum lamps settings to determine the lighting setpoint throughout the day.	Maximum Lamps = 100% @ 13% sunrise, 1/4 levels @ 38% sunrise, 2/4 levels @ 63% sunrise, 3/4 levels @ 78% sunrise, 4/4 levels
Non-dimmable, 3 Levels	Non-dimmable lighting uses the maximum lamps settings to determine the lighting setpoint throughout the day. Do not set Maximum Lamps > 75%.	Maximum Lamps = 75% @ 17% sunrise, 1/3 levels @ 50% sunrise, 2/3 levels @ 84% sunrise, 3/3 levels
Non-dimmable, 2 Levels	Non-dimmable lighting uses the maximum lamps settings to determine the lighting setpoint throughout the day. Do not set Maximum Lamps > 50%.	Maximum Lamps = 50% @ 25% sunrise, 1/2 levels @ 75% sunrise, 2/2 levels
Non-	Non-dimmable lighting uses the	Maximum Lamps = 25%

dimmable, 1 Level	maximum lamps settings to determine the lighting setpoint throughout the day. Do not set Maximum Lamps > 25%.	@ 50% sunrise, 1/1 levels

- *Bank 1-4* checkbox
    - Used to specify whether the astronomical clock is enabled or disabled for this lamp bank.

When the schedule is running, the astronomical clock settings can be viewed for information on sunrise and sunset.

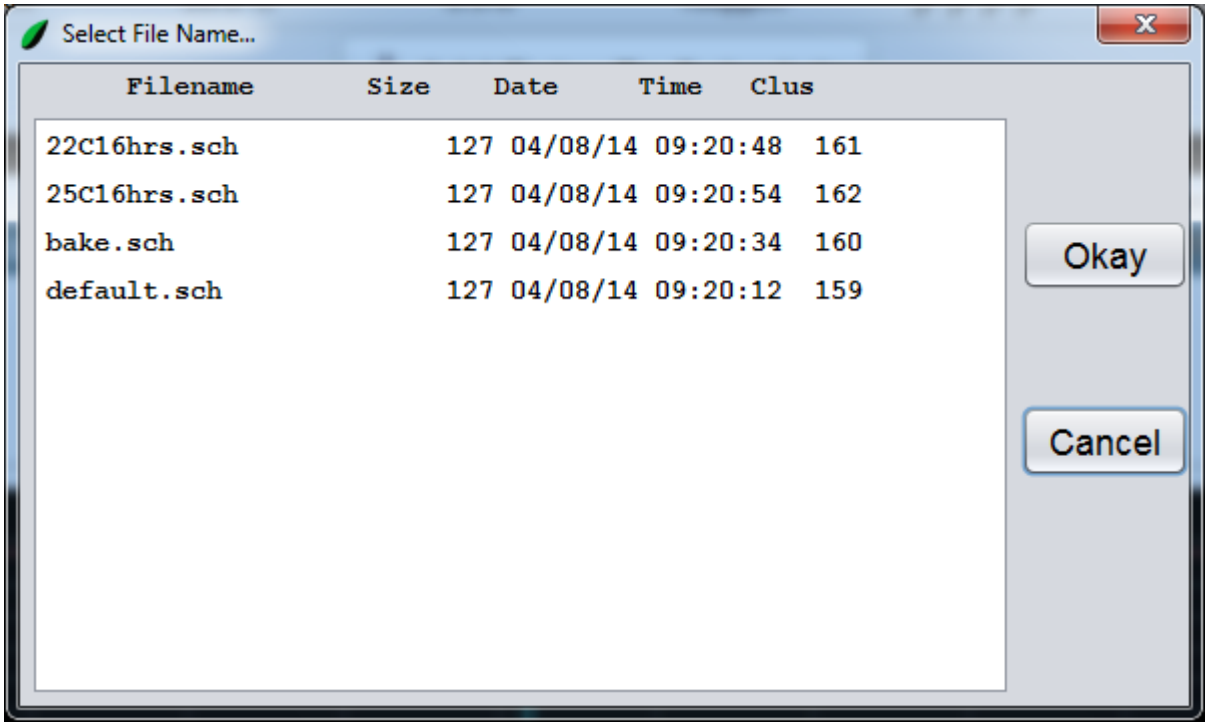


An example of writing and running an astronomical clock schedule is given in the Schedule Examples section.

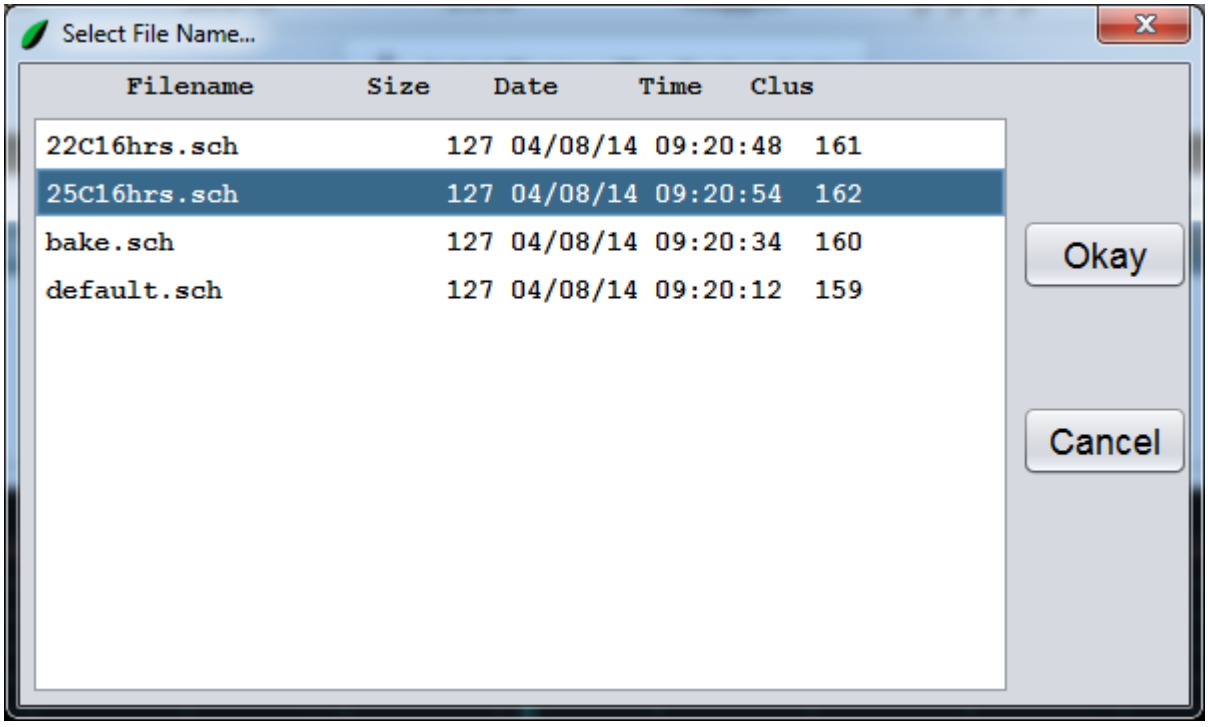
Switching Schedules

The following procedure explains how to switch from the currently running schedule to an existing schedule in BioChambers VNet 4.

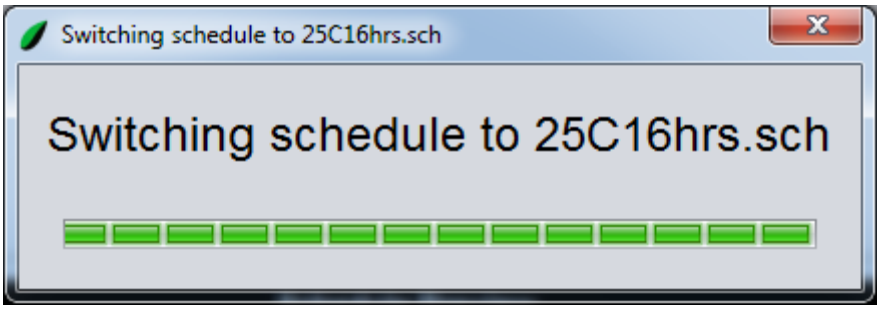
1. Click on the **Switch Schedule** button. The following window will appear:



2. Click on the schedule to be run.



3. Click on the **Okay** button. The following window will appear:



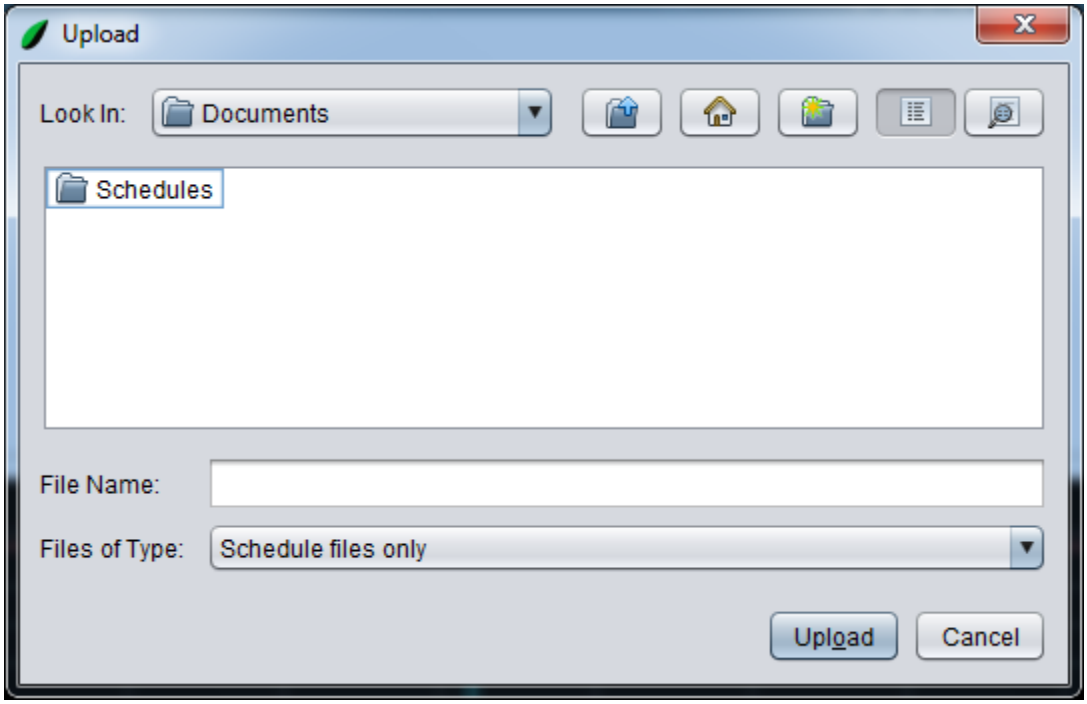
After approximately two seconds the loading window will close and the new schedule will be running.

Importing a Schedule

The following procedure explains how to import a schedule into BioChambers VNet 4. This process is useful for running backed up schedules or transferring schedules from one piece of BioChambers equipment to another.

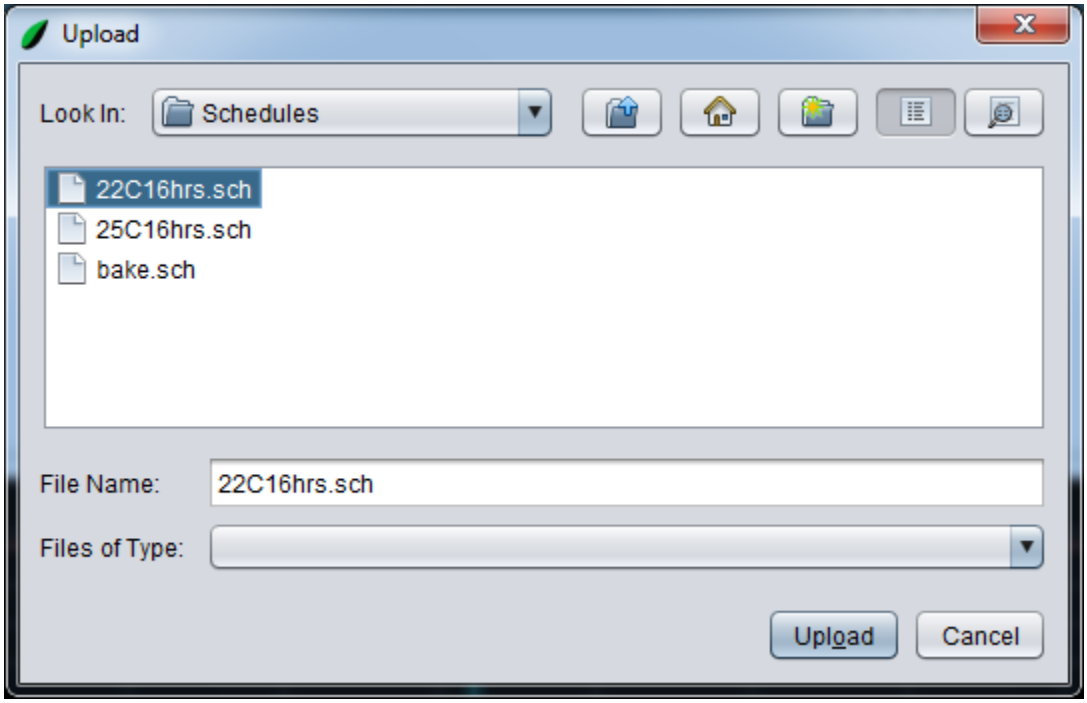
Note	BioChambers VNet 4 will not run schedules from older versions of BioChambers VNet. Do not transfer schedules from older controller firmware to BioChambers VNet 4.

1. Click on the **Import Schedule(s)** button. The following window will appear:



Note	This screen may appear different depending on the system.

2. Navigate to where the desired schedule file is saved.
3. Click on the desired schedule file.



4. Click the **Upload** button.

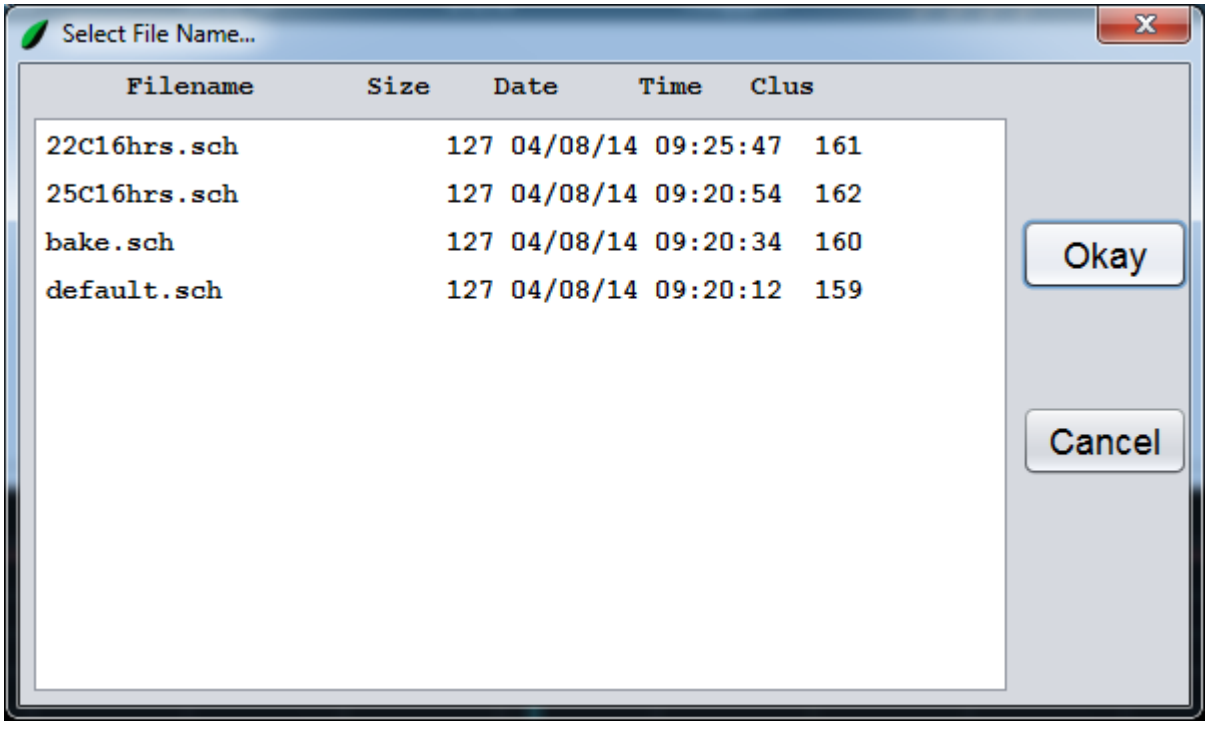
The schedule file has been imported into BioChambers VNet 4. The file can be edited or ran using the **Edit a Schedule** and **Switch Schedule** functions.

Note	Schedules may behave differently from one BioChambers unit to another. After importing, always edit the schedule before running it to correct any unwanted behavior.

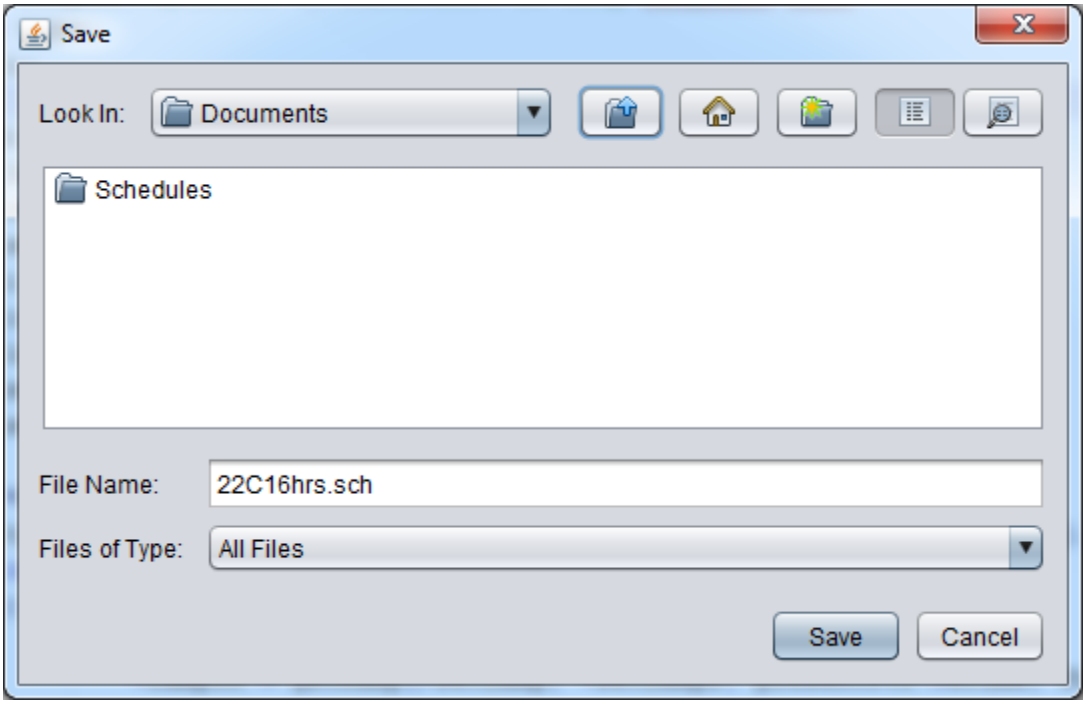
Exporting a Schedule

The following process explains how to export a schedule from BioChambers VNet 4. This process is useful for backing up schedules or transferring schedules from one piece of BioChambers equipment to another.

1. Click on the **Export Schedule** button. The following window will appear:



2. Click on the desired schedule file.
3. Click the **Okay** button. The following window will appear:



Note	This screen may appear different depending on the system.

4. Navigate to where the selected file is to be saved.
5. Click the **Save** button.

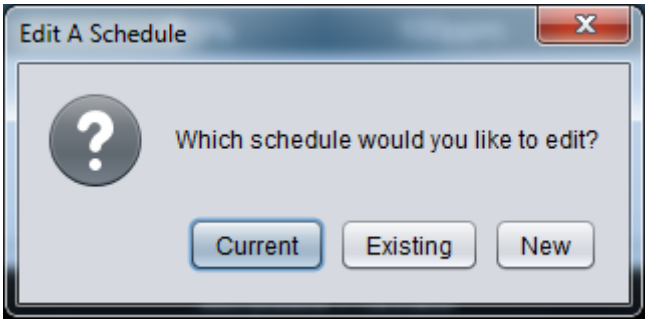
The schedule file has been exported. Using the **Import Schedule** function this schedule can now be transferred to another piece of equipment or retrieved as a back-up.

Schedule Examples

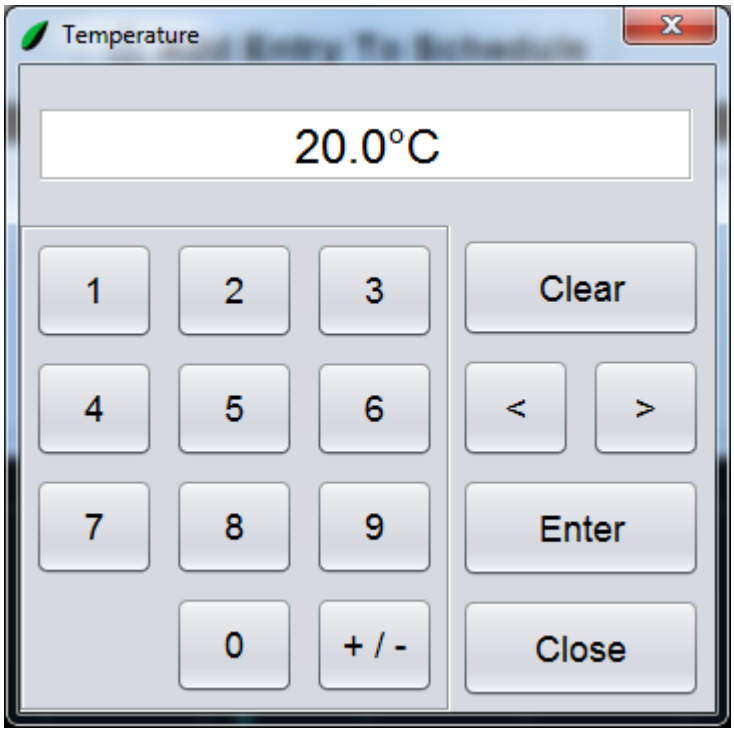
Single-Line Schedule

A single-line schedule will maintain one setpoint indefinitely.

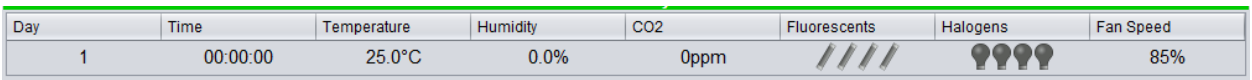
1. Click on the **Edit a Schedule** button. The following window will appear:



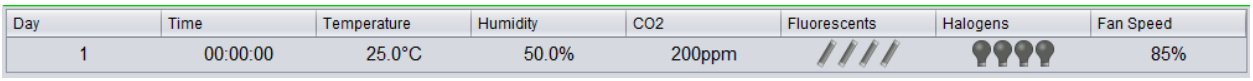
2. Click on the **New** button. The schedule window will enter editing mode with an empty schedule loaded.
3. Click on the **Temperature** field in the *New Entry* area. The following onscreen keypad will appear:



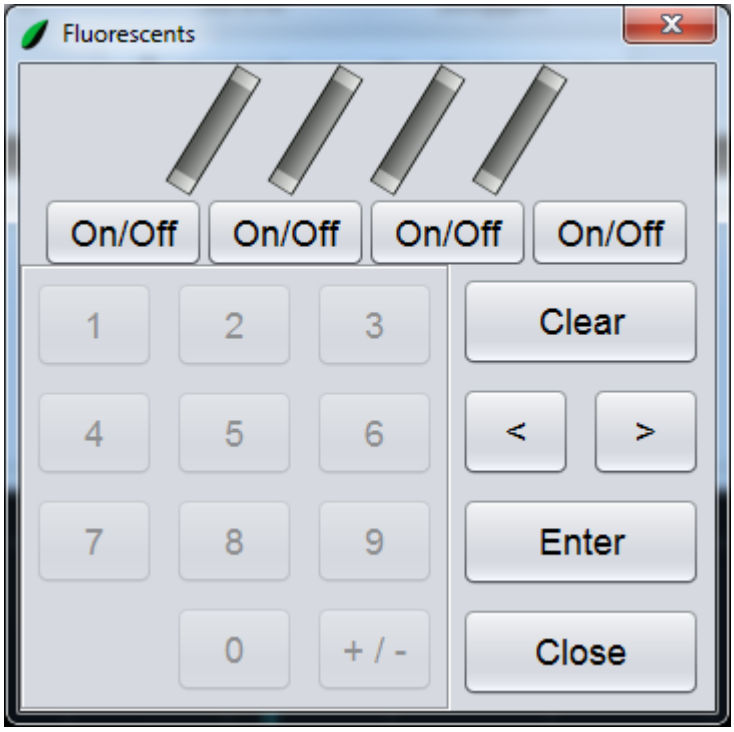
4. Enter "25.0" and click on the **Enter** button. The value of 25.0°C is entered into the *New Entry* line.



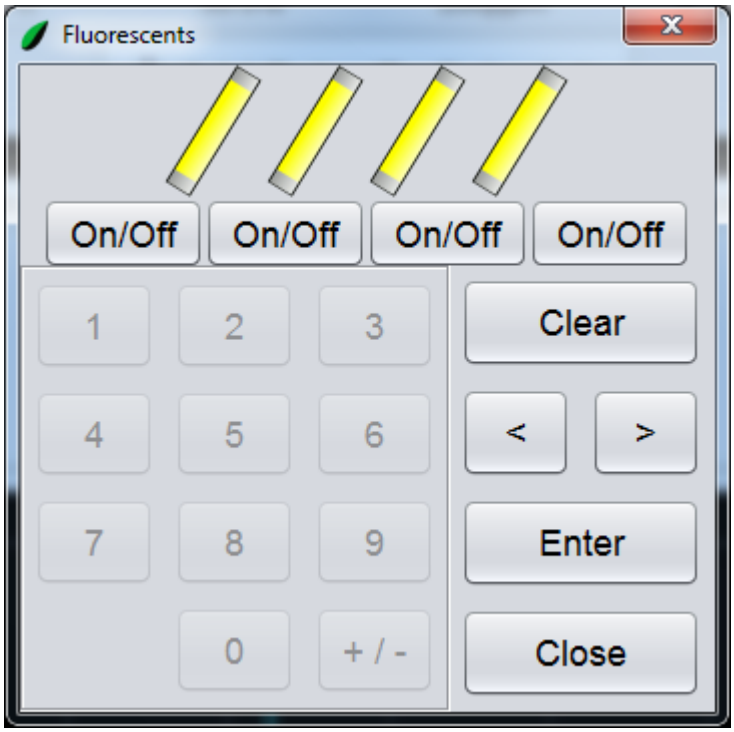
5. Repeat the process to set the humidity to 50%RH and the CO_2 to 200ppm if applicable.



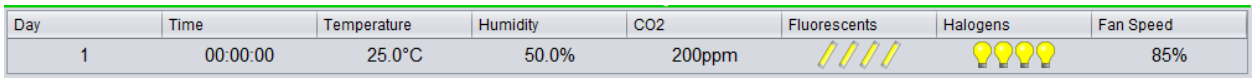
6. Click on the **Fluorescent** field. This field's name will depend on the type of BioChambers equipment the schedule is for. The following onscreen keypad will appear:



7. Click on all the **On/Off** buttons.

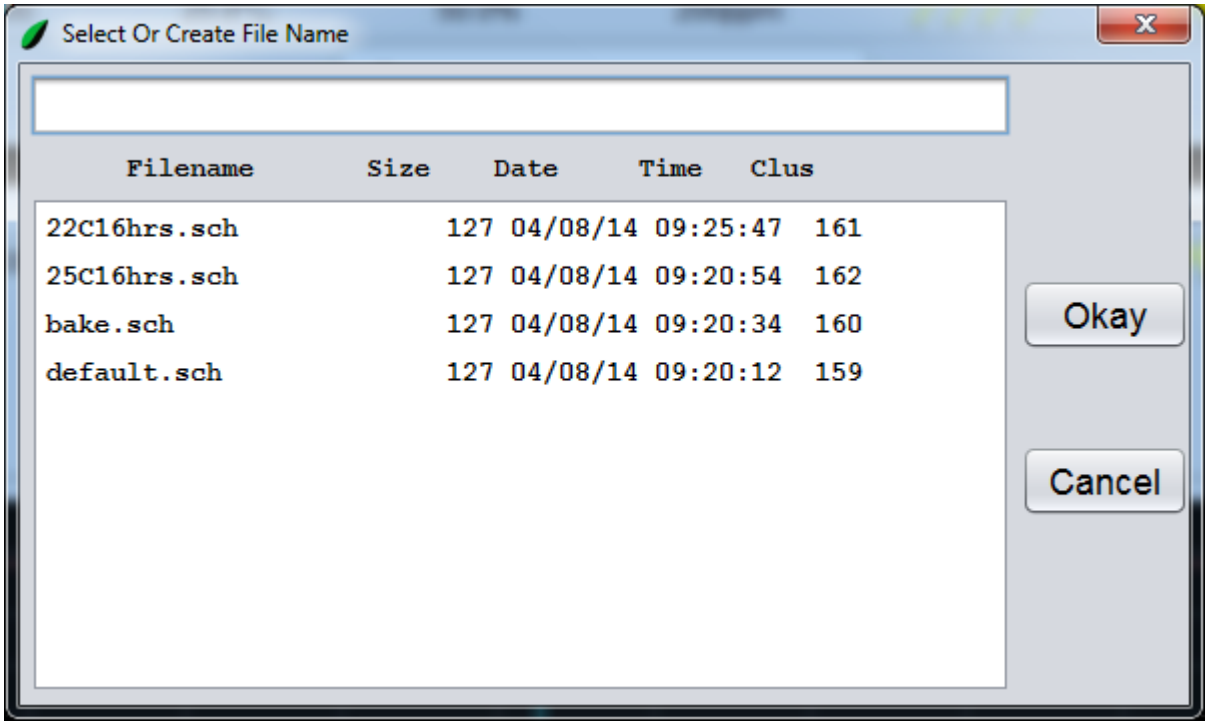


8. Click on the **Enter** button. The value is entered into the *New Entry* line.
9. Click on the **Incandescent** field and repeat the process to all incandescent lamps on.

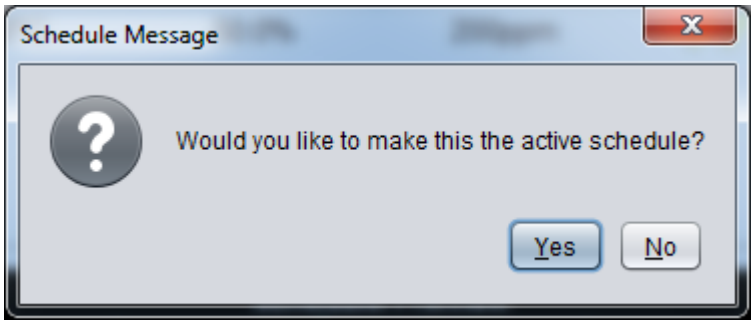


10. Click on the **Add Entry To Schedule** button. The new entry will be added to the schedule.

11. Click on the **Save** button. The following window will appear:



12. Click on the textbox at the top and use the onscreen board to type in "single.sch".
13. On the onscreen keyboard click on the **Enter** button.
14. Click on the **Okay** button. The following window will appear:



15. Click on the **No** button.

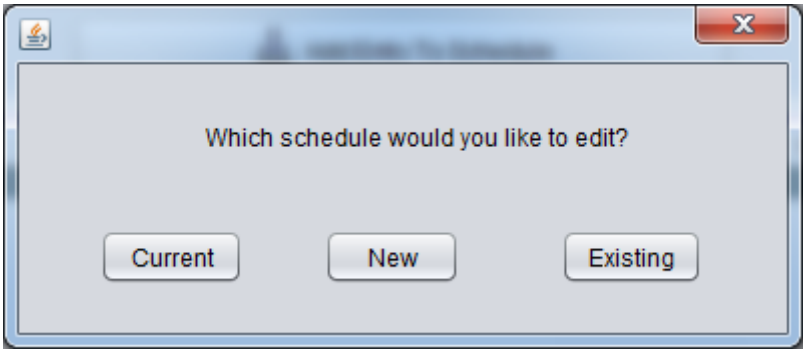
Note	Clicking on the **Yes** button will switch to this schedule once saved.

The schedule is complete. This schedule will run 25°C, 50%RH and 200ppm CO2 concentration with all lights indefinitely.

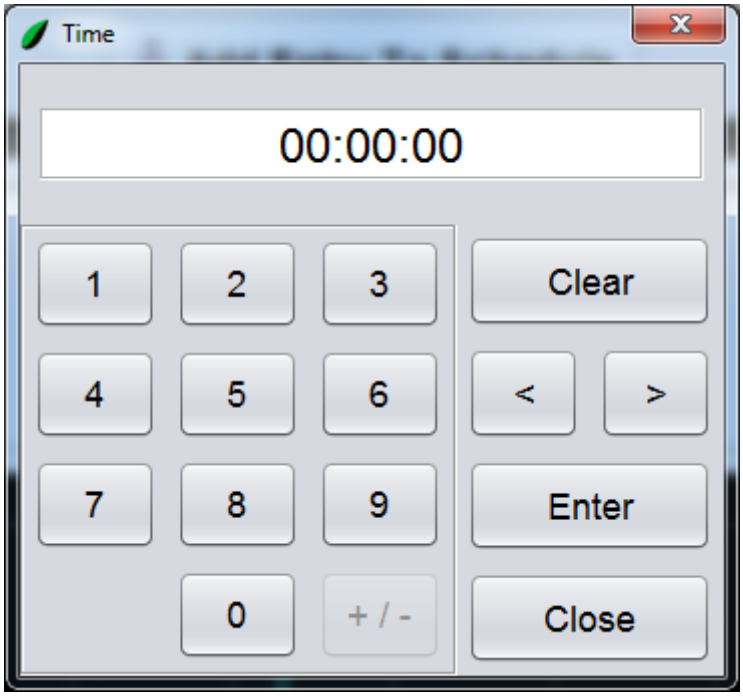
Single-Day, Multi-Line Schedule

A single-day, multi-line schedule will maintain multiple setpoints throughout the day. After the day is complete the schedule will repeat.

1. Click on the **Edit a Schedule** button. The following window will appear:



2. Click on the **New** button. The schedule window will enter editing mode with an empty schedule loaded.
3. Click on the **Time** field in the *New Entry* area. The following keypad will appear:



4. Enter "80000" and click on the **Enter** button. The value of 8:00:00 is entered into the *New Entry* line.

Day	Time	Temperature	Humidity	CO2	Fluorescents	Halogens	Fan Speed
1	08:00:00	20.0°C	0.0%	0ppm	////	💡💡💡💡	85%

5. Repeat the process to set the temperature to 25.0°C, the humidity to 50%RH, the CO_2 to 200ppm (if applicable) and to set all lights on.
6. Click on the **Add Entry To Schedule** button. The new entry will be added to the schedule.

7. Click on the **Time** field in the *New Entry* area. Enter "160000" and click on the **Enter** button. The value of 16:00:00 (4:00pm) is entered into the *New Entry* line.
8. Continue modifying the values in the *New Entry* area to set the temperature to 20.0°C, the humidity to 50%RH, the CO_2 to 200ppm and to set all lights off.

Day	Time	Temperature	Humidity	CO2	Fluorescents	Halogens	Fan Speed
1	16:00:00	20.0°C	50.0%	200ppm	////	💡💡💡💡	85%

9. Click on the **Add Entry To Schedule** button. The new entry will be added to the schedule.

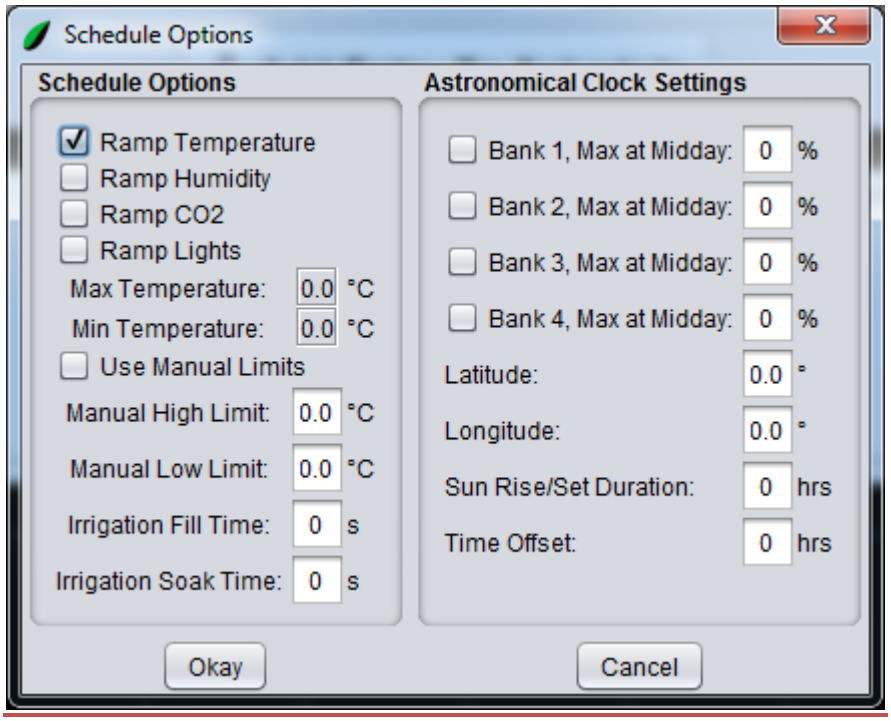
10. Click on the **Save** button.
11. Save the schedule as "DayNight.sch".

The schedule is complete. Between the hours of 8:00am and 4:00pm the first schedule line will be run. Between the hours of 4:00pm and 8:00am the second schedule line will be run. This day will repeat indefinitely.

Create a Ramping Schedule

1. Click on the **Edit a Schedule** button.
2. Use the same process as the previous example to create a single-day, two-line schedule. Use the same parameters as above for these two schedule lines. Wait to save the schedule until the end of this example.

3. Click on the **Schedule Options** button.
4. Click on the **Ramp Temperature** checkbox.



5. Click on the **Okay** button. The schedule will change to a temperature ramping schedule.

Notice the schedule preview graph. This is how the temperature setpoint will change throughout the day.

6. Click on the **Save** button.
7. Save the schedule as "DayNightRamp.sch".

The schedule is complete. Between the hours of 8:00am and 4:00pm the temperature will ramp from 25°C to 20°C with the lights on. Between the hours of 4:00pm and 8:00am the temperature will ramp from 20°C to 25°C with the lights off. This day will repeat indefinitely.

Multi-Day Schedule

A multi-day schedule will maintain multiple setpoints over many days. After the final day is complete the schedule will repeat.

1. Click on the **Edit a Schedule** button.
2. Use the same process as the previous example to create a single-day, two-line schedule. Use the same parameters as above for these

two schedule lines. Wait to save the schedule until the end of this example.

3. Use the same process above to create two more schedule lines with the following parameters:

   Line 3: Day (2), Time (7:30:00), Temperature (23.0°C), Humidity (50%RH), CO_2 (200ppm), Lights (all on)

   Line 4: Day (2), Time (16:30:00), Temperature (19.0°C), Humidity (50%RH), CO_2 (200ppm), Lights (all off)

4. Click on the **Save** button.
5. Save the schedule as "2Day.sch".

The schedule is complete. The schedule will run as follows:

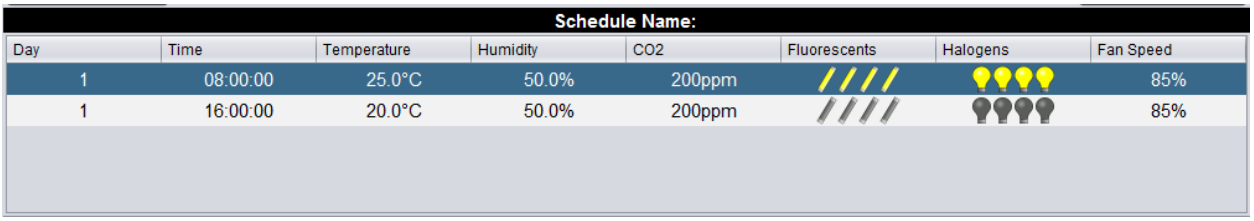
Time Period	Schedule Line
Day 1, 12:00am to 8:00am	Schedule Line #4
Day 1, 8:00am to 4:00pm	Schedule Line #1
Day 1, 4:00pm to Day 2, 7:30am	Schedule Line #2

Day 2, 7:30am to 4:30pm	Schedule Line #3
Day 2, 4:30pm to 12:00am	Schedule Line #4

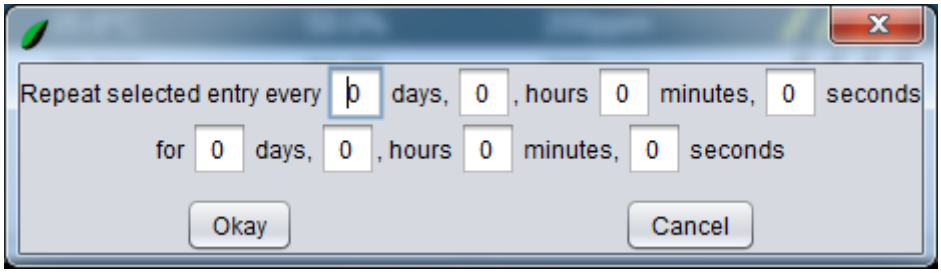
After the last schedule day the schedule will repeat from first schedule day.

Creating an Astronomical Clock Schedule

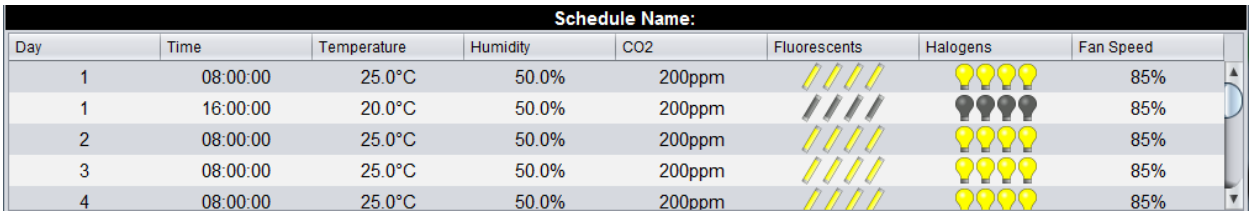
1. Click on the **Edit a Schedule** button.
2. Create a single-day, two-line schedule. Wait to save the schedule until the end of this example.
3. Select the first schedule line.



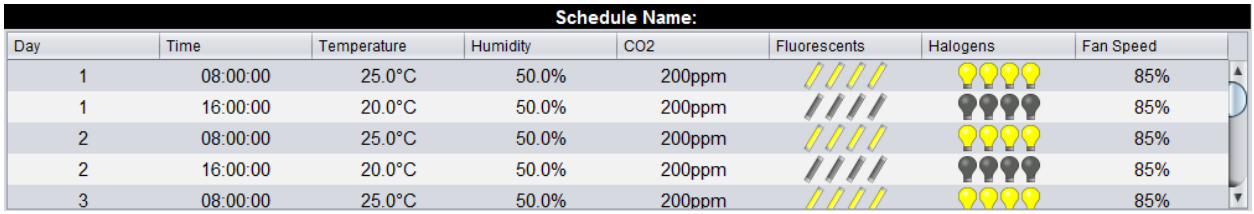
4. Click on the **Repeat Entry** button. The following window will appear:



5. Under "Repeat selected line every" set the number of *Days* to 1.
6. Under "For" set the number of *Days* to 365.
7. Click on the **OK** button. The schedule preview will appear as follows:

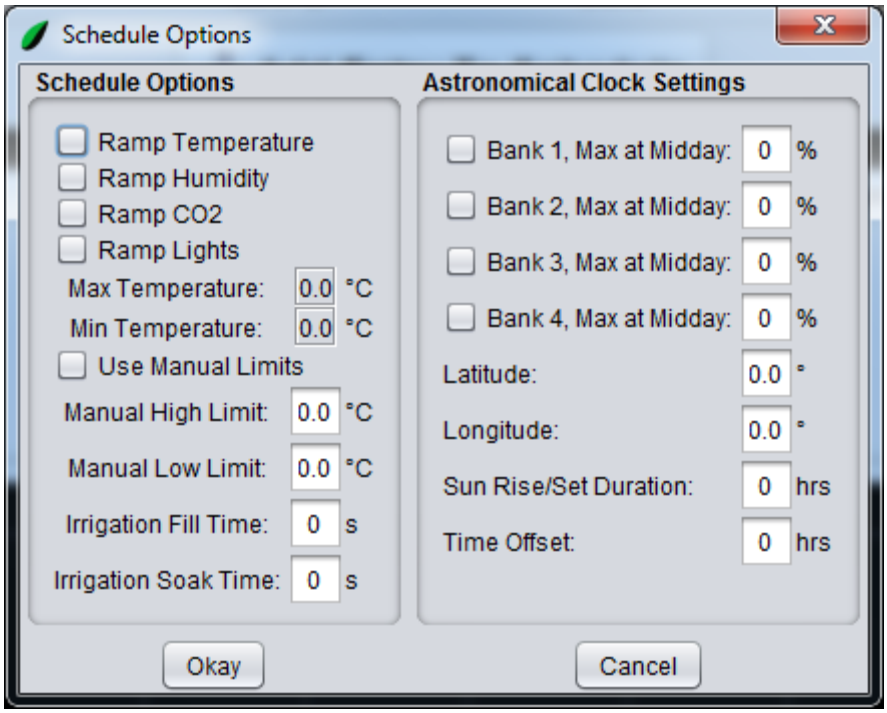


8. Select the second schedule line and repeat the same process. The schedule preview will appear as follows:

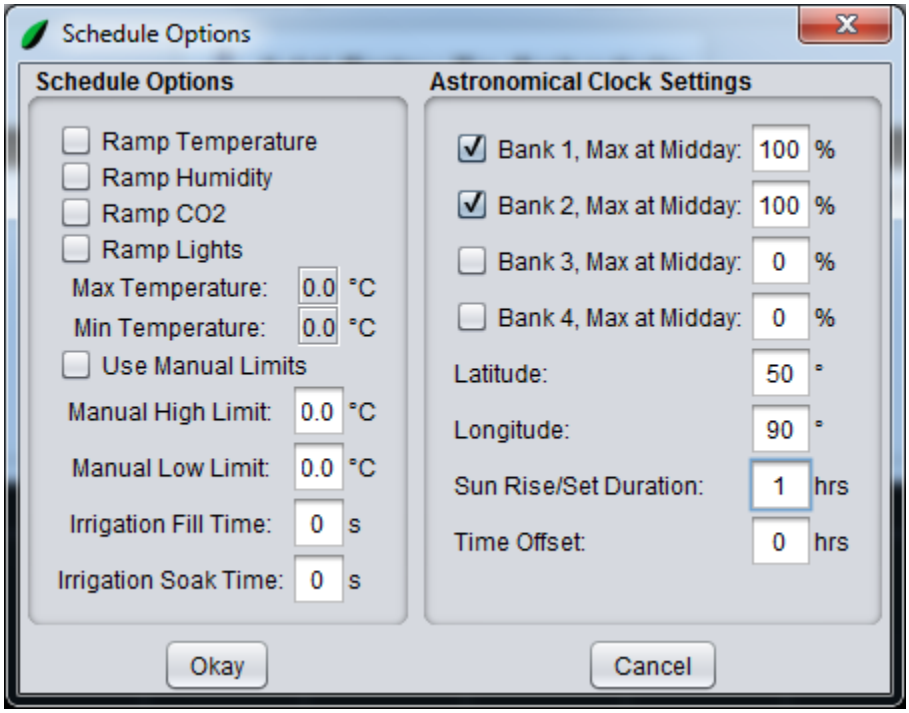


The schedule now contains two lines for each day of the year. Each schedule day has a day and night temperature. For more precise control you may wish to have three or more schedule lines for each day.

9. Click on the **Schedule Options** button. The following window will appear:



10. Use the onscreen keyboard to enter the latitude, longitude, duration, offset and maximums for the schedule.
11. Click on the **Bank 1** and **Bank** 2 checkbox.



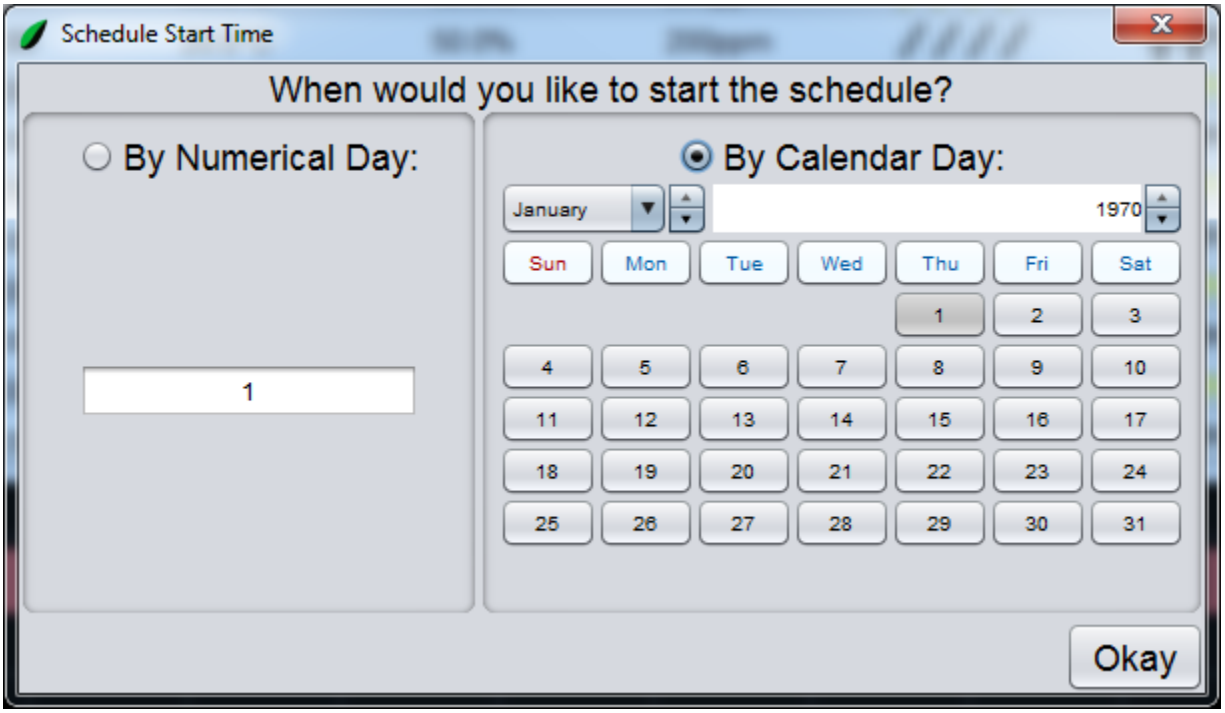
12. Click on the **OK** button.

13. Save the schedule as "astro.sch".

The schedule is complete. This type of schedule will control the lighting using the astronomical clock settings and the schedule day and time. The non-lighting variables are unaffected. Below is how to run an astronomical clock schedule.

14. Run the schedule using the **Switch Schedule** function.

15. When running the schedule the following window will appear:



16. Click on the **By Calendar Day** radio button.
17. Use the date chooser to select which day of the year to being the schedule.
18. Click on the **OK** button.

BioChambers VNet 4 will calculate the correct numerical day of the year (1-365) automatically and start the schedule on the line with that day value.

Alarms

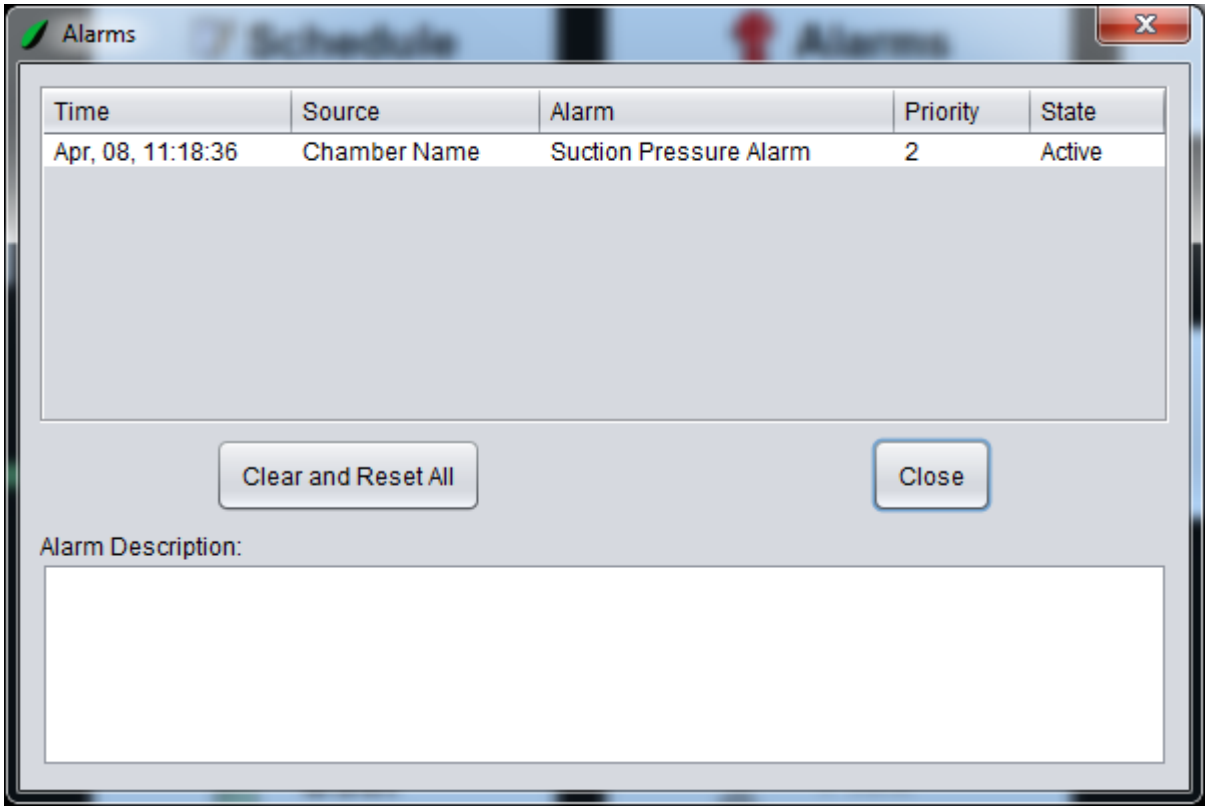
BioChambers VNet 4 has a sophisticated alarm system that assists in diagnostic work and prevents damage to the equipment or research. Each alarm is assigned a priority as follows:

- Priority 0 – Informational alarms that do not affect equipment operation.
- Priority 1 – Cautionary alarms. The chamber is still running but continuous cautionary alarms are a concern.
- Priority 2 or Higher - Critical alarms that will shut the chamber down.

The octagonal light on the **Name and Status** tab will change color to indicate the general alarm condition of the chamber:

State	Color	Description
Clear	Green	The chamber is running with no alarms higher than Priority 0 and any previous alarms have been cleared by an administrator.
Cautionary	Yellow	The chamber is running but has one or both of the following: - Active Priority 1 alarms - Inactive Priority 1 or higher alarms that have not been cleared
Critical	Red	The chamber is off due to an active Priority 2 or higher alarm.

A list of recent and currently active alarms can be viewed by clicking on the **Alarms** button on the home screen.



Note	Access Level 6 is required in order to clear and reset the alarms.

Alarm history can also be viewed using the Logs and Graphing functions.

If a problem persists please contact BioChambers:

Telephone: 204-589-8900

Toll Free: 800-361-7778

Email: service@biochambers.com

Logs and Graphing

BioChambers VNet 4 has sophisticated logging that allows researchers to download and view the operating variables of the experiment. BioChambers VNet 4 has two main methods for viewing and retrieving this data. The Graph will display the logged data graphically and the Logs will display the logged data in tabular form.

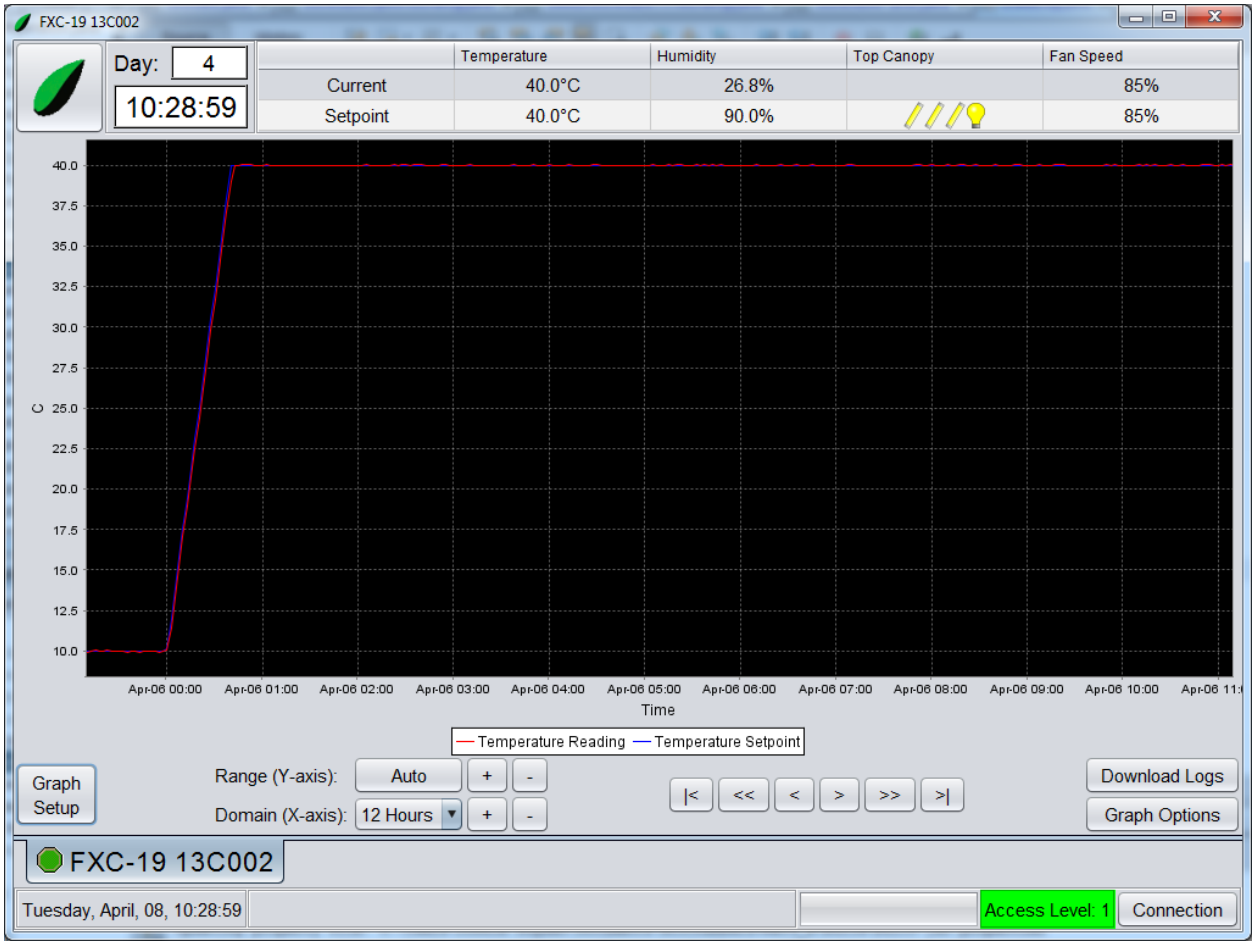
Access to logged data is as follows:

- Level 1 (all users)
    - Chamber and alarm logs
- Level 6
    - All Level 1 functions
    - Portions of the service logs used for diagnostics
- Level 9
    - All level 6 functions
    - Full service log

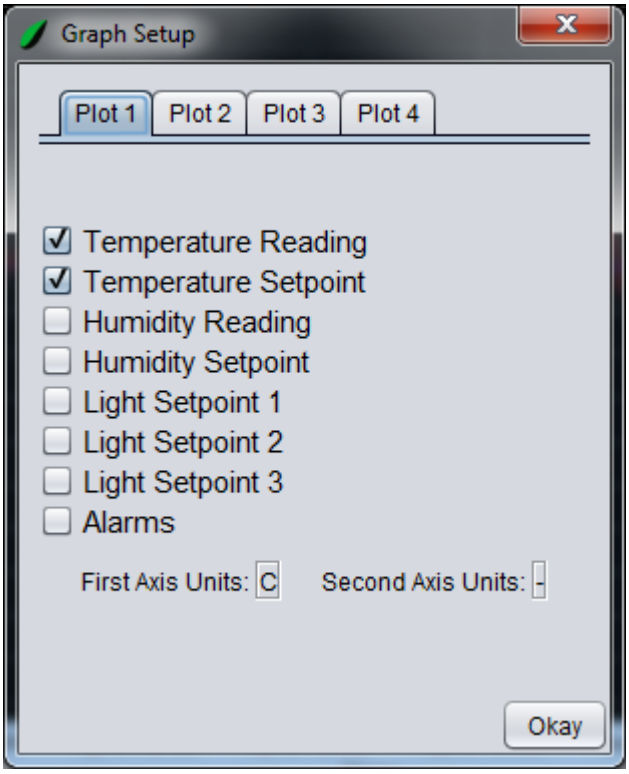
Graphing

The BioChambers VNet 4 Graph function allows users to view logged data in graphical form within the software. The following exercise will go through the various functions and features of BioChambers VNet Graphing 4.

1. Click on the **Graph** button on the home screen. The following window will appear:

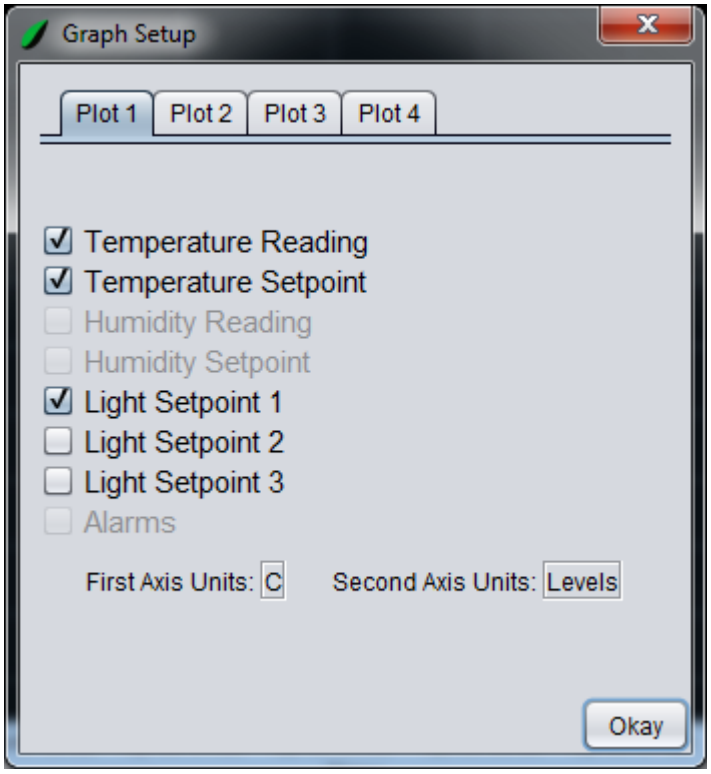


2. Click on the **Graph Setup** button. The following window will appear:



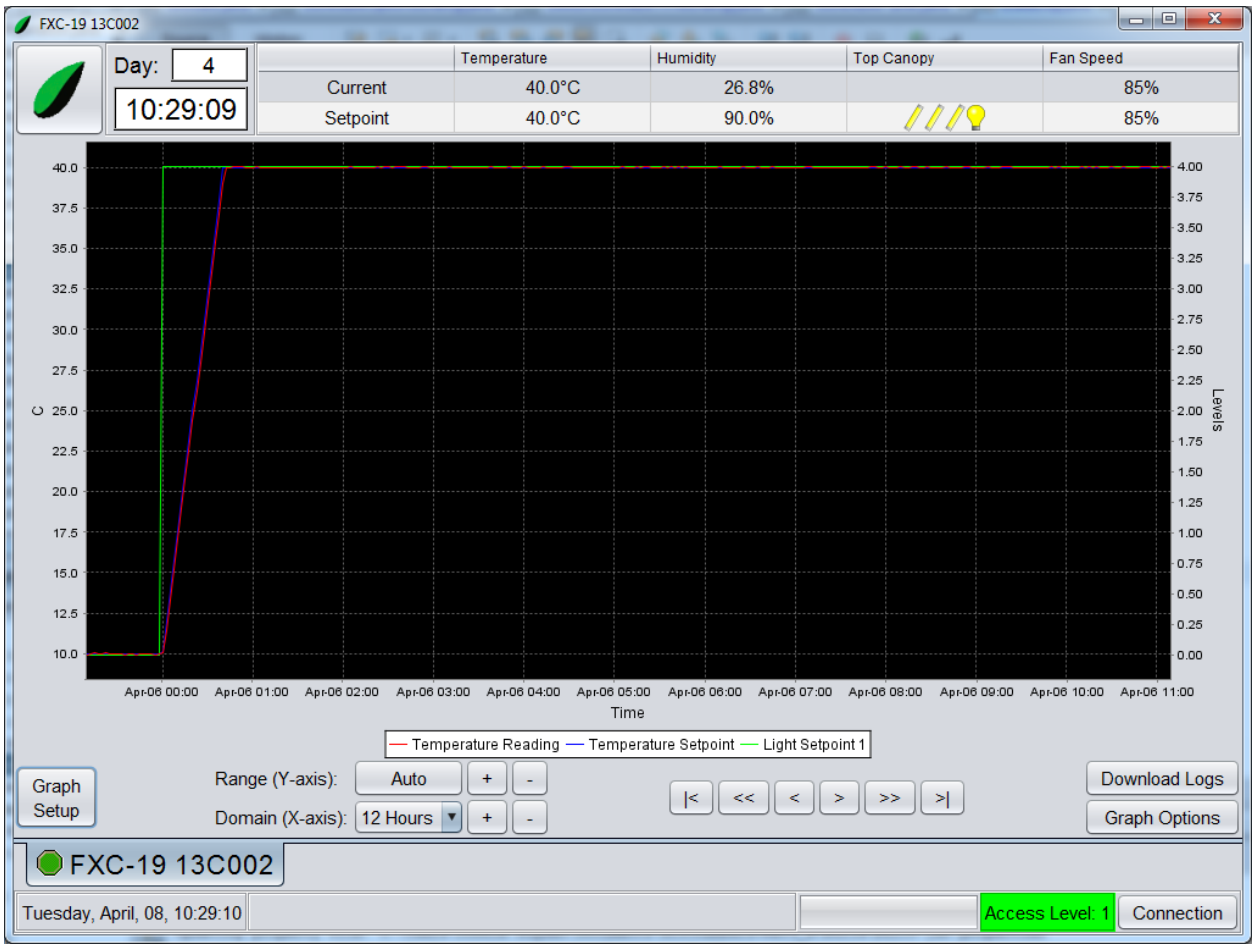
The Graph Setup is used to choose what variables are graphed on each plot.

3. Choose **Light 1 Setpoint** from the list.



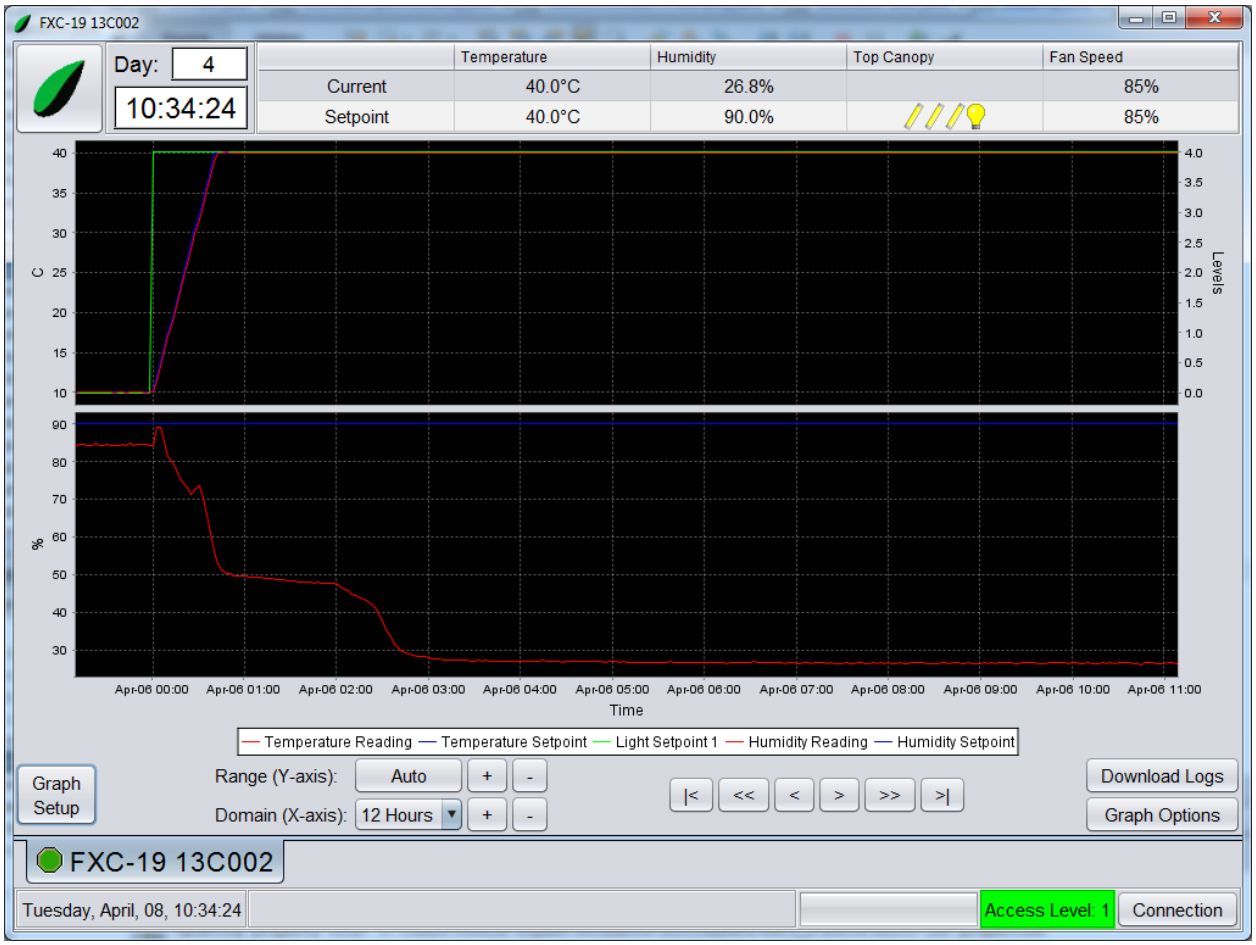
Notice how some of the options are now unavailable. This is because two units have been assigned to the graph, degrees Celsius and Levels. Therefore it is not possible to add any other variables that do not share these units.

4. Click on the **Okay** button.



Notice that the right vertical axis correspond the Light Setpoint series and uses *Levels* for its unit. The left vertical axis corresponds to the Temperature series and uses °C for its unit.

5. Click on the **Graph Setup** button.
6. Click on the **Plot 2** tab.
7. Click on the **Humidity Reading** and **Humidity Setpoint** checkboxes.
8. Click on the **Okay** button.

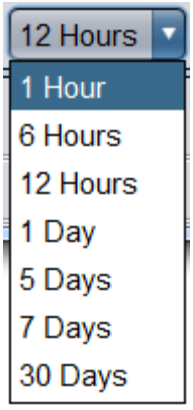


A second plot has been added.

There are three buttons right of the *Range (Y-axis)* label.

- **Auto**
  - Attempts to fit all data in the graph
- **+**
  - Decreases the range, causing the graph to zoom in
- **-**
  - Increases the range, causing the graph to zoom out

9. Click on the **+, -** and **Auto** buttons to get a feel for how they operate.
10. Click on the combo box next to the *Domain* label. The following list will appear:



This list allows the user to specify the automatic horizontal axis range. The **+** and **–** buttons next to this combo box can be used to manually expand and contact the horizontal axis.

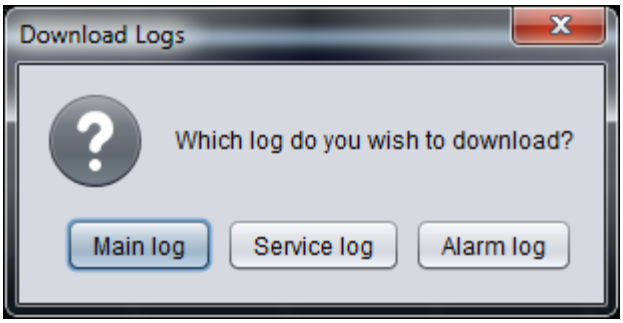
11. Choose some of the horizontal axis buttons to get a feel for how they operate.

The |<, <<, <, >, >> and >| buttons are used to move back and forth on the horizontal axis.

- |<
  - Moves to the oldest logged data
- <<
  - Moves to the older data by one half of the current horizontal axis
- <
  - Moves to the older data by one sixth of the current horizontal axis
- >
  - Moves to the newer data by one sixth of the current horizontal axis
- >>
  - Moves to the newer data by one half of the current horizontal axis
- >|
  - Moves to the newest logged data

The navigation buttons will not allow viewing beyond the newest logged data.

12. Click on the horizontal axis movement buttons to get a feel for how they operate.
13. Click on the **Download Logs** button. The following window will appear:



This window allows a user to download the logged data from the controller into BioChambers VNet 4. This may be required to get older logged data than is currently visible or if the logged data has not already been downloaded.

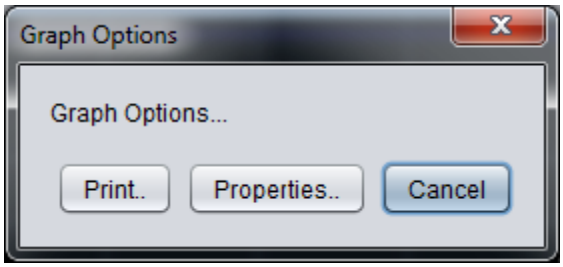
The Main Logs contain control variables like temperature, humidity and lighting at a rate set by the chamber administrator. The Service Logs contain control variables like temperature, humidity and lighting but at a different rate, set by a service technician. In addition the Service Logs contain information about refrigeration and limit sensors. The Alarm Logs contain a record of alarms, indicating the time and whether or not the alarm is active or inactive.

14. Click on the **Main log** button. The following window will appear:

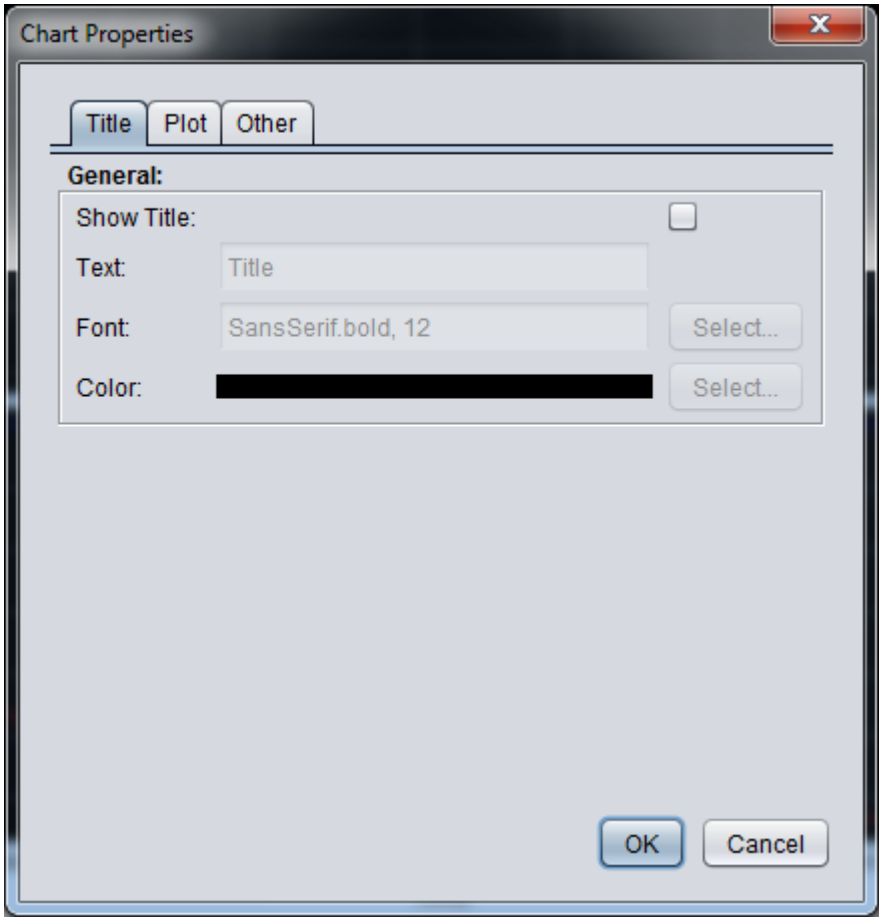
Click on the **Full log** button will download the full log file and clicking on the **Newest Entries** button will download only the most recent data.

Note	Downloading only the newest entries maybe preferred in some cases. Depending on the logging options the full log file may be quite large and take a long time to download.

15. Click on the **X** button to cancel.
16. Click on the **Graph Options** button. The following window will appear:

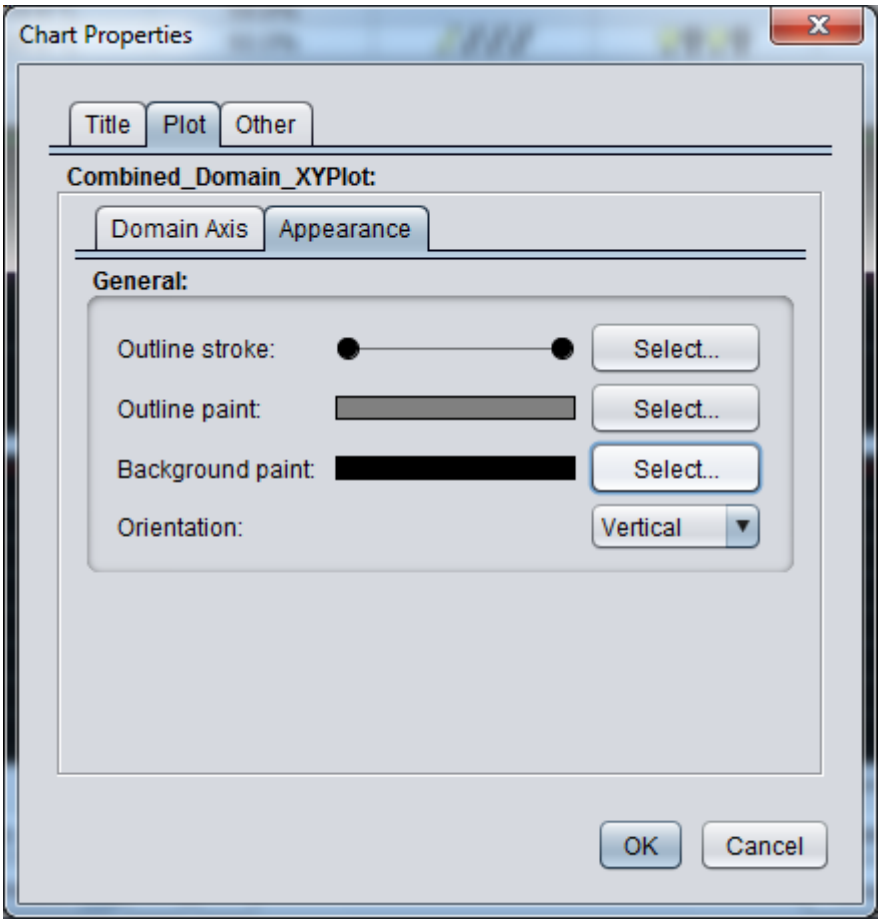


17. Click on the **Properties** button. The following window will appear:



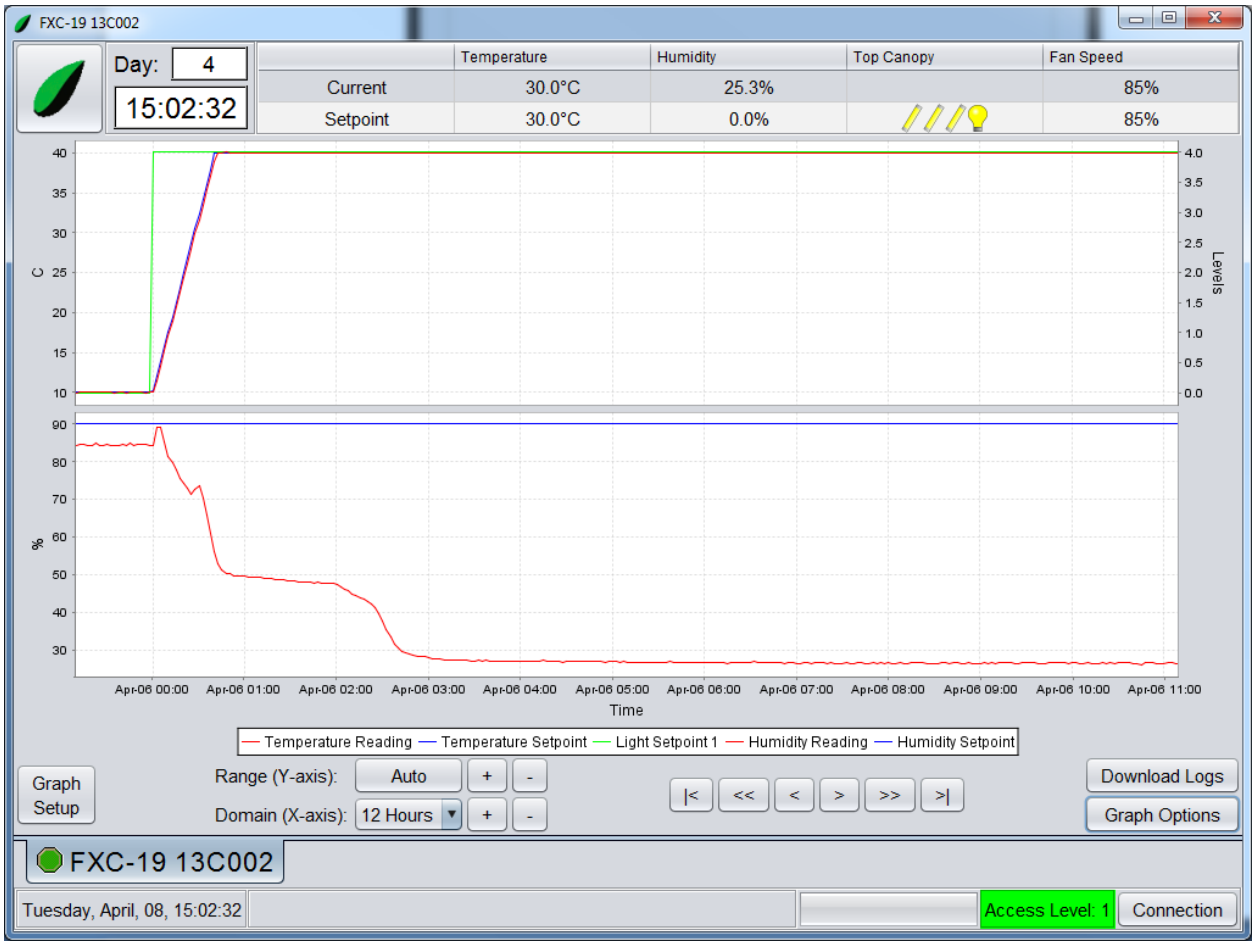
Graph settings such as background color can be changed from here. Changing the background color to white makes the graph easier to read when printed.

18. Click on the **Plot** tab. The following window will appear:



19. Click on the **Appearance** tab.
20. Click on the **Select** button next to *Background paint*. A color chooser will appear.
21. Choose white and click on the **Okay** button.
22. Click on the **OK** button.

The graph should now appear as follows:

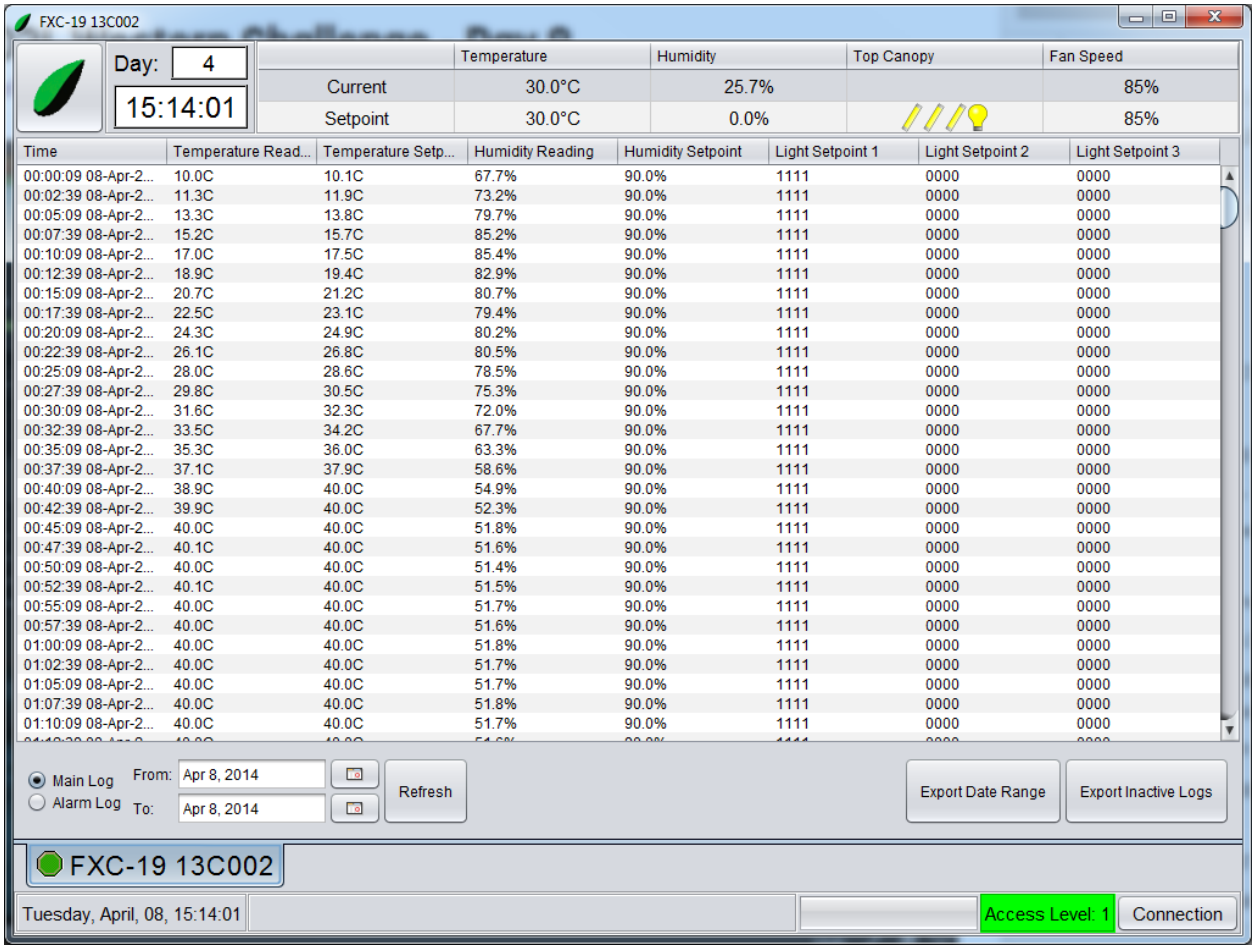


23. Click on the **Graph Options** button.
24. Click on the **Print** button. A Java print dialog will appear. From here you can select the appropriate print options and print the graph.

Logs

The BioChambers VNet 4 Logs function allows users to view logged data in tabular form. The following exercise will go through the various functions and features of BioChambers VNet 4 Logs.

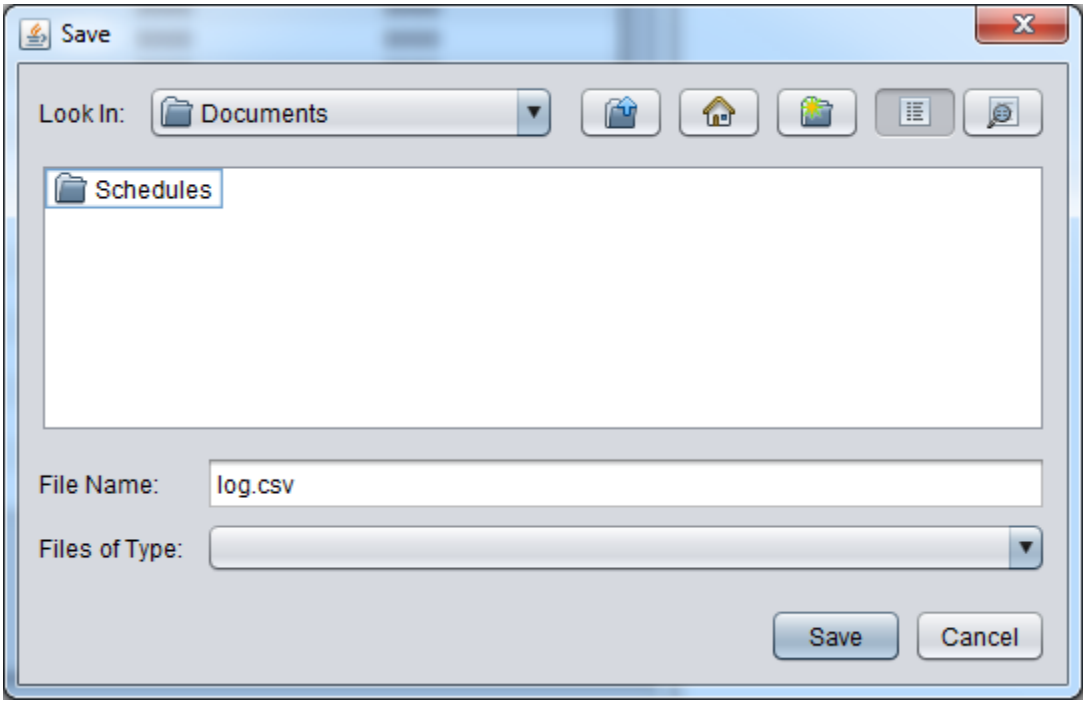
1. Click on the Logs button on the home screen. The following window will appear:



2. Click on the **Main Log** radio button.
3. Select the date range you wish to view by using the date chooser buttons. The table will refresh when a new date range is chosen. You can also force a refresh by hitting the **Refresh** button.

Note	If no data appears after selecting a new date range or clicking the **Refresh** button there may be no data available for the specified data range. Be sure to download the complete log files as described in the Graph section to ensure all data is available.

4. Click on the **Export Date Range** button. The following window will appear:



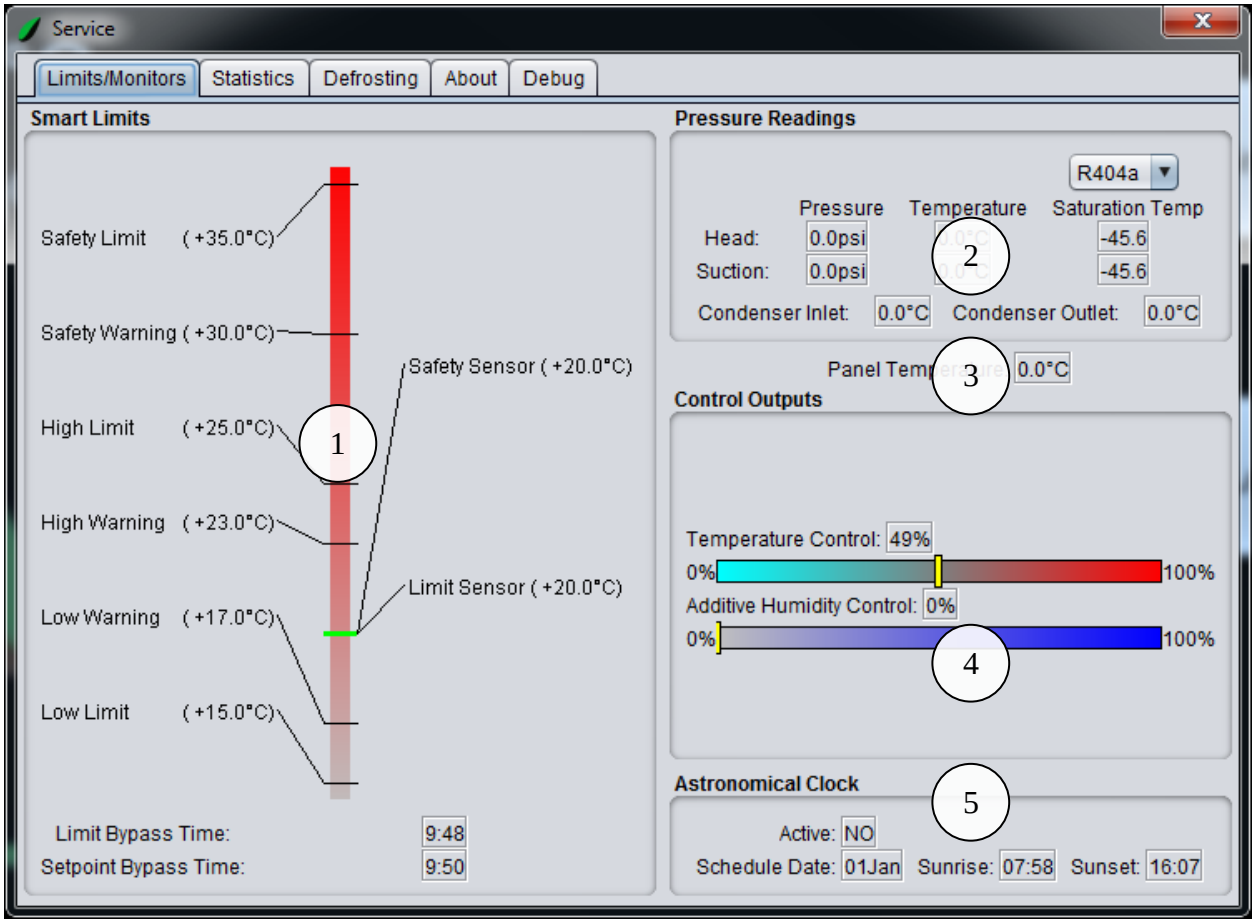
5. Choose a location and file name for the exported data.

BioChambers VNet 4 exports in a .csv format that can be opened by most spreadsheet programs and text editors.

If you have changed the name of the log file (see Logs in the Setup section) and wish to export data contained in older log files you may do so by clicking on the **Export Inactive Logs** button.

Service

The *Service* window in BioChambers VNet provides data that is useful for maintenance and diagnostics. Through this feature users can view information on the smart limits, sensor inputs and control outputs. Click on the **Service** button on the home screen to open the *Service* window.



The **Limits/Monitors** tab contains most of the limits and control information of BioChambers VNet and is particularly useful for diagnostics. There is more information on the limits in Appendix 1.

1. *High/Low Limit and Safety*

   Displays the values of the calculated limits along with the respective sensor readings

2. *Refrigeration Monitors*

   Displays sensor readings in the refrigeration system

3. *Panel Temperature*

   Displays the temperature inside the electrical panel

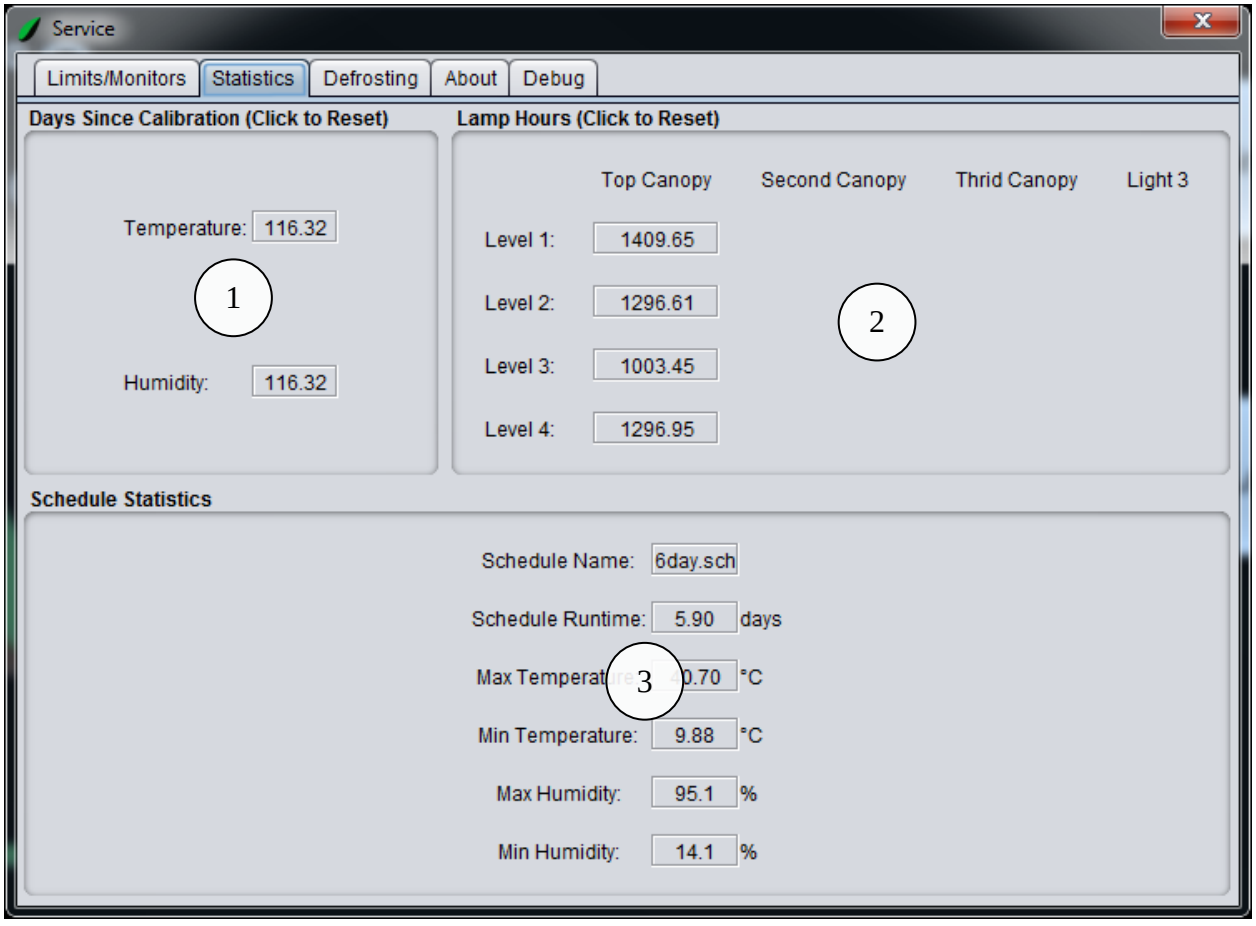
4. *Control Outputs*

   Displays the controllers calculated output values

5. *Astronomical Clock*

   Displays the astronomical clock status

The **Statistics** tab contains a number of counters and values useful for general maintenance.



1. *Time Since Last Calibration*

   Contains counters that can be used to monitor the amount of time that has passed since a sensor has been checked. Click on a counter to reset it.

2. *Lamp Runtime*

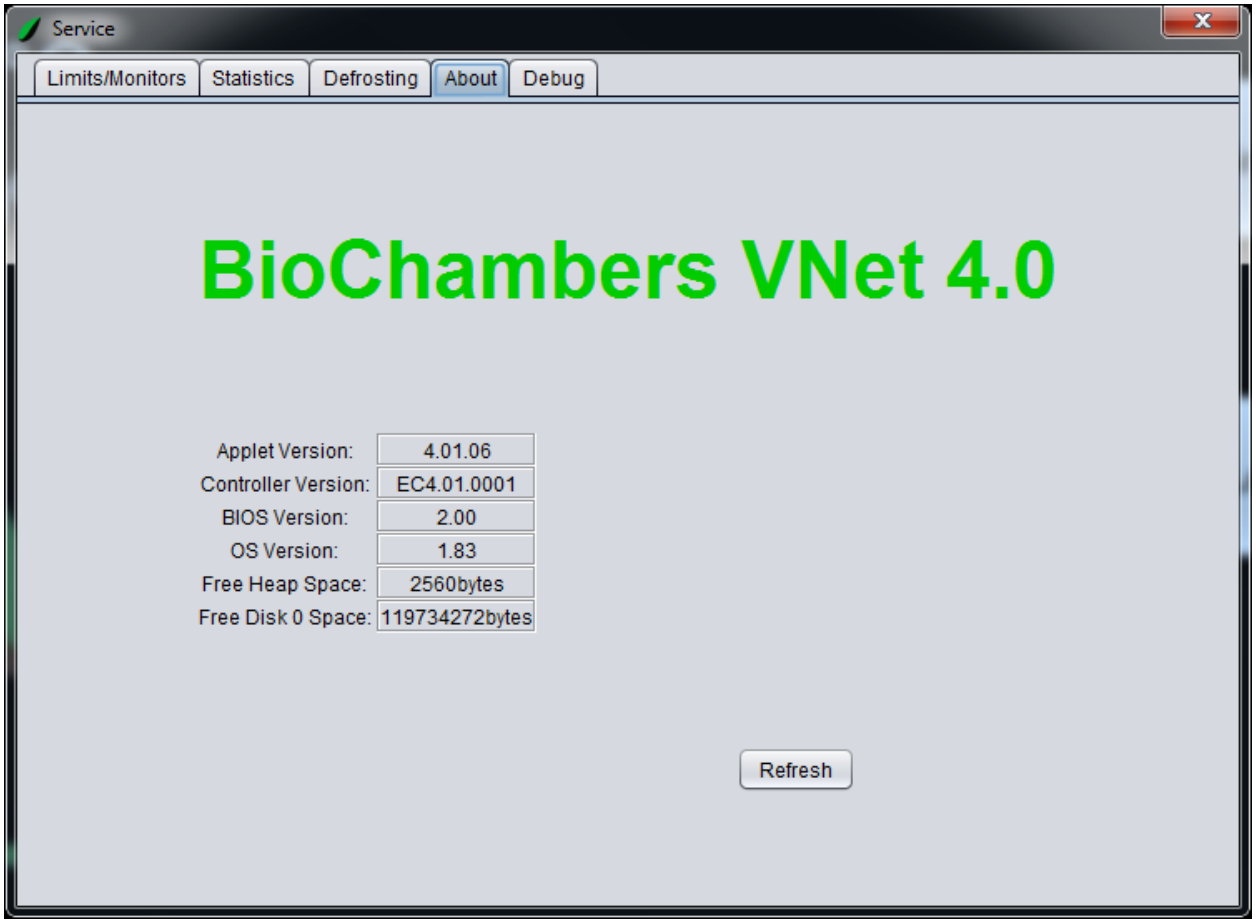
   Contains counters that are used to track the number of hours a set of lamps has been on and can assist in a lamp replacement schedule. Click on a counter to reset it.

Note	You must have Level 6 access in order to reset the counters.

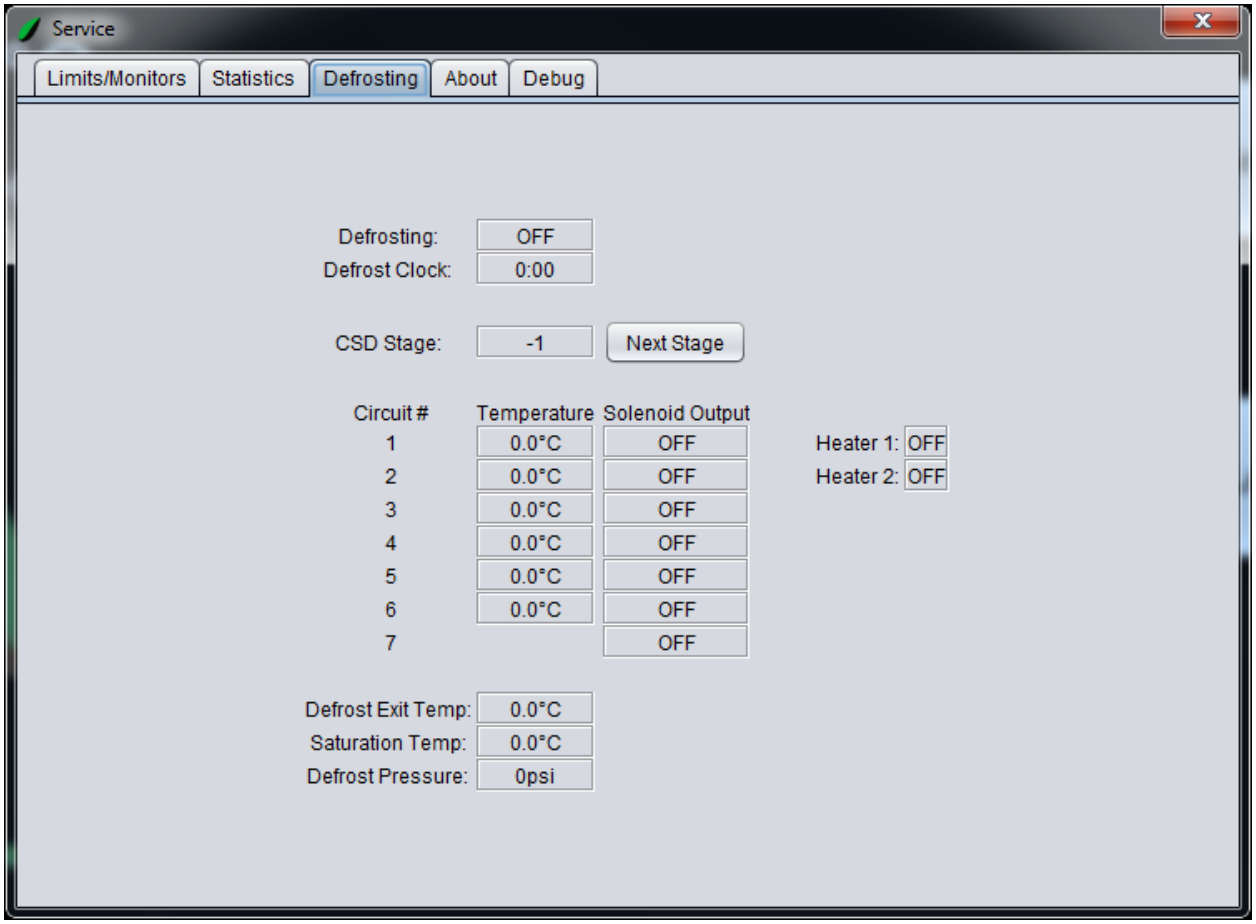
3. *Schedule Statistics*

   Contains information about the current schedule

The **About** tab contains information about the BioChambers VNet 4 software. It contains information such as the software version and other data which is helpful for diagnostics.

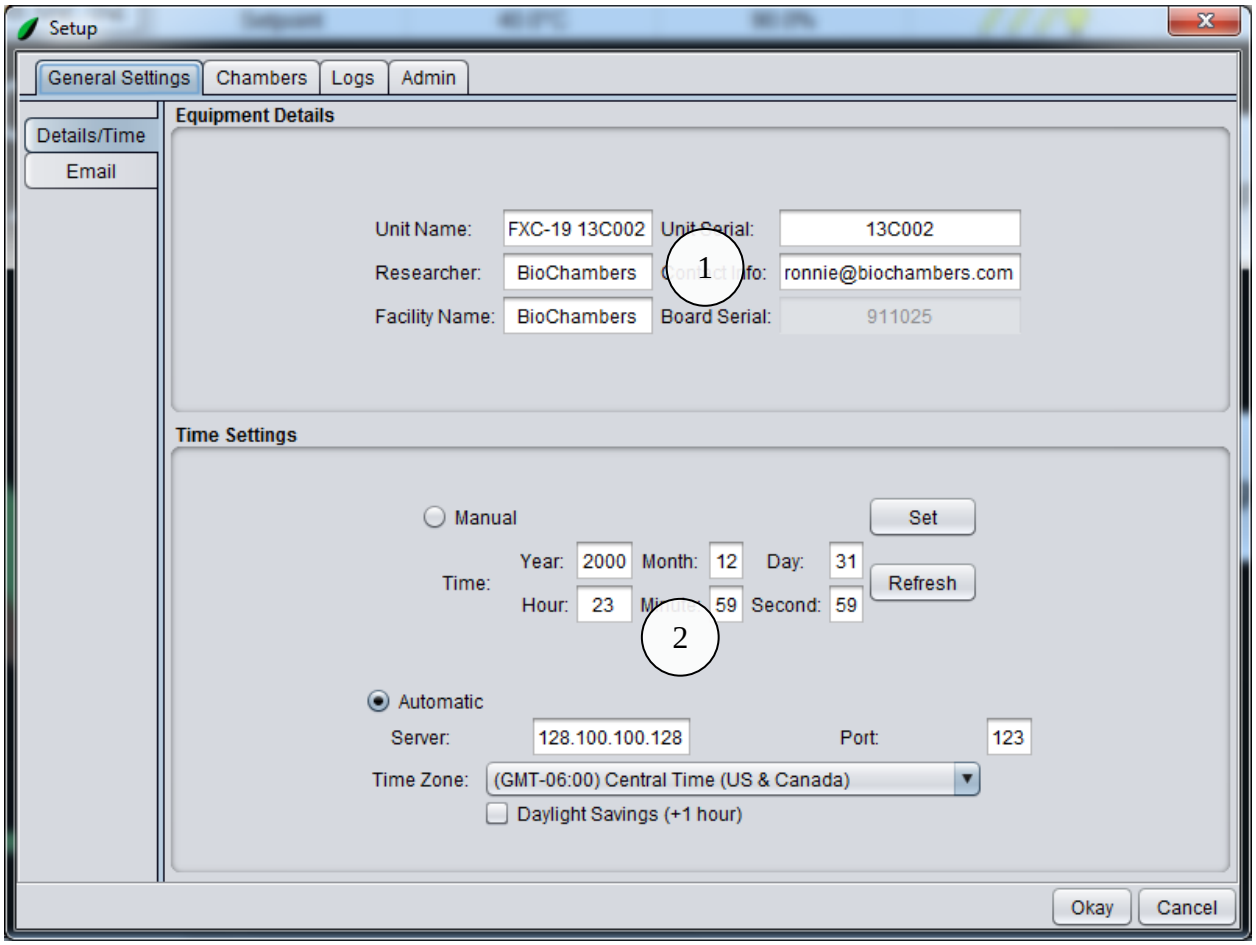


The **Defrost** tab contains information about BioChambers VNet 4 defrosting system. These readings will be blank if your chamber is not equipped with a defrost system.


Service
Limits/Monitors
Statistics
Defrosting
About
Debug
Defrosting:
OFF
Defrost Clock:
0:00
CSD Stage:
-1
Next Stage
Circuit #
Temperature
Solenoid Output
1
0.0°C
OFF
2
0.0°C
OFF
3
0.0°C
OFF
4
0.0°C
OFF
5
0.0°C
OFF
6
0.0°C
OFF
7
OFF
Heater 1:
OFF
Heater 2:
OFF
Defrost Exit Temp:
0.0°C
Saturation Temp:
0.0°C
Defrost Pressure:
0psi

Setup

BioChambers VNet 4 is universal software for all BioChambers equipment and is custom configured for each chamber. All of the needed configurations are accessible by clicking on the **Setup** button. The following exercise goes through all the features available to a Level 6 user. Click on the **Setup** button on the home screen to open the *Setup* window.



The **General Settings** tab contains information and settings specific to a given piece of equipment.

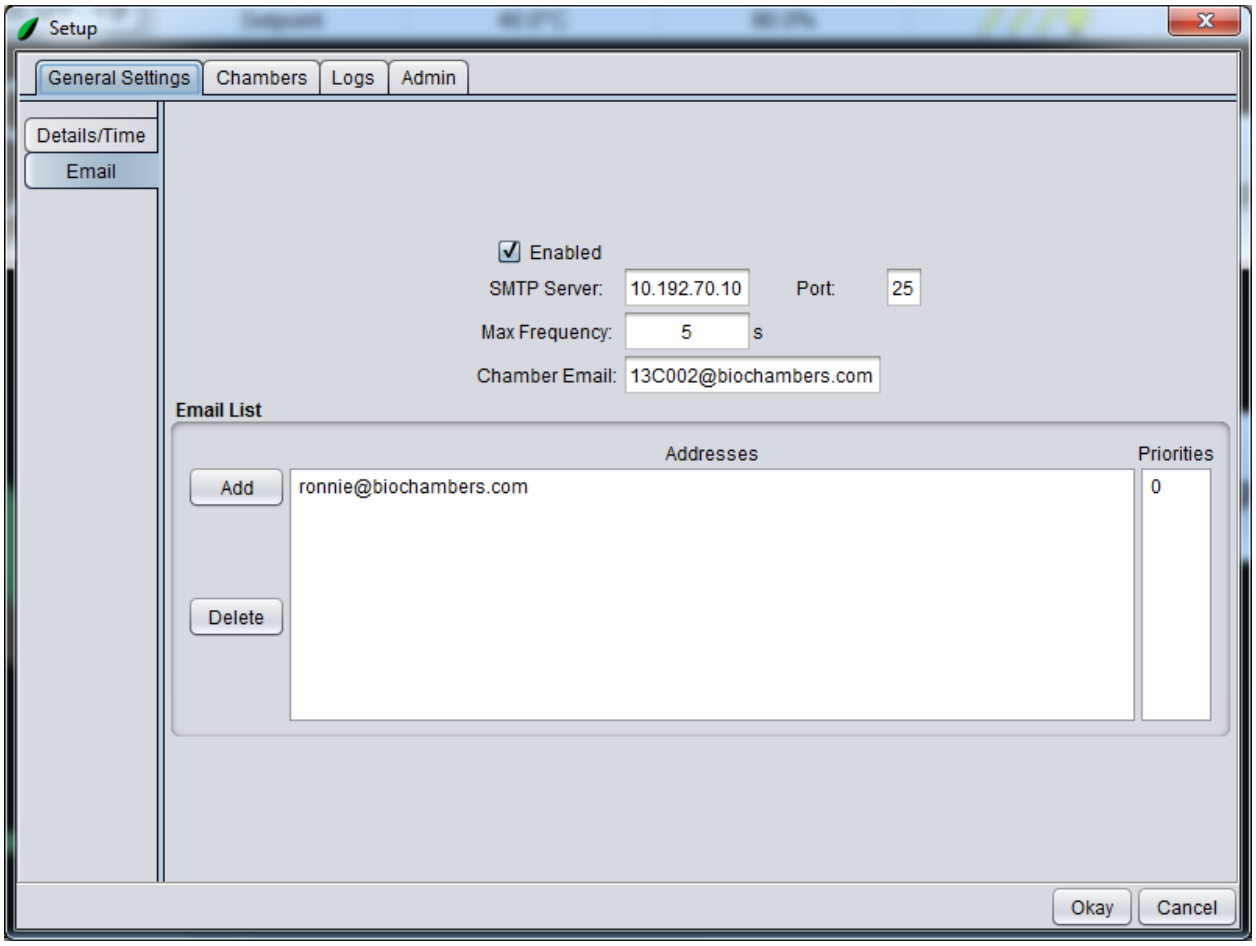
1. *Equipment Details*

   Contains detailed information about this equipment.

2. *Time Settings*

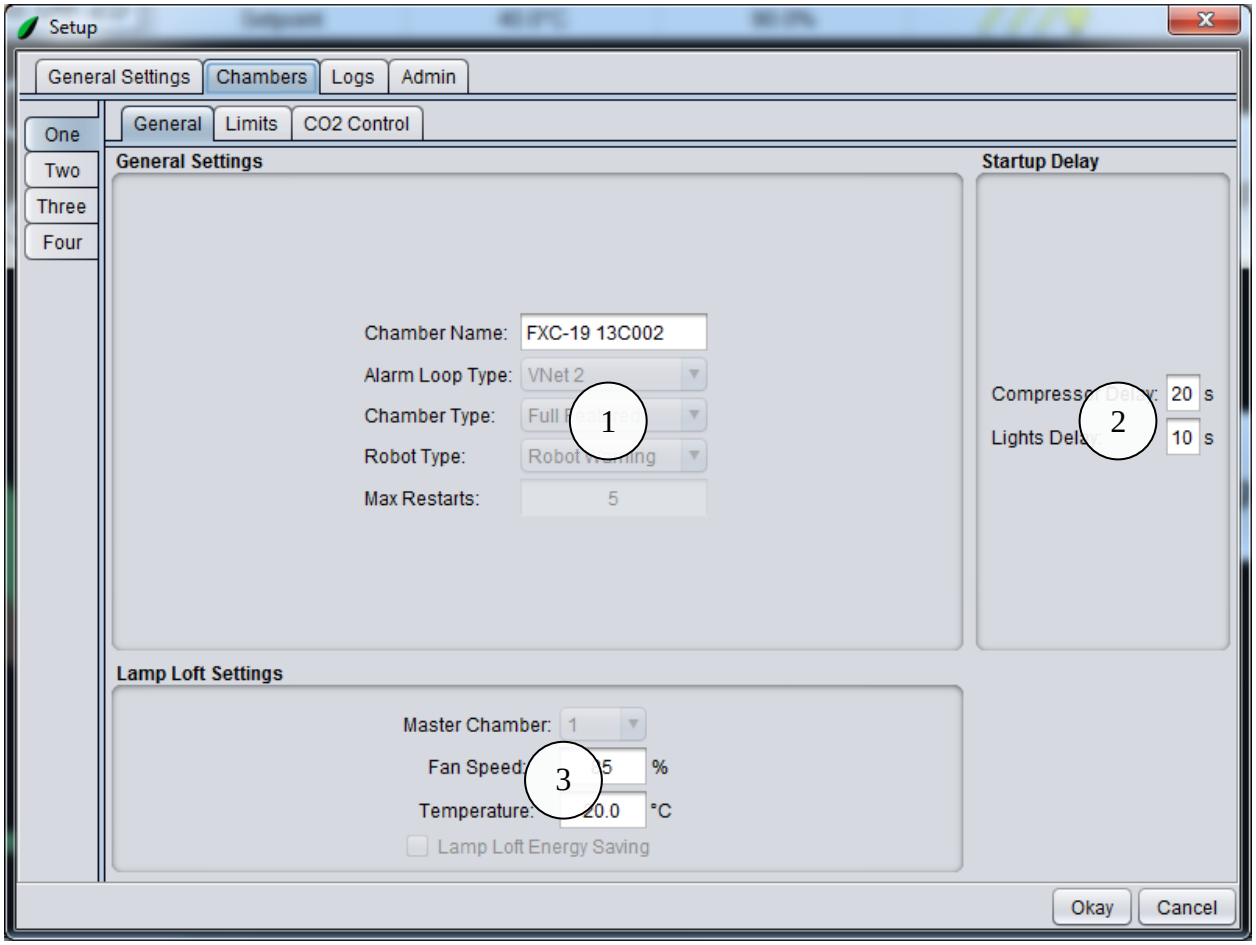
The real time clock on the BioChambers VNet 4 controller can be set two ways. One, manually by setting the time and setting it. Two, by configuring the controller to connect to a specified time server over the internet.

The **Email** tab contains settings that allow the BioChambers VNet 4 controller to use a networked email server to send emails when alarms become active or inactive.



The **Chambers** tab contains settings for chambers one through four. More information on multi-chamber configuration can be found in Appendix 2.

The **General** tab contains general settings for the chamber.



1. *General Settings*

   From here the chamber name can be changed. Other settings are reserved for BioChambers technicians.

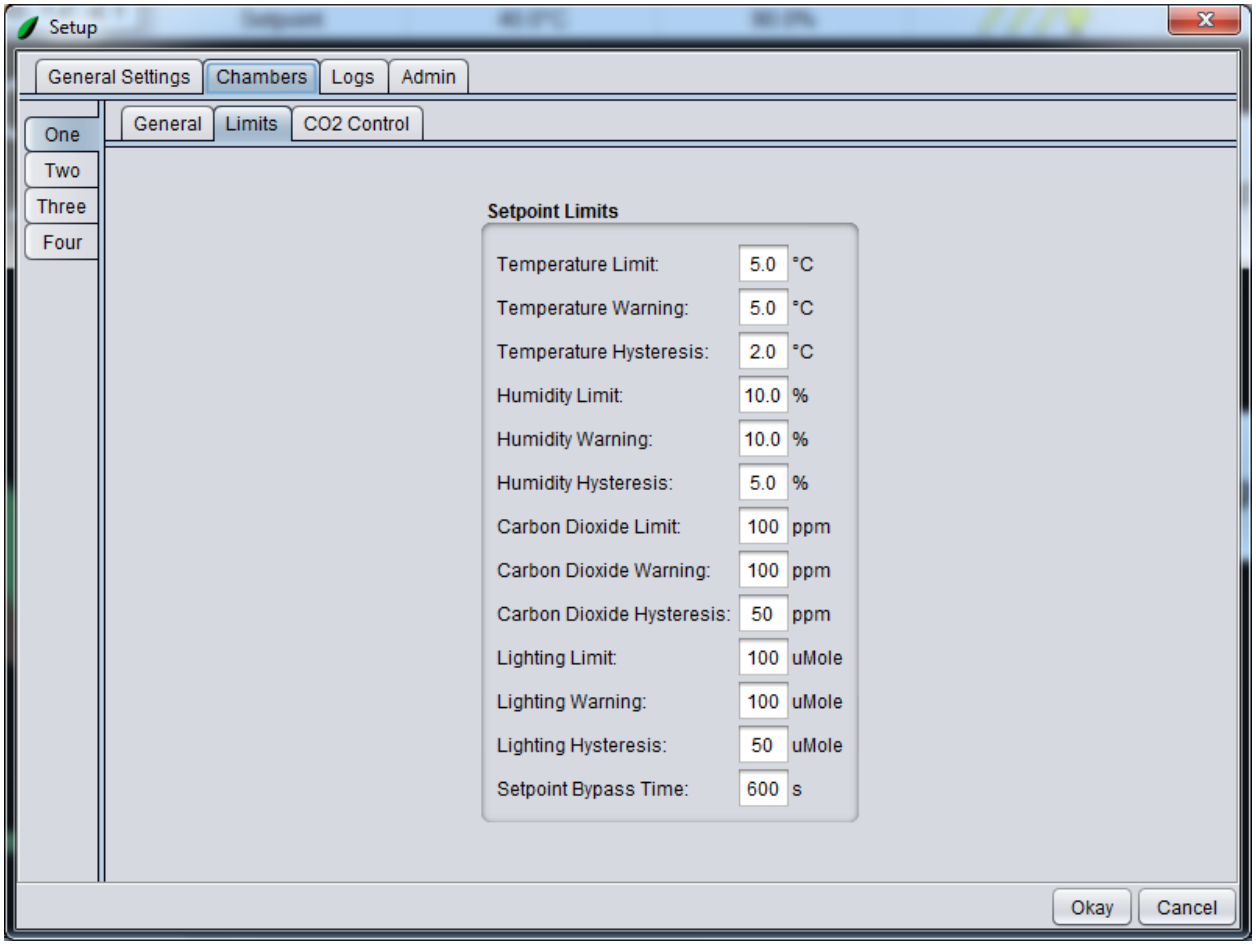
2. *Startup Delay*

   The chamber startup delay can be adjusted here for the compressor and lights separately.

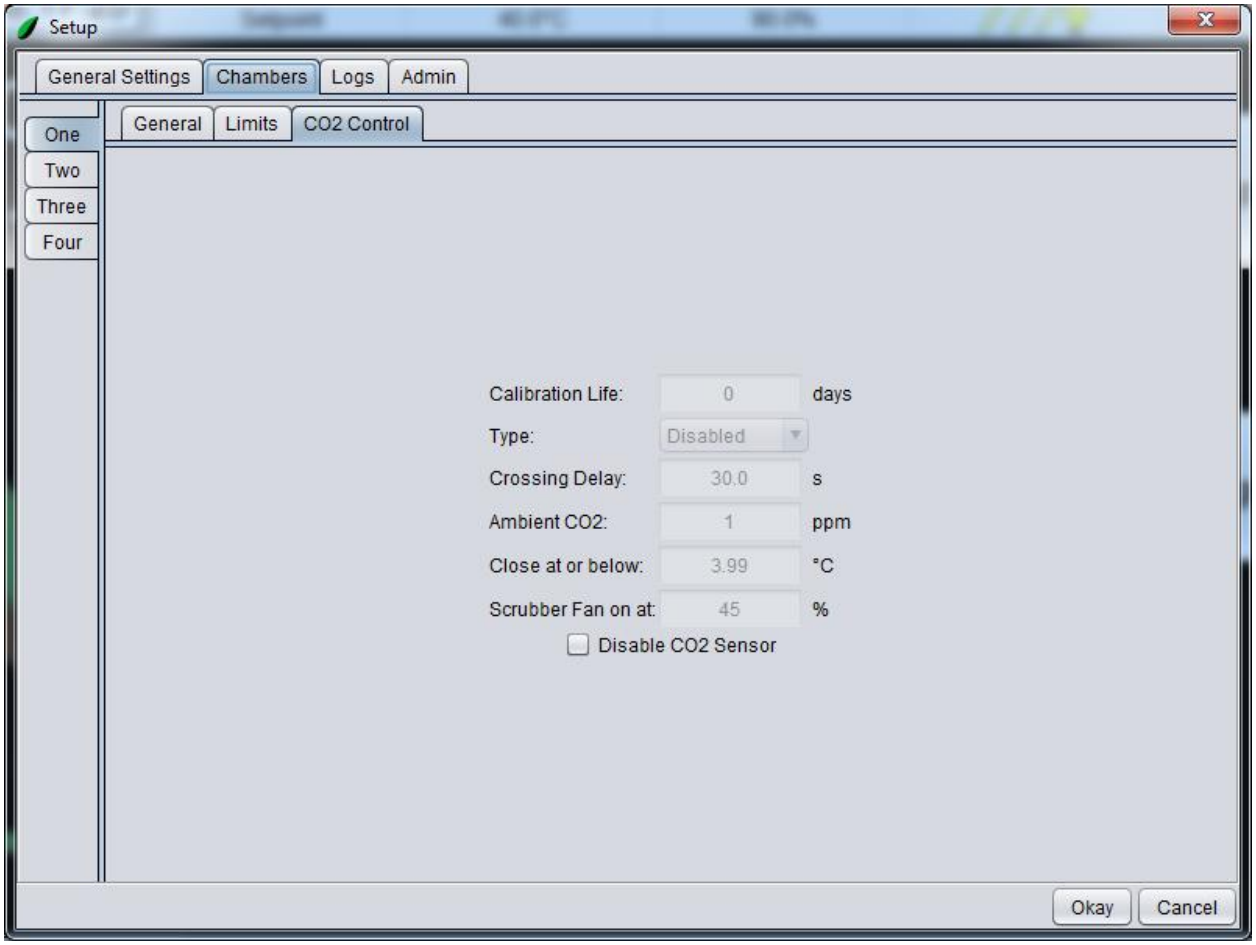
3. *Lamp Loft Settings*

   If this chamber is configured as a lamp loft (see Appendix 2), the lamp loft schedule settings can be adjusted here.

The **Limits** tab contains settings for setpoint limits. Setpoint limits are bypassed by default and must be activated before using these settings.

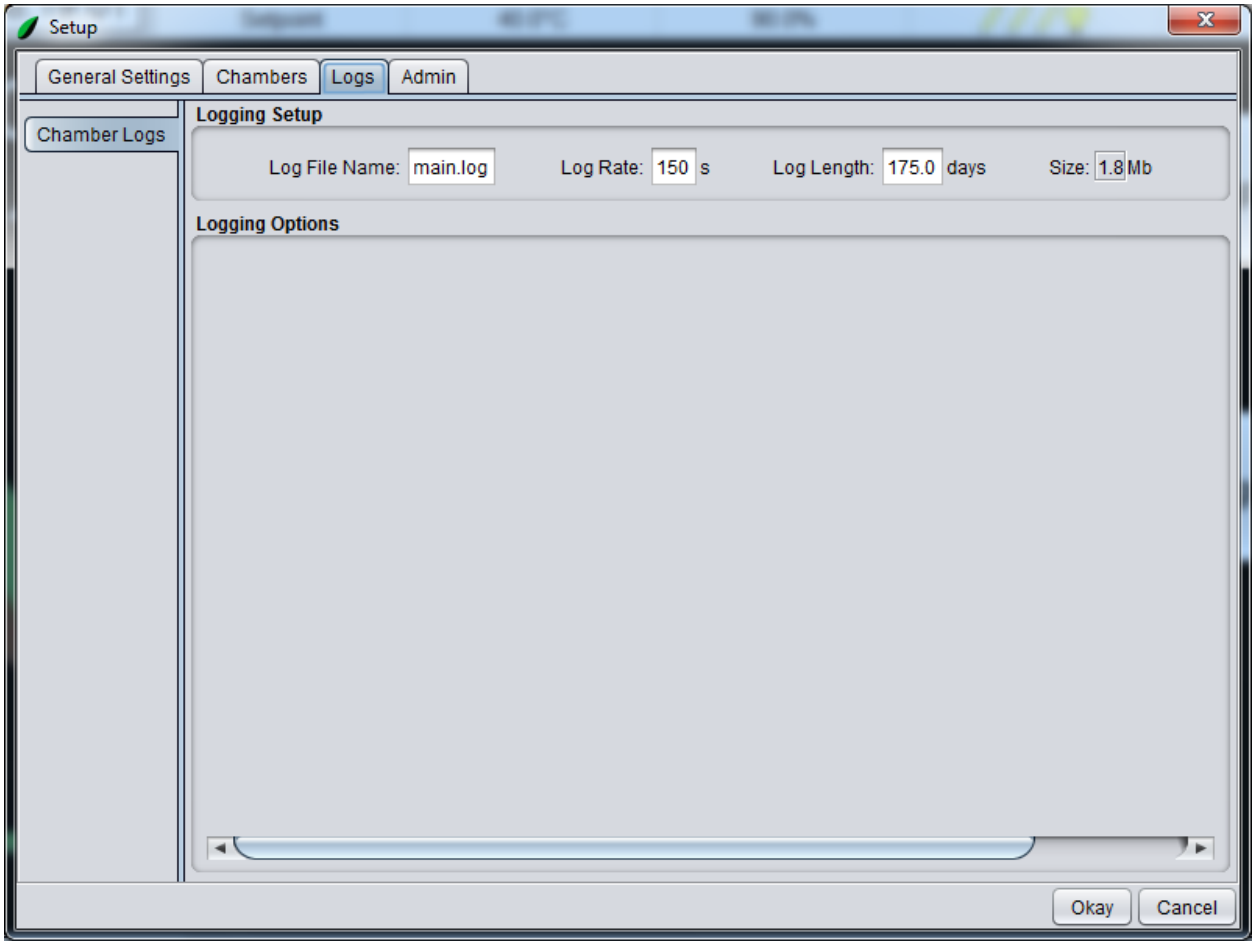


The **CO2 Control** tab contains settings for a chamber with carbon dioxide control.



Checking the **Disable CO2 Sensor** checkbox will power off the CO2 sensor and disable CO2 functionality in the chamber after the **Okay** button has been clicked.

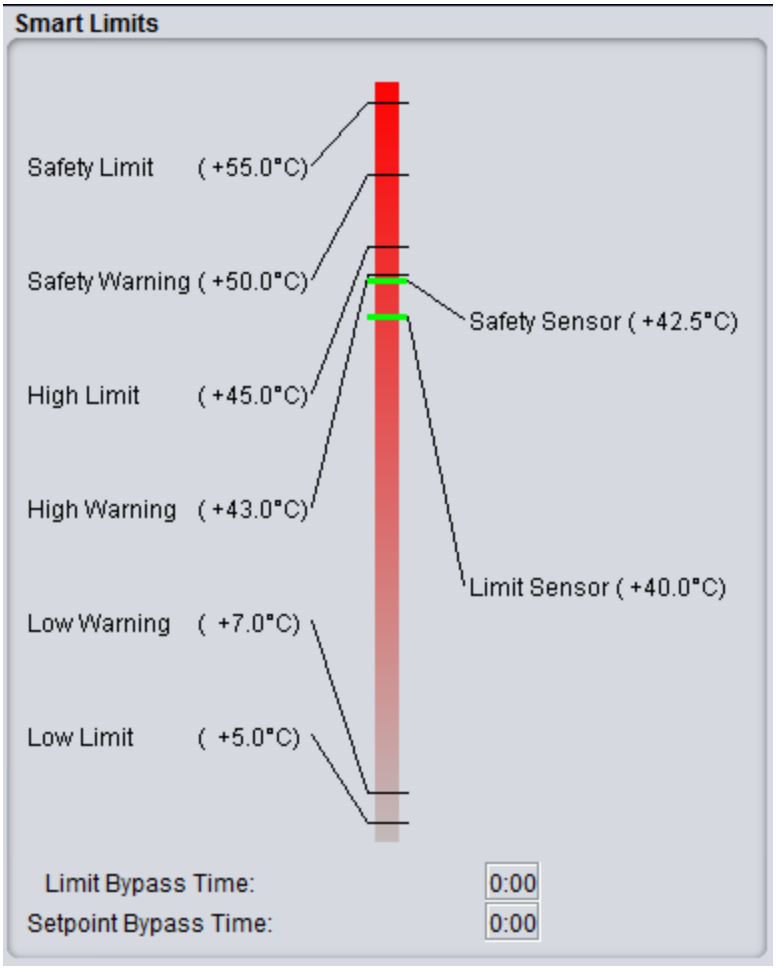
The **Logs** tab contains settings for name, rate and length of the log file.


Setup
General Settings
Chambers
Logs
Admin
Chamber Logs
Logging Setup
Log File Name: main.log
Log Rate: 150 s
Log Length: 175.0 days
Size: 1.8 Mb
Logging Options
Okay
Cancel

Appendix 1 – Smart Limits

Smart Limits is a built-in feature for BioChambers VNet. These temperature limits are calculated based on the highest and lowest setpoint temperatures in the currently running schedule. The Smart Limits will monitor the temperature sensors inside the equipment and ensure that the control is functioning within set parameters.

The BioChambers VNet limits can be seen in the **Limits/Monitors** tab of the ***Service*** window.



- *Limit Sensor*
    - The limit sensor is located next to the main chamber temperature sensor and is typically in an aspirated sensor box inside the plant growth area. The reading

from this sensor is compared to the calculated limit values and will take action if the temperature drifts outside of the boundaries. This sensor provides the first line of defense against a system failure.

- High Warning – BioChambers VNet 4 will generate a priority 1 alarm if the limit sensor reading rises above this value. The green indicator line will turn yellow.
- High Limit – BioChambers VNet 4 will generate a priority 2 alarm if the limit sensor reading rises above this value. The equipment will turn off and the indicator line will turn red.
- Low Warning – BioChambers VNet 4 will generate a priority 1 alarm if the limit sensor reading falls below this value. The green indicator line will turn yellow.
- Low Limit – BioChambers VNet 4 will generate a priority 2 alarm if the limit sensor reading falls below this value. The equipment will turn off and the indicator line will turn red.

- *Safety Sensor*
  - The safety sensor is usually located above the lamp canopy inside the plant growth area. The reading from this sensor is compared to the calculated safety values and will take action if the temperature drifts outside of the boundaries. This sensor provides the second line of defense against a system failure.
    - Safety Warning – BioChambers VNet 4 will generate a priority 1 alarm if the safety sensor reading rises above this value. The green indicator line will turn yellow.
    - Safety Limit – BioChambers VNet will 4 generate a priority 2 alarm if the safety sensor reading rises above this value. The equipment will turn off and the indicator line will turn red.
- *Limit Bypass Time*
  - On a start-up the Smart Limits will automatically be bypassed for a given period of time to allow the equipment time to reach its setpoint temperature. A

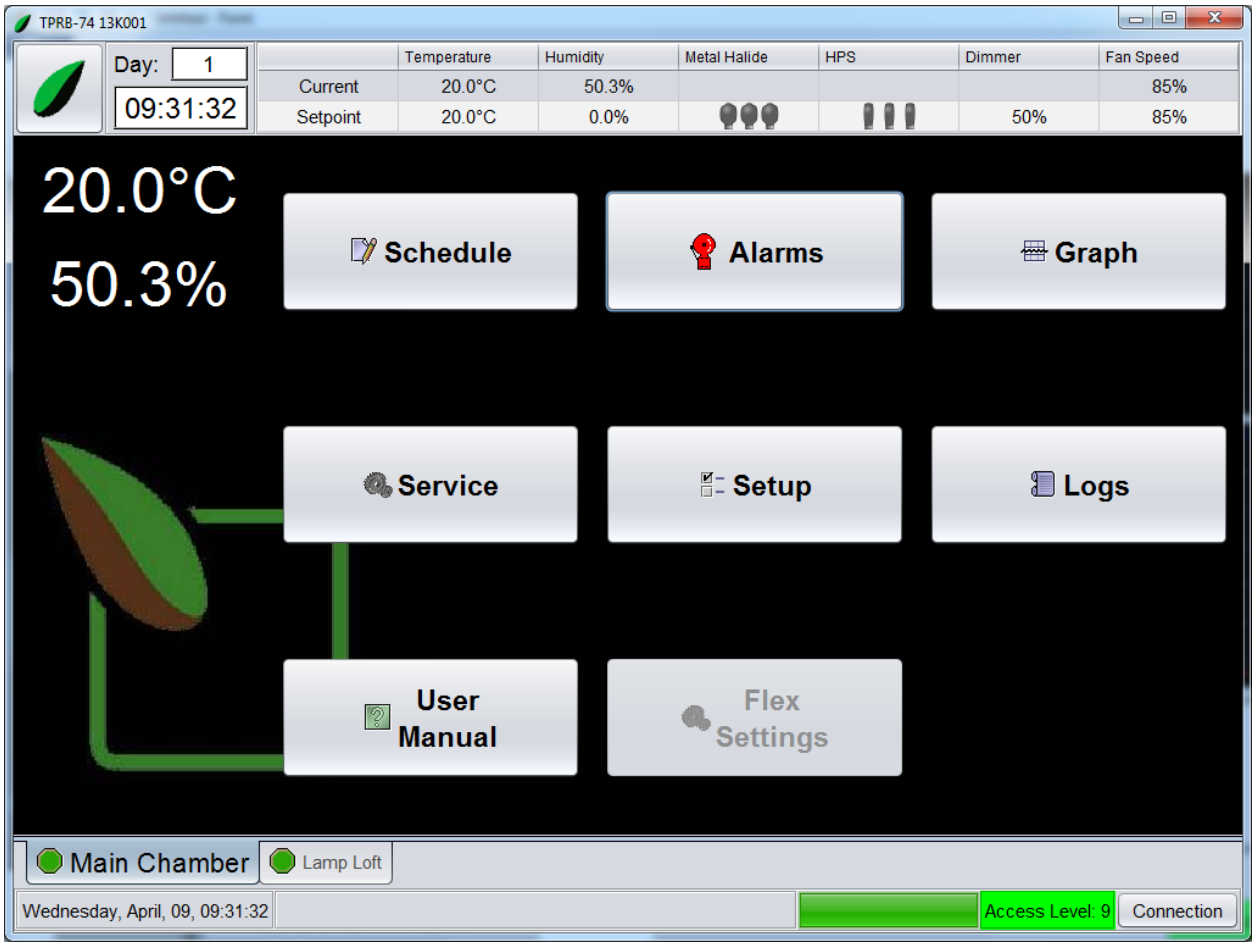
value of 0:00 indicates that the Smart Limits are no longer bypassed.

Appendix 2 – Multi-Chamber

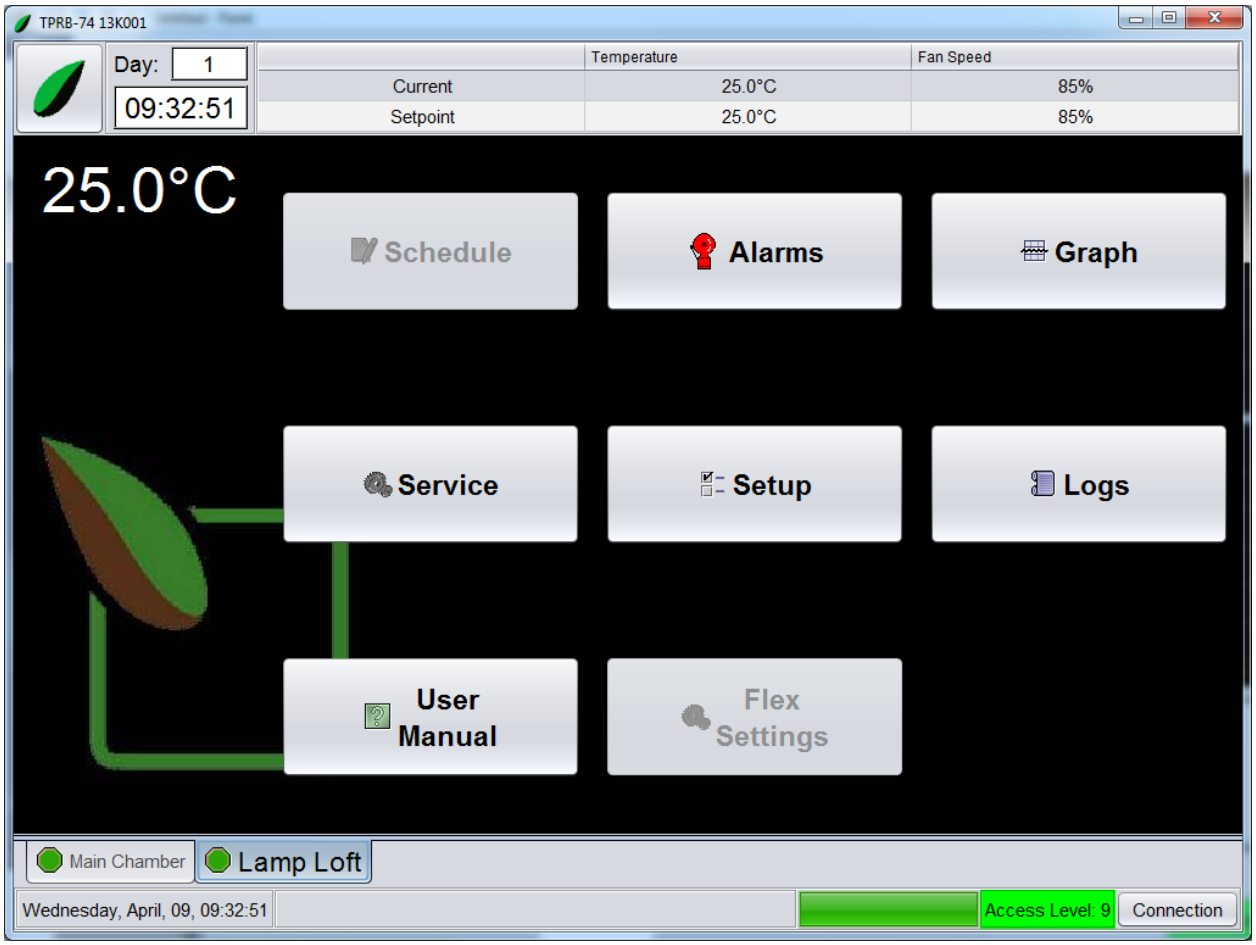
BioChambers VNet 4 can control up to 4 virtual chambers from the same controller. In some cases this is used to control a lamp loft environment, a separately controlled area where the chamber lighting is. In other cases, equipment is built with two separate controlled environments. These chambers are independent of one another in many ways. An example of a two chamber system is an SPC-7-2H which has an upper and lower chamber, but only one controller.

Barriered Chambers

Barriered equipment has a second chamber called a lamp loft. The second chamber will appear as a new tab, next to the main chamber.

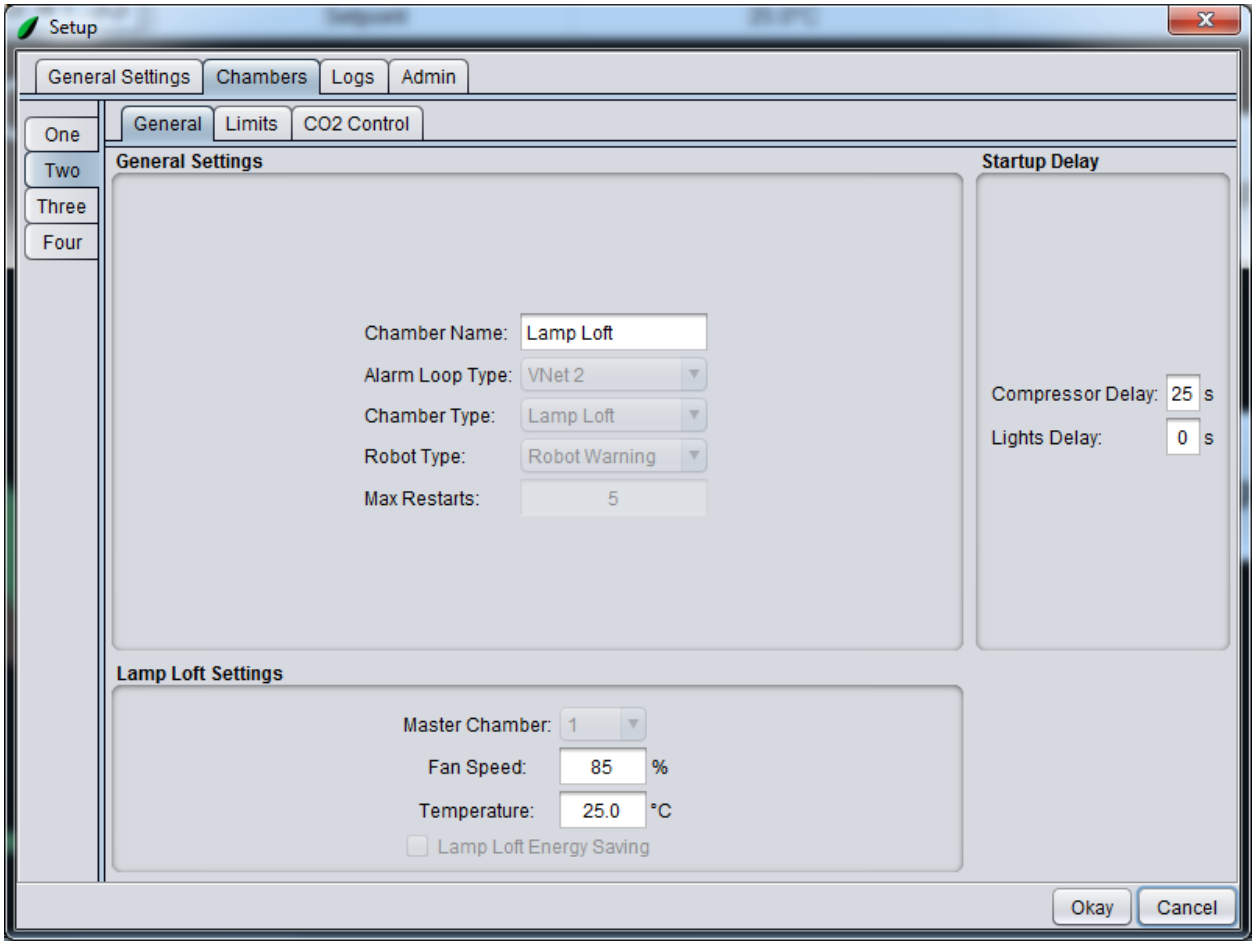


To switch to the lamp loft, click on the **Lamp Loft** tab.



There are several things to note about the lamp loft. Firstly the lamp loft does not have a lighting system, all lighting is controlled by the main chamber schedule. However, if the lamp loft is not running (red status) then the lights will not be on in the chamber. Secondly is that the lamp loft **Schedule** button is disabled. To change the lamp loft temperature setpoint follow this procedure:

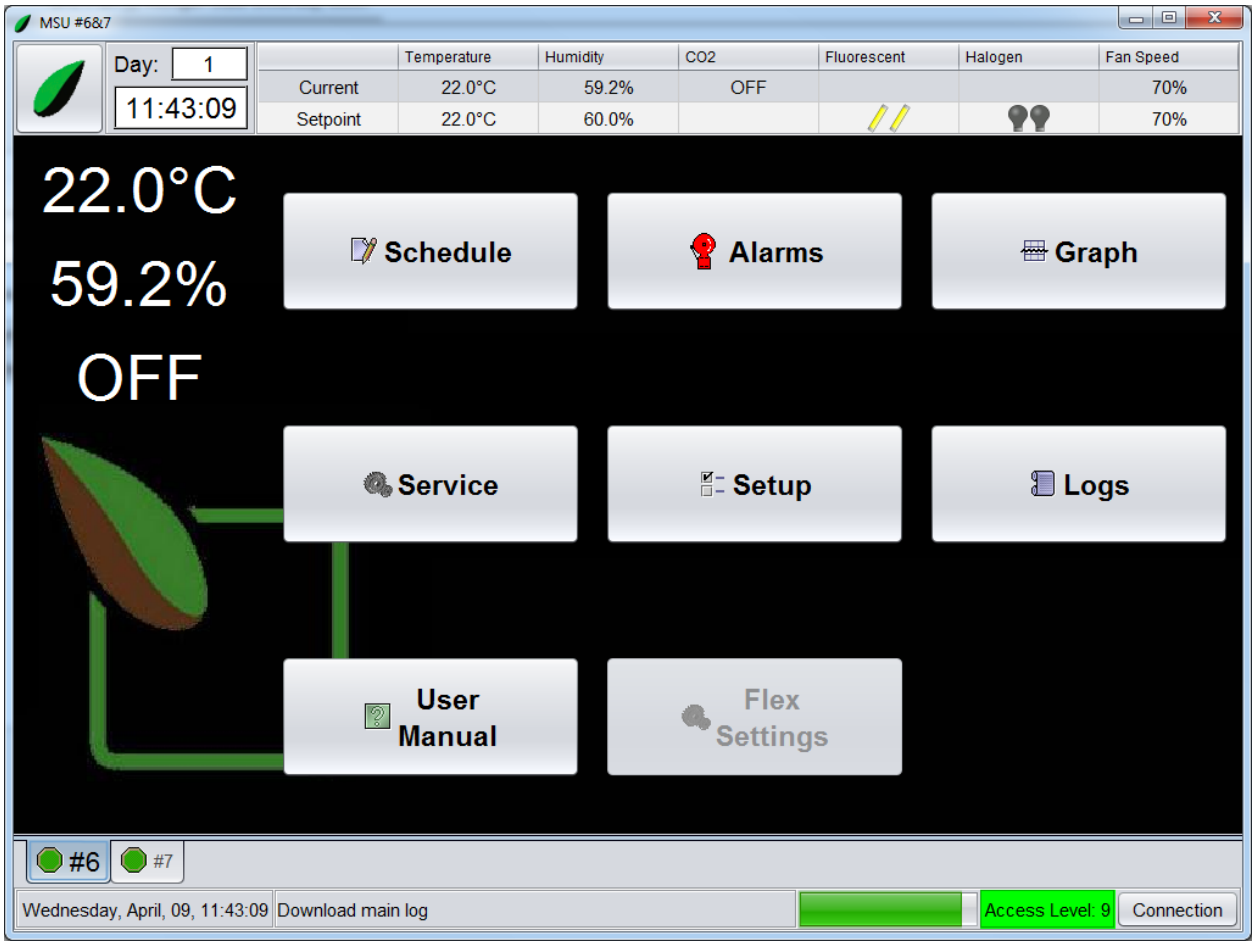
1. Log in as n Access Level 6 user
2. Click on the **Setup** button on the home screen
3. Click on the **Chambers** tab
4. Click on the **Two** tab. The *Setup* window should appear as follows:



5. The lamp loft is using the fan speed and temperature from the *Lamp Loft Settings*. These settings can be adjusted here and saved by clicking the **Okay** button.

Multi-Chambers

Multi-Chamber equipment has more than one control environment, but has only one controller. In this mode the two chambers act mostly independently. As in the barriered chamber, switching control between the multiple virtual chambers is done by clicking on the chamber tabs.


MSU #6&7
Day: 1
11:43:09
Temperature
Humidity
CO2
Fluorescent
Halogen
Fan Speed
Current
22.0°C
59.2%
OFF
70%
Setpoint
22.0°C
60.0%
70%
22.0°C
59.2%
OFF
Schedule
Alarms
Graph
Service
Setup
Logs
User Manual
Flex Settings
#6
#7
Wednesday, April, 09, 11:43:09
Download main log
Access Level: 9
Connection

Appendix 3 – BioChambers VNet on Your PC

BioChambers VNet 4 can be installed on a desktop computer to allow remote control of BioChambers equipment from your office or remotely over the internet. In this case BioChambers VNet 4 will run in windowed mode like your other applications instead of using up the entire screen. The following functions will operate differently:

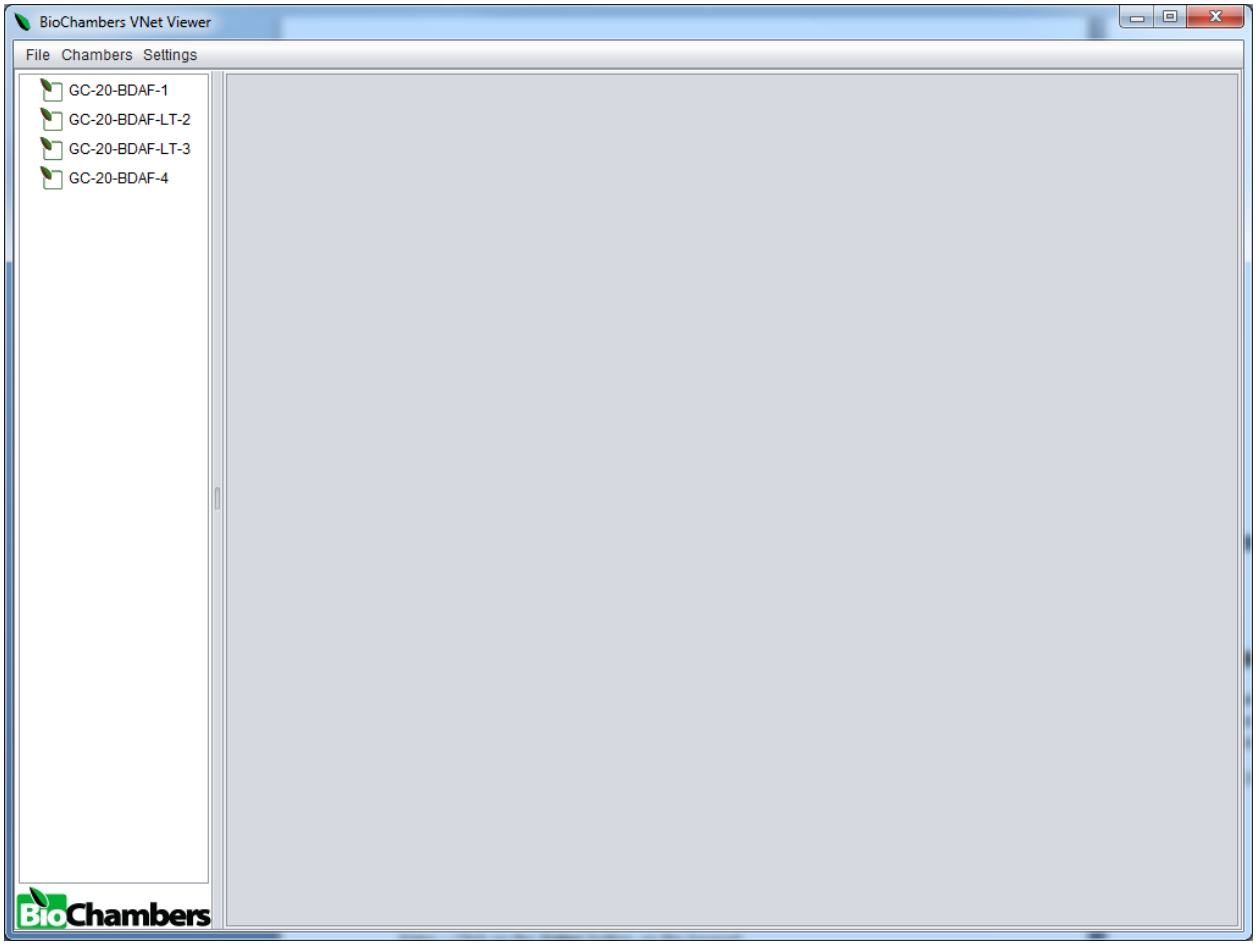
- The onscreen keyboard will not appear. You will use your regular keyboard instead.
- The number pad on a keyboard can be used with the onscreen keypad in the schedule window.

Keyboard Button	Onscreen Keypad Function
0-9	0-9 (1-4 will toggle the four individual levels for lamp banks)
*	>
/	<
Enter	Enter
Backspace	Clear
-	+/-
Esc	Close

Appendix 4 – BioChambers VNet Viewer

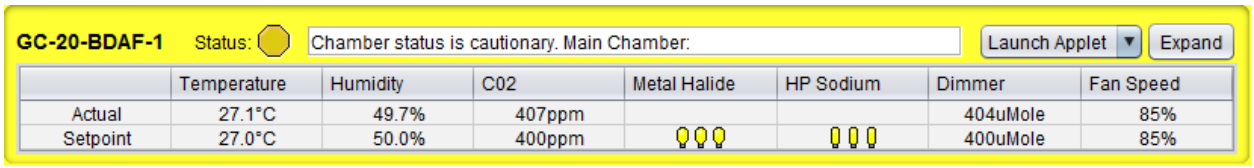
BioChambers VNet Viewer can be used to manage multiple pieces of equipment from one computer. The following exercise will go through the features of the BioChambers VNet Viewer.

1. Double-click on the **VNet Viewer** icon to start the program. The following window will appear:



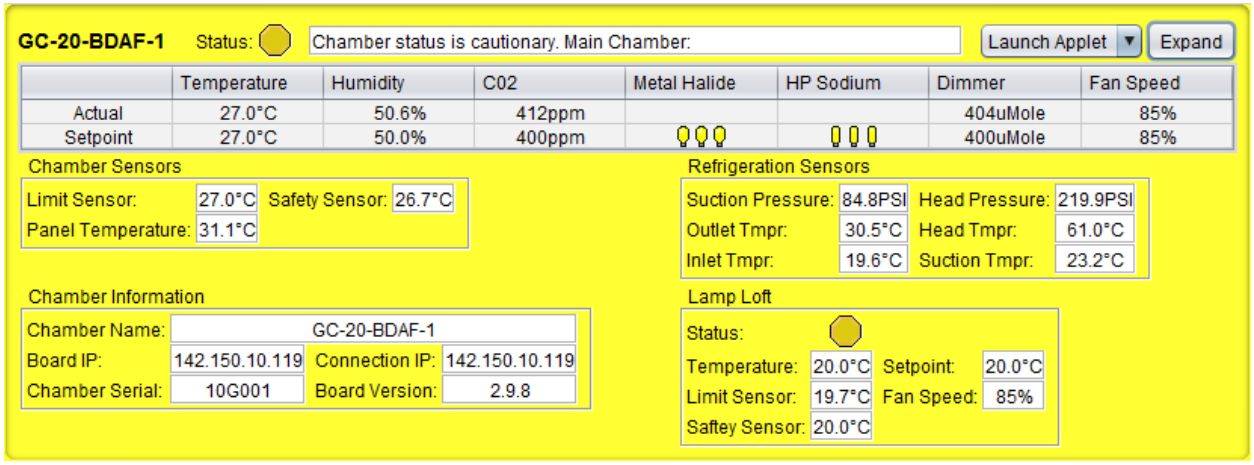
Note	The *Equipment List* on the left will appear different than shown, depending on the equipment in your facility.

2. Click on the first entry in the *Equipment List* on the left and drag it into the *Status Pane* on the right. This will load the entry and connect to the BioChambers equipment.



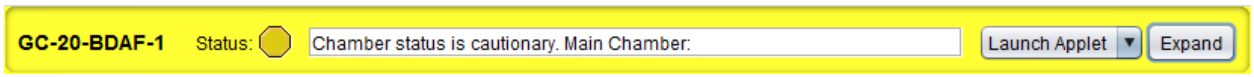
This view shows the current alarm status of the equipment as well as the current readings and setpoints of the equipment.

3. Click on the **Expand** button.



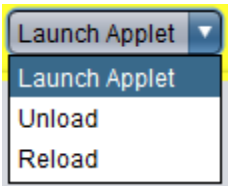
This view provides more detailed information about the equipment including all temperature sensor readings, refrigeration sensors, identification information and lamp loft information (if equipped).

4. Click on the **Expand** button again.



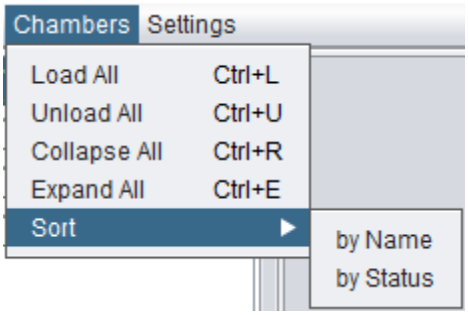
This view shows only the status of the equipment. This view takes less space in the *Status Pane* and is helpful when viewing many pieces of equipment simultaneously.

5. Click on the combo box next to the **Expand** button.



The **Launch Applet** selection will launch the BioChambers VNet applet in windowed mode. The **Unload** selection will remove the equipment from the *Status Pane*. The **Reload** selection will reload the equipment and attempt to re-establish a connection.

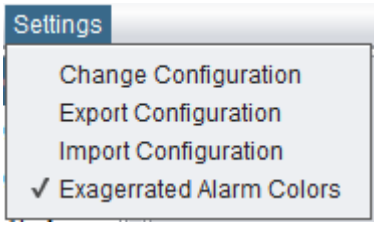
6. Click on the **Chambers** menu at the top left-hand corner



- **Load All**
    - Loads all equipment from the *Equipment List* into the *Status Pane.*
- **Unload All**
    - Removes all equipment from the *Status Pane.*
- **Collapse All**
    - Collapses all equipment in the *Status Pane* into status only view.
- **Expand All**
    - Expands all equipment in the *Status Pane* by one view.
- **Sort by Name**
    - Sorts all equipment in the *Status Pane* into alphabetical order.
- **Sort by Status**
    - Sorts all equipment in the *Status Pane* by status from red (critical) at the top to green (clear) at the bottom.

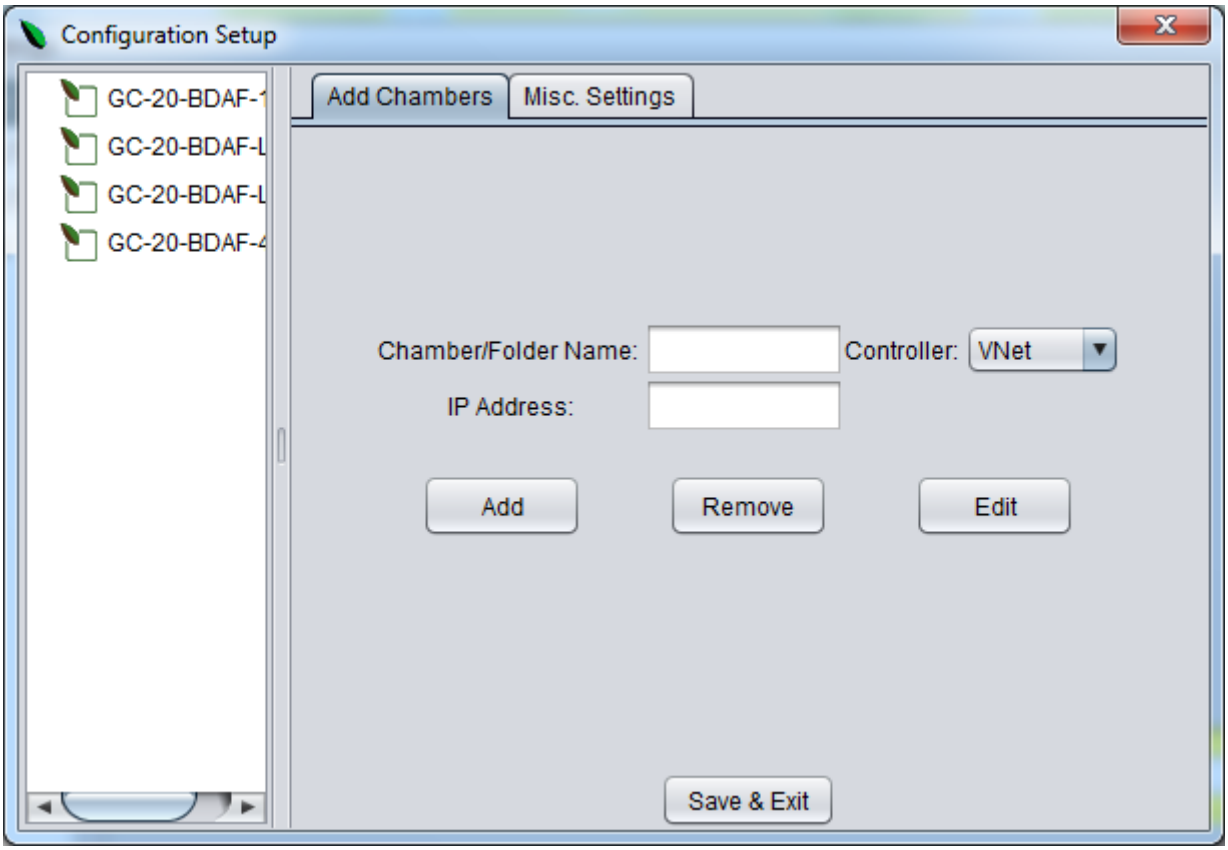
- Unconnected equipment in the *Status Pane* will appear at the bottom.

7. Click on the **Settings** menu at the top left-hand corner.



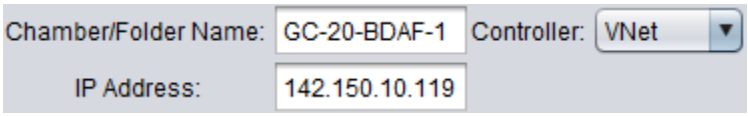
- **Change Configuration**
  - Changes the configuration of the equipment in the BioChambers VNet Viewer.
- **Export Configuration**
  - Creates a backup of the configuration.
  - Can be used to transfer the configuration from one computer to another.
- **Import Configuration**
  - Imports a previously backed up configuration.
- **Exaggerated Alarm Colors**
  - Toggles exaggerated alarm colors on and off.

8. Click on the **Change Configuration** menu option. The following window will appear:

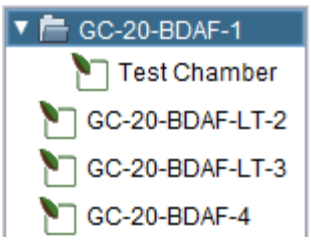


This window is where the *Equipment List* and all parameters are configured. We will now add a new piece of equipment to the list.

9. Click on the first entry in the list. This entry will be used as the parent for the new piece of equipment and will be changed into a folder. The information from the entry will be displayed:

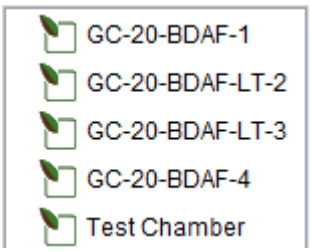


10. Change the *Chamber/Folder Name* to "Test Chamber".
11. Change the *IP address* to "0.0.0.0".
12. Click on the **Add** button.



"Test Chamber" has been added to the *Equipment List*. Since the first entry was selected before the **Add** button was clicked, it was chosen to be the parent folder for "Test Chamber".

13. Click and drag "Test Chamber" to the end of the list.

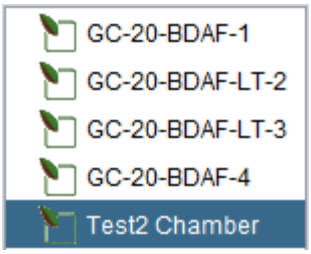


Notice how "Test Chamber" was taken out of the parent folder "GC-20-BDAF-1" and the parent folder has reverted from a folder back to a chamber entry because it no longer has any child entries.

14. Click on *Test Chamber.*

15. Change the *Chamber/Folder Name* to "Test2 Chamber".

16. Click on the **Edit** button.



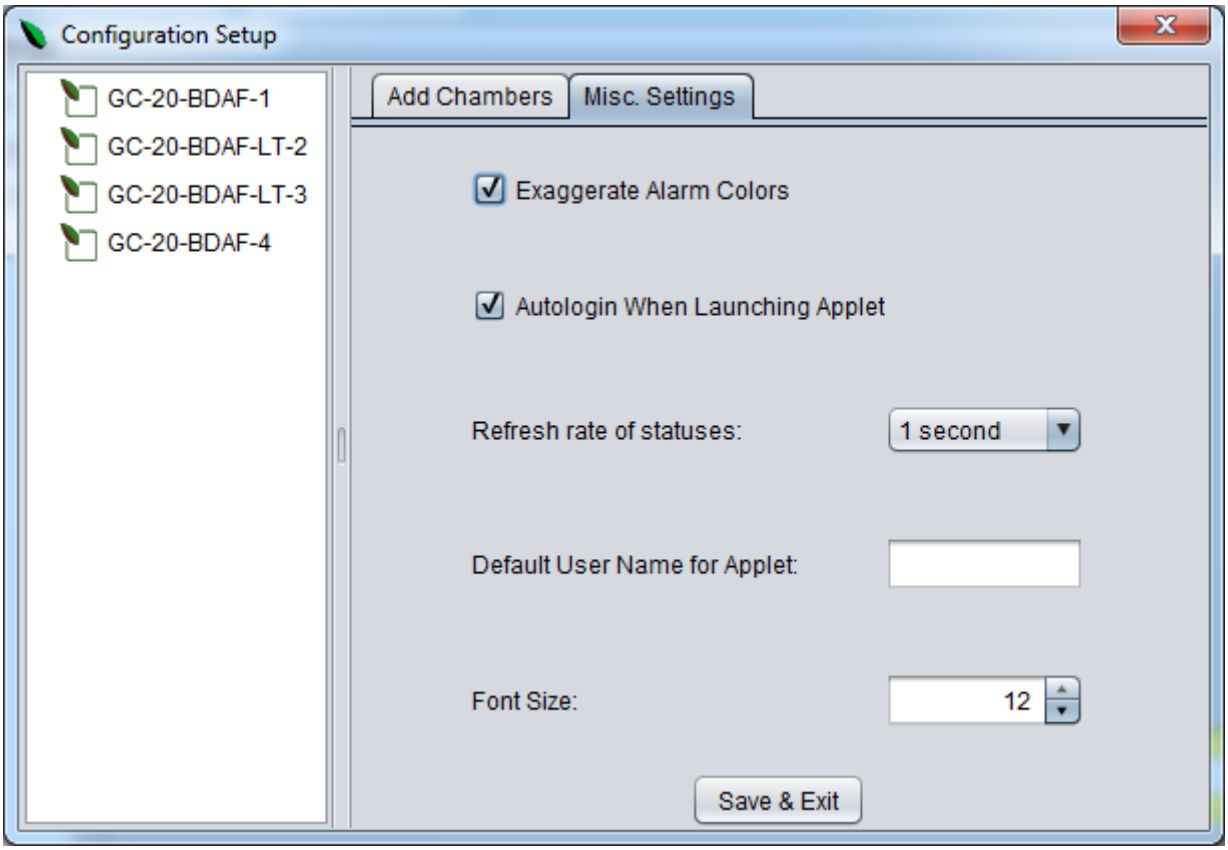
The **Edit** button will alter the information of the selected element in the list. This operation changed "Test Chamber" to "Test2 Chamber".

17. Click on "Test2 Chamber".

18. Click on the **Remove** button.

The **Remove** button removes an entry from the list.

19. Click on the **Misc. Settings** tab.



- *Exaggerate Alarm Colors*
    - Selected by default the first time Biochambers VNet Viewer starts
- *Autologin When Launching Applet*
    - If selected, BioChambers VNet Viewer will automatically login at access level 1 whenever **Launch Applet** is selected on an entry in the Status Pane
    - If not selected you will be prompted for a username and password before BioChambers VNet will connect to the equipment
- *Refresh rate of statuses*
    - The refresh rate at which the equipment is polled
- *Default User Name for Applet*
    - The username that will automatically be loaded when launching BioChambers VNet
- *Font Size*
    - The font size used in the Status Pane

20. Click on the red **X** button in the top right-hand corner to exit the *Configuration Setup* window without saving changes.

OR

21. Click on the **Save & Exit** button to save your changes and then exit the *Configuration Setup* window.

This completes the BioChambers VNet Viewer exercise.