

Scurry Activity Monitoring Software

User's Manual



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Part I: Introduction

I.A. Welcome

Lafayette Instrument Company has been assisting researchers in the fields of behavioral psychology and neuroscience for over 65 years, and we are still committed to providing highly effective tools and instruments of the utmost quality. This software package can be used with any of Lafayette Instrument Company's available activity wheels, provided the corresponding interfaces and counters are upgraded and has been developed with the customer in mind. The Scurry software package is intended to replace older Activity Monitoring packages while providing the foundation for future iterations. As the team of engineers at Lafayette Instrument Company develops and implements new solutions in response to the demands and challenges researchers face, those additions will be made immediately available to customers via online updates, accessible directly from within the Scurry software.

I.B. Minimum Computer Specifications

- Operating System: Windows Vista, 7, 8, 8.1, and 10 (32/64 bit editions)
- Processor: 1GHz (multi-core recommended)
- RAM: 1GB (4GB recommended)
- Disk space: 60GB (1TB recommended)
- Hardware: 1x (or more) USB 2.0 or higher ports*

* While USB connection support is somewhat unlimited, a practical limitation of 8 interfaces (supports 128 wheels, counters, or some combination of both) being connected to a single PC with software is recommended.

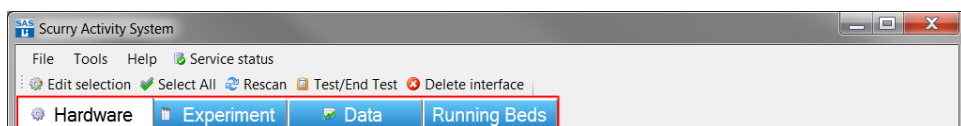
I.C. Quick Start Guide

This software is provided with an Installer executable. The software should be installed before connecting an interface. It is also recommended that you close all other programs while installing any software. Double click the Scurry setup icon and follow the on screen instructions in order to complete the installation. See Appendix A for more details on software installation. Once the installation is complete, the Scurry icon will be available on the desktop.

Once the software is installed, connect any desired equipment to the same PC. Once the interface(s) and all peripherals are connected, double click the desktop icon to start the software.

Part II: Tabs

The Scurry Activity Monitoring Software is organized into four main sections denoted by tabs in the user interface. The hardware section gives the user the ability to connect and monitor various devices, and it will be used to set up the system prior to running any experiments. The Experiment Tab will be used for designing tests based on one-time settings or programmable experiment schedules. The Data Tab will be utilized when analyzing either previously completed experiments or those that are currently running. Lastly, the Running Beds Tab will be used to install and run any Lafayette Instrument Co. standalone Forced Exercise Wheel System. Additional settings, user preferences, and other information can be accessed in the File and Help menus on the toolbar. For more information regarding those options, please refer to Part III of this manual.

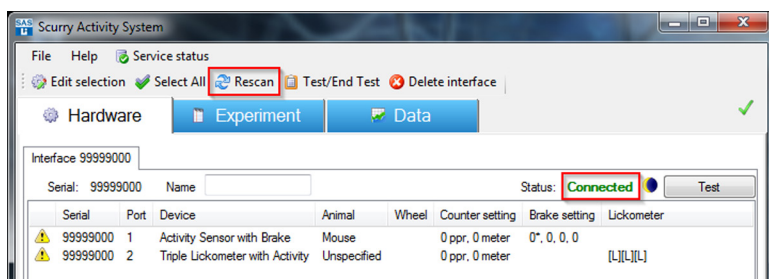


II.A. Hardware Tab

Here, the user is able to view any currently connected devices, make changes to them, and test that they are functioning properly before beginning an experiment. A single or multiple Scurry Interfaces may be connected to a single PC.

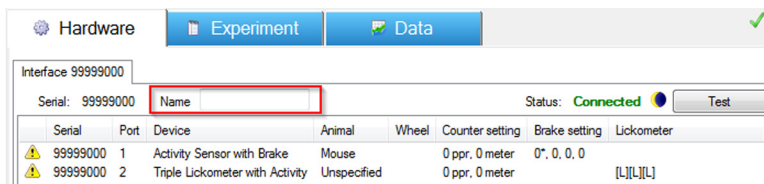
II.A.1. Connecting Equipment

Once the Scurry software is open, connect any desired devices that have not already been connected and then power on the Scurry Interface(s) (additional devices may be connected at a later time while the interface is powered on, if necessary). The green power light on the interface will indicate that the unit is receiving power. Once on, the connected hardware will show up in the pane associated with the proper interface. By default, interfaces are identified using their serial numbers. See Part II.A.2 for info on updating interface names. If the connected hardware did not show up automatically, the user may press the “Rescan” button to refresh the list. If this does not work, see Appendix B for troubleshooting. When an interface is properly connected, the status in the upper right portion of the window will read “Connected”. If the interface is powered down or disconnected for any other reason while the software is open, the status will read “Disconnected”.



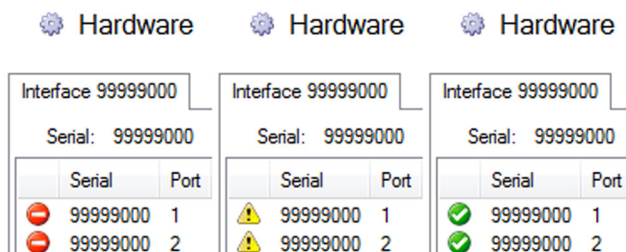
II.A.2. Renaming Interfaces

In order to rename an interface within the Scurry software, first click the smaller tab displaying the serial number of the interface to be renamed. The serial number will be repeated just below the tab. Click inside the field labeled "Name", just to the right of the serial number. Type in the desired name, and click outside of the field to complete the change. Repeat this process for any other interface that needs to be renamed.



II.A.3. Setting Up and Editing Devices

Connected Devices: Devices are organized by interface and port number. Devices that are properly connected and set up will be identified with a green check mark icon. Disconnected devices will be identified by a red dash icon, and devices that are connected but still need to be set up will be identified by a yellow exclamation icon (all shown below). To set up or edit the configuration of a device, the user may either double-click the device name in the list or select the device with a single click and subsequently click the button marked "Edit selection".



Device Configuration Window: The above actions will bring up a new window labeled "Edit device configuration". The name of the selected device will also appear in the field at the top of the window. The rest of the options flow from top to bottom. First, the user will select the type of animal being observed from the drop-down menu. This selection will filter the products available for selection in the next step. If the type of animal is irrelevant, the user may choose to select "Unspecified". In this case, all applicable products will be available for selection.

Activity System: Next, the user will select the associated product number from the drop-down menu in the Activity pane. The default pulse per revolution and meters per revolution for that particular product will be filled automatically. These settings may be changed if necessary and also allow for a custom setup such as a misstep wheel. The pulse per revolution should equal the number of times the sensor will be blocked during a single revolution of the wheel. For Lafayette Instrument Company products, this will be 38 for mice and 6 for rats. Meters per revolution should always equal the internal circumference of the wheel being used.

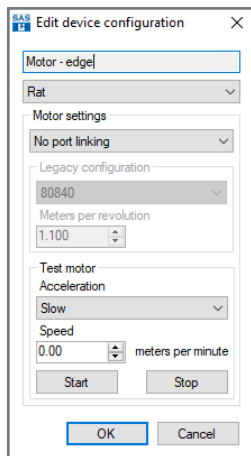
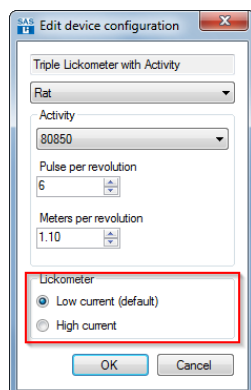
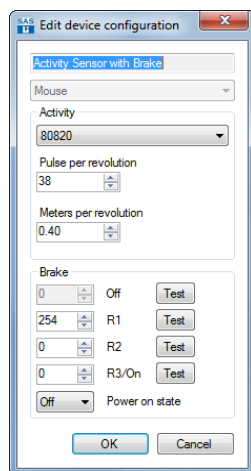
Brake Settings: The brake pane provides the user with the ability to customize brake settings. The number selected (between 0 and 254) will set the height of the brake when engaged. The brake is set to '0' while off. The user may also choose whether the brake will be engaged or disengaged while the system is powered on and at rest.

Lickometer Setting: Finally, if a lickometer is present, the user should designate whether the device will utilize low or high current. By default, the low setting should be selected. The high setting may be used to increase the instrument sensitivity when triggers are being missed using low current. Lickometers connected to the Scurry software measure individual licks sequentially one at a time, as well as sustained licks (latch on) at a rate of 8 counts per second.

Motor Settings: The motor pane provides the user with the ability to setup and/or test motors. Port linking can be used to link an 86115 or 86118 standard counter attached to ports 1-4 and mounted on the motorized wheel to get more accurate distance tracking. A meters per revolution setting is required before running an experiment. The Test motor section allows for pre experiment testing of the motors. More information on acceleration can be found in section II.B.3.

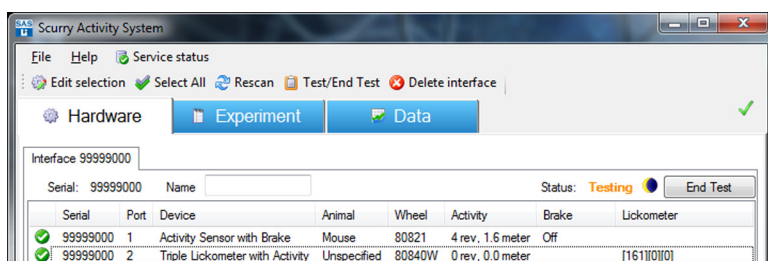
Legacy Motors: Configure legacy motors using the Legacy configuration section. Upon final setup, all legacy motors require testing per the 86150 Legacy Motor Adapter manual before use.

Finalizing Configuration: When finished, click OK to close the window and apply the changes. If the current changes are undesired, the user may click Cancel to close the window without applying the changes. This process can be done for each device individually. Additionally, devices with the same setup may be edited simultaneously by selecting all applicable devices before clicking "Edit selection". In order to select multiple devices, the user can click and drag the cursor to select a desired area, hold the Shift key while clicking a range of devices, or hold the Ctrl key while individually clicking each desired device. Once a device is set up, the green check mark icon should appear next to the device in the list, verifying that connection and set up were successful. If all devices are to be set up in the same way, the user is able to select all devices by clicking "Select All" in the upper left portion of the window prior to clicking "Edit selection".

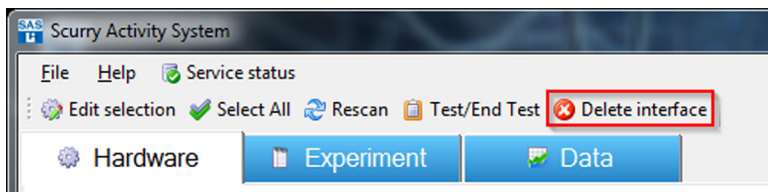


II.A.4. Testing Connected Devices

A test feature has been implemented on the hardware tab in order to ensure the proper working condition of devices prior to running an experiment. To initiate a test, click the “Test” button in the top right of the Scurry software window. When done properly, the status to the left of the button will change from “Connected” to “Testing”. In this mode, the user is able to manually operate the equipment while viewing the output in real time, verifying that everything is installed and working properly. Each device in the list will display pertinent information regarding its use in the right-most columns (Activity, Brake, and Lickometer). Keep in mind that for activity sensors, it will take a minimum of the selected pulses per revolution (an entire revolution of the wheel) before the data will update. When testing of the equipment setup is complete, click the “End Test” button (previously labeled “Test”). There is also a photo sensor built in to the Scurry Interface that detects whether or not the environment is currently illuminated. A sun or moon icon next to the Interface Status indicates whether the environment is light or dark, respectively.



II.A.5. Removing Interfaces

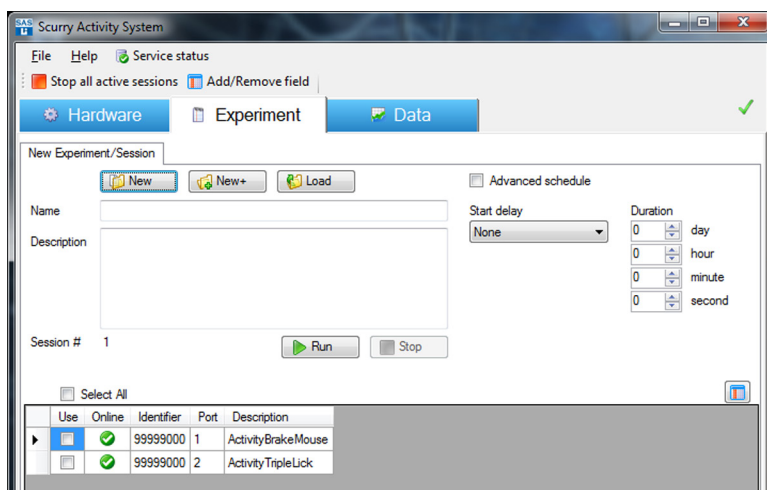


In the event that an interface needs to be removed from the system, it is best to power down the unit first, then disconnect the hardware from the PC. Information for the previously connected interface will be retained in the software unless it is removed by the user. To do this, first select the interface by clicking the associated tab (labeled with the name of that interface). Next, click “Delete interface”, marked with a red “X” icon near the top of the window. the Scurry software will open a small window, asking the user to confirm the deletion of the interface. Click “Yes” to finalize deletion, or “No”/“Cancel” to go back without removing the interface. The user also has the option to bypass the confirmation window in the future. To do this, simply check the box labeled “Never show this again” before clicking “Yes”.

In order to reconnect any devices that had been associated with the recently removed interface, each individual device must be attached to another currently connected interface and set up according to section II.A.3.

II.B. Experiment Tab

The Experiment Tab will be used to create, organize, and initiate sessions using the equipment connected and set up via the Hardware Tab. If the list of connected hardware in the lower portion of the window does not match the list in the Hardware Tab, it may be necessary to click the “New” button in the upper left in order to refresh the list of devices. It is possible to run simple and advanced schedules. It should be noted that brake and motor control options are only available on advanced schedules.



II.B.1. Creating a Run

Data for simple runs are automatically saved, stored, and maintained within the software, while advanced schedules can be stored in a location designated by the user.

Starting a New Run: To begin, click the “New” button on the left side of the window. This will clear any old information from the fields below and refresh the device list so that the currently connected devices are displayed and available to use. By clicking the check box to the right, an advanced schedule can be created or loaded. If it is necessary to incorporate brake or motor function into the experiment, an advanced schedule must be used. For more information on advanced schedules, please refer to section II.B.3.

Defining the Run: By clicking in the “Name” and “Description” fields, the user is able to enter the desired information to define and describe the experiment being designed. Next, the delay can be set (when applicable). By using the drop down menu labeled “Start delay”, the user is able to choose between starting the run immediately and starting the run at a specific time in the future. When setting a delay, choose the option “Wait Until” and then specify the desired start time in the newly available field. This field allows any time within the upcoming 24 hours to be selected.

Duration

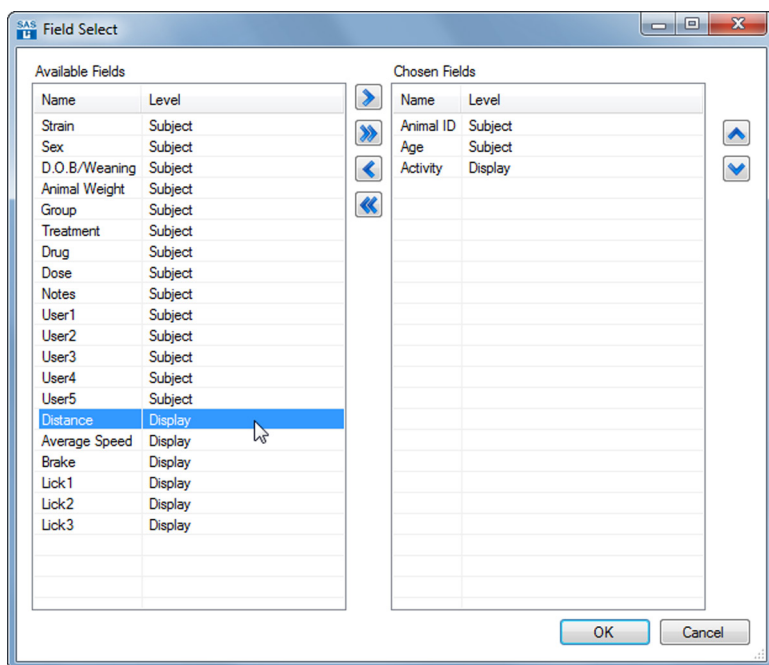
0	▲▼	day
0	▲▼	hour
0	▲▼	minute
0	▲▼	second

Scurry interfaces also come equipped with a photo sensor, allowing the user to trigger the start of their run when the presence of light changes. When using the light sensor, ensure that it is unobstructed and working properly in the current conditions. The duration of the experiment is specified using the appropriate fields as shown to the right. Selections are made by adjusting days, hours, minutes, and seconds independently.

Selecting Equipment: The list in the lower portion of the window displays all currently connected and configured devices. The first column contains check boxes that allow the user to select the desired device(s) for the experiment. It is possible to use as many devices as are connected to the interface, simultaneously.

Selecting Reported Information: Click “Add/Remove Field”, or the button just above and to the right of the device list to edit the displayed fields associated with each device. The default fields as chosen in “Preferences” will be loaded automatically. For more information on setting the default fields, please refer to “Default Experiment Fields” in section III.A.

Once the “Field Select” window is open, the user is able to add or remove a variety of fields as shown in the figure on the next page. Subject level fields are user defined, and are meant to store pertinent information regarding to the experiment such as the subject ID, age, gender, etc. Display level fields are not adjustable by the user but are determined by instrument response. For example, the activity field will display the current number of wheel revolutions completed since the start of the run. Desired fields are chosen by clicking on their name in the list of available fields and then clicking the right arrow button between the lists. Conversely, fields may be removed by clicking the field name in the list of chosen fields and subsequently clicking the left arrow button between the lists. The double arrow buttons in the center of the window will move all fields to the left or right respectively. Additionally, the up and down arrow buttons on the right-hand side of the window can be used to re-order the list of chosen fields. To accomplish this, click on the chosen field to be moved up or down in the list, and then click the respective up or down button until the field has been moved to the proper location.



Once the proper selections have been made, click OK to confirm and apply those choices. Click Cancel to negate any changes and return to the Experiment Tab.

Error Checking: At the bottom of the Experiment Tab, any potential errors that need to be addressed prior to beginning the run will be displayed. For a complete list of error codes, please refer to Appendix B: Troubleshooting.

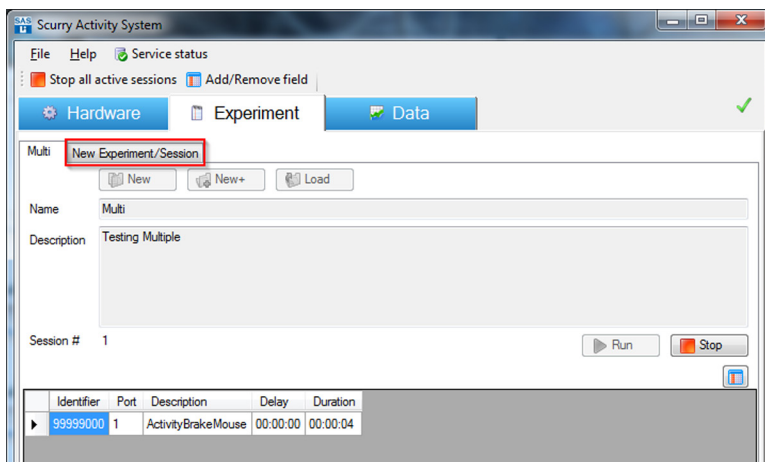
Beginning the Run: After all necessary parameters have been defined, click the “Run” button with the green arrow to begin the experiment.

New+ and Load: When creating an experiment, it is possible to use an old run as a template in two different ways. The



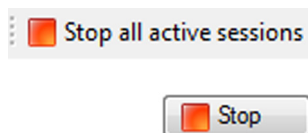
New+ option allows the user to copy the settings from an existing run, but will leave the name blank. Therefore, the name of the run will need to be defined by the user. Alternatively, an old run may be pulled up using the Load function. When re-running a loaded experiment, even the name of the run is duplicated. Any replicate run will be designated in the data tab as a sequential session. Please refer to section II.C for more information on the Data Tab. All runs are also time and date stamped when initiated in order to avoid ambiguity. This information will also show up on the Data Tab.

Concurrent Experiments: When multiple Scurry interfaces are connected it is possible to run multiple experiments concurrently, one per interface. After one experiment has been started, click the “New Experiment/Session” tab, as pictured below, to begin the process of setting up another run. The new run must use a currently idle interface or interfaces, and the run can be designed in the same way as the first. Repeat these steps for as many interfaces as applicable.



II.B.2. Stopping a Run

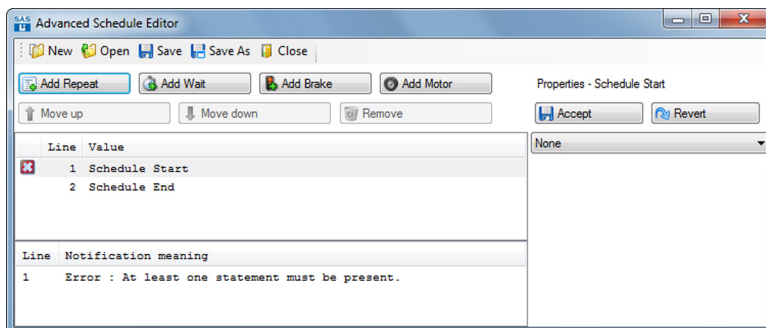
If it becomes necessary to halt an experiment prior to the scheduled endpoint, the user has the option to manually stop the run. By clicking “Stop all active sessions”, as shown here, the system will discontinue running any current processes. This will include every device being used and every experiment. If there are multiple Scurry interfaces connected to the system, it is possible to run multiple experiments simultaneously. In this case, it may be desirable to halt only a single run clicking the tab associated with the run to be ceased and then clicking the stop button as shown here. By default, either choice will result in a prompt for the user to confirm the action. Click “Yes” to confirm the termination of the experiment(s). Click “No” or “Cancel” to allow the run(s) to continue. If desired, check the box to keep this prompt from coming up again in the future.



II.B.3. Advanced Schedules

Selecting an Existing Advanced Schedule: After checking the box for advanced schedules, the user is able to decide between selecting a pre-existing schedule and creating a new schedule. Existing schedules can be chosen and applied to the run by clicking “Select schedules”, then navigating the file system in a typical windows fashion and opening the desired file. Multiple schedules may be selected and loaded at once, if necessary. It is recommended to store schedules in a file location that is easy to remember, especially when multiple users have access to a single system. Back on the Experiment Tab, in the “schedule” column, the user should confirm that the desired schedule is properly assigned to each piece of equipment. It is possible for each device to be running a different schedule. By using the drop down field, the proper schedules may be assigned to each device individually. If no advanced schedule has been previously created, the user will have to create a new one.

Creating or Editing an Advanced Schedule: To create a new advanced schedule or edit an existing one, click the “Create schedule” button which will open the Advanced Schedule Editor (pictured below).



The Advanced Schedule Editor allows the user to set up a more dynamic experiment. By clicking on the appropriate icon in the menu bar, the user is able to create a new schedule, open an existing schedule, save changes to the schedule in progress, save a new iteration of the schedule in progress, or close the window without making any changes, respectively. Files are managed in a typical Windows fashion. Errors in the schedule design that need to be addressed by the user will be displayed in the lower portion of the window, and they will be matched up with the line in the schedule containing the error. For example, in the image above, an error message tells the user that additional lines must be added before the schedule can be executed.

By using the buttons (Move up, Move down, Remove, Add Repeat, Add Wait, and Add Brake) in the upper portion of the window, events can be added and organized to the experiment. The functions of those button are further described in this section.

Add Wait: This adds an event to the schedule that will run for a user defined duration based on a choice of metrics. Using the drop down fields on the right-hand portion of the window, the user is able to choose the duration of the wait event by setting a count, or waiting until a specified

time. Counts can be defined by variables specific to the experiment such as revolutions of the wheel or distance traveled by the subject. Distance is rounded up to the whole revolution based upon the Meters per revolution setting for the counter. These counts can be set to either an interval dependent count or a cumulative (total) count. Scurry interfaces also come equipped with a photo sensor, allowing the user to trigger wait events run when the presence of light changes. When using the light sensor, ensure that it is unobstructed and working properly in the current conditions. Once a selection has been made, the "Accept" button must be clicked in order to apply the changes to the event. The "Revert" button may be used to discard any changes made since the settings were last accepted.

Add Brake: This option adds a brake event to the schedule (the necessary hardware must be connected), giving the user the ability to engage or disengage the brake at a specific point during the experiment. The distance of action in regard to the brake pad will reflect the settings made on the hardware tab. Please refer to Brake Settings in part II.A.3 for more information on this setting. A brake event can be set to engage or disengage by selecting the corresponding choice using the drop down field on the right-hand portion of the window. Once a selection has been made, the "Accept" button must be clicked in order to apply the changes to the event. The "Revert" button may be used to discard any changes made since the settings were last accepted.

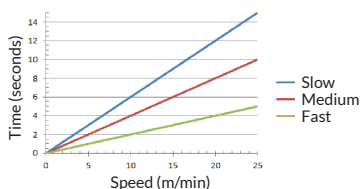
Add Motor: This option adds a motor event to the schedule (the necessary hardware must be connected), giving the user the ability to disengage or engage the motor at a specific point during the experiment. First, the user should choose whether the event will disengage or engage the motor by clicking either "Motor off" or "Motor speed" respectively. The drop down field allows the user to select the acceleration rate of the motor. Slow, medium, and fast options correlate to a 15, 10, and 5 second time period required to achieve the maximum motor speed from a starting point of zero. The below chart describes the time required to reach maximum speed by the chosen option. The desired wheel speed is set using the numeric field below. Once a selection has been made, the "Accept" button must be clicked in order to apply the changes to the event. The "Revert" button may be used to discard any changes made since the settings were last accepted.

Scurry provides three acceleration/deceleration rates with 5% accuracy at no load. Adding an animal could change these values. The acceleration/deceleration rates referred to as Slow, Medium, and Fast, and the rates are as follows:

Slow: 0.028m/s^2

Medium: 0.042m/s^2

Fast: 0.083m/s^2



Scurry Activity Monitoring Software

The Advanced Schedule Editor does not account for offset caused by these accelerations/decelerations. Schedules move line to line and do not anticipate or wait for ramping to complete. This could introduce a small error into wait for time or wait for distance commands. The following table includes the information needed to adjust wait times to eliminate this error. Please contact Lafayette Instrument for more help concerning critical wait commands.

Adjustment to Advanced Schedule for Acceleration and Deceleration

Speed	Acceleration/Deceleration seconds to/from 0m/min			Extra meters when decelerating to 0m/min*		
m/min	Slow	Medium	Fast	Slow	Medium	Fast
0.5	0.0	0.0	0.0	0.00	0.00	0.00
1	0.3	0.2	0.1	0.00	0.00	0.00
1.5	0.6	0.4	0.2	0.01	0.01	0.00
2	0.9	0.6	0.3	0.02	0.01	0.01
2.5	1.2	0.8	0.4	0.03	0.02	0.01
3	1.5	1.0	0.5	0.04	0.03	0.01
3.5	1.8	1.2	0.6	0.05	0.04	0.02
4	2.1	1.4	0.7	0.07	0.05	0.02
4.5	2.4	1.6	0.8	0.09	0.06	0.03
5	2.8	1.8	0.9	0.11	0.08	0.04
5.5	3.1	2.0	1.0	0.14	0.09	0.05
6	3.4	2.2	1.1	0.17	0.11	0.06
6.5	3.7	2.4	1.2	0.20	0.13	0.07
7	4.0	2.7	1.3	0.23	0.15	0.08
7.5	4.3	2.9	1.4	0.27	0.18	0.09
8	4.6	3.1	1.5	0.31	0.20	0.10
8.5	4.9	3.3	1.6	0.35	0.23	0.12
9	5.2	3.5	1.7	0.39	0.26	0.13
9.5	5.5	3.7	1.8	0.44	0.29	0.15
10	5.8	3.9	1.9	0.48	0.32	0.16
10.5	6.1	4.1	2.0	0.54	0.36	0.18
11	6.4	4.3	2.1	0.59	0.39	0.20
11.5	6.7	4.5	2.2	0.65	0.43	0.22

*When using an 86115 or 86118 counter
in conjunction with the motor

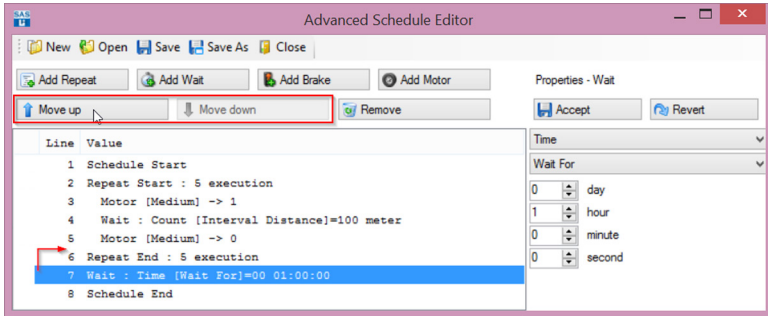
Adjustment to Advanced Schedule for Acceleration and Deceleration (continued)

Speed m/min	Acceleration/Deceleration seconds to/from 0m/min			Extra meters when decelerating to 0m/min*		
	Slow	Medium	Fast	Slow	Medium	Fast
12	7.0	4.7	2.3	0.70	0.47	0.23
12.5	7.3	4.9	2.4	0.77	0.51	0.26
13	7.7	5.1	2.6	0.83	0.55	0.28
13.5	8.0	5.3	2.7	0.90	0.60	0.30
14	8.3	5.5	2.8	0.96	0.64	0.32
14.5	8.6	5.7	2.9	1.04	0.69	0.35
15	8.9	5.9	3.0	1.11	0.74	0.37
15.5	9.2	6.1	3.1	1.19	0.79	0.40
16	9.5	6.3	3.2	1.26	0.84	0.42
16.5	9.8	6.5	3.3	1.35	0.90	0.45
17	10.1	6.7	3.4	1.43	0.95	0.48
17.5	10.4	6.9	3.5	1.52	1.01	0.51
18	10.7	7.1	3.6	1.61	1.07	0.54
18.5	11.0	7.3	3.7	1.70	1.13	0.57
19	11.3	7.5	3.8	1.79	1.20	0.60
19.5	11.6	7.8	3.9	1.89	1.26	0.63
20	11.9	8.0	4.0	1.99	1.33	0.66
20.5	12.2	8.2	4.1	2.09	1.39	0.70
21	12.5	8.4	4.2	2.20	1.46	0.73
21.5	12.9	8.6	4.3	2.30	1.54	0.77
22	13.2	8.8	4.4	2.41	1.61	0.80
22.5	13.5	9.0	4.5	2.52	1.68	0.84
23	13.8	9.2	4.6	2.64	1.76	0.88
23.5	14.1	9.4	4.7	2.76	1.84	0.92
24	14.4	9.6	4.8	2.88	1.92	0.96
24.5	14.7	9.8	4.9	3.00	2.00	1.00
25	15.0	10.0	5.0	3.13	2.08	1.04

*When using an 86115 or 86118 counter
in conjunction with the motor

Add Repeat: This option adds a loop event into the schedule which can be repeated a variable number of times as defined by the user. Any events contained within (or bracketed by) the repeat start and end points will be subject to the loop. Repeated events can occur in parallel or within another loop (nested), though the limit for nested loops is 4. Loops can also be run infinitely, but the user should note that this setting would inherently nullify any events outside of the infinitely repeating loop. This setting can be changed by using the drop down field on the right side of the window. When choosing a finite loop, the number of replicates can be selected using the field just below. Once a selection has been made, the “Accept” button must be clicked in order to apply the changes to the event. The “Revert” button may be used to discard any changes made since the settings were last accepted.

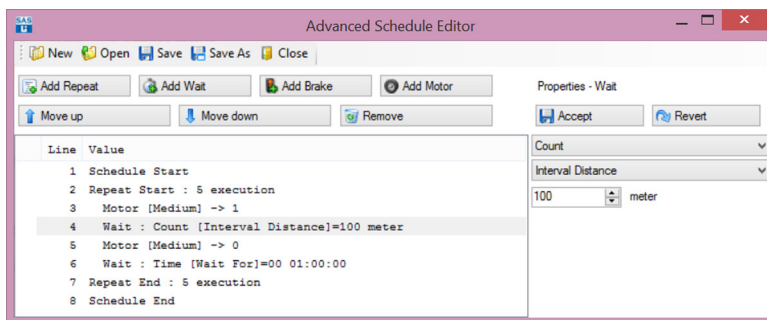
Move up/Move down: These two options allow the user to organize the events within the schedule. By first clicking on a line number or event title in the event list and then clicking either “Move up” or “Move down”, the selected event will shift relative to the other list items either up or down, respectively. An example of the use of these functions would be when organizing events inside loops.



Remove: The “Remove” option allows the user to delete events from a schedule by clicking the event to be removed and subsequently clicking the “Remove” button. Schedule start and end points cannot be removed.

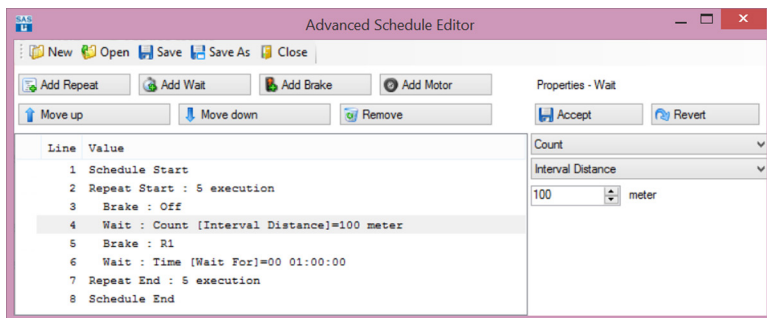
Example Schedule: The following screenshots depict example schedules, providing a basic model for an experiment using the advanced schedule feature. The first example uses a motorized setup, while the second example does not.

NOTE: These examples are meant to illustrate the functions of the software, not necessarily to provide examples of real experiments.



Based on the event list, this schedule will perform the specified functions and will execute in this fashion:

1. The experiment will initialize.
2. The first iteration of the loop will start, and will be repeated 4 times for a total of 5 replicates.
3. The motor will be engaged, turning the wheel at a rate of 1 meter per minute.
4. The animal will be free to use the wheel until a distance of 100 meters has been reached, including distance gained while the animal is not running as the motor is being used (for this example, it would take 100 minutes at 1 meter per minute). The schedule will then move on to the next line item.
5. The motor will shut off for the specified amount of time below.
6. The motor will remain off until 1 hour has elapsed.
7. Lines 3-6 will be repeated 4 times, starting with the motor being engaged at a rate of 1 meter per minute.
8. Once the loop has been completed 5 times, the experiment will terminate. All data generated by the experiment will be available on the Data Tab.



Based on the event list, this schedule will perform the specified functions and will execute in this fashion:

1. The experiment will initialize.
2. The first iteration of the loop will start, and will be repeated 4 times for a total of 5 replicates.
3. At the start of the loop, the brake will be disengaged allowing the wheel to rotate freely.

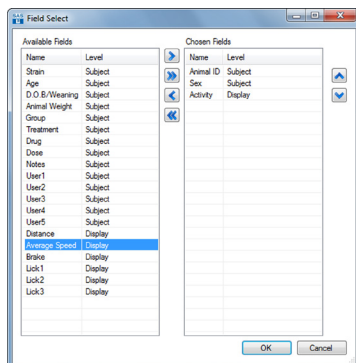
4. The animal will be free to use the wheel until a distance of 100 meters has been reached as a cumulative total for the current iteration of the loop. Once complete, the schedule will then move on to the next line item.
5. The brake on the wheel will be engaged based on the current brake settings for R1.
6. The brake will remain engaged until 1 hour has elapsed.
7. Lines 3-6 will be repeated 4 times, starting with the disengaging of the brake.
8. Once the loop has been completed 5 times, the experiment will terminate. All data generated by the experiment will be available on the Data Tab.

Selecting the New Schedule: Once the advanced schedule is complete, save the file appropriately and then close the Advanced Schedule Editor. Click “Select schedules” and open the newly created advanced schedule. The rest of the experiment will be set up in much the same way as a simple run.

Defining the Run: By clicking in the “Name” and “Description” fields, the user is able to enter the desired information to define and describe the experiment being designed.

Selecting Equipment: The list in the lower portion of the window displays all currently connected and configured devices. The first column contains check boxes that allow the user to select the desired device(s) for the experiment. It is possible to use as many devices as are connected to the interface, simultaneously. Here, in the “Schedule” column, it is also recommended to confirm that the desired schedule is properly assigned to each piece of equipment. It is also possible for each device to be running a different schedule. By using the drop down field, the proper schedules may be assigned to each device individually. It is important to note that while each device can run a different schedule, all devices on a particular interface must be started at the same time.

Selecting Reported Information: Click “Add/Remove Field”, or the button just above and to the right of the device list to edit the displayed fields associated with each device. From here, the user is able to add a variety of fields as shown in the figure at right. Subject level fields are user defined, and are meant to store pertinent information regarding to the experiment such as the subject ID, age, gender, etc. Display level fields are not adjustable by the user, but they are instead determined by instrument response. For example, the activity field will display the current number of wheel revolutions completed since the start of the run. Desired fields are chosen by clicking on their name in the list of available fields and then clicking the right arrow button between the lists. Conversely, fields may be removed by clicking the field name in the list of chosen fields and subsequently clicking the left arrow button between the lists. Additionally, the double arrow buttons will move all fields to the left or right respectively.



Once the proper selections have been made, click OK to confirm and apply those choices. Click Cancel to negate any changes and return to the Experiment Tab.

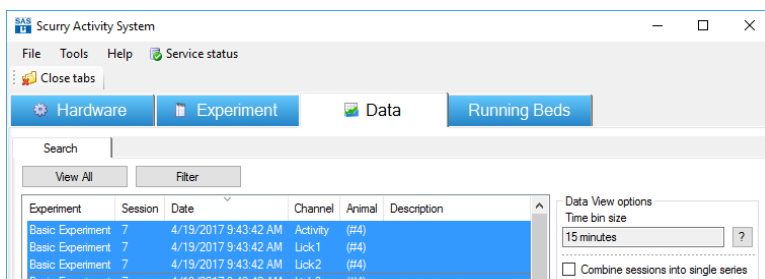
Error Checking: At the bottom of the Experiment Tab, any potential errors that need to be addressed prior to beginning the run will be displayed. For a complete list of error codes, please refer to Appendix B: Troubleshooting.

Beginning the Run: After all necessary parameters have been defined, click the “Run” button with the green arrow to begin the experiment.

Data from completed runs as well as runs in process will be immediately available from the Data tab.

II.C. Data Tab

The Data Tab allows the user to organize and maintain data generated from experiments, as well as to perform a quick at-a-glance analysis of data. Data may also be exported for further in-depth analysis.



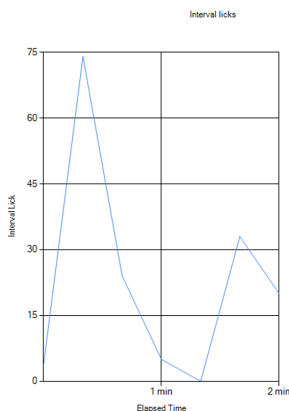
II.C.1. Organizing Data

Upon selection of the data tab, the user is given a list of all collected data being stored in the current database (refer to section III.A for more information on selecting a database). If no information is displayed, click the “View All” button to refresh the list. By default, this data will be organized by date, from most to least recent. From here, the user is able to modify the organization of the data, filter out unwanted records, adjust the time bin size, and open the data for viewing. For explanation of Combined an overview on Framing, see the Email section.

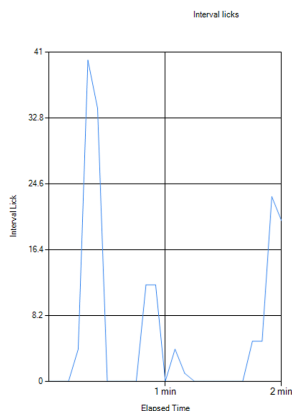
Sorting data: Data sorting can be done simply by clicking on the column header of the parameter the user wishes to sort by. A subsequent click on the same column header will result in a reversal of the ordering using the same parameter. For instance, a single click on “Experiment” would result in the list being sorted alphanumerically from zero to Z by experiment title. A second click would reverse the order, sorting the data alphanumerically from Z to zero by experiment title. Dates work in a similar way, but are ordered chronologically. This can be done with or without filters applied to the list.

Filtering data: Once a large number of experiments have been run, and there is a great deal of data to sort through, it may be useful to filter the data in a way that only displays a selection based on user defined criteria. To begin this process, click the “Filter” button to bring up the following window. By using the leftmost drop down fields, the user is able to select data based on date, experiment, description, session number, and even user defined fields such as Animal ID.

Time bin size: The time bin size will define the way that data is represented graphically when viewed in charts by adjusting the number of data points used on the x-axis (elapsed time). A longer time bin size will result in a smoother graph with lower resolution, while a shorter time bin size will result in a graph with much higher resolution. This is accomplished by changing the way the numerical data is organized and reported. As the time bin size decreases (as shown below), the number of data points (bins) on the x-axis (time) effectively increases, changing the distribution of the data represented on the y-axis with respect to time. Essentially, decreasing the time bin size allows the user to look at specific time periods with higher resolution. Keep in mind that adjusting the time bin size may alter calculations, as the values on the y-axis are subject to change. This setting can be changed prior to viewing data or as often as desired while viewing data by clicking the associated “?” button. An example is shown below. The default time bin size in the Scurry software is 15 minutes.

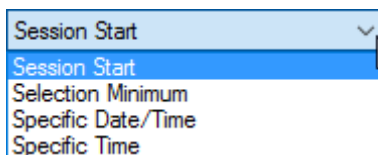


20 second time bin size



5 second time bin size

Start Time Framing: Aligns the start time to produce a particular pattern to the data, i.e. how the data is presented.

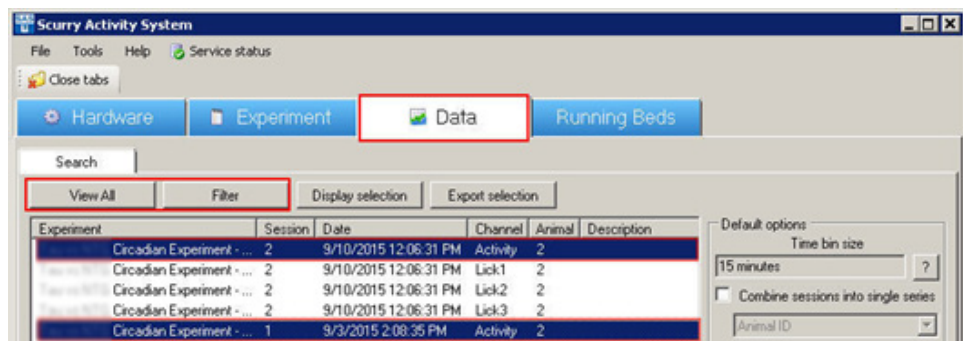


Alignment Style (Framing)

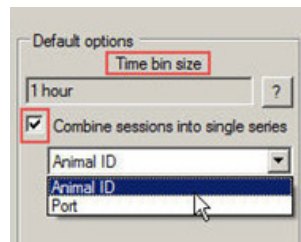
- Session Start (default): Time aligns to the session start time (time zero) of the individual data sets (sessions).
- Selection Minimum: Time aligns to the session with the earliest start time, all subsequent sessions are offset by this session time.
- Specific Date/Time: Sessions align to an arbitrary date and time that is set by the user. This date and time must be before (pre) or equal to the minimum session time of the data selected.
- Specific Time: Sessions align to an arbitrary time of day. This is typically the time of day for all sessions to start for a given experiment (e.g. experiments are to start at 12:00 noon but some start a few minutes later). In this example, this setting forces all session data to align to the noon hour.

Combining Data: The Combine sessions into single series check box on the Data Tab may be used to combine multiple session data for the same Animal ID or wheel port. This may include a full data display or simply the time bin values for data export. For very large data, the latter is considerably faster.

Open Scurry and click the Data Tab followed either by View All or Filter. In the example below, the data set was filtered to display the data for a single animal run on two separate sessions. From this reduced data set just two activity sessions were selected.

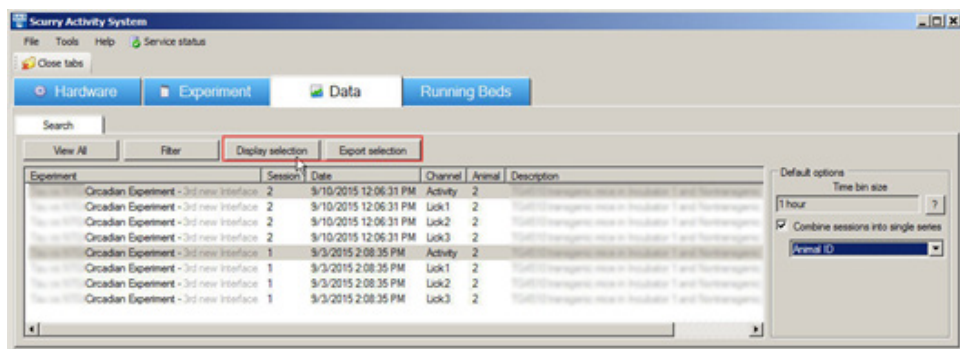


Click the "?" box to select an appropriate Time bin size for the data being combined. In this example, it's 1 hour. Check the "Combine sessions into single series" checkbox and select Animal ID. If Animal ID's were not used during the collection of data, you may use the interface port number associated with the wheel that the animal of interest was run in.

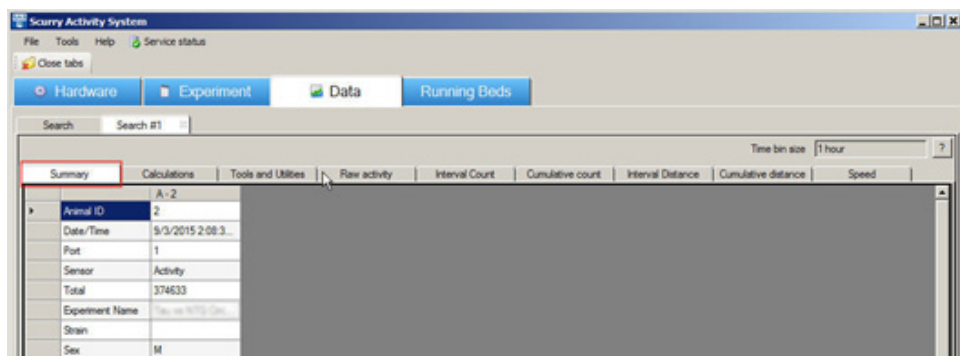


Scurry Activity Monitoring Software

Either **Display selection** or **Export selection** may be selected.



Display Selection: Click Display selection. A loading icon appears as the selected sessions are combined with all digital and display data. For long sessions or a large number of files, this can take some time. If you simply wish to export raw data, use the Export selection and skip this section. The session Summary tab is selected by default. It contains experiment specific and session specific information as well as the total activity count for the combined data.



A number of tabs follow the Summary tab:

Calculations: Statistics for the combined sessions include Mean, Median, Mode, Minimum, Maximum, and Standard Deviation.

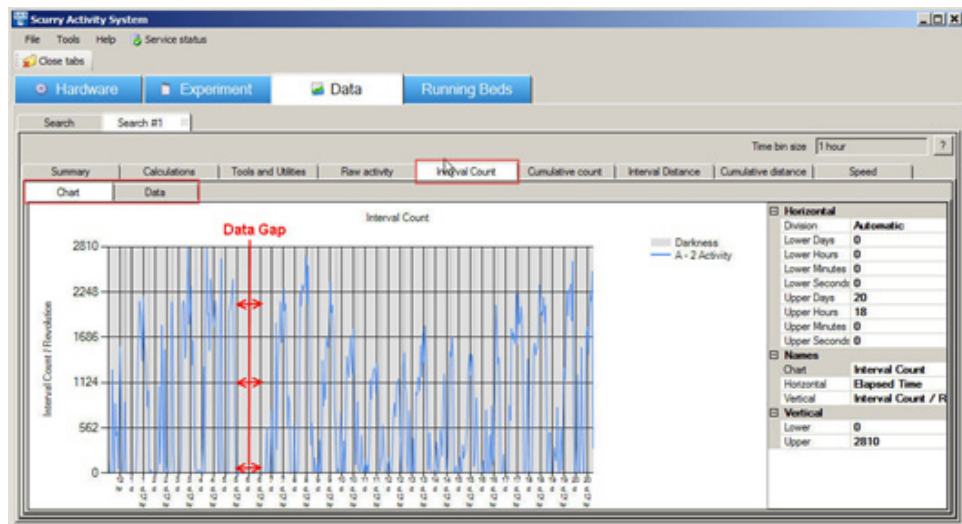
Tools and Utilities: Export data and Delete Sessions (deletes the original sessions that were combined)

Raw activity: 3 second counts when using a wheel activity sensor.

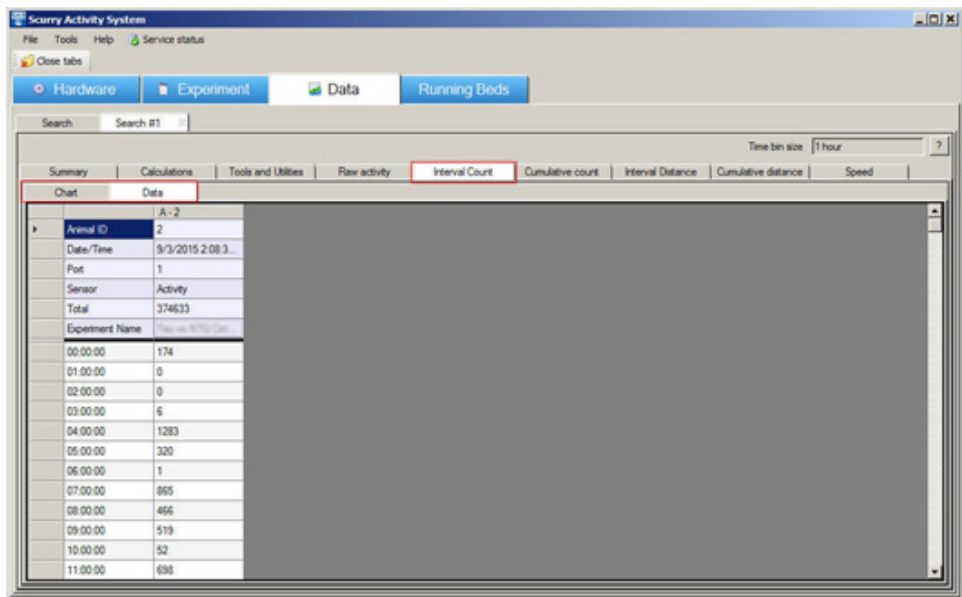
Interval & Cumulative Count, Distance, Speed: Time bin values in both Chart and Data (digital) format.

Sample Interval Count Tab selection. Note the Chart view is open by default. Click on the Data Tab to select the Data view.

Interval Count - Chart View

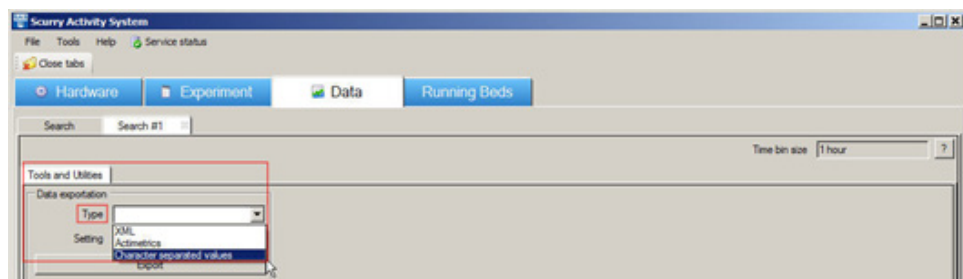


Interval Count - Data View

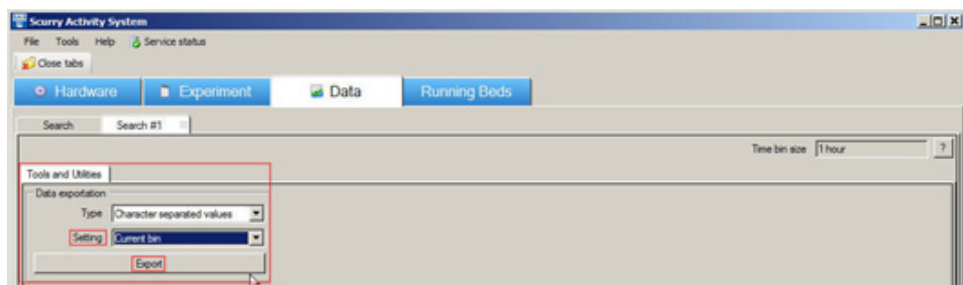


Export Selection: Click Export selection. A loading icon appears as the digital data is combined for the selected sessions. Although this may take a little time for long sessions or a large number of files, it will be far quicker than the Display selection option and is all you need if you simply wish to export raw data. Once completed, only the Tools and Utilities tab is displayed.

Select the Type (format) for the data export from the pull down menu. At this time, the available types are XML, Actimetrics compatible (ClockLab Analysis), and Character separated values (CSV).

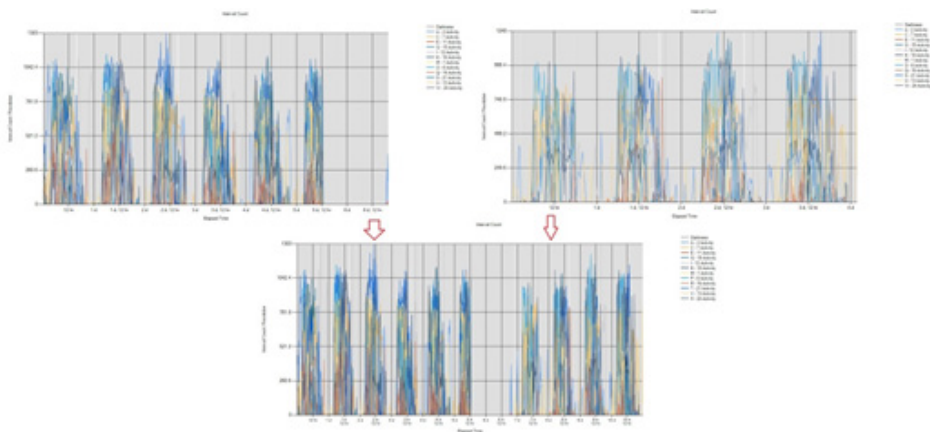


Use the Setting pull-down menu to select the original recorded values or the Current bin values. Current bin was selected here.



Clicking Export will produce a Save as window. Select a suitable path and folder, enter a suitable file name, and click Save. The resulting CSV file in this case may be opened by Excel, a text editor, or any compatible application. The original sessions will remain in the Scurry database. The combined data is not retained by Scurry, but the procedure may be repeated as many times as needed.

The following is an example of combined data merging a 6 day session with a 4 day session.



II.C.2. Viewing Data

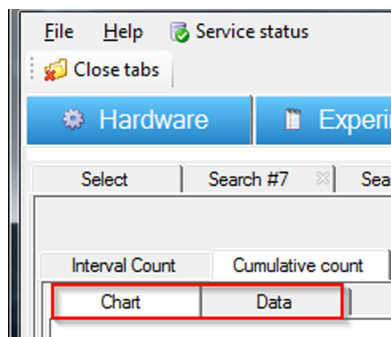
Once data is properly filtered and sorted, select either a single or multiple records from the list, and click on the “Display selection” button as shown in the image below. This action will open up the selected data for review in a new search tab, as illustrated in the following two images (in the example, the selection is opened as “Search #9”).

The screenshot shows the Scurry Activity System software interface. The main window has a menu bar (File, Tools, Help, Service status) and a toolbar (Close tabs). Below the toolbar are four tabs: Hardware, Experiment, Data, and Running Beds. The Data tab is selected, showing a list of experiments and sessions. The list has columns for Experiment, Session, Date, Channel, Animal, and Description. The first four rows are selected. To the right of the list is a 'Data View options' panel with a 'Time bin size' of 15 minutes, a 'Combine sessions into single series' checkbox, an 'Animal ID' dropdown, a 'Start time framing' dropdown set to 'Session Start', and two buttons: 'Display selection' and 'Display selection (RAW)'.

Experiment	Session	Date	Channel	Animal	Description
Basic Experiment	7	4/19/2017 9:43:42 AM	Activity	(#4)	
Basic Experiment	7	4/19/2017 9:43:42 AM	Lick1	(#4)	
Basic Experiment	7	4/19/2017 9:43:42 AM	Lick2	(#4)	
Basic Experiment	7	4/19/2017 9:43:42 AM	Lick3	(#4)	
Basic Experiment	6	4/19/2017 9:25:30 AM	Activity	(#4)	
Basic Experiment	6	4/19/2017 9:25:30 AM	Lick1	(#4)	
Basic Experiment	6	4/19/2017 9:25:30 AM	Lick2	(#4)	
Basic Experiment	6	4/19/2017 9:25:30 AM	Lick3	(#4)	
Basic Experiment	5	4/19/2017 9:17:57 AM	Activity	(#4)	
Basic Experiment	5	4/19/2017 9:17:57 AM	Lick1	(#4)	
Basic Experiment	5	4/19/2017 9:17:57 AM	Lick2	(#4)	
Basic Experiment	5	4/19/2017 9:17:57 AM	Lick3	(#4)	
Basic Experiment	4	4/13/2017 4:37:10 PM	Activity	(#1)	
Basic Experiment	4	4/13/2017 4:37:10 PM	Activity	(#2)	

When viewing data, navigation is made possible using a series of tabbed panes within the Scurry software window. Under the data search tabs, a variety of tabs will be available based on the connected hardware and experimental parameters used. When there are too many tabs to fit across the window, small left and right arrow buttons will be present to allow the user to scroll across to the hidden tabs.

The next level of tabs will be associated with the currently displayed data or chart. By default, charts will be displayed when first opened. To see the associated raw data, click the small “Data” tab as illustrated here (and vice versa). It should also be noted that while data is being displayed, it is possible to change the time bin size at any point in order to adjust the data in the charts. Please refer to section II.C.1 for more information regarding time bin size.



To remove displayed data from the window, click on the small “x” icon at the right side of the search tab. To close all displayed data, click the “Close tabs” button.

While viewing data, the user is able to access options to select, copy, or export specific sections by right-clicking in the desired area.

II.C.3. Example Data

On the next page, is an example of data generated from four test subjects in separate experiments. This illustrates how periods of light and dark are represented and how information from multiple subjects is displayed. Data may be displayed in a variety of forms based on the specifics of the experiment as either a chart (as shown below) or a table containing a numerical view of the data by clicking on the “Chart” and “Data” tabs, respectively. A description of the tabs is as follows:

Source Data: All activity data in this tab is displayed chronologically in three second increments. Time bin size does not apply to this tab and there is no “Chart” option for the information on this tab.

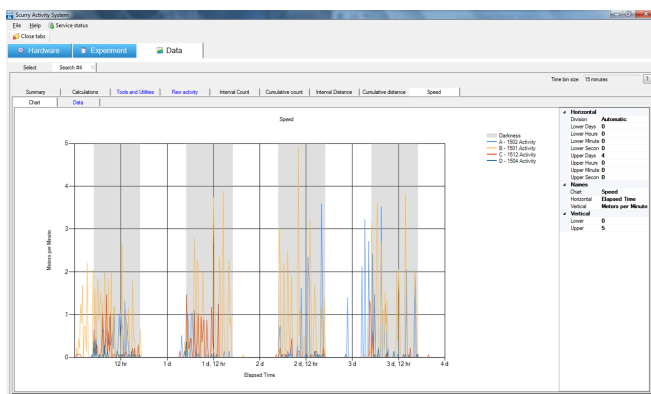
Interval Count: The information displayed on this tab is very similar to what is displayed on the “Raw Activity” tab, but is condensed according to the time bin size. On the “Chart” tab, the data is plotted as Interval Count (y) vs Elapsed Time (x). Periods of darkness are denoted by shaded areas within the graph.

Cumulative Count: The same information that is displayed on the “Interval Count” tab is used to populate the table and chart associated with this tab. Here, however, the data will be reported cumulatively with respect to time.

Interval Distance: The “Interval Distance” (in meters) tab displays the amount of distance traveled by each subject within specified intervals as defined by the time bin size. The graph of this information will appear very similar to the “Interval Count” graph, with the difference being the values and units of the y-axis (distance rather than counts).

Cumulative Distance: The same information that is displayed on the “Interval Distance” tab is used to populate the table and chart associated with this tab. Here, however, the data will be reported cumulatively with respect to time.

Speed: The “Speed” tab displays a table and chart of the average speeds of the animal within separate time intervals defined by the time bin size, reported as meters per minute.



II.C.4. Summary and Calculations

The “Summary” tab under “Data” provides the user with a quick view of the experimental parameters defined manually before the experiment using “Add/Remove Field”. These parameters may also have been set in the preferences menu (see Part III.A “Default Analysis Fields” for more information on changing the displayed fields).

The “Calculations” tab lists statistics regarding the viewed experiment(s). The fields displayed may be changed in the preferences menu under “Default Analysis Fields” (see Part III.A “Default Analysis Fields” for more information). The initial default settings are pictured following this section, and include statistics such as:

Mean: The mean is calculated as the average of the numbers in a data set. That is, the total sum of the data set divided by the number of data points within the set.

Median: Median is determined as the middle number in a data set, or in the case of two middle numbers, the average of those two numbers.

Mode: Mode is determined as the most repeated value in a data set.

Minimum: The minimum is defined as the lowest value within a data set.

Maximum: The maximum is defined as the highest value within a data set.

Standard Deviation: Standard deviation is a measure of the variance in a data set, and is calculated within the Scurry software as: $s = \sqrt{(\sum (x - \bar{x})^2) / n}$

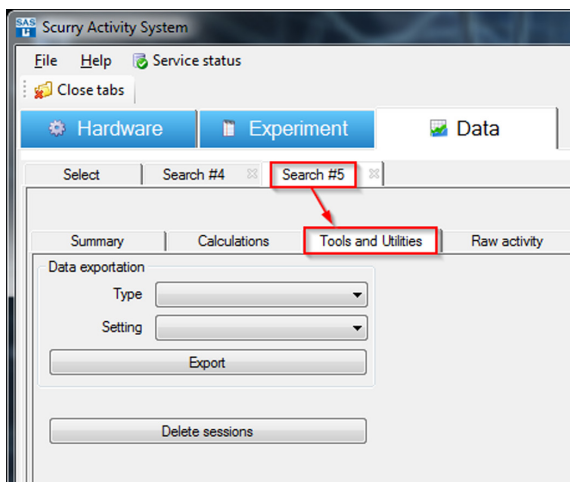
Total: The total is the sum of all of the activity throughout the experiment.

Summary	Calculations	Tools and Utilities	Raw activity	Interval Cou
	A - 1502	B - 1501	C - 1512	D - 1504
Total	792	1954	375	68
Duration				
Delay Start				
User1				
User2				
User3				
User4				
User5				
Serial Number	1329680M	1329680M	1329680M	1329680M
Port	1	2	3	4
Sensor	Activity	Activity	Activity	Activity
Mean	46.588	114.941	22.058	4
Median	31	130	10	3
Mode	0	0	0	7, 0, 1
Minimum	0	0	0	0
Maximum	163	274	121	15
Standard Deviation	49.174	97.889	31.545	4.365
Experiment Name	4 Day Baseline	4 Day Baseline	4 Day Baseline	4 Day Baseline
Date	5/15/2014	5/15/2014	5/15/2014	5/15/2014
Time	10:58 AM	10:58 AM	10:58 AM	10:58 AM
Date/Time	5/15/2014 10:58...	5/15/2014 10:58...	5/15/2014 10:58...	5/15/2014 10:58...
Session #	1	1	1	1
Schedule	*BASIC*	*BASIC*	*BASIC*	*BASIC*

NOTE: Displayed statistics are subject to change as time bin size is adjusted

II.C.5. Exporting and Removing Data

While viewing any particular combination of data, click on the smaller tab associated with the data to be exported or deleted to select it. Once it has been selected, click on the sub-tab labelled “Tools and Utilities” as shown below.



Type: All data contained in the currently active Search tab (Search #5 in this case) will be exported to an external file based on the “Type” and “Setting” options. By clicking in the drop down field associated with type, the user is able to choose the file format of the exported data. The available options are XML, Actimetrics, or CSV (comma separated values).

Setting: The setting option for exported data allows the user to choose how the information will be reported in the exported file. By clicking in the drop down field associated with setting, the user will be able to choose between the current time bin size and all recorded values. This setting determines the interval of reported data based on time. By choosing “Recorded value”, all recorded data will be present. By choosing “Current bin”, the user will be able to define the interval based on the currently selected time bin size. For instance, if the time bin size is at least as long as the total run time, only a single point of data will be exported for each subject. A time bin size equivalent to half the total run time will result in two data points, and so on. The totals will remain the same.

Export: Once the type and setting have been chosen, click the “Export” button to continue. In the resulting window, navigate to an appropriate file location to store the exported data, name the file as desired, and click “Save” to finalize the export.

Delete Sessions: In order to remove data from the Data Tab, the user must simply click the “Delete sessions” button, and then confirm removal of the data by clicking “Yes” in the resulting window. If the “Delete sessions” button is clicked in error, click No or Cancel in the confirmation window to return to the Scurry software without removing the data.

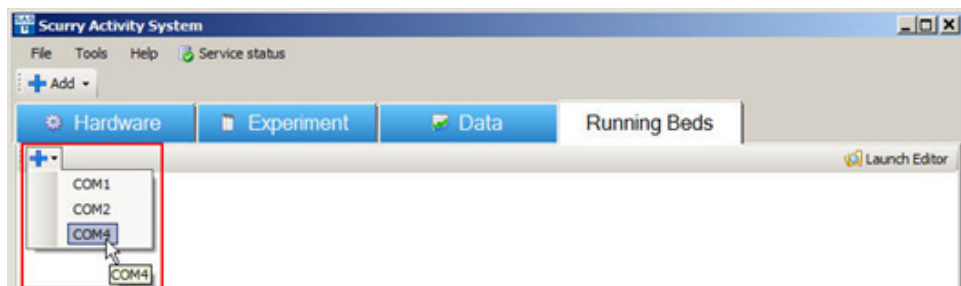
II.D. Running Beds Tab

The Running Beds Tab allows the user to install and run any Lafayette Instrument standalone Forced Exercise Wheel Bed. The running beds are controlled using the same schedule features used to control individual motorized wheels and described in some detail in Section II.B.3 Advanced Schedules.

II.D.1. Installing the Running Bed

Running Beds contain a USB to COM convertor and use Serial Communication over a USB connection. A USB cable is provided with all beds. Connect this Cable to any available port on the computer. Windows should automatically detect new hardware and may require a restart to properly install the driver. Once this is completed, click the Scurry Software Icon on the desktop or select the Scurry Activity System from the Start menu.

Click the “+” tool on the Running Beds Tab to reveal a list of potential “COM” Connections on the computer. If you clicked this before connecting the Running Bed you will notice that a new COM has been added. In the screen below COM4 is selected.

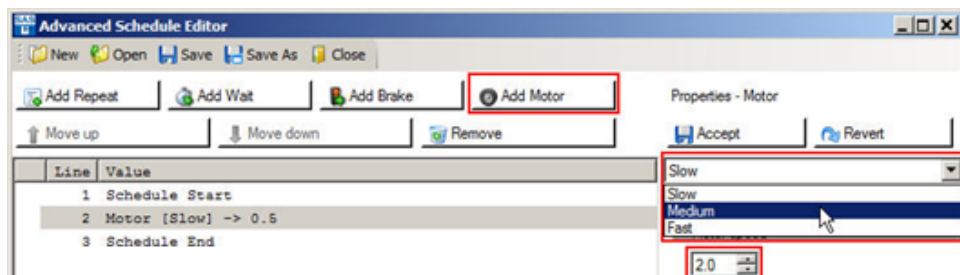


The connected bed is now identified with a Play, Stop, and Remove button, however the bed still needs a control schedule before it can be run. Click Launch Editor and proceed to the next section for a simple sample schedule or see Section II.B.3 Advanced Schedules for detailed information on all schedule features.



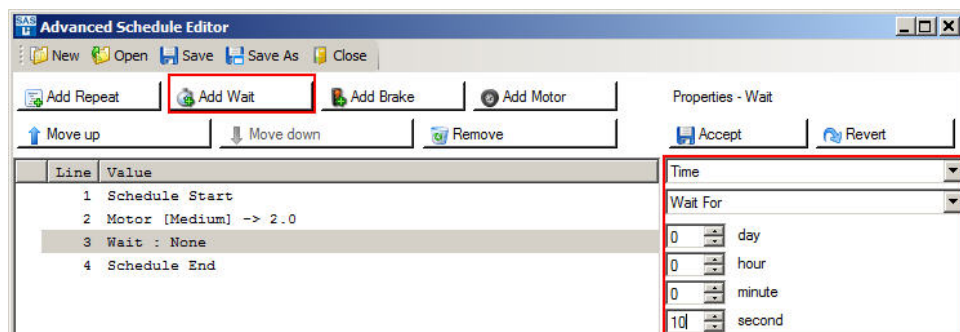
II.D.2. Creating A Sample Running Bed Schedule

The Schedule Editor opens with a Schedule Start and Schedule End. Click Add Motor, select Slow, Medium, or Fast for the ramp speed (time for the motor to reach the full speed selected), and enter an appropriate speed for the connected bed (2.0 M/min for this example). Note speeds outside the normal range of the bed could result in the bed running at full speed.



Click Accept to update the motor line of the schedule.

Click the Add Wait Button, select **Time and Wait** For from the drop down menus, and enter the desired time for the bed to run (10 seconds in this example),

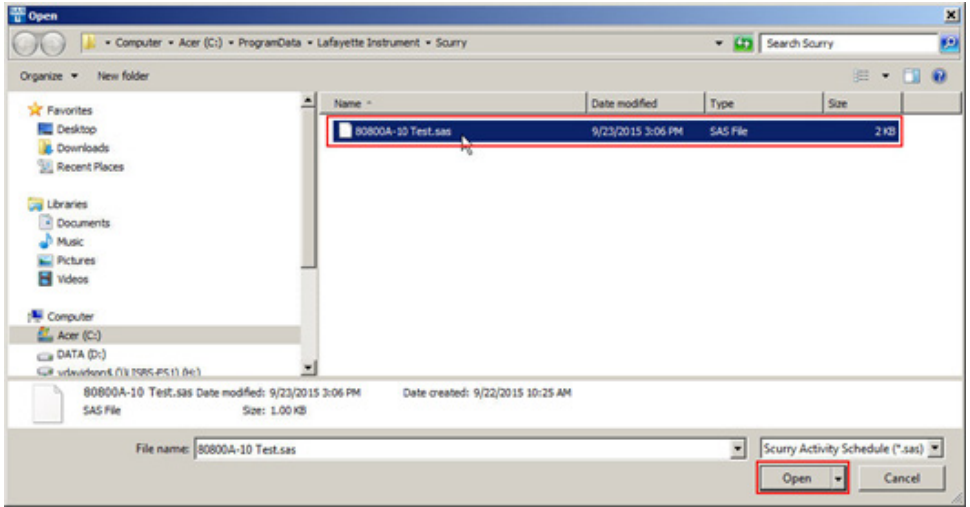


Click Accept to update the Wait Line in the schedule.

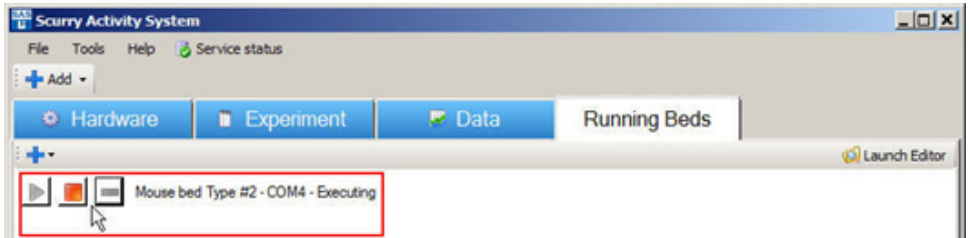
The last step is to click **Save** or **Save As** on the Schedule Editor. Type an appropriate File name in the designated space on the Save As form and click Save to close this window. Click Close on the Schedule Editor.

II.D.3. Running A Sample Running Bed Schedule

Click the Play icon for the attached bed to open a list of saved schedules. Select the schedule you wish to run and click Open.



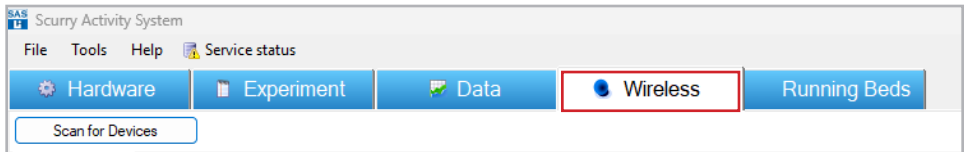
The **Stop** button is active while the schedule is running and may be used at any time to abort a schedule.



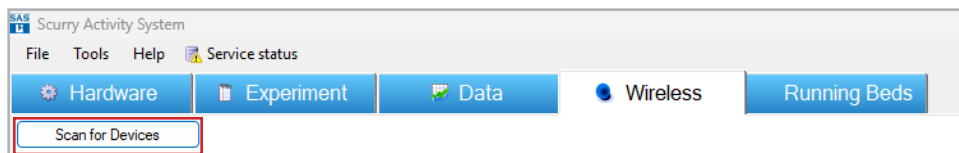
II.E. Wireless Wheel Installation

Step 1: Connect Wireless Gateway to the computer via a USB cable.

Step 2: Select the Wireless tab at the top of the Scurry software window.



Step 3: Click Scan for Devices. This will find the Wireless Gateway and list its System ID. The Gateway will report any connected wheels.



Step 4: Select the desired wheel(s).

	Use	Online	Identifier	Port	Description	Connection Status	Duration	Animal ID	Activity	Distance
	☐	☒	881845760	1	Activity	Connected	00:00:00		0	0.00
	☐	☒	881845760	2	Activity	Connected	00:00:00		0	0.00
	☐	☒	881845760	3	Activity	Connected	00:00:00		0	0.00
	☐	☒	881845760	7	Activity	Connected	00:00:00		0	0.00
	☐	☒	881845760	8	Activity	Connected	00:00:00		0	0.00
	☐	☒	881845760	9	Activity	Connected	00:00:00		0	0.00
	☒	☒	881845760	10	Activity	Executing	00:00:33		21	8.72
	☐	☒	881845760	11	Activity	Connected	00:00:00		0	0.00
	☐	☒	881845760	14	Activity	Connected	00:00:00		0	0.00

Note: Wheel numbers will be located on the serial tag on the bottom of the wheels. The example shows wheel number 10.

Lafayette Instrument Co.
 PN: ACT-557-WLP
 SN: 1924698Q
 ID: 572/63/10

Step 5: Manually spin connected wheels to ensure revolutions are updating. Revolution count may require a few seconds to display.

Step 6: Enter an experiment name and if needed, enter a description.

572 - 881845760

System ID: 572 Serial: 881845760 Version: 10

Name: Wireless Wheel

Description:

Session # 1

Step 7: Enter desired experiment duration.

☐ Advanced schedule

Start delay
None ▾

Duration

0 ▴ ▾ day

0 ▴ ▾ hour

0 ▴ ▾ minute

0 ▴ ▾ second

Note: Start Delay is not available when using wireless wheels.

Step 8: Click Run to start the experiment.

▶ Run

■ Stop

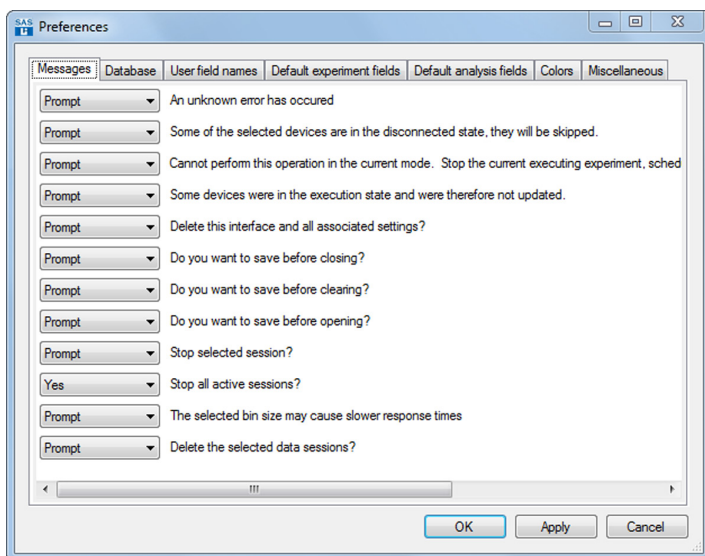
Note: Be sure to resolve any errors listed in lower left corner before running a schedule.

Part III: Other Features

Scurry comes with many options that allow users to fully customize their experience. Preference settings can be found under File on the menu bar. In the event that the user encounters a problem with the software that cannot be solved by typical troubleshooting, support at Lafayette Instrument can be contacted through the Help feature on the menu bar. Additionally, any updates made to the software are immediately available to the user through the automatic update in the Help menu.

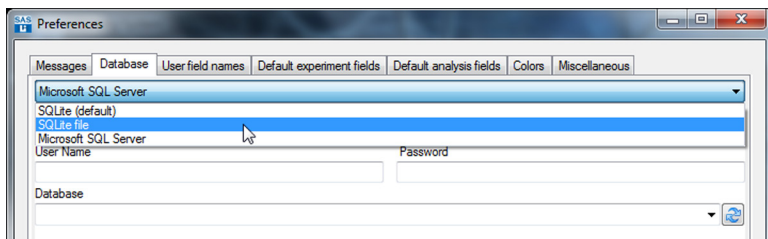
III.A. Preferences

There are quite a few settings available to customize in the Preferences menu. It is recommended to adjust the default experiment and analysis fields in order to save time when running a large number of similar studies. Preference settings can be changed based on the categories organized by the tabs at the top of the window.



Messages: Under this tab, the user is able to choose whether or not the default prompts will occur while using the Scurry software. By using the drop down field associated with each message, it is possible to choose which option (Yes, No, or Cancel) will be used whenever that particular message would arise. It is important to note that the user will no longer see the prompt window. If it becomes necessary for users to be prompted again, the setting can always be changed back to "Prompt". After any settings have been adjusted, click on the "Apply" button in the lower right-hand corner of the window to finalize the changes.

Database: Under this tab, the user is able to change the storage location for the Scurry software database. This database includes any data that is not saved to a specific location by the user, such as run data and data generated by experiments. It is recommended to finalize this setting before running experiments so that old data is not misplaced. Data will be stored at the install location by default, but it can be changed to another location on the hard drive using the “SQLite” option in the drop down field, or on a server using the final option. Once the desired option has been selected, click on the “Apply” button in the lower right-hand corner of the window to finalize the changes. For more information about setting up a connection to a Microsoft SQL Server Database, refer to Appendix C: Configuration of Microsoft SQL Server for use with Scurry.

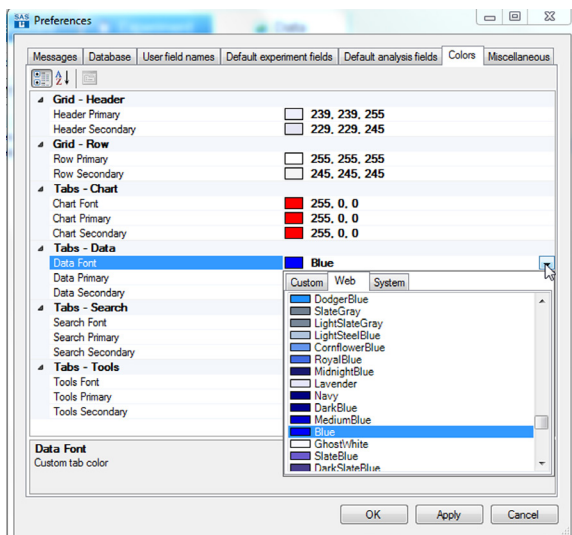


User field names: Under this tab, it is possible to define the identification of up to five users. These user names will be made available when adding fields to an experiment on the Experiment Tab. Please refer to section II.B.1 for more information on setting up an experiment. Once the desired changes have been made, click on the “Apply” button in the lower right-hand corner of the window to finalize the changes.

Default experiment fields: The default fields to be included in every new experiment may be selected on this tab and will be automatically added to future runs in order to save time. These fields will only be used in creating a new experiment. Desired fields are chosen by clicking on their name in the list of available fields and then clicking the right arrow button between the lists. Conversely, fields may be removed by clicking the field name in the list of chosen fields and subsequently clicking the left arrow button between the lists. Additionally, the double arrow buttons will move all fields to the left or right respectively. Once the desired selections have been made, click on the “Apply” button in the lower right-hand corner of the window to finalize the changes.

Default analysis fields: Here, the default fields to be included in the data analysis charts and spreadsheets are available for selection. Analysis level fields, in particular, may be useful to add. In order to add fields, click on the name in the list of available fields and then click the right arrow button between the lists. Conversely, fields may be removed by clicking the field name in the list of chosen fields and subsequently clicking the left arrow button between the lists. Additionally, the double arrow buttons will move all fields to the left or right respectively. Once the desired selections have been made, click on the “Apply” button in the lower right-hand corner of the window to finalize the changes.

Colors: The Colors Tab allows the user to customize various aspects of the software interface. Click on the parameter that will be changed to select it, and then use the resulting drop down menu on the far right-hand side of the row to select from a list of available colors. Once the desired selections have been made, click on the “Apply” button in the lower right-hand corner of the window to finalize the changes.



Miscellaneous: The Miscellaneous Tab allows the user to change the default time bin size, average update threshold, and default viewing tab (in data analysis). The counter and drop-down fields are used to make selections. The average speed update threshold defines the time interval by which data is sent from the Scurry interface to the PC during an experiment. For instance, a selection of 12 seconds would result in data being updated in the software every 12 seconds. This does not affect the amount of data captured, only the rate at which it is transferred from the Scurry interface to the PC. This option is available in increments of 3 seconds, which is also the fastest available update threshold.

The default viewing tab option simply determines which tab is viewed first in data analysis.

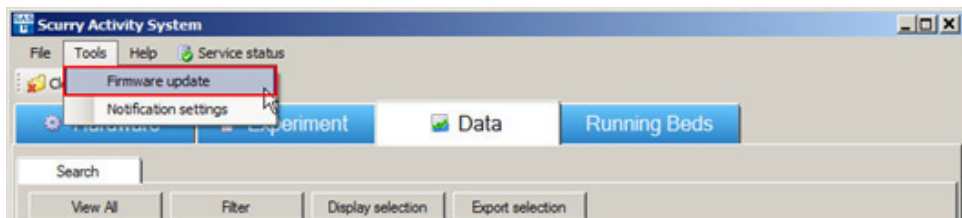
For more information on time bin sizes, please refer to section II.C.1.

Once the desired selections have been made, click on the “Apply” button in the lower right-hand corner of the window to finalize the changes.

After all preferences have been set accordingly, click “OK” or “Cancel” to close the “Preferences” window and return to the Scurry software.

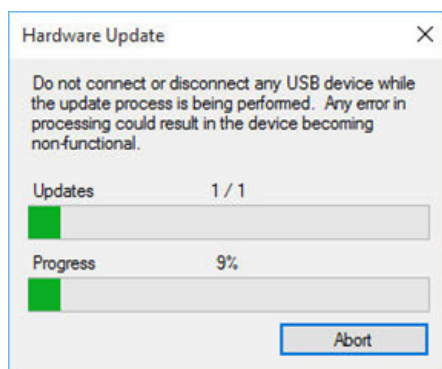
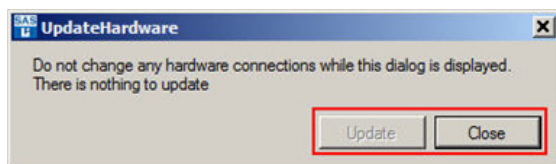
III.B. Firmware Updates

The Scurry Activity System's advanced design supports automatic updates of both Scurry Software and the firmware contained in the 86100 and 86100M Interfaces. Software updates are probably more common and will be discussed in Section III.C.2 Automatic Updates. When a firmware update is required to accommodate a software change, an appropriate message will be displayed. It is also possible to periodically check for updates from the Tools menu. Make sure at least one interface is connected and turned on and click Firmware update on the Tools menu.



One of two message screens will appear.

If an update is available, click update and a progress screen will appear with instructions.

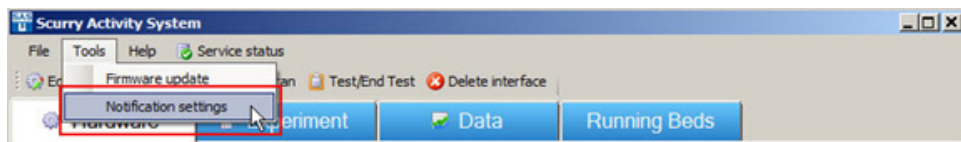


NOTE: A good practice to follow upon the completion of the update is to close the Scurry Software, power cycle the interface (Turn Off/On) and re-open the software.

III.C. Notifications

The notification system allows the user to be notified either by email, text message, or both when certain events occur in an activity experiment running under the Scurry Activity Monitoring Software. To set up this feature the user or his/her IT department needs to first complete the Email Server Configuration information on the first tab of the Notification Settings window.

Click **Tools** on the main Scurry menu and select **Notification settings**.



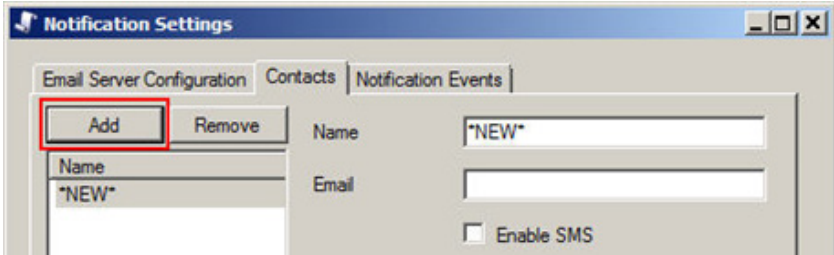
III.C.1 Email Server Configuration

Complete the following information for your laboratory.

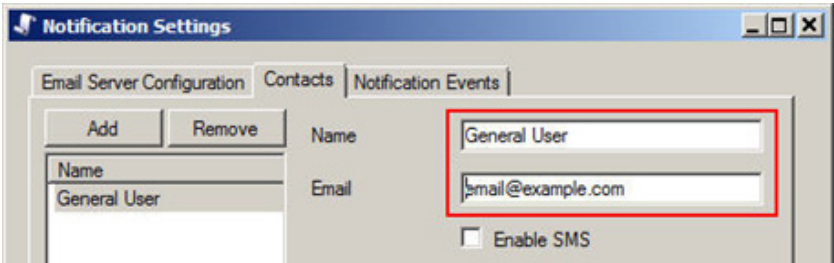
- Server Name for the computer running Scurry that will be sending the notification (required)
- Click User Authentication to enter a User Name and Password if desired.
- Click SSL (Secure Sockets Layer) if desired. SSL establishes an encrypted link between the mail server and mail client or contact used for notifications.
- Complete if needed to complete the credentials for the “server” used to send the notification.
- Enter a valid “From” email address on the server named at the top of this form.

III.C.2 Contacts

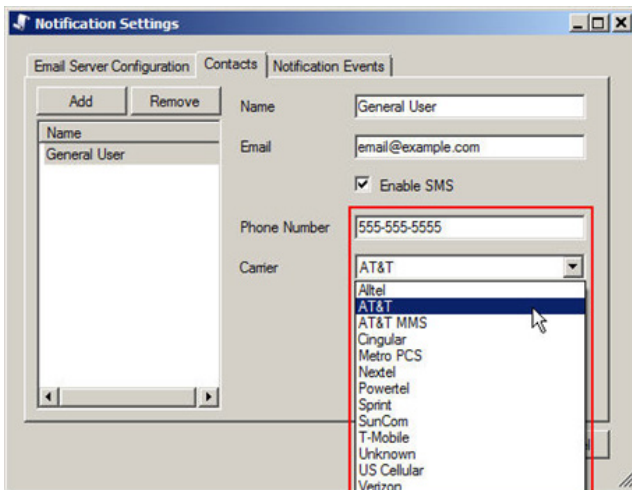
Click the Contacts tab to open the contacts form. Click Add and “NEW” will be temporarily placed on the contacts list and in the Name window.



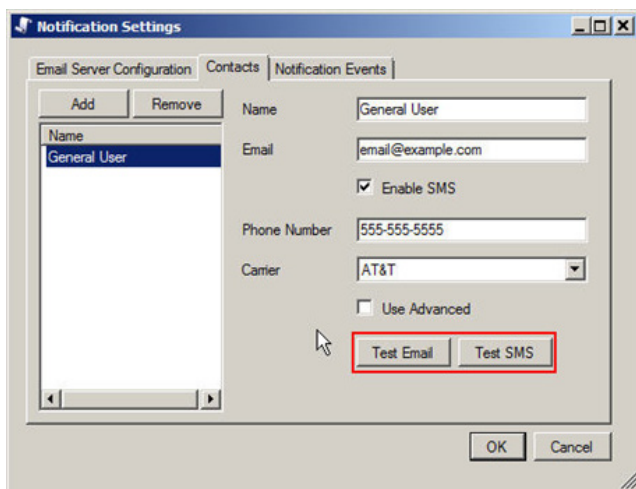
Highlight “NEW” and replace with a suitable User Name followed by a valid Email Address for this contact. Click Add to place additional contacts on the list. Click OK to finish or Check Enable SMS (Short Message Service) to add a mobile phone capable of receiving text messages.



Clicking Enable SMS opens information windows for Phone Number and Carrier. If your carrier is not found on the Carrier list, check the Use Advanced box to enter the Direct SMS address.

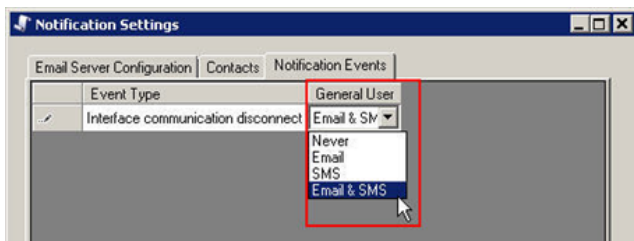


Test Buttons: Once the notification contact information is complete, click Test Email and/or Test SMS to verify that this feature is properly set up.



III.C.3 Notification Events

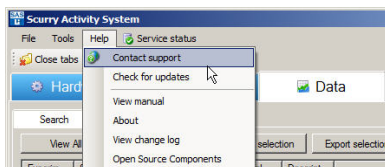
At the writing of this manual, only one Event Type was included on this list to provide notification should there be an Interface communications disconnect. This could signal a non-recoverable condition in the interface itself or a physical disconnect between the computer and the interface. The following steps complete the notification feature set-up.



For multiple events, each event will have its own row. For multiple users, each user will have its own column. Use each individual pull down menu to determine the event and user that generates and receives notifications via Email, SMS, or Both.

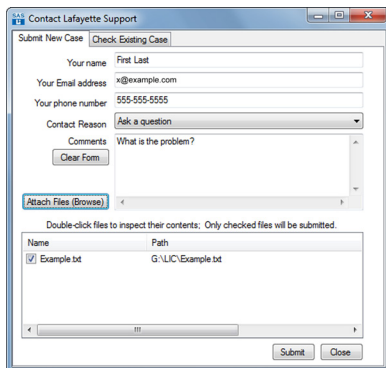
III.D. Help

The Help menu gives the user direct access to customer support as well as online software updates that will be made immediately available upon implementation. Additionally, information about the software and Lafayette Instrument Company, as well as open source components used in the Scurry software can be accessed from this menu.



III.D.1. Contact Support

In order to contact online customer support at Lafayette Instrument, click Help and then Contact support on the menu bar. Fill out the case form, including any information that may be relevant to the problem. Be sure to include a name, phone number, and email address in the proper fields. Use the "Contact Reason" drop down list to select the nature of the support request. Any request for information about a potential bug in the system should be specified in the comments section. If there are any relevant files that need to be sent with the support request such as an error log or detailed question, those may be attached at the bottom of the window. Before submitting the request, make sure that attached files are checked in the list, and that all of the fields are properly filled in. Click the "Submit" button to send the support request. Click "Close" to cancel the request, if necessary. Any outstanding requests submitted from the same system can be accessed and reviewed from the "Check Existing Case" tab at the top of the support window. If a case has been resolved independently, it may be deleted. **NOTE:** If an update is available and the PC is online, a message will be displayed to that effect within the "Contact Lafayette Support" window.

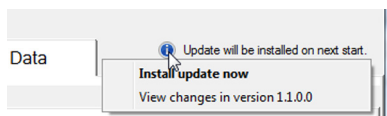


III.D.2. Automatic Updates

Updates to the Scurry software are made immediately available to the customer at no extra charge. It is recommended to check for updates on a routine basis.

This is easily accomplished by clicking Help and then

“Check for updates” on the menu bar. A message will display in the top right portion of the Scurry software window, notifying the user whether or not updates are available. If the software is up to date, a green check mark will be displayed in the upper right.



If an update is available, it will be downloaded automatically and will be installed the next time the Scurry software is started up, and a message to this effect will be displayed as shown below. If the user performs a right-click on the displayed message, two options, “Install update now” and “View changes...” are made available. By clicking the second option, the user is able to view the changes associated with the update. To update the Scurry software immediately, the user may click the first option. The changes may still be viewed in the same way once the update is complete.

III.D.3. View Manual

By selecting “View manual” on the Help drop down menu, the user is able to view the version of the manual shipped with the latest version of the software. Use Save As to place a copy on the desktop. Copies of the manual are generally available under the product description on our web site as well.

III.D.4. About

By clicking Help then “About” in the menu bar, the user is able to view the version information for the Scurry software as well as contact information for Lafayette Instrument Company. For more information, please visit the Neuroscience portion of the Lafayette Instrument Company website using the link provided in the software.

III.D.5. View Change Log

By selecting “View change log” on the Help drop down menu, the user is able to view the history log of all revisions to the Scurry software. New features are listed along with patches or bug fixes that have resolved previously undetected issues. Feel free to contact Lafayette Instrument Company if additional information is required.

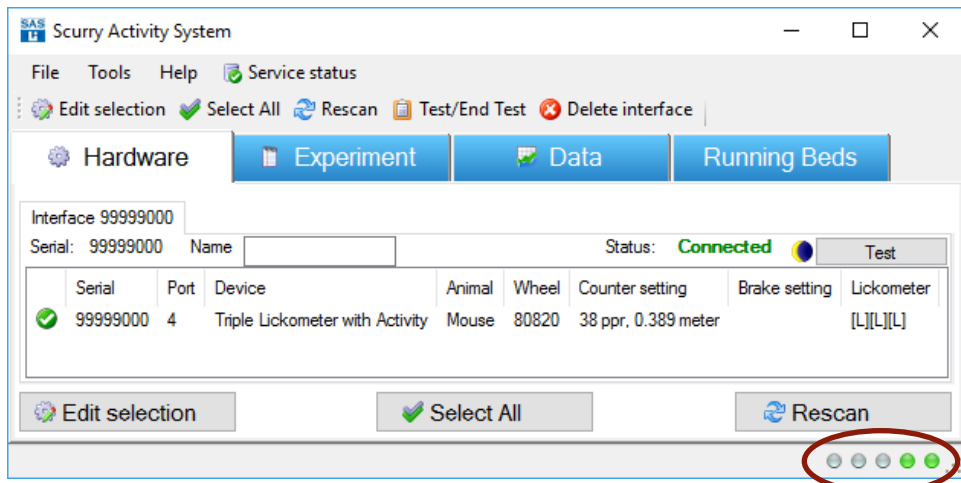
III.D.6. Open Source Components

For information regarding the open-source components used in the Scurry software, or the licenses thereof, click “Open Source Components” in the “Help” menu. Click on the links within the resulting window to visit the associated websites.

III.E. Service Status

Scurry uses a Windows service to ensure near constant communication to any connected hardware. This service acts as the gateway between an active scurry application and the hardware. When properly connected, a green check mark will be present. The service is configured to automatically restart in the event of a catastrophic error. In such an event the Scurry software will display the status as disconnected, you can click the “Connect” button under “Service status” to attempt to reconnect.

III.F. Status Lights



From Right to Left:

- Service Connection
 - Green: Connected
 - Red: Disconnected
- Interface Connection
 - Green: Interfaces Connected
 - Yellow: Some Disconnected
 - Red: All Disconnected
- Session Active
 - Green: Active
 - Gray: No Session
- Backup Data
 - Blue: Transferring backup data
 - Gray: None
- Detached Data Presence
 - Yellow: Present
 - Gray: None

What is Detached Data?

When an issue occurs and the Scurry Data Collection Service (SDCS) has data that the software cannot determine to where it belongs, the data is put it into Detached Data. Detached Data often occurs in situations where an experiment is improperly stopped or closed.

III.G. Closing the Software

Before closing the software, ensure that there are no runs currently in progress. If everything is completed, the program may be closed by either clicking "Exit" in the file menu or by clicking the red "X" in the upper right-hand corner of the window.

Part IV: Appendices

Appendix A: Installation

1. To open the install wizard, double click Setup icon.
2. If prompted whether or not to allow the program to make changes to the computer, click "Yes" to continue.
3. At the welcome screen, close any other open programs (if applicable) and then click "Next" to continue.
4. Review the license agreement in the next window and accept by clicking the appropriate option. Click the "Next" button to continue.
5. Select the desired install location for Scurry. Leave the default in the field, or designate a custom location by clicking "Browse" and navigating to the appropriate location. When the selection has been made, click "Next" to continue.
6. Choose whether or not to create a start menu folder by checking or unchecking the associated check box. Checking this option will allow users to access Scurry from the start menu. When the selection has been made, click "Next" to continue.
7. Similarly, choose whether or not to create desktop icon by checking or unchecking the associated check box. Checking this option will allow users to access Scurry from the desktop. Once the selection has been made, click "Next" to continue.
8. Review the installation details. If any errors are present, use the "Back" button to return and correct them before continuing. If there are no errors, click "Install" to begin the installation.
9. Once the install has completed, click "Finish" to exit the wizard.

Appendix B: Troubleshooting

General Error Messages	
Displayed Error Message	Meaning
No rows selected for use.	On the experiment tab, at least one device must be selected from the list before beginning a run.
Hardware needs to be configured.	Hardware settings for the currently selected device(s) must be defined from the hardware tab prior to beginning a run.
Name cannot be empty.	On the experiment tab, a name must be entered into the "Name" field before a run can be started.
Select a schedule.	When "Advanced schedule" has been selected for an experiment, the desired advanced schedules must be associated with the devices in use individually in the device list.
Select a non-zero time.	When executing a simple run, it is necessary to set a timeframe for the experiment using the "Start delay" drop down list and the "Duration" fields.
Schedule duration is too short.	An experiment must be at least 10 seconds long in order to be executed.
There is no schedule data to transmit.	This error may be displayed when attempting to run a schedule that performs a non-trivial operation which isn't clearly defined.
The requested schedules exceed available memory.	The schedules being loaded are collectively too complex and require too much memory to run. It may be necessary to simplify or consolidate the schedules.

Advanced Schedule Editor Error Messages	
Displayed Error Message	Meaning
Error: At least one statement must be present.	This message will only display when an advanced schedule contains no statements other than the start and end statements.
Warning: At least one statement is recommended.	This message will display when a repeat is present that does not contain any statement within the loop.
The maximum nested repeat depth has been reached.	Repeat statements may only have 4 layers within a single nested repeat statement. However, parallel repeat statements in excess of this quantity are possible.
A schedule start can only be the first line.	The "Schedule Start" statement must be moved to the first position in the event list.*
A schedule stop can only be the last line.	The "Schedule Stop" statement must be moved to the last position in the event list.*
Missing or mismatched repeat statement start + end.	This error will be displayed when a repeat statement does not have both a start and end point linked together.*
An unexpected statement was encountered on this line.	This error will be displayed if the Scurry software is unable to interpret or recognize a statement based on its syntax.*

* Denotes given error is only possible when the schedule has been edited manually outside of the Scurry software.

In the event of an unexpected or undefined problem, close the Scurry software and power off any connected interface(s). After restarting the Scurry software, power on the interface(s) and run through hardware setup if necessary. If this does not work, it may be necessary to reboot the entire system, including the PC. If the issue persists, contact customer support as is specified in Part III.B.1 of this manual.

Appendix C: Configuration of Microsoft SQL Server for use with Scurry

Microsoft SQL Server can be installed on a Server system or a standard PC. Depending on your organization, a server may already be setup on your network, please consult your IT department.

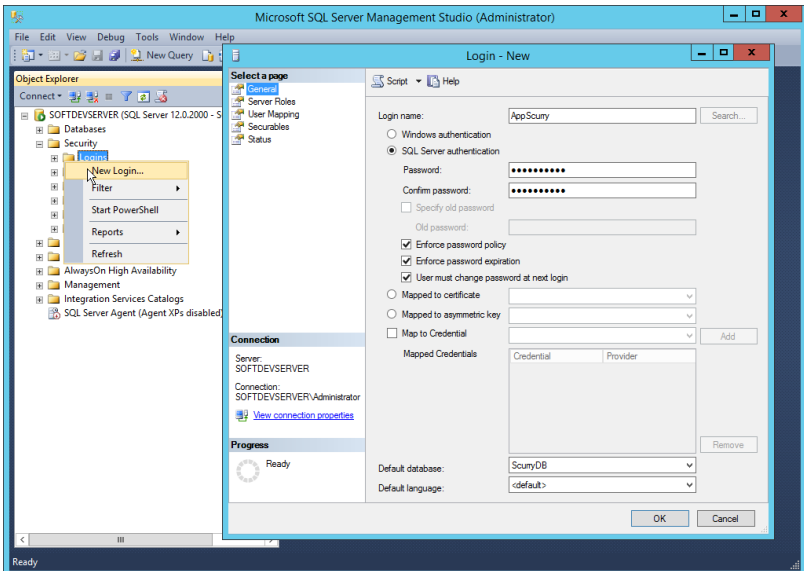
The following steps are for setting up a Microsoft SQL Server database using the Microsoft SQL Server Management Studio. In order to set up the database connection between Scurry and Microsoft SQL Server, you will need 4 pieces of information: *

- Computer name: *For this example, it is SoftDevServer*
- Database: *For this example, we will use ScurryDB*
- Login name: *For this example, we will use AppScurry*
- Password: *For this example, we will use Scurry2015*

* Lafayette Instrument Company recommends using strong login/password combinations and not merely copying the information provided in this demonstration.

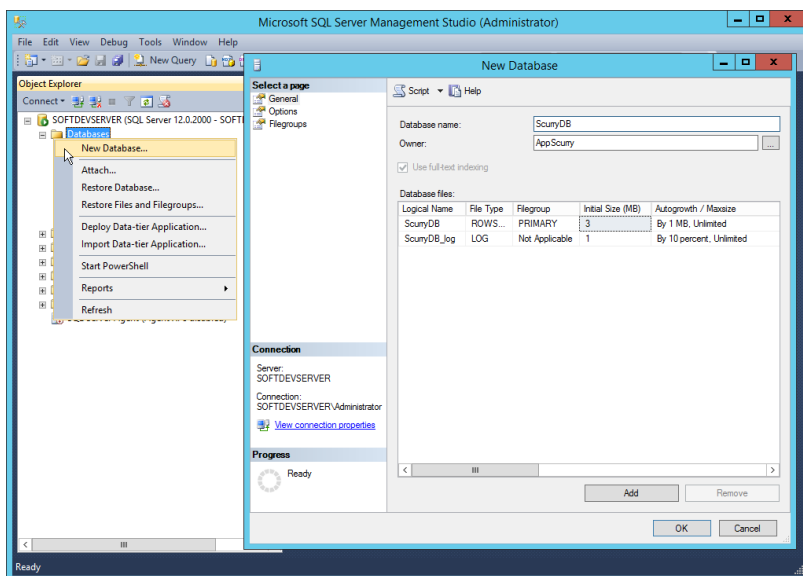
Step 1: Create a New Database User

- Expand the Security branch on the left panel of the Management Studio.
- Right-click on the “Logins” folder and select “New Login.”
- Fill in the Login name and SQL Server authentication with the login and password selected.
- Decide on how you want to enforce passwords for this login.



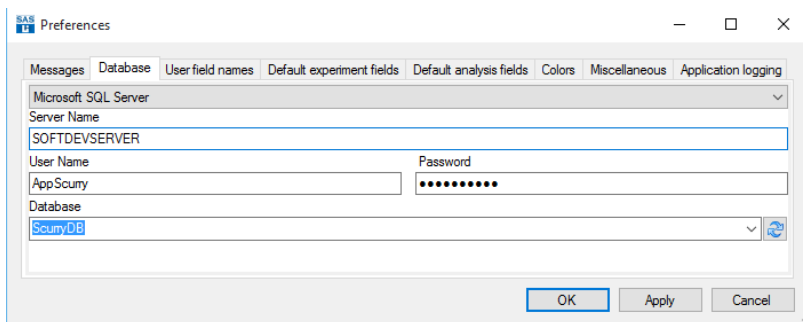
Step 2: Create a New Database

- From the left panel, right-click the “Database” branch, and select “New Database.”
- Fill in the Database name with the value selected.
- Set the Owner of the database to be the User previously created.



Step 3: Set up Scurry Connection to SQL Server Database

- In Scurry software, go to Scurry Preferences (File > Preferences) and select “Database” tab.
- Select “Microsoft SQL Server” from the dropdown.
- Enter the information set up in previous steps into the provided fields.



Terms and Conditions

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Fax: (765) 423-4111

sales@lafayetteinstrument.com

export@lafayetteinstrument.com (Outside the USA)

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Lafayette Instrument Europe

Phone: +44 1509 817700

Fax: +44 1509 817701

Email: eusales@lafayetteinstrument.com

Phone, Fax, Email or Mail-in Orders

All orders need to be accompanied by a hard copy of your purchase order. All orders must include the following information:

- Quantity
- Part Number
- Description
- Your purchase order number or method of pre-payment
- Your tax status (include tax-exempt numbers)
- Shipping address for this order
- Billing address for the invoice we'll mail when this order is shipped
- Signature and typed name of person authorized to order these products
- Your telephone number
- Your email address
- Your FAX number

Domestic Terms

There is a \$50 minimum order. Open accounts can be extended to most recognized businesses. Net amount due 30 days from the date of shipment unless otherwise specified by us. Enclose payment with the order; charge with VISA, MasterCard, American Express, or pay COD. We must have a hard copy of your purchase order by mail, E-mail or fax. Students, individuals and private companies may call for a credit application.

International Payment Information

There is a \$50 minimum order. Payment must be made in advance by: draft drawn on a major US bank; wire transfers to our account; charge with VISA, MasterCard, American Express, or confirmed irrevocable letter of credit. Proforma invoices will be provided upon request.

Exports

If ordering instrumentation for use outside the USA, please specify the country of ultimate destination, as well as the power requirements (110V/60Hz or 220V/50Hz). Some model numbers for 220V/50Hz will have a "C" suffix.

Quotations

Quotations are supplied upon request. Written quotations will include the price of goods, cost of shipping and handling, if requested, and estimated delivery time frame. Quotations are good for 30 days, unless otherwise noted. Following that time, prices are subject to change and will be re-quoted at your request.

Cancellations

Orders for custom products, custom assemblies or instruments built to customer specifications will be subject to a cancellation penalty of 100%. Payment for up to 100% of the invoice value of custom products may be required in advance. Cancellation for a standard Lafayette Instrument manufactured product once the product has been shipped will normally be assessed a charge of 25% of the invoice value, plus shipping charges. Resell items, like custom products, will be subject to a cancellation penalty of 100%.

Exchanges and Refunds

Please see the cancellation penalty as described above. No item may be returned without prior authorization of Lafayette Instrument Company and a Return Goods Authorization (RGA#) number which must be affixed to the shipping label of the returned goods. The merchandise should be packed well, insured for the full value and returned along with a cover letter explaining the reason for return. Unopened merchandise may be returned prepaid within thirty (30) days after receipt of the item and in the original shipping carton. Collect shipments will not be accepted. Product must be returned in saleable condition, and credit is subject to inspection of the merchandise.

Repairs

Instrumentation may not be returned without first receiving a Return Goods Authorization Number (RGA). When returning instrumentation for service, please call Lafayette Instrument to receive a RGA number. Your RGA number will be good for 30 days. Address the shipment to:

Lafayette Instrument Company

3700 Sagamore Parkway North

Lafayette, IN 47904, USA.

Shipments cannot be received at the PO Box. The items should be packed well, insured for full value, and returned along with a cover letter explaining the malfunction. An estimate of repair will be given prior to completion ONLY if requested in your enclosed cover letter. We must have a hard copy of your purchase order by mail or fax, or repair work cannot commence for non-warranty repairs.

Damaged Goods

Damaged instrumentation should not be returned to Lafayette Instrument prior to a thorough inspection. If a shipment arrives damaged, note damage on delivery bill and have the driver sign it to acknowledge the damage. Contact the delivery service, and they will file an insurance claim. If damage is not detected at the time of delivery, contact the carrier/shipper and request an inspection within 10 days of the original delivery. Please call the Lafayette Instrument Customer Service Department for repair or replacement of the damaged merchandise.

Limited Warranty

Lafayette Instrument Company warrants equipment manufactured by the company to be free of defects in material and workmanship for a period of one year from the date of shipment, except as provided hereinafter. The original manufacturer's warranty will be honored by Lafayette Instrument for items not manufactured by Lafayette Instrument Company, i.e. resell items. This assumes normal usage under commonly accepted operating parameters and excludes consumable products.

Warranty period for repairs or used instrumentation purchased from Lafayette Instrument is 90 days. Lafayette Instrument Company agrees either to repair or replace, at its sole option and free of part charges to the customer, instrumentation which, under proper and normal conditions of use, proves to be defective within the warranty period. Warranty for any parts of such repaired or replaced instrumentation shall be covered under the same limited warranty and shall have a warranty period of 90 days from the date of shipment or the remainder of the original warranty period whichever is greater. This warranty and remedy are given expressly and in lieu of all other warranties, expressed or implied, of merchantability or fitness for a particular purpose and constitutes the only warranty made by Lafayette Instrument Company.

Lafayette Instrument Company neither assumes nor authorizes any person to assume for it any other liability in connection with the sale, installation, service or use of its instrumentation. Lafayette Instrument Company shall have no liability whatsoever for special, consequential, or punitive damages of any kind from any cause arising out of the sale, installation, service or use of its instrumentation. All products manufactured by Lafayette Instrument Company are tested and inspected prior to shipment. Upon prompt notification by the Customer, Lafayette Instrument Company will correct any defect in warranted equipment of its manufacture either, at its option, by return of the item to the factory, or shipment of a repaired or replacement part. Lafayette Instrument Company will not be obliged, however, to replace or repair any piece of equipment, which has been abused, improperly installed, altered, damaged, or repaired by others. Defects in equipment do not include decomposition, wear, or damage by chemical action or corrosion, or damage incurred during shipment.

Limited Obligations Covered by this Warranty

1. In the case of instruments not of Lafayette Instrument Company manufacture, the original manufacturer's warranty applies.
2. Shipping charges under warranty are covered only in one direction. The customer is responsible for shipping charges to the factory if return of the part is required.
3. This warranty does not cover damage to components due to improper installation by the customer.
4. Consumable and/or expendable items, including but not limited to electrodes, lights, batteries, fuses, O-rings, gaskets, and tubing, are excluded from warranty.
5. Failure by the customer to perform normal and reasonable maintenance on instruments will void warranty claims.
6. If the original invoice for the instrument is issued to a company that is not the company of the end user, and not an authorized Lafayette Instrument Company distributor, then all requests for warranty must be processed through the company that sold the product to the end user, and not directly to Lafayette Instrument Company.

Export License

The U.S. Department of Commerce requires an export license for any polygraph system shipment with an ULTIMATE destination other than: Australia, Japan, New Zealand or any NATO Member Countries. It is against U.S. law to ship a Polygraph system to any other country without an export license. If the ultimate destination is not one of the above listed countries, contact us for the required license application forms.