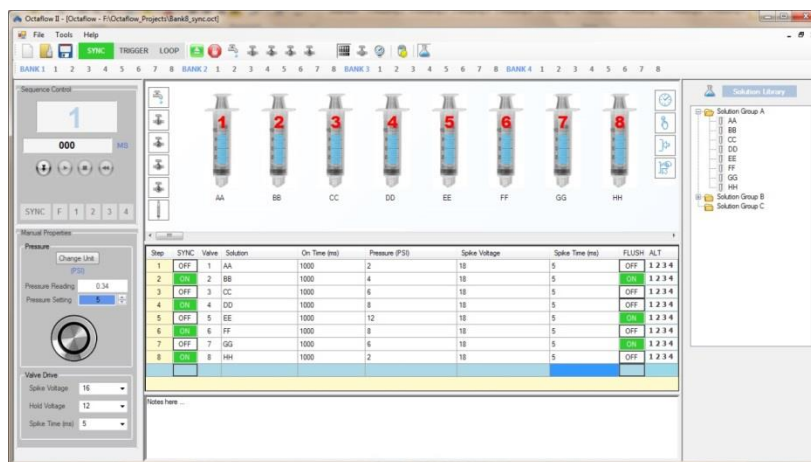




Software Manual

Model # Octaflow II

Ver. 3.0.1.1
3.20



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Safety Information



Warning: Make sure to read the following advice prior to install or to use the device and the software. If you do not fulfill all requirements stated below, this may lead to malfunctions or breakage of connected hardware, or even fatal injuries.

Warning: Obey always the rules of local regulations and laws. Only qualified personnel should be allowed to perform laboratory work. Work according to good laboratory practice to obtain best results and to minimize risks.

This device (Octaflow II) may only

- be used for its **intended purpose**;
- be used when in **perfect condition**.
- Improper use could lead to serious, even fatal injuries to the user or third parties and damage to the device itself or other material damage.

Warning: This device is **not** intended for medical uses and **must not** be used on humans.

Malfunctions which could impair safety should be rectified immediately.

High Voltage

Electrical cords must be properly laid and installed. The length and quality of the cords must be in accordance with local provisions.

Only qualified technicians may work on the electrical system.

- Each time before starting up, make sure that the **main power supply** agrees with the specifications of the product.
- Check the **power cord** for damage each time the site is changed. Damaged power cords should be replaced immediately and may never be reused.
- Do not try to insert anything sharp or metallic into the vents or the case.
- Liquids may cause short circuits or other damage. Keep the device and the power cords always **dry**. Do **not** handle it with wet hands. Make sure the device and your experiment are set up in a way that makes it impossible that any liquid spills onto the device or drips into the device from the surface of the table.

IMPORTANT NOTE: BEFORE BEGINNING ANY WORK WITH YOUR OCTAFLOW™, PLEASE READ THE SAFETY INFORMATION AND WARRANTY PAGES; THESE CONTAIN VITAL INFORMATION THAT THE USER MUST KNOW!

Introduction

The OCTAFLOW II™ system provides a powerful, yet easy-to-use, intuitive interface designed to facilitate and automate perfusion system operation. Typical features include:

- Individually programmable valve drive voltage to encompass a wide variety of valve types and tailored perfusion rates
- Individually programmable channel pressures
- Software and hardware triggered operation
- Simple valve configuration and sequencing setup
- Remote manual operation
- Single and simultaneous dual value automated sequencing including repeat sequence and delayed stepping of valve timing
- Manual and automated inter-step flushing
- Four additional user-defined ALT valves
- Flexible spreadsheet layout to quickly setup custom valve configurations.

This manual gives instructions and descriptions of all OCTAFLOW II™ software functions. The sections in this manual will have a *how to* part with screen shots to help the user follow along better. Although our aim was to cover all functionality of the Octaflow II system software in this manual, there are multiple ways of performing the same functions within the software. It will be up to the user to find which is best.

The user will learn that there are many parameters that can be manipulated to achieve the best perfusion response for the specific experiment being performed. The Octaflow II software allows the user to easily change parameters to optimize the system. The OCTAFLOW II™ Daily Usage manual gives helpful hints on how to optimize a perfusion system. Please refer to this manual when you are ready to begin setting up solutions reservoirs, tubing, front end and priming the valves.

Software Setup

Software Setup Installation

This section provides a brief guide to help you install and setup your OCTAFLOW II™ software for the first time. Before beginning please make note of the basic system requirements:

- Windows 7, Windows 10 operating systems 64 bit
- At least 100 MB of free hard drive space for installation
- 55MB of hard drive space for OCTAFLOW II™ software
- CD ROM/DVD drive (if installing from disc)
- USB version 2.0 or higher compatible port

The Octaflow II system comes with a CD containing the latest version of the Octaflow II software. If a newer version is released or the software requires being re-installed, the software can also be downloaded from the ALA Scientific website. Simply go to the following address; <http://alascience.com/product/octaflow/> and go to the *Downloads* tab. The software is compressed as a zip file. Download the software, unpack it into a temp folder and follow the steps below.

1. Browse to the OCTAFLOW II™ CD or download folder where you should find **Setup.exe** and run this file (double click). This will start the Installation process.

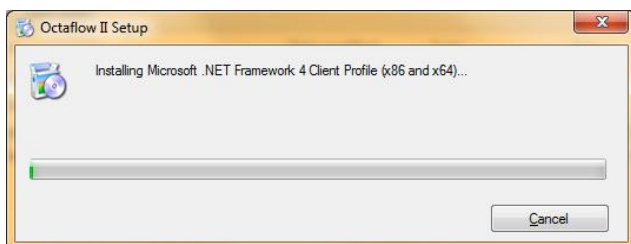
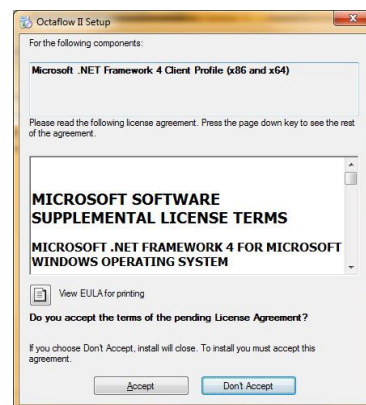
If the .NET 4.0 Framework is already on your PC, then the setup will start with step 3.

2. If your system does not have the **Microsoft .NET Framework 4.0** already installed, you will see the window on the right asking you to accept the Setup to install the **.Net 4.0 Framework**.

Press **Accept**.



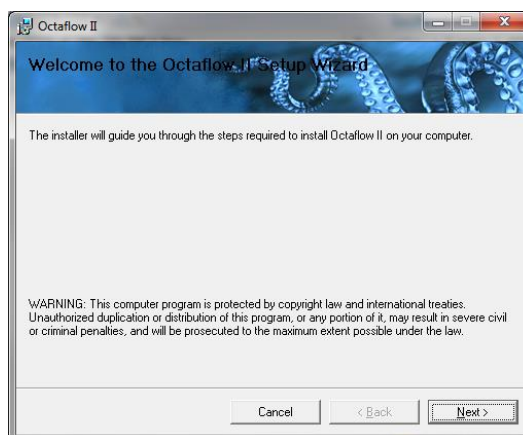
Press **Yes** to accept the installation to begin.



When the .NET Framework 4.0 installation is complete the Octaflow II software will begin installing.

3. The OCTAFLOW II™ install wizard will begin by displaying the welcome window.

Press **Next**

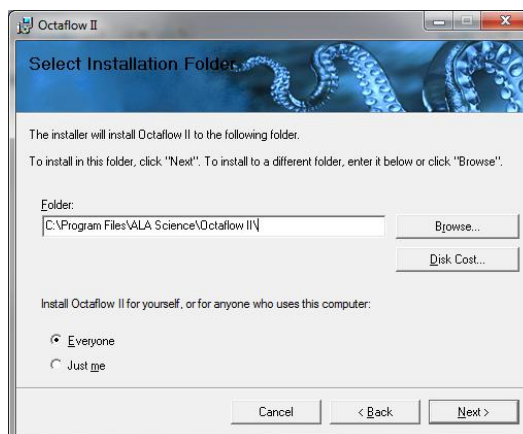


4. Select the **folder to install** the OCTAFLOWII™ program files. The default folder is recommended.

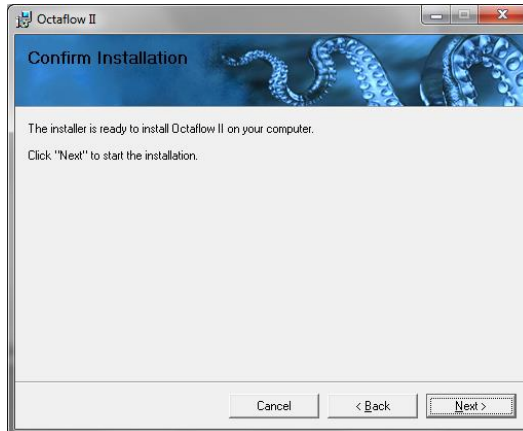
Select to install the program to your profile only or to **Everyone** on the PC.

It is recommended that you install to the default folder.

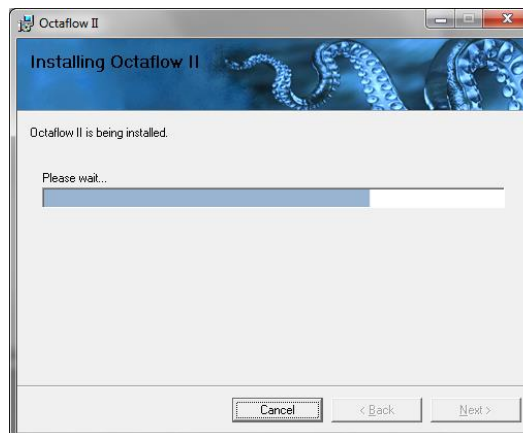
Press **Next**



5. Press **Next** to begin installing the program files unto your computer.
If a warning appears about *unkown publiser* , allow installation.



6. Files will begin to be installed.



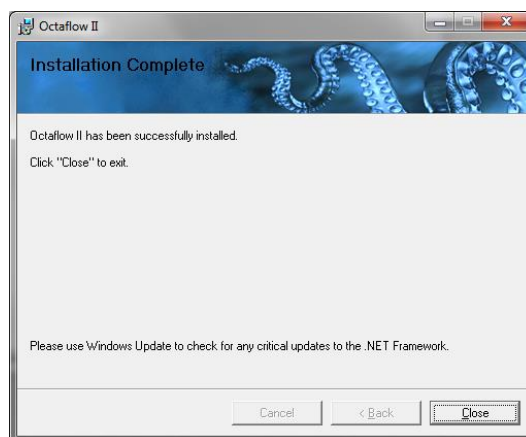
7. Installation is **Complete**.

Press '**Close**'.

The software installation has created a directory on your hard drive named '**ALA Science**' under *Program Files*. This directory contains a folder named OCTAFLOW II. This folder contains the OCTAFLOW II™ program files and support files.

Important...

The OCTAFLOW II™ USB driver is automatically installed when the software is installed. If the driver could not be installed automatically, it must be installed manually before the OCTAFLOW II™ can operate. The USB driver is located at **C:\Program Files\ALA Science\Octaflow II\Driver**.



Software Re-install / Upgrade

Note: Although the re-install or upgrade procedures will not remove the configuration and sequence files created by the User, it is recommended that you make a backup of these files before proceeding with the un-install.

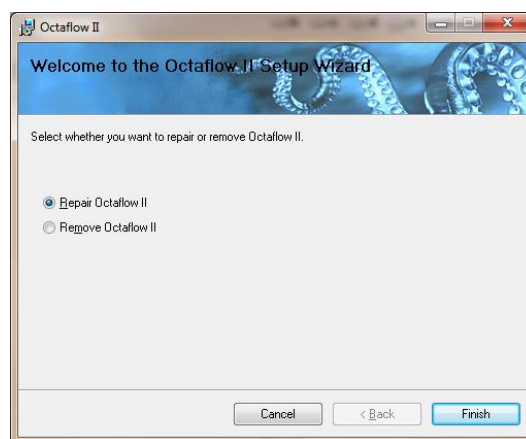
If for some reason you are required to **re-install** the same version of OCTAFLOW II™ software it is important that all configuration and sequence files created by the user be **backed up**.

Running the Setup file of the same version will open a window with the choice to either **repair** or **remove** the OCTAFLOW II™ software on the PC.

Selecting to repair the installation will load all files to its default state. This will not change or remove any user named files from the directories.

Selecting to Remove the software will completely delete all the OCTAFLOW II™ files and folders. It is recommended that you back up all user created files before proceeding with this selection.

To **upgrade** your current version of the OCTAFLOW II™ software, go to the ALA Scientific website OCTAFLOW II™ page and download the latest version. Follow the steps in the next section to install the software.



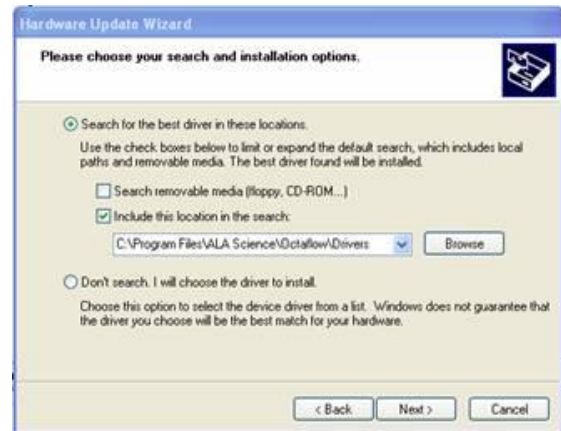
Note: The Octaflow II software requires that the Octaflow II interface be connected to the computer via the provided usb cable and powered ON in order for the drivers to be installed. The software features also requires that the interface be connected and powered ON in order to execute any commands.

USB Driver manual installation

1. Connect the USB to the computer with the Octaflow unit powered **ON** and Octaflow software closed or idle. After a few seconds you should hear an attached confirmation 'bing' followed by a "**Found New hardware**" and a New or Update Driver form.

2. Select the second option named, "**Install from a list or specific location (Advanced)**" and then press **NEXT**.

3. Select the '**Include this location in the search**' and browse to the folder where you installed the OCTAFLOW II™ files. The default being '**C:\Program Files\ALA Science\Octaflow II\Driver**'



If you installed the OCTAFLOW II™ setup file in a different directory other than the default, make sure you point to that directory in the above step.

Press **NEXT**

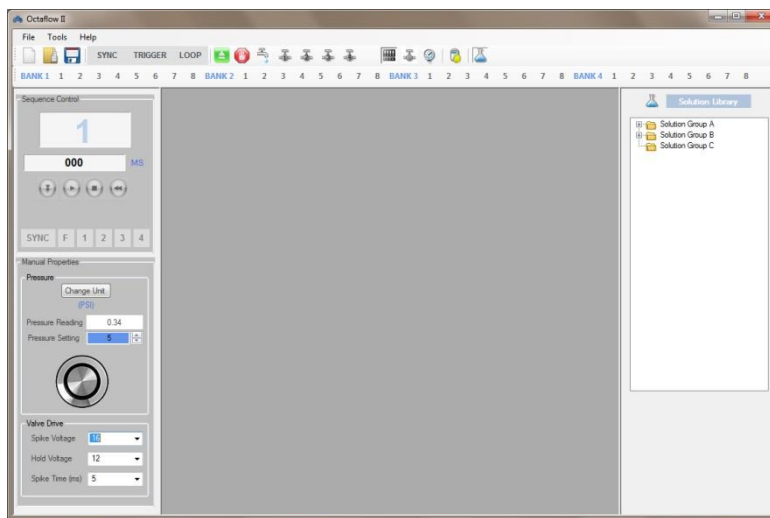


4. Shortly, you should receive a message stating that "**Your new hardware is installed and ready to use**".

Running the Octaflow Software

To start the OCTAFLOW II™ software, go to your desktop and double click on the OCTAFLOW II™ icon placed there during setup. The following screen will then be loaded.


Before beginning an experiment, the system must first be configured to insure proper valve electromechanical and fluidic performance and arranged in a firing sequence designed to affect the desired perfusion profile. This is accomplished via the left control window under the 'Systems Properties' label.

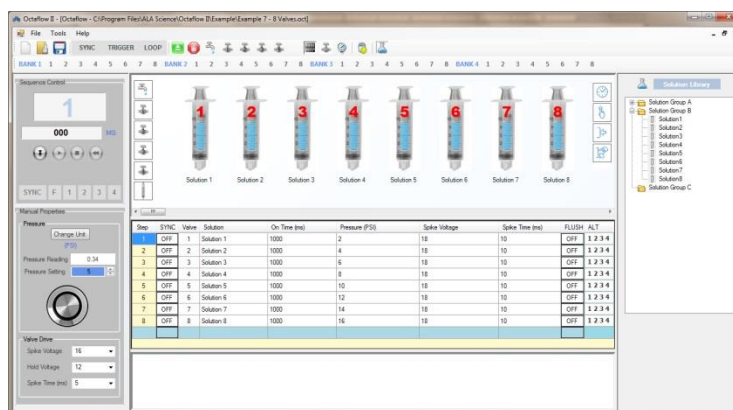


There are sample single valve bank sequence files installed during setup. Use them to familiarize yourself with the structure of the Perfusion Manager window. You can also create your own configuration and sequence files as outlined in the next section

Sample Project

To open a sample project;

1. **Press** the  **Open Project** button on the Toolbar. This will open the 'Open Project' window.
2. Browse to *C:\Program Files\ALA Science\OCTAFLOW II\Example* folder
3. Open the "Example" folder.
4. Click on the one of the sample projects. The 8 valve project is shown.



The sample projects will allow you to test the OCTAFLOW II™ system when it is first set up.

Software Toolbar



New Project: Creates a new blank sequence window.



Open Project: Opens the “Open Project” window to retrieve saved projects.



Save Project: Opens the “Save As” window to save an untitled project

SYNC

Sync Off: Sync Out port is disabled. No signal present when valve is ON.

SYNC

Sync On: Sync OUT port is enabled. TTL high (5Vdc) signal present when a valve is ON.

TRIGGER

Trigger Off: Trigger function is disabled. All trigger sequence controls are disabled.

TRIGGER

Trigger On: Trigger function is enabled. All trigger sequence controls are enabled and require a trigger signal to proceed to the next sequence step.

LOOP

Loop Off: Loop function is disabled. All loop routines in the sequence are disabled.

LOOP

Loop On: loop function is enabled. All loop routines will be processed.



Manual record sequence. After inserting syringes into sequence workspace, press record button to record manual valve functions into the sequence window.



Emergency Stop: All active Octaflow functions cease.



Flush Off: Flush port on rear panel is OFF.



Flush On: Flush port on rear panel is ON. 12Vdc is delivered to this port for valve function.



ALT 1 Off: ALT 1 port on rear panel is OFF.



ALT 1 ON: ALT 1 port on rear panel is ON. 12Vdc is delivered to this port for valve function



ALT 2 off: ALT 2 port on rear panel is OFF.



ALT 2 ON: ALT 2 port on rear panel is ON. 12Vdc is delivered to this port for valve function.



ALT 3 Off: ALT 3 port on rear panel is OFF.



ALT 3 ON: ALT 3 port on rear panel is ON. 12Vdc is delivered to this port for valve function.



ALT 4 Off: ALT 4 port on rear panel is OFF.



ALT 4 ON: ALT 4 port on Octaflow rear panel is ON. 12Vdc is delivered to this port for valve function.



Bank Valve ON: Toggles Valve Banks visibility. Hide and unhide valve bank (manifold) buttons. Default position is ON.



Normal Valve Mode: Default valve mode for manual control of valves. Any number of valves can be activated at a time in this mode.



Latched Valve Mode: Click on valve mode button to change to latched valve mode. In this mode manual control of valves allows only one valve at a time to be activated.



Momentary Valve Mode: Click on valve mode button until momentary manual control of valves is enabled. In this mode, a valve is activated only as long as button is held down.



Pressure Off: Keeps the set pressure even when valve is OFF..



Clean: The cleaning function is disabled.



START

0 : 00 : 00

Cleaning ON: A Timer is displayed. Enter the cleaning function run time. For more information, go to the Cleaning function section.



Solution Library: Hide/Show the Solution Library.



Bank 1 Control Buttons: manual control of valves. Each button corresponds to same valve number on valve manifold.



Left clicking on the “BANK1” label enables F-key control. Use F1 – F8 to control valves 1 to 8, respectively.

OCTAFLOW II™ Software Control windows

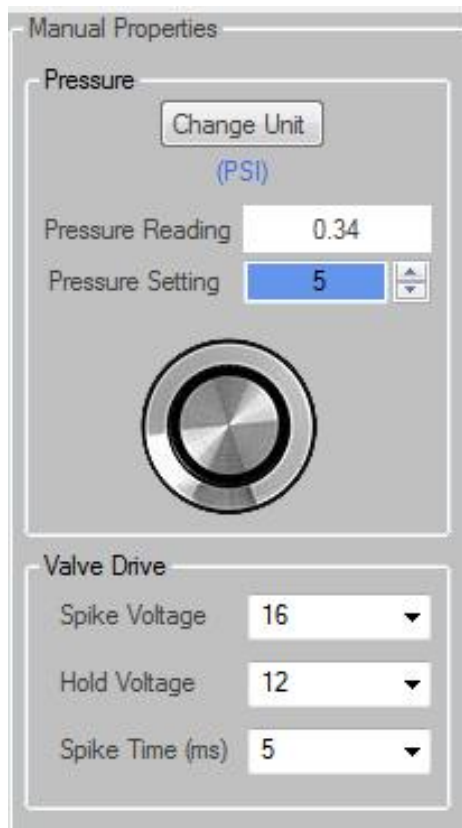
Manual Properties Window

The purpose of manual properties is to provide a simple and convenient means to edit, store and reload settings for numerous applications. In this way, effective configurations can be reloaded and system parameters automatically preset to avoid the need for tedious and error prone manual adjustment and tinkering each time an experiment is performed.

When a stored project is loaded or a new project is opened, the “Manual Properties” window is displayed.

The Manual Properties panel displays the following starting from the top;

- Change Unit button: allows the units of pressure to be changed between, psi, mmHg, mbar and kPa.
- Pressure (PSI): The Actual operating pressure read by the system is in the white box.
- The preset manual pressure is in the blue box. The pressure can be set by typing a value in the box or by rotating the dial.
- Spike Voltage: The voltage that is delivered to a valve for 5 ms (in this case) before settling on the Hold voltage. Typically this voltage is higher than the Hold Voltage allowing for the valve to open faster. Enter a value in the text box or use the drop down to set the value.
- Hold Voltage: The voltage that is delivered to a valve during the On Time, minus the Spike Time. Enter a value in the text box or use the drop down to set the value.
- Spike Time (ms): The amount of time the valve receives the Spike Voltage. The maximum time allowed is 100ms. Enter a value in the text box.



Sequence Resource Window

The sequence resource window is where the user builds the configuration to be used in the experiment. User selected solutions are displayed as reservoirs. Any number of solutions can be displayed up to 32. Solutions are inserted into this window from the Solution Library window (See solution Library section for more info). Each reservoir contains configuration parameters that the user can modify or use the default setting. Finally the user can build a sequence with the resources displayed in the Resource window. From solution names, flush steps to trigger steps can be inserted into a sequence. All these function will be explained later in this section.



The following describes the built-in resources displayed in the Sequence Resource window.



Flush: Inserts a flush step in the sequence planner. The Flush port is turned ON for a user defined ON Time in the sequence step created.



ALT Port: Inserts a corresponding ALT valve step in the sequence planner. The ALT port specified will be turned ON for a user defined On Time in the sequence step created.



Add a new syringe (solution) to the resource window. The new syringe must then be assigned a valve number and solution name. Right click on the valve number to edit the syringe properties and assign a name.



Time Interval Pause: Inserts a pause step for a user defined time interval before proceeding to the next step.



Wait for User Pause: Inserts a pause step and will wait for user to press the **F10** key before proceeding to the next step in the sequence.

The next two pause steps require an input trigger signal from an external source. The type of trigger signal required can be set in the settings menu under the Tools drop down on the toolbar. The default setting is Positive edge trigger.



Trigger Signal Pause: Inserts a pause step and will wait for a trigger signal before proceeding to the next step in the sequence.



Trigger/ User Pause: Inserts a pause step and will wait for either a trigger signal or the user pressing the F10 key before proceeding to the next step in the sequence.

Sequence Planner Window

SYNC	Valve	Solution	On Time (ms)	Pressure (PSI)	Spike Voltage	Spike Time (ms)	FLUSH	ALT
ON	1	AA	1000	2	18	5	OFF	1 2 3 4
ON	2	BB	1000	4	18	5	OFF	1 2 3 4
OFF	N/A	PAUSE		N/A	N/A	N/A	OFF	1 2 3 4
ON	3	CC	1000	6	18	5	OFF	1 2 3 4
OFF	4	DD	1000	8	18	5	OFF	1 2 3 4
ON	5	EE	1000	12	18	5	OFF	1 2 3 4
ON	6	FF	1000	8	18	5	OFF	1 2 3 4
ON	7	GG	1000	6	18	5	OFF	1 2 3 4
ON	8	HH	1000	2	18	5	OFF	1 2 3 4

The above screen shows the sequence planner window with an 8 valve configuration, incorporating all the sequence resources described above.

This window displays the sequence steps for the Octaflow II to execute. Each step contains instructions the Octaflow II will follow from ON times, pressure settings, pauses to Valve spike voltages.

To insert a sequence resource step:

There are 2 ways to insert a sequence resource.

1. The first is to left mouse click the resource desired. This will place the desired step at the end of the sequence.
2. The second way is to right mouse click the resource desired. To place the resource in a specific step in the sequence, right click the step where you want the resource step to be placed in.


Notes Window

The Notes window is located below the Sequence Planner window. The user can enter experimental notes that will be saved along with the sequence project.

7	OFF	7	Solution 7	1000	14	13.80	18	10	OFF	1 2 3 4
8	OFF	8	Solution 8	1000	16	14.76	18	10	OFF	1 2 3 4
Notes can be entered here...										

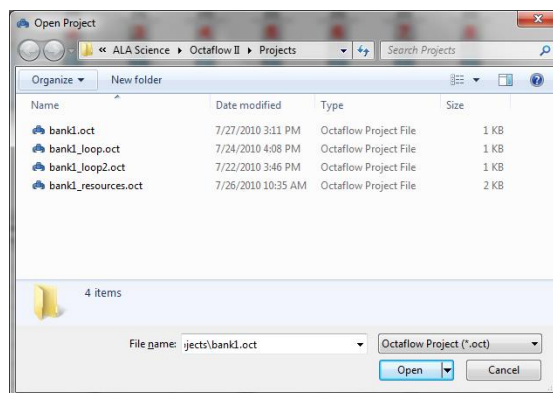
Sequence Projects

How to open a Sequence project

1. Go to the **File** menu and select Open or click the icon  on the toolbar.
2. The Open Project window will appear.
3. Browse to the location of your saved project files.

Select it and press **Open**.

This will load the project file to the Octaflow II software.



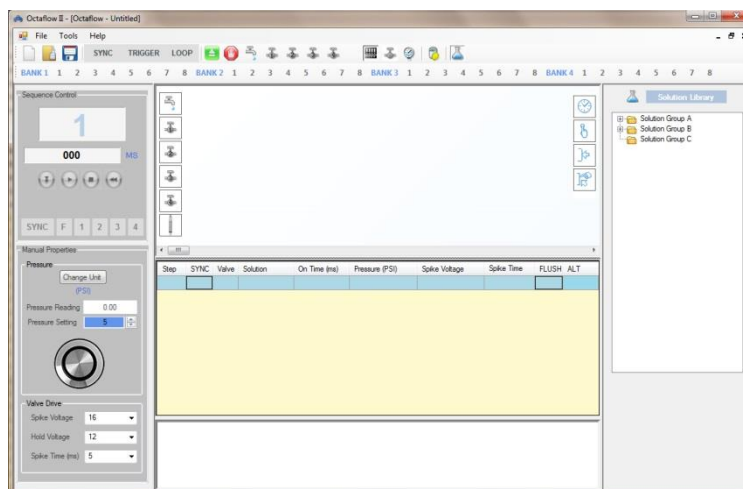
How to create a New Project

An Octaflow II project is a combination of configuration parameters and sequence steps.

To create a new project;

There are 2 ways that a sequence project can be created. The first is manual input and the second is automatic from the solution library. Both methods require that a new project be opened as follows;

- Go to the **File** menu and select the **New** or click the  icon on the toolbar.

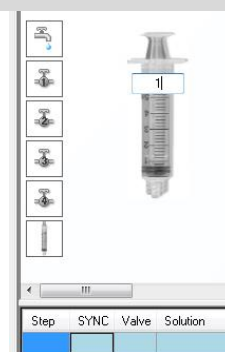


The Project Editor will now appear as shown above. The Sequence Control, Manual Properties, Sequence Resource and Sequence Planner windows are displayed. The default parameters for manual valve operation are displayed in the Manual Properties window. Go to the Manual Properties section for more details.

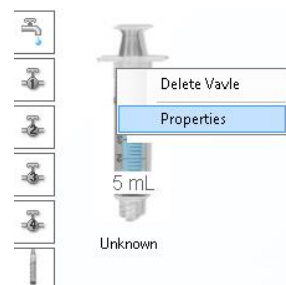
Manual Input of a Sequence Project

1. Click on the “**Add Valve**” icon  to add a new valve (syringe).

2. Type the valve number and press **ENTER**.



3. Right click on the syringe number to display the valve drop down and select “**Properties**”. The valves sequence default values can be entered here.



4. Enter the solution name for that valve.

5. Enter the pressure to be applied when the valve is activated.

6. Enter the *spike voltage* that will be applied when the valve is activated.

Properties

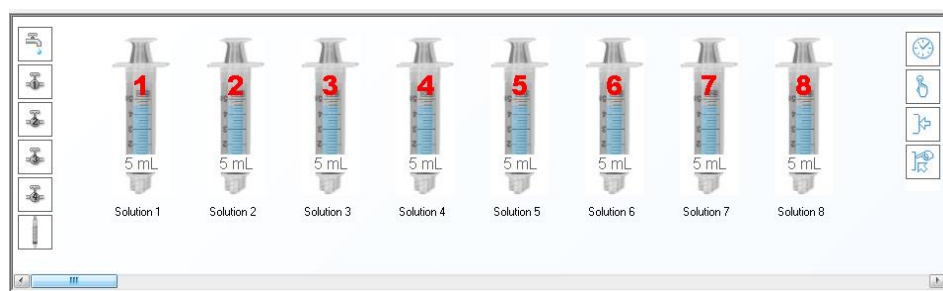
Valve Number	1
Solution	Unknown
Pressure (PSI)	0.00
Spike Voltage	16
Spike Time (ms)	5

Cancel Save

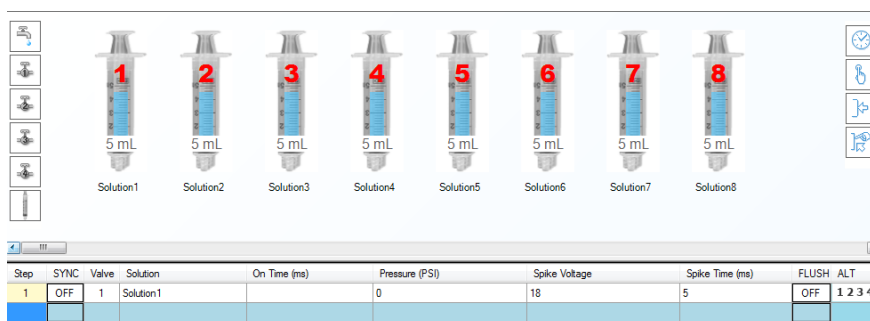
7. Enter the, *spike time*, length of time the spike voltage will be applied for.

8. Press the “**Save**” button when done.

9. Repeat steps 1-8 to add more solutions. A total of 32 solutions can be added.



10. Once all the solutions to be used in an experiment are added and configured, the sequence project can be created.



Left click on the reservoir number to add a step in the sequence window. The reservoir property values will populate the respective columns.

11. In the “**ON Time**” Cell, enter the amount of time the valve will be ON for. The default unit of time is millisecond. For information on how to change units, go to the sequence step menu section.

12. The **Flush** port can be enabled at this time. Press the cell under the “FLUSH” column so it reads ON.

Spike Voltage	Spike Time	FLUSH	ALT
18	10	ON	1 2 3 4

13. The **ALT** ports can be enabled by clicking on one of the numbers in the cell under the ALT column. Each number corresponds to an ALT port on the rear panel of the control unit. The ALT port that is enabled will be in green.

Spike Time	FLUSH	ALT
10	OFF	1 2 3 4


14. To have the step output a TTL signal out when the valve is ON. Click on the cell under the “SYNC” column to read ON. Enable the Sync function by pressing the SYNC button on the toolbar.

15. Sequence resource steps such as triggers, pauses and port control can be inserted into the sequence as described below,

There are 2 ways to insert a sequence resource.

- The first is to left mouse click the resource desired. This will place the desired step at the end of the sequence.
- The second way is to right mouse click the resource desired. To place the resource in a specific step in the sequence, right click the step where you want the resource to be placed in.

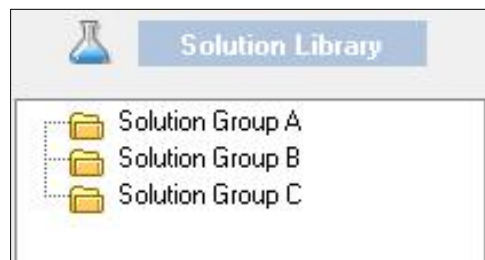
16. Repeat the above instructions with the next valve number to add steps for the other valves in the system.

17. Once the sequence is complete it can be saved by pressing the  or “File” save as dropdown.

Automatic Input of Sequence Project

1. Open the Solution Library.

Press the  icon in the toolbar.

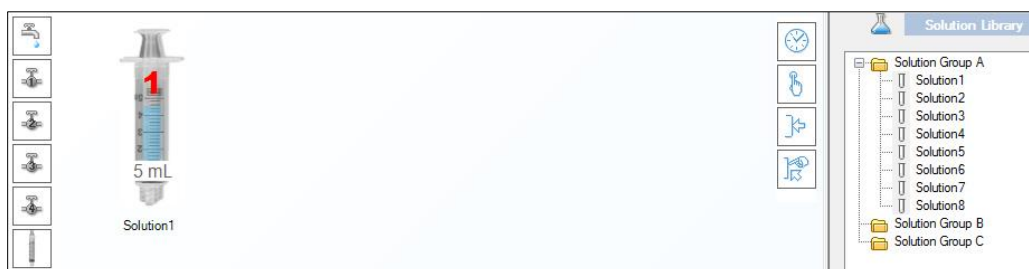


2. The Solution library will be on the right side of the screen. Expand the Solution group to be used. If no Solutions have been defined, go to the *Solution Library* section for more information before proceeding.

3. **Left Click** on the solutions to be used in the new sequence in the order desired.



4. Assign a valve position to the syringe and corresponding solution. In syringe text box write the number of the valve to associate the solution with. Press **ENTER** to assign valve number. The solution name from the library will also be assigned to that reservoir.



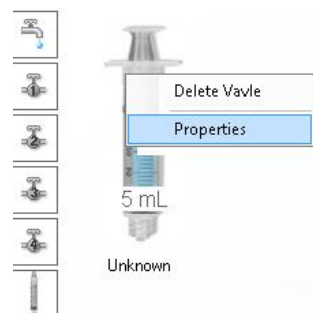
5. **Right click** on the syringe number to display the valve drop down and select "**Properties**". The valves sequence default values can be entered here.

6. Enter the input pressure to the valve, the spike voltage and spike time. These will be the default values for this valve.

Press **Save** when done.

Properties	
Valve Number	1
Solution	Unknown
Pressure (PSI)	0.00
Spike Voltage	16
Spike Time (ms)	5

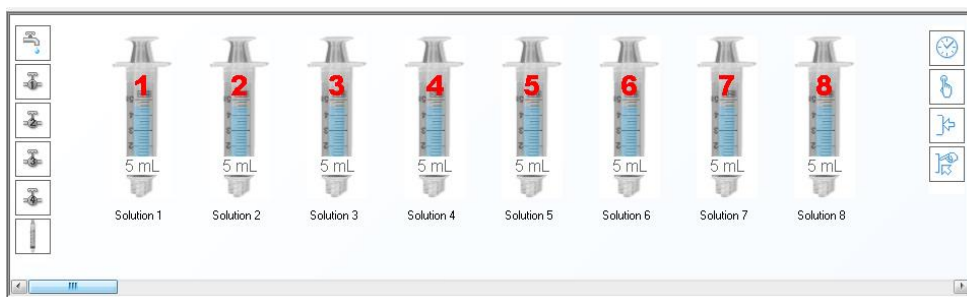
Cancel Save



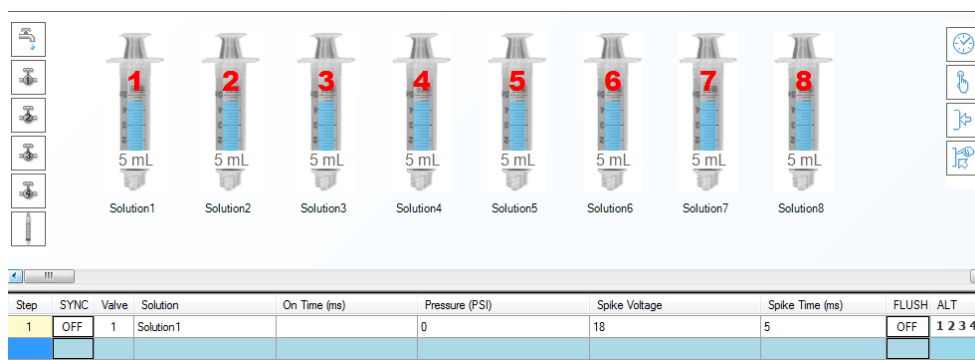
7. Assign each syringe a valve number. In the text box in each syringe, type the valve number associated with the solution name. Press **Enter** after each number entered. A total of 32 valves can be entered.



8. Repeat above until all valves used in an experiment have been assigned a solution and configured.



9. To insert a specific valves parameters step in the sequence planner window with, **left click** on the syringe number. The next available step in the sequence planner will be populated with the properties of the syringe selected.



10. In the “**ON Time**” Cell, enter the amount of time the valve will be ON for. The default unit of time is millisecond. For information on how to change units, go to the sequence step menu section.

11. The remaining cells (Pressure, Spike voltage and Spike Time) have default values set in the syringe properties. You can change these values or use the default settings.

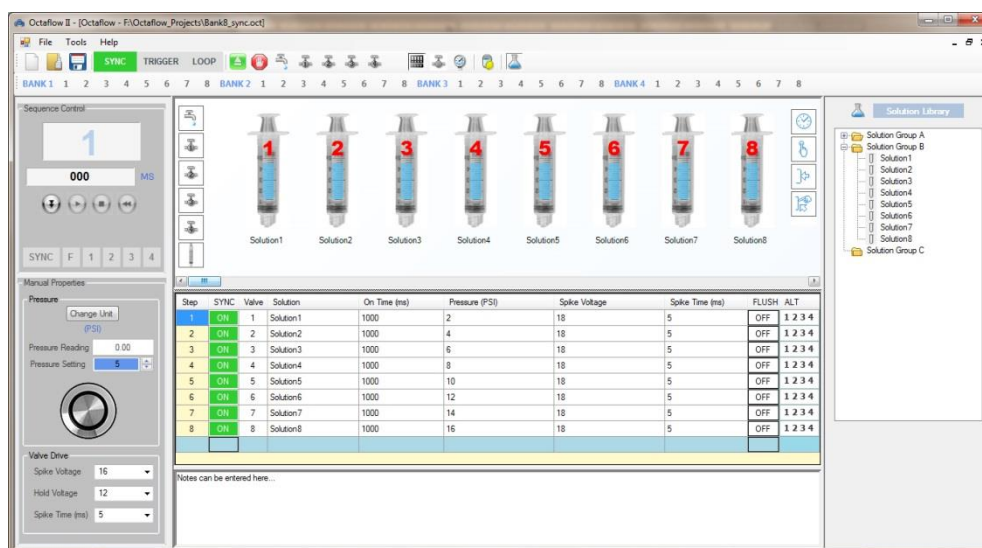
12. The *Flush port* can be enabled by left clicking the cell under the column labeled *FLUSH*. The cell will display 'ON'.

Spike Voltage	Spike Time	FLUSH	ALT
18	10	ON	1 2 3 4

13. The *ALT* ports can be enabled by clicking on one of the numbers in the cell under the ALT column. Each number corresponds to an ALT port on the rear panel of the control unit. The ALT port that is enabled will be in green.

Spike Time	FLUSH	ALT
10	OFF	1 2 3 4

14. To have the step output a TTL signal out when the valve is ON. Click on the cell under the "**SYNC**" column to read ON. Enable the Sync function by pressing the SYNC button on the toolbar.



15. Repeat step 9 -18 to add multiple step to the sequence planner.

Sequence Project Editing Commands

The sequence planner window is supplied with convenient editing commands accessible via the **Right mouse button**. To open the editing command window, point the cursor over a cell and *right click* on the mouse.

Do not *left click* into the cell. Placing the cursor in the cell and then *right clicking* will open up a standard command window instead of the Project editing commands.

These commands will allow you to quickly update all cells in a particular row or column without the need to type into every cell.

Step	SYNC	Valve	Solution	On Time (ms)	Pressure (PSI)
1	ON	1	Solution1	1000	2
2	ON	2	Solution2		
3	ON	3	Solution3		
4	ON	4	Solution4		
5	ON	5	Solution5		
6	ON	6	Solution6		
7	ON	7	Solution7		
8	ON	8	Solution8		

Insert Row
 Delete Row(s)
 Start Step
 End Step
 Loop
 Clear Row
 Clear Column
 Set Selected Cell(s) to Same Value
 Units

The following commands are available:

- Insert Row:** select step where a new row will be inserted and right mouse click. Select from the dropdown the type of command to insert into the row. The valves available reflect the syringes available in the sequence project window.
- Delete Row (s):** Deletes the selected row. Highlight multiple rows to delete more than one.
- Start Step:** Sets the selected step (row) as the starting step in the sequence. The step number will be highlighted in green. To clear the start step, right click on the step and select "Remove Start Step".
- End Step:** Sets the selected step (row) as the end step in the sequence. The step number will be highlighted in red. To clear the end step, right click on the step and select "Remove End Step".
- Loop:** Opens menu to add or delete a loop function.
- Clear Row:** Deletes all entries in the selected row.
- Clear Column:** Deletes all entries from the selected column.
- Set All Cell (s) to Same Value:** Highlight all necessary cells in column. Right mouse click cell with the desired value for all cell selected. Scroll down to 'Set All Rows to Same value' and left click to assign.
- Units:** Change the units of Time and Pressure in the Sequence Planner.

Insert Row	Valve 1
Delete Row(s)	Valve 2
Start Step	Valve 3
End Step	Valve 4
Loop	Valve 5
Clear Row	Valve 6
Clear Column	Valve 7
Set Selected Cell(s) to Same Value	Valve 8
Units	Pause for Specified Time
	Wait for User to Press F10 Key
	Wait for External Trigger
	Wait for Trigger or User
	FLUSH
	ALT 1
	ALT 2
	ALT 3
	ALT 4

Step	SYNC	Valve	Solution
1	ON	1	Solution1
2	ON	2	Solution2
3	ON	3	Solution3
4	ON	4	Solution4
5	ON	5	Solution5
6	ON	6	Solution6
7	ON	7	Solution7
8	ON	8	Solution8

Pressure (PSI)	Spike Voltage
2	18
4	
6	
8	
10	
12	
14	
16	
0.00	

Insert Row
 Delete Row(s)
 Start Step
 End Step
 Loop
 Clear Row
 Clear Column
 Set Selected Cell(s) to Same Value
 Units

- The units of pressure available are shown on the right. The default unit is PSI.

Units	Pressure	mmHg
	Time	kPa
		mbar
		PSI

- The units of time available are shown on the right. The default unit is millisecond.

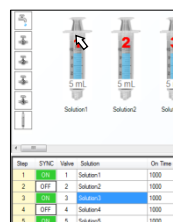
Units	Pressure	Milliseconds
	Time	Seconds
		Minutes

To Insert a row in a sequence:

This allows you to add a row at a specific step. Only defined solutions or built in resources can be inserted.

To insert a row using the sequence project window;

1. Right mouse Click the solution number to be inserted.



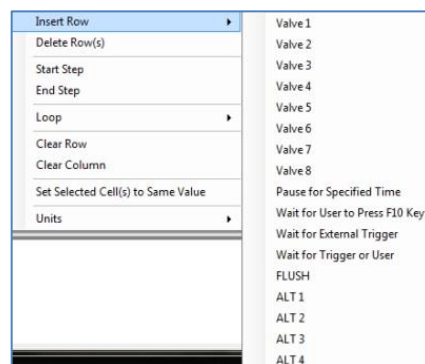
2. Left mouse click the anywhere on row where the new row will be inserted. The values from the valve properties will be applied.

Step	SYNC	Valve	Solution	On Time (ms)	Pressure (PSI)	Solve Voltage	Solve Time (ms)	FLUSH	ALT
1	ON	1	Solution1	1000	2	10	5	ON	1 2 3 4
2	OFF	2	Solution2	1000	4	10	5	ON	1 2 3 4
3	OFF	1	Solution1	1000	6	10	5	OFF	1 2 3 4
4	ON	3	Solution3	1000	8	10	5	ON	1 2 3 4
5	OFF	4	Solution4	1000	10	10	5	ON	1 2 3 4
6	ON	5	Solution5	1000	12	10	5	ON	1 2 3 4
7	OFF	6	Solution6	1000	14	10	5	ON	1 2 3 4
8	ON	7	Solution7	1000	16	10	5	ON	1 2 3 4
9	OFF	8	Solution8	1000	18	10	5	ON	1 2 3 4

3. Fill in all cells with missing values.

To insert a row using the sequence dropdown window:

1. Right click on the Step (row) where the new row will be inserted.
2. Select a valve or resource to insert and left click into it.
3. A new row will be inserted with the selected value.
4. Fill in all cells with missing values.

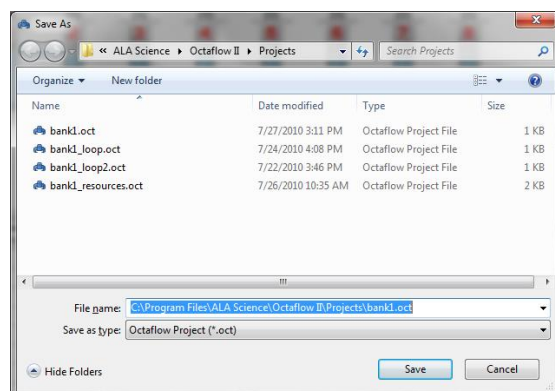


Saving Sequence Projects

Once satisfied with a given setup, you can save the sequence project by clicking the **Save** or **Save as** button under **File** in the toolbar or clicking on the save icon on the toolbar.




Sequence Projects are saved as Octaflow II *.oct files.



Solution Library

The Solution library feature makes creating projects easier by having the solution names most commonly used by the researcher readily available to be inserted in a sequence.

Open the Solution library by clicking on the  icon in the toolbar or for temporary use, bring the cursor to the right most side of the window to show the library.

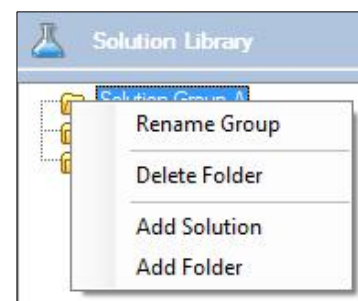
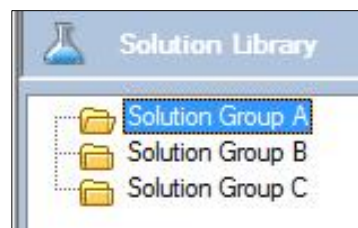
The library comes with 3 solution group folders already created.

To edit the folders or add new folders, right click on a folder to bring up the library menu.

This menu allows you to rename the folder, delete the folder or add a solution name into the folder selected.

The *Add folder* option adds a global folder to the solution library.

All entries into the Solution Library are automatically saved by the Octaflow2 program and can be used in other Sequence projects.



Add a Solution to the library

To add solution names to the library,

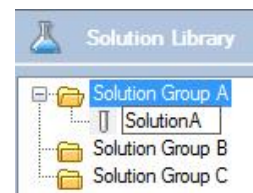
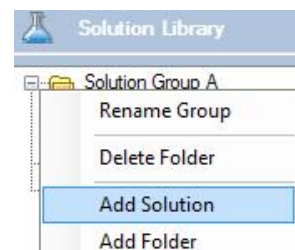
1. Right click on the Folder the solution name will be placed in. The Solution library menu will open.

Select **Add Solution**.

2. A text box will open to type the name of the solution below the folder selected.

3. Type the name of the solution. Press Enter.

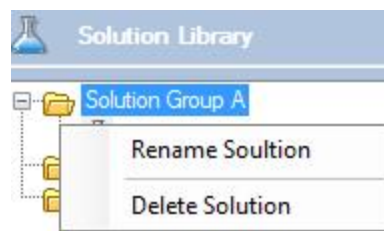
4. Repeat above step to enter multiple solution names.



Rename or Delete a Solution

Solution names can be renamed or deleted at any time without affecting the sequence created by them. Both commands can be accessed by right clicking on the solution name. From the menu that appears, select either Rename Solution or Delete Solution.

Once deleted the solution name cannot be retrieved.

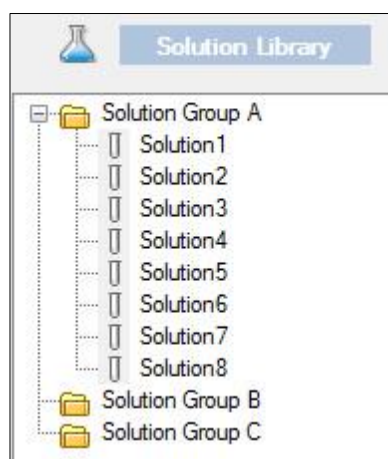


Using the Solution Library to Create Sequence Projects

Once the Solution library is populated with all the solutions to be used in an experiment, it can be used to create a new sequence project.

Left clicking on the Solution name will create a protocol in the Sequence Resource window. A Syringe with the solution name will appear in the Sequence Resource window. This protocol has the default parameters defined in the setting menu.

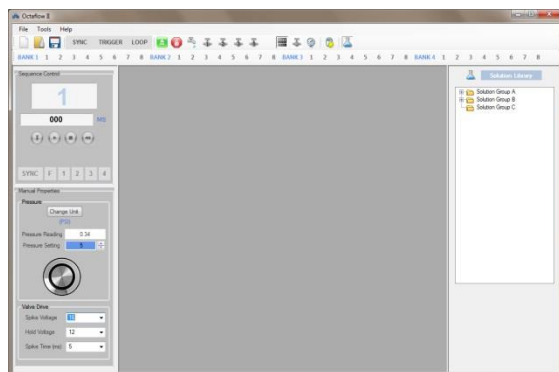
As described in the section “Automatic input of a Sequence Project”, Solutions can be added to the Sequence Resource window to be used in a sequence project.



Valve Control – Running Experiments

Once having setup valve configuration and sequencing, you are ready to begin conducting experiments in one of two modes: manual and automatic sequencing modes.

Manual Mode



Manual mode provides a simple and efficient means to control basic projects or experiment with adjusting valve parameters to customize perfusion profiles.

Manual mode requires no sequence files to operate.

In the Manual Properties window, the pressure, spike voltages, spike time and hold voltages can be entered. *Refer to the section ‘Manual Properties window’ earlier in the manual for more information.*

Valves are controlled manually via the **Valve Bank** control panel in the program toolbar. There are 4 banks of 8 valves each that control a total of 32 valves. The front panel of the Octaflow II interface has 4 DB-9 connectors corresponding to each bank.



Place the mouse pointer over the bank valve number desired and left click to activate the valve. Left click again to de-activate the valve.

Click on the valve mode button on the toolbar for other valve control options:



Normal Valve Mode: Default valve mode for manual control of valves. Any number of valves can be activated at a time in this mode.



Latched Valve Mode: Click on valve mode button to change to latched valve mode. In this mode manual control of valves allows only one valve at a time to be activated.

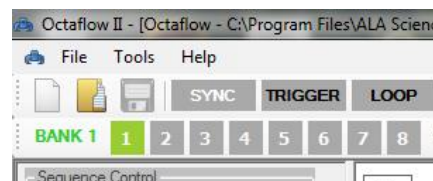


Momentary Valve Mode: Click on valve mode button until momentary manual control of valves is enabled. In this mode, a valve is activated only as long as button is held down.

Short Cut keyboard Keys for manual control




To control the valves via F-key keyboard input

1. Enable the Valve Bank by clicking the name of the bank. The name will turn green when enabled.
2. Press the F-Keys 1 through 8 on the keyboard to control each corresponding valves.
3. Disable this feature by clicking on the green bank name.




Running valve Sequences

Sequence projects that have been saved or newly created can be executed and controlled by the sequence control buttons.

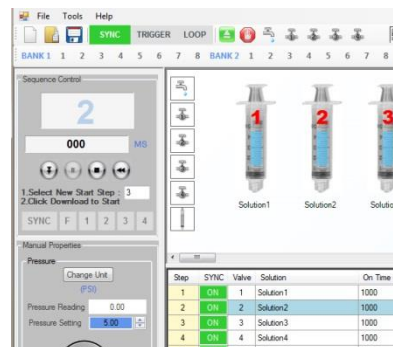
- 1)  **Download:** After loading the desired sequence project file or creating new one, the program has to be loaded onto the interface. This is done by pressing the **download** icon. A download must be performed after every change you apply to a sequence project file.
- 2)  **Run:** Sequences can be started and stopped or paused at any time simply by clicking on the corresponding button on the control panel. To execute (**Run**) the program, press the right arrow icon.
- 3)  **Pause:** A sequence can be paused at any time during a **run** and continued from the same step when the pause button is pressed again.




- 4)  **Stop:** The **Stop** button ends all valve executions for that specific step. The step that was stopped will be highlighted.

There are 2 options when the stop button is pressed.

- The sequence can terminate by pressing the Reset button and returning to step 1 as the start step.
- The sequence can resume on any step by entering the step value in the provided box, pressing the download button and then running the sequence again.



- 5)  **Reset:** The **Reset** button stops the sequence and sets the sequence counter back to the Starting step.

The SYNC, F, 1,2,3,4 boxes in the bottom of the Sequence control window are indicators when SYNC, Flush, ALT1, ALT2, ALT3, ALT4 ports are active.

The Sequence Control window indicates which step is active and has a counter that indicates the ON Time.

Octaflow Features

Trigger Functions

A major improvement in the OCTAFLOW II™ system is the many I/O capabilities via the Trigger port on the front panel. Due to the capabilities of today's acquisition systems TTL outputs, we have designed the trigger port to be floating (not grounded). This allows for many options in trigger settings to best work with your requirements. It is important to have a physical connection (BNC cable) from the Trigger port to your device for the trigger to function properly.

Trigger Function:

The port is set to TTL low (0V dc) This is used to halt sequence progression at the specified checked step and wait for an external rising (0 – 5V dc) TTL pulse via the BNC connector on the front panel before executing that step in the sequence.

The trigger function is inserted into the Sequence as a step via the Sequence resource window. The controls shown on the right will insert a trigger step when clicked.

There are 2 ways to insert a trigger step.

- The first is to left mouse click the resource desired. This will place the desired step at the end of the sequence.
- The second way is to right mouse click the resource desired. To place the resource in a specific step in the sequence, right click the step where you want the resource step to be placed in.



There are 4 types of trigger steps that can be used. Each is described below.



Time Interval Pause: Inserts a pause step for a user defined time interval before proceeding to the next step.



Wait for User Pause: Inserts a pause step and will wait for user to press the F10 key before proceeding to the next step in the sequence.

The next two pause steps require an input trigger signal from an external source. The type of trigger signal required can be set in the settings menu under the Tools drop down on the toolbar. The default setting is Positive edge trigger.



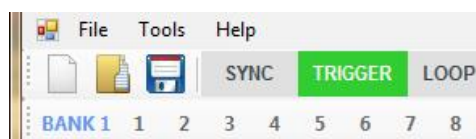
Trigger Signal Pause: Inserts a pause step and will wait for a trigger signal before proceeding to the next step in the sequence.



Trigger/ User Pause: Inserts a pause step and will wait for either a trigger signal or the user pressing the F10 key before proceeding to the next step in the sequence.

Step	SYNC	Valve	Solution	On Time (ms)	Pressure (PSI)	Spike Voltage	Spike Time (ms)	FLUSH	ALT
1	ON	1	Solution1	1000	2	18	5	ON	1 2 3 4
2	OFF	N/A	PAUSE		N/A	N/A	N/A	OFF	1 2 3 4
3	OFF	2	Solution2	1000	4	18	5	ON	1 2 3 4
4	ON	3	Solution3	1000	6	18	5	ON	1 2 3 4
5	OFF	N/A	WAIT FOR USER		N/A	N/A	N/A	OFF	1 2 3 4
6	OFF	4	Solution4	1000	8	18	5	ON	1 2 3 4
7	OFF	N/A	WAIT FOR INPUT		N/A	N/A	N/A	OFF	1 2 3 4
8	ON	5	Solution5	1000	10	18	5	ON	1 2 3 4
9	OFF	6	Solution6	1000	12	18	5	ON	1 2 3 4
10	OFF	N/A	WAIT		N/A	N/A	N/A	OFF	1 2 3 4
11	ON	7	Solution7	1000	14	18	5	ON	1 2 3 4
12	OFF	8	Solution8	1000	16	18	5	ON	1 2 3 4

When using trigger steps in a sequence project, the trigger function must be enabled. To enable the trigger function, click on the trigger button on the toolbar.



Sequence Loops

The OCTAFLOW II™ software allows you to create loops within the sequence steps. You can create loops to run any number of steps multiple times before proceeding to the next step outside of that loop. The loop function is controlled via the *Step Column* only.

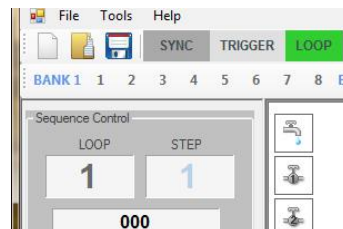
How to create loops

1. Place cursor on the step cell (under Step column) you want your loop to begin at. Hold down the left mouse button and drag it to the last step you want in the loop.
2. When you release the button the loop counter window will pop up. Here you can input the number of loops (repetitions) you want.



Press **OK** to accept the loop command or press **Cancel** to decline the loop command. Once accepted the selected loop steps will be highlighted a different color than the other steps.

3. Enable the loop function. In the toolbar click on the Loop button. It will be green when enabled.

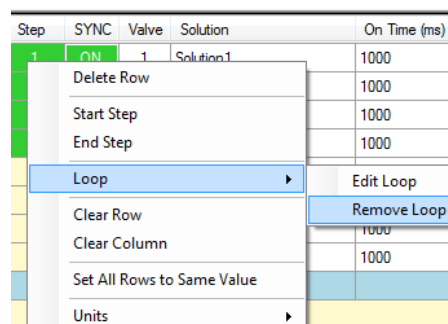


Note: Remember to download the sequence whenever you make any changes to the sequence file before running it.

How to edit or remove loops

To edit or remove any loop created in the sequence:

1. *Right mouse* click anywhere on the sequence planner window and select edit or remove loop from the dropdown menu.
2. From here you can remove the loop from the sequence, change the starting step, the ending step or the loop count.
3. Press **OK** when done editing.



Note: Remember to download the sequence whenever you make any changes to the sequence file before running it.

Record Manual Steps



Manual steps can be recorded by clicking the **Record** icon in the manual control window. This allows you to record every manual step that was executed.




Enabling manual recording when there is no sequence file opened will open a **New** sequence editor. All executed manual steps will appear in the sequence editor. This recorded sequence can now be saved for future use or for reference.

Software Tools

Cleaning Function

Periodic cleaning or flushing of perfusion system tubing is an essential maintenance routine for any perfusion system to insure proper operation, accurate test results and maximum equipment life. The OCTAFLOW™ provides a **Cleaning Function** as a simple, convenient way to quickly setup and executes a flush operation.

To perform a flushing routine:

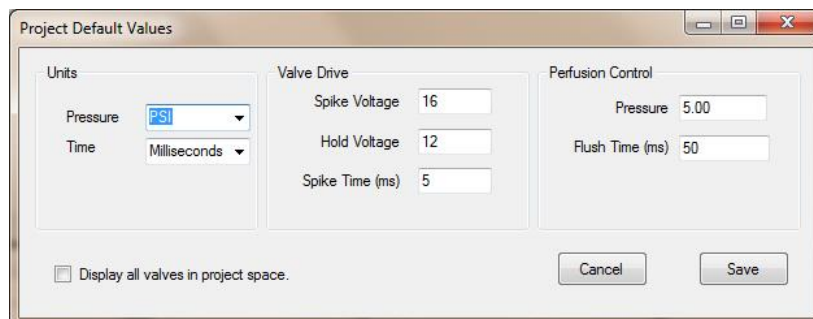
-  Select the **Cleaning Function** icon option from the toolbar.
- The cleaning control will open in the toolbar
- Select any combination of 1 to 8 valves from any bank with available valves or select the entire bank.
- Enter desired flush time into **Time** box. Time is in hh:mm:ss format.
- Press the Enter key for the time vales to be sent to the interface.
- Set the pressure in the system properties window.
- Finally, begin flush operation by clicking the Start button. Once started, flushing can then be stopped and resumed as desired using the Start/Stop button.



Note: Due to device power limitations and overheating, no more than 8 valves may be flushed at a time.

Settings

Project Default Values allows you to assign default values to be used for manual control of Octaflow II system. These values are saved and will be loaded every time the Octaflow II software is opened.



To access settings select the **Tools** option from the **Toolbar**. This will open the **Settings** window as shown.

Units:

Default Pressure, voltage and Time units can be selected here. When a new sequence is started the default units will be used.

Valve Drive:

Default Hold voltage, Spike voltage and Spike time values can be entered here. These values will be used for manual valve control as well as for new valve properties.

Perfusion Control:

Default Pressure value, Tubing size and Flush time are entered here. These values are used in new sequence projects.

Flush time also requires that the flush feature be enabled in each step in a sequence.

Under the Flush column in the sequence window, click on the cell labeled "FLUSH" so it reads ON. That sequence step enable the Flush port on the rear of the

Spike Voltage	Spike Time	FLUSH	ALT
18	10	ON	1 2 3 4

Octaflow II interface for the amount of time

