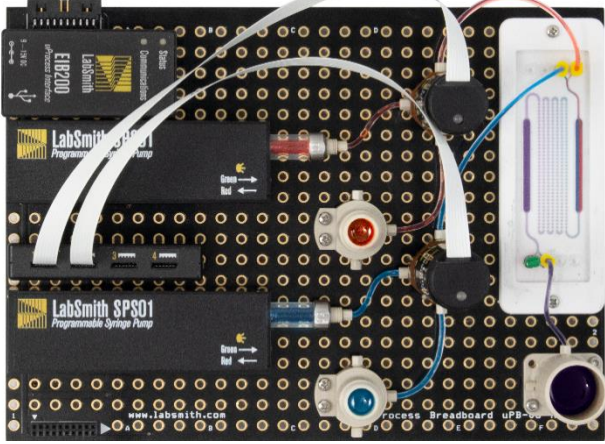
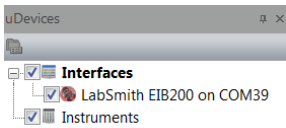



Microfluidic Educational Kit - Troubleshooting Guide

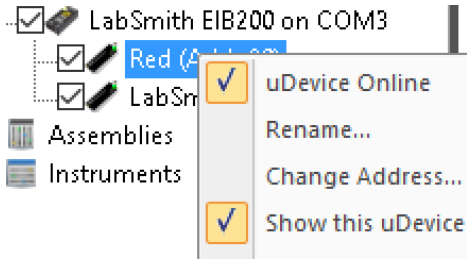
ASSEMBLY PROBLEMS:

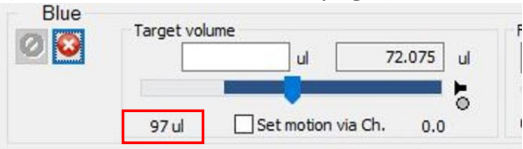
Problem	Resolution
The tubing won't fit in the one-piece fitting	The one-piece fitting probably got compressed from overtightening. A 1/16 th inch drill bit can be used to open up the fitting. Make sure you cut the tubing with sharp scissors.
Tubing won't stay in the fitting.	See informational video: https://www.youtube.com/watch?v=xs7wYqSid2Q <ol style="list-style-type: none"> 1. Make sure that the end of the tubing protrudes slightly through the fitting. 2. Turn the fitting until it is finger-tight and then use the provided wrench to tighten it by one quarter turn (Be careful, over-tightening could cause the fitting to break in the port) 3. Try a different fitting or piece of tubing
The components don't fit on the breadboard	Reposition the syringe pumps, EIB200, and 4VM02 so they follow this approximate setup: 
Tubing is pulled tight or pinched	Reposition the components so the tubing is slack and not pulled taught and that there aren't any kinks in the tubing.
There are bubbles in the microfluidic chip	Add a small drop of diluted dish soap to one of the intake reservoirs. Pull the liquid from that reservoir into the syringe pump and push it through the chip. Continue flushing until all bubbles are removed from the chip.
There are bubbles in the tubing/syringe pumps	The system needs to be degassed. Refer to this link and see the article about how to degass. https://labsmith.com/labsmith-application/degassing-a-microfluidic-system-2/

SOFTWARE CONNECTION PROBLEMS:

Problem	Resolution
<p>Correct Com port can't be found</p>	<ul style="list-style-type: none"> • Check that EIB200 is plugged into a power outlet (Red LED should be illuminated on EIB200). • Check that USB cable is plugged into EIB200 and computer. • Follow the instructions in assembly guide to determine the correct com port and connect to EIB. • Ensure that the device driver is installed. Download the driver at https://labsmith.com/support/uprocess-microfluidic-automation/ under "Software and Drivers."
<p>EIB200 is listed under interfaces, but has a red circle/slash through it</p> 	<ul style="list-style-type: none"> • Click the 'Rescan for Devices' button (🔄) on the top toolbar. • If rescanning doesn't work, right click on the EIB icon, select <i>Remove this interface</i>, then follow instructions above.
<p>Valves do not show up in the 'Interfaces' page</p> 	<ul style="list-style-type: none"> • Check that the ribbon cables are connected in the proper orientation at both the valve and the 4VM02 • Once the cables are correct, click the 'Rescan for Devices' button (🔄) on the top toolbar.
<p>The software finds the EIB200, but one or more of the components plugged into the breadboard is missing</p>	<p>Make sure all the components are properly connected to the breadboard and click the 'Rescan for Devices' button (🔄) on the top toolbar.</p>
<p>Syringes are not filling with liquid</p>	<ul style="list-style-type: none"> • Check that the valve is switched to the correct position. For most setups, the valve will be in position 'B' to fill the syringe. • Check that the fittings are tight and the tubing between the valve and syringe and valve and reservoir are secure. A loose fitting will allow to air pull into the system • Check that there are no kinks in the tubing between the valve and syringe or reservoir.
<p>No flow for one or both colors through the chip</p>	<ul style="list-style-type: none"> • There could be air bubbles in the syringe and tubing that need to be pushed out. Let the automation repeat one or two times to push any air out. • Check and make sure the valves are switching. The LED on top will light up when the valve changes and the arm on the front of the valve indicates its position. • Make sure the syringe pump is moving. The LED will light up Green when pushing and Red when pulling. • Compare your script to the one in instruction packet. Check to be sure your valves are switching correctly and are not reversed.

SCRIPT ERRORS: (Note, for all script errors you can double click on the error in the Output Window and it will highlight the line of the error)

Common script errors	Resolution
One object declared in the script cannot be found	<ul style="list-style-type: none"> • One of the devices is not connected or has a different name than the one in the script. • Check and make sure all the devices show up in the 'Interfaces' page. • Either rename all the instances of the device in the script or rename the object (right click on the device in the device tree and select 'Rename').
Device not found	<ul style="list-style-type: none"> • Double click on the error and make sure that all device specific commands (SetFlowRate, SetValves, MoveTo, Stop) include a device For example, both these commands need "Red:" before them in order to work: <pre>Red: SetFlowRate(500.000 u1/min) Red: MoveTo(80.000 u1)</pre> • If that is not the problem, this means there is no declaration for the device. The top heading should look like this: <pre>*Red = SPS01 80 u1 *Blue = SPS01 80 u1 *4VM = 4VM02</pre> Red, Blue, and 4VM should be the names of the devices listed in the device tree. To rename a device, right click on the device in the device tree and click 'Rename'. 
Command not found	<p>Double click on the error and make sure that there are no typos in the function and that it is a valid function for the device type. Remember, some commands are device specific:</p> <pre>BLUE: MoveTo(0.0) ✓ MoveTo(0.0) ✗</pre> <p>While others are global commands:</p> <pre>Wait() ✓ Blue: Wait() ✗</pre>

<p>Wrong parameter type</p>	<p>This most likely occurs when there is a command that uses a variable that has not been defined.</p> <p>For example, here the variable 'a' is used before it's defined:</p> <pre>Red: MoveTo(a) a = 5</pre> <p>To fix the error, define the variable before it is used:</p> <pre>a = 5 Red: MoveTo(a)</pre>
<p>Variable "x" is not defined</p>	<p>See 'Wrong parameter type'</p>
<p>Label not found 'StepName'</p>	<p>Step names cannot have spaces and must end with a colon:</p> <pre>Step_1: Red: SetFlowRate(300.000 u1/min) Red: MoveTo(80.000 u1)</pre> <p>Goto or loop commands have to match the step name exactly:</p> <pre>Goto Step_1</pre>
<p>Unexpected characters found</p>	<p>Double click on the error and check to be sure there aren't extra characters before or after a command. If you want to include a comment, put a semicolon (;) before it in the line.</p> <p>Also remember a 'Goto' command does not require a number after it (like a 'Loop' does). It will repeat until the script is manually stopped.</p> <pre>Goto Step_1 Loop Step_1 5</pre>
<p>The parameter is outside the range supported by the uDevice in its present configuration.</p>	<p>Syringe pump flow rates have to be between 0.1 and 2800 (The flow rate cannot be zero)</p> <p>Syringe pumps can be set to move to any value between 0 and their set maximum position.</p> <p>(Found on the 'Interfaces' page:)</p>  <p>Valves can be set to position 0 (no change), 1 (open A), 2 (close), or 3 (open B)</p>
<p>Duplicate label</p>	<p>All step labels (Step1, Valves_B, Fill_Syringes, Valves_A, Infuse, etc.) must be unique.</p>