

PHIL Operation

1. Operate PHIL

a. Start GUI

- i. Open latest GUI version.
- ii. Run GUI script.
- iii. Select Configuration File or click cancel to generate a new one.
- iv. Click “Detect Port,” if necessary.
- v. Select Arduino Port.
- vi. Click “Connect.”
- vii. After connection is acknowledged click “Home.”

The screenshot displays the PHIL GUI interface. On the left, there are input fields for 'User Initials', 'Microscope' (set to '11'), and 'Reagent Names' (Reagent 1 through Reagent 9). Below these are 'Experimental Parameters' including 'Plate Type' (set to '96 Wells') and 'Steps' (set to '1'). Buttons for 'Generate Steps', 'Load Excel', 'Save Excel', and 'Run' are located at the bottom left. The central area features a 96-well plate grid with columns labeled 1-12 and rows labeled A-H. A 'Change well' button is positioned over the D6 well. On the right, a 'Pipette Order' table is visible, showing 'Volume (uL)' (100), 'Suction (uL)' (150), 'Repetitions' (1), and 'Step Delay (ms)' (50). At the bottom, there are buttons for 'iv. Detect Port', 'vi. Connect', and 'vii. Home', along with a 'Configuration File' path and 'Browse', 'Load Configuration', and 'Save Configuration' buttons.

b. Calibrate Robot

- i. Place a 96 well plate in the stage.
- ii. Move the robot to your desired wells.
- iii. For each well:
 1. When the pipet tips are above each well enter an estimated offset.
 2. Click “Go to Offset.”
 3. If you are satisfied with the adjustment click “Set offset”
 4. If you are not satisfied with the adjustment click “Go back” and enter new offset values.
- iv. Click any well.
- v. Click “Go to Well Bottom.”
- vi. Adjust the pipet height up or down.
- vii. When satisfied click “Set Well Bottom.”

H29		711		0		0		0		0		0		0		0		0		0		0						
Setup P.H.L. Control P.H.L. Script Experiment Headless Mode																												
Penstatic	100	vL	ADD Waste	SUBTRACT Waste	96 Well Plate 384 Well Plate																							
Penstatic	100	vL	ADD 1	SUBTRACT 1	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12
Penstatic	100	vL	ADD 2	SUBTRACT 2	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12
Penstatic	100	vL	ADD 3	SUBTRACT 3	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Penstatic	100	vL	ADD 4	SUBTRACT 4	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12
Penstatic	100	vL	ADD 5	SUBTRACT 5																								
Penstatic	100	vL	ADD 6	SUBTRACT 6																								
Penstatic	100	vL	ADD 7	SUBTRACT 7																								
Penstatic	100	vL	ADD 8	SUBTRACT 8																								
Penstatic	100	vL	ADD 9	SUBTRACT 9																								
Clean Load																												
Forward				Up																								
Left				Right																								
Backward				Down																								
Distance (mm)				5																								
X Offset (mm)				1. 2.5				4. Go Back				2. Go to Offset				3. Set Offset												
Y Offset (mm)				1. 2.5																								
Set Enclosure Top Height				Set Plate Top Height				vii. Set Plate Bottom Height				Home XYZ				Disable Motors												
Go to Enclosure Top				Go to Plate Top				Go to Plate Bottom																				
0				0				4003																				
Port	4	Detect Port	Connect	Home	Configuration File: N:\chneider\Gara\PD\G\In\STAGEBOT\SCABBY\210513_Configuration.mtl																		Browse	Load Configuration	Save Configuration			

c. Script experiment

- Enter your desired step count.
- Select your desired plate type.
- Click “Generate Steps.”
- Enter your fluid names in their assigned locations.
- Enter your desired times between steps for each step.
- Enter your desired suction and addition volumes for each step.
- Click each well you wish the robot to modify and enter your desired ratios for each fluid for each step.
- Click “Save Excel.”
- Click “Run.”

H29		711		0		0		0		0		0		0		0		0		0		0			
Setup P.H.L. Control P.H.L. Script Experiment Headless Mode																									
Experiment																									
User Initials																									
Microscope		11																							
Reagent Names																									
Reagent 1	iv.																								
Reagent 2																									
Reagent 3																									
Reagent 4																									
Reagent 5																									
Reagent 6																									
Reagent 7																									
Reagent 8																									
Reagent 9																									
Experimental Parameters																									
Plate Type	i. 96 Wells																								
Steps	ii. 1																								
iii. Generate Steps																									
Load Excel																									
ix. Save Excel																									
X. Run																									
Step 1																									
A	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	B	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12
C	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	D	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12
E	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	F	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
G	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	H	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12
Pipette Order																									
Suction First																									
vii. Suction (uL)																									
vi. Suction (uL)																									
Repetitions																									
v. Step Delay (min)																									
63																									
Port	4	Detect Port	Connect	Home	Configuration File: N:\chneider\Gara\PD\G\In\STAGEBOT\SCABBY\210513_Configuration.mtl																		Browse	Load Configuration	Save Configuration