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**Bioresearch Support Core**

# **Beckman Coulter Echo 650 Acoustic Liquid Handler**

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STANDARD OPERATING PROTOCOL



## Bioresearch Support Core

# Echo650 Liquid Handler Standard Operating Protocol

## I. Preparation

1. Use Echo qualified source plates.

	PP plate (#PP-0200 or #001-14555)	LDV plate (#LP-0200 or #001-12782)
Vol range	15-65 uL	3-12 uL

*\*\*Depends on the liquid property, see Appendix Table 1.*

2. Prepare the sample and load adequate volume (include dead volume) to the Echo-qualified source plate.
3. Centrifuge the plate at 1500 g for 5 min to remove trapped air bubble.
4. Clean the bottom of the plate with Kimwipe.

## II. Initialization

5. Log in PPMS tracker.

Launch the software *Echo Plate Reformat v1.8.2*, select **Connect**.

6. In Protocol setup, select appropriate options in (a) source plate, (b) destination plate and (c) mapping mode.

### (a) Source Plate

Plate format: select **384PP** or **384LDV**

- Default Plate Type: select appropriate calibration protocol based on liquid properties. (Check *Appendix, Table 1*)

### (b) Destination Plate

- Plate type: select Biorad-4805 Hardshell

### (c) Mapping mode

- select Custom



Protocol Setup

(a) Source Plate

Name: Source

Plate Format: 384PP

Default Plate Type: 384PP\_AQ\_GP3

(b) Destination Plate

Name: Destination

Plate Type: Bio-Rad 4805 Hardshell

(c) Mapping Mode

☒ Regional

☒ Replication ☐ Full Plate

☐ Compress

☐ Decompress

☐ Custom

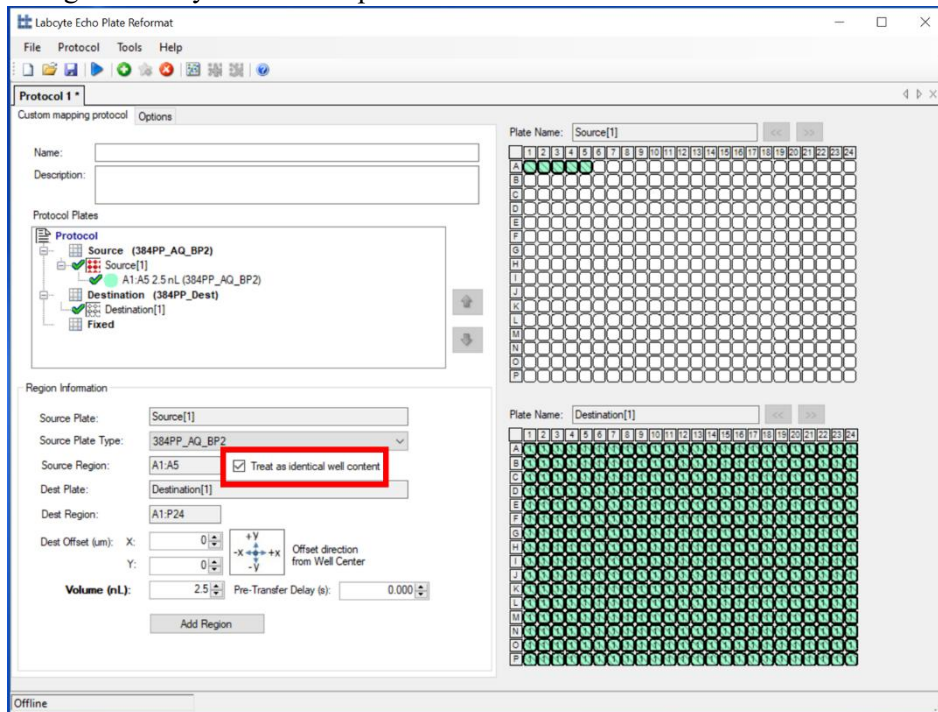
OK Cancel



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### III. Transferring liquid

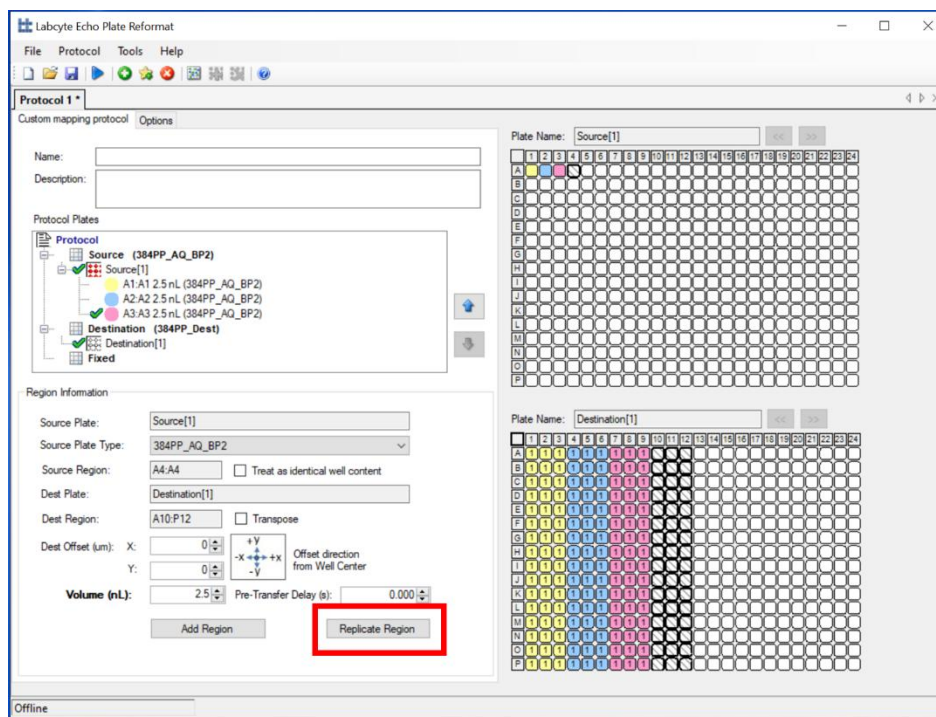
7. Create a new protocol.
8. Select the well(s) in the sources plate which contains the fluid to be transferred and select the well(s) in destination plate to receive the transfer volume.
  - a. If multiple wells have same content (e.g. master mix), check the box ***Treat as identical well content*** for optimizing the survey time and dispense.



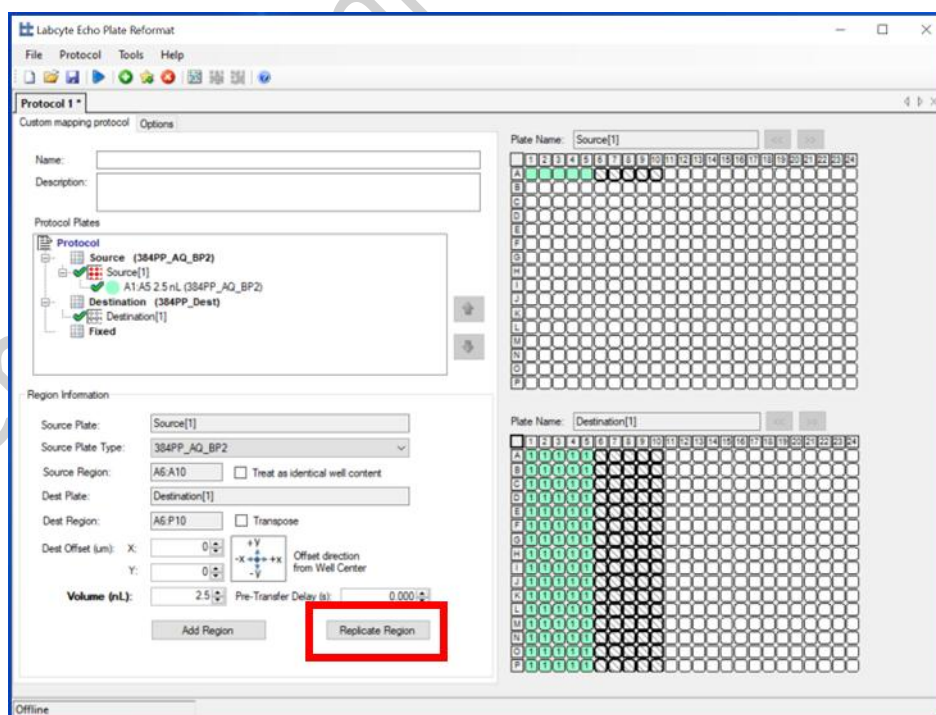


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- b. If a sample from one well will be dispensed to multiple wells (e.g., cDNA), select **Replicate Region**.



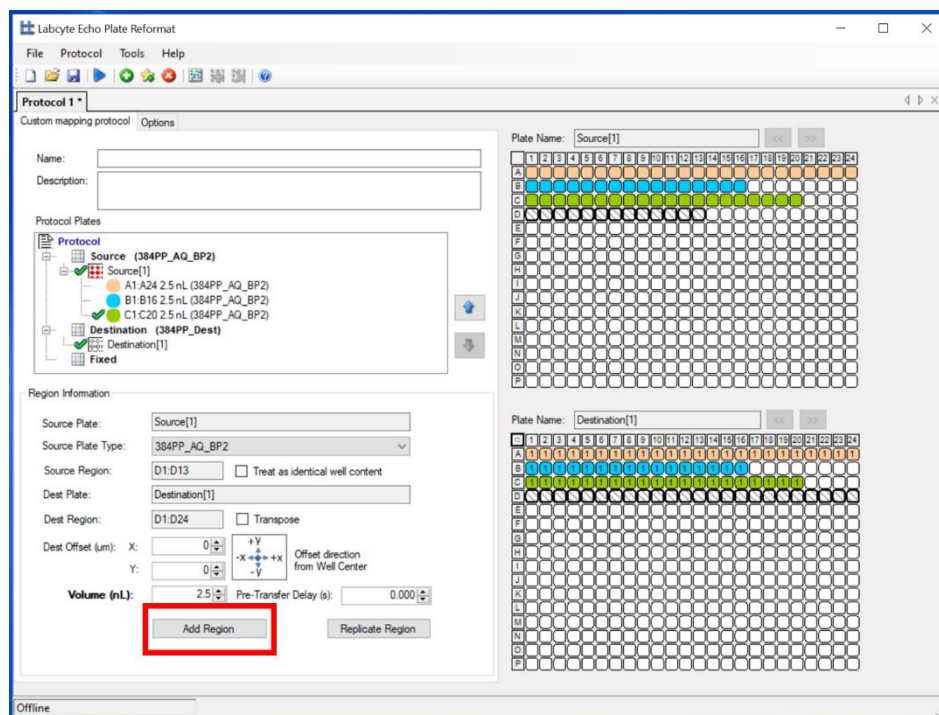
- c. If multiple dispenses of samples from **A1** to **A5** for 16 times (i.e. across the whole column), each at **A1** to **P1** and **A5** to **P5** respectively, select **Replicate Region**.



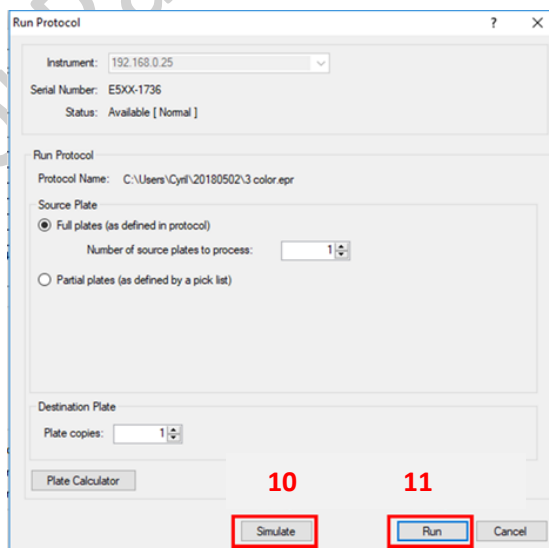


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- d. If samples will be replicated to the destination plate, select **Add Region**.



9. Input the volume to be transferred.  
Save the Protocol in D:\Users\Department\PI's Name\User Name. Click on **Start** button.
10. **(Optional)** Use **Simulate** to verify the protocol was set up properly. Adjust the delays in Animation if necessary. Skip the animation if needed. Check whether the volume and event counts in source and destination wells are as expected.



Close the Simulation tap. Amend the protocol for any issues being identified and repeat the simulation again if needed.

11. Click Start in Echo Reformat and click **Run**.
12. Put source plate on the reservoir plate gripper. Click **OK**



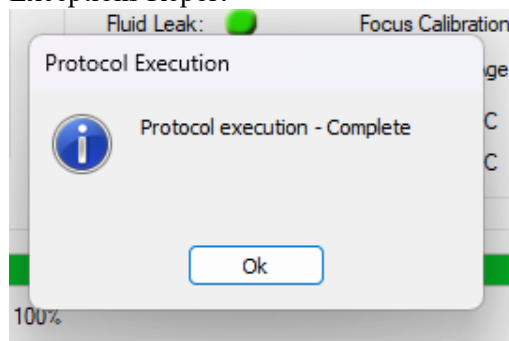


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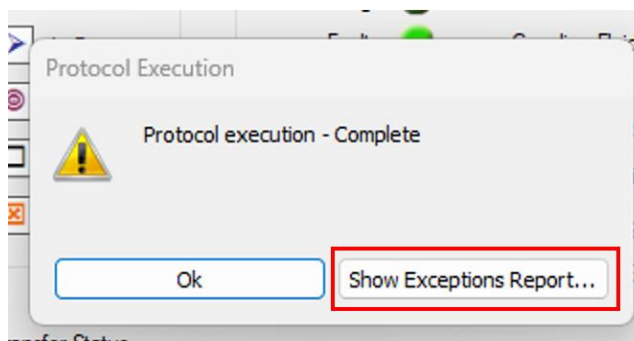
13. Put the destination plate in the receiver plate gripper. Click **OK** to start the transfer.

When the transfer finishes, remove the plates from Echo650 and put a cover on it or put it on ice if needed. Click **OK** after removal of each plate.

14. Upon transfer completion, if there are no exceptions, Click “OK”, otherwise there is exceptions, Click “Show Exceptions Report”



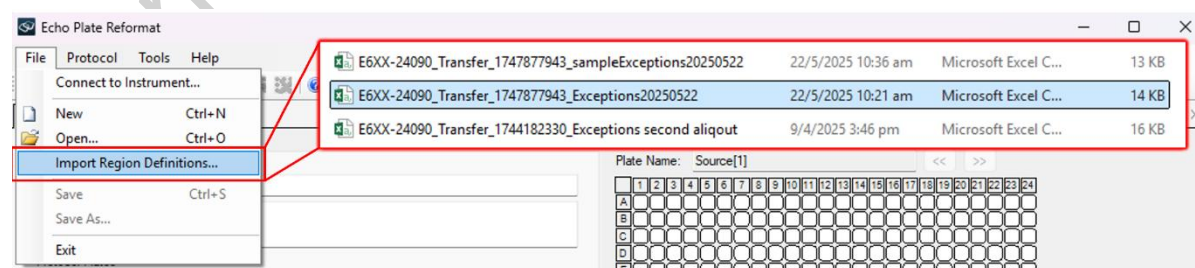
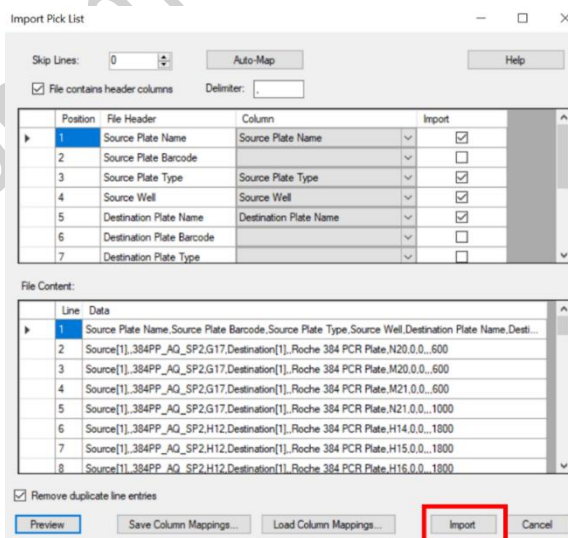
**No Exception**



**Exception occurred**

15. Go to “Echo Plate Reformat” folder and open the transfer record excel file. Make up for any transfer exception by importing a pick list (by editing the exception report) to transfer the makeup volume. To import excel file for transferring, click a new dispense file and click **File > Import Region Definition**. Choose the amended excel file. Click **Import**.

	A	B	C	D	E	F	G	H	I	J	K
1	Date Time	Source Plz	Source Plz	Source Wt	Destination	Destination	Destination	Destination	Destination	Transfer Volume	
2	03:03.4	Source[1]	384PP_ACJ3		Destination[2]	Bio-Rad 4i A1				1800	
3	03:04.4	Source[1]	384PP_ACJ3		Destination[2]	Bio-Rad 4i B1				1800	
4	03:04.5	Source[1]	384PP_ACJ3		Destination[2]	Bio-Rad 4i B2				1800	
5	03:04.6	Source[1]	384PP_ACJ7		Destination[2]	Bio-Rad 4i A2				600	
6	03:06.6	Source[1]	384PP_ACJ5		Destination[2]	Bio-Rad 4i A3				1000	
7	03:07.9	Source[1]	384PP_ACJ6		Destination[2]	Bio-Rad 4i B3				1400	
8	03:08.5	Source[1]	384PP_ACJ2		Destination[2]	Bio-Rad 4i B4				1400	
9	03:09.5	Source[1]	384PP_ACJ8		Destination[2]	Bio-Rad 4i A4				1800	
10	03:10.1	Source[1]	384PP_ACJ4		Destination[2]	Bio-Rad 4i A5				1800	
11	03:10.5	Source[1]	384PP_ACJ3		Destination[2]	Bio-Rad 4i B5				1800	
12	03:10.6	Source[1]	384PP_ACJ1		Destination[2]	Bio-Rad 4i B6				1800	
13	03:10.8	Source[1]	384PP_ACJ7		Destination[2]	Bio-Rad 4i A6				1800	
14	03:11.4	Source[1]	384PP_ACJ5		Destination[2]	Bio-Rad 4i A7				1800	
15	03:11.6	Source[1]	384PP_ACJ6		Destination[2]	Bio-Rad 4i B7				1800	
16	03:11.8	Source[1]	384PP_ACJ2		Destination[2]	Bio-Rad 4i B8				1800	
17	03:12.2	Source[1]	384PP_ACJ8		Destination[2]	Bio-Rad 4i A8				1800	
18	03:12.7	Source[1]	384PP_ACJ4		Destination[2]	Bio-Rad 4i A9				1800	
19	03:13.1	Source[1]	384PP_ACJ3		Destination[2]	Bio-Rad 4i B9				1800	
20	03:13.3	Source[1]	384PP_ACJ1		Destination[2]	Bio-Rad 4i B10				1800	
21	03:13.5	Source[1]	384PP_ACJ7		Destination[2]	Bio-Rad 4i A10				1800	
22	03:59.5	Source[1]	384PP_AC K1		Destination[2]	Bio-Rad 4i D8				200	
23	04:01.9	Source[1]	384PP_AC K8		Destination[2]	Bio-Rad 4i C8				200	
24	04:04.9	Source[1]	384PP_AC K2		Destination[2]	Bio-Rad 4i C9				1000	
25	04:06.5	Source[1]	384PP_AC K7		Destination[2]	Bio-Rad 4i D9				1000	
26	04:08.1	Source[1]	384PP_AC K6		Destination[2]	Bio-Rad 4i D10				1400	
27	04:08.8	Source[1]	384PP_AC K4		Destination[2]	Bio-Rad 4i C10				1400	
28										0	



16. Close Echo Reformat and log out PPMS tracker.

17. Sign on the logbook.



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### IV. Appendix

Table 1. Calibration Protocol based on liquid properties.

#### LDV plate

Calibration	Summary	Example fluids	Vol (μL)
384LDV_DMSO	384-plate, DMSO	70-100% DMSO	2.5 - 12
1536LDV_DMSO	1536-plate, DMSO		1 – 5.5
384LDV_AQ_B2	384-plate, buffer	Buffer without surfactant E.g. Oligos, cDNA, RNA, Guide-RNA, gene fragments and libraries	3 – 12
384LDV_AQ_P2	384-plate, protein	Buffers without surfactant containing proteins E.g. Enzymes/antibodies	6 – 16

#### PP plate

Calibration	Summary	Example fluids	Vol μL)
384PP_DMSO2	DMSO	70-100% DMSO	15 – 65
384PP_AQ_SP2	surfactant / protein	Buffers containing surfactant E.g. PCR mixes, lysis buffer, serum and plasma	15 – 65
384PP_AQ_GP3	buffer / protein	Reagents without surfactant E.g. Small molecules in water or buffer DNA/ RNA/ Plasmid/ Primers in TE/ water Proteins in water, buffer or glycerol storage solution Cell culture medium	15 – 65
384PP_AQ_CP	crystallography reagents, salts, etc.	Reagents w/o surfactants. MPD/PEGs/Osmotic solutions.	20 – 50