Echo® Array Maker Quick Start Guide

Version 1.6

The Echo® Array Maker application provides a variety of plate transfer functions to the Echo Liquid Handler and works with all Echo liquid handlers. With an interactive graphical editor, researchers can design custom spotting patterns to build custom arrays. In a similar fashion, researchers can create and edit protocols that map the transfer of fluids from microplates to the custom arrays using the Echo liquid handler. A variety of spotting patterns can be created for microarrays, MALDI-chips, and more.

The steps to creating a typical transfer protocol for Echo Array Maker Application are shown below.

1. Import the Labware.
2. Create an array or arrays within a new destination plate type (slide holder or microplate).
3. Create, add, or edit the pattern of spots within the array.
4. Create a new protocol.
5. Select the source plate type and the destination array type.
6. Add a region.
7. Save the protocol.
8. Start the protocol.

Importing the Labware

When connecting to an Echo instrument for the first time, the associated Labware files must be imported. This is required each time the Echo Array Maker application is connected to a new Echo instrument or if the Labware for a previously connected Echo changes. If the user skips this step, they may find that an error occurs when loading plate types.

To import Labware:

1. Select the **Tools** > **Labware Definitions** menu option. The **Plate Type List** dialog box is displayed.
2. Click **Import** to load the Labware files. The **Open Labware File** dialog box is shown.
3. Navigate to and select `C:/Labcyte/Echo/Protocols/EAMDestinationLabware.elwx`.
4. Click **Open** to load the Labware file. The following Labware Destination plates types are added:
   - 4-Slide-Holder
   - Greiner_CrystalQuick_96
   - Intelliplate_96x3well_LP
   - Intelliplate_96x3well_LVR
   - SwissCI_96x3well
5. Click **Save** to save the imported Labware.

6. Click **Close** to exit the **Plate Type List** dialog box.

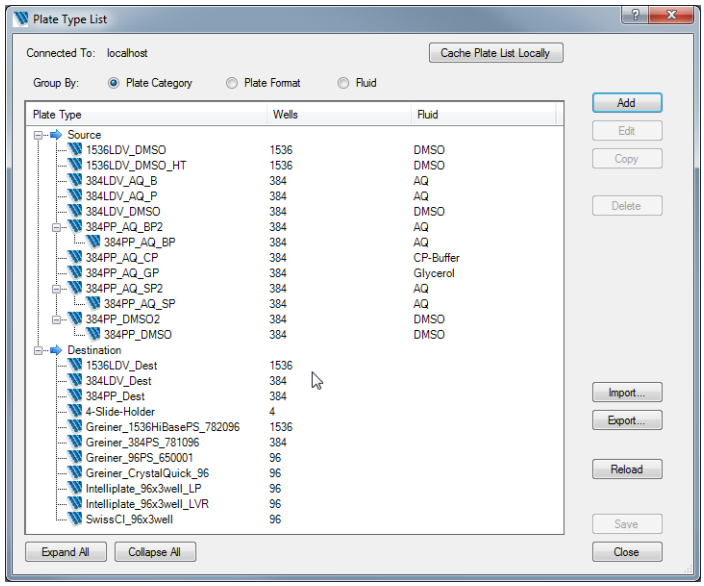

Figure 2.1 Plate Type List dialog box

Creating an Array within a Destination Plate Type

After importing the Labware Destination plate types, create a new Destination array. A Destination array contains one or more arrays. Each array can contain one or more unique patterns.

Patterns are the series of spots that can be assigned to one or more arrays within a Destination array. Patterns are created for specific array types. Pattern dimensions are limited by the array dimensions for which they were created.

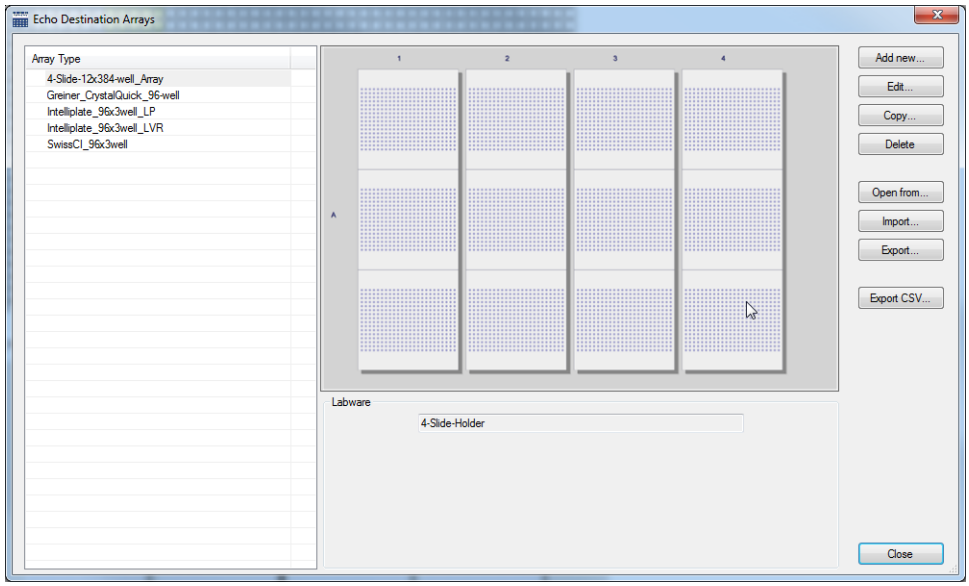

Figure 2.2 Destination Arrays dialog box

To create an array:

1. Select the **Tools** > **Destinations Arrays** menu option. The **Destination Arrays** dialog box is displayed.

2. Click the **Add new** button. The **Destination Array Editor** dialog box is displayed.

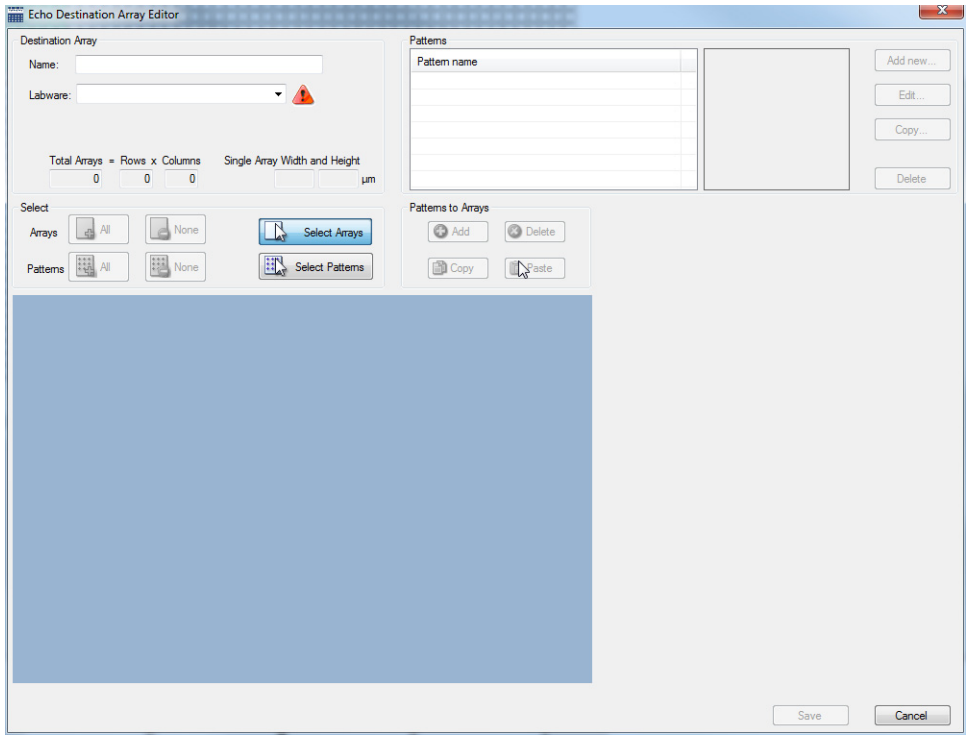

Figure 2.3 Destination Array Editor dialog box

3. Enter the **Name** of the array.
4. Select **Labware** from the drop-down menu. Based on the Labware selected, the **Total Arrays**, **Rows**, and **Columns** fields will be automatically filled in with the corresponding values.

Creating a Pattern

To create a pattern:

1. Create a pattern to add to an array. In the **Destination Array Editor** dialog box, click **Add New** next to the **Patterns** library. The **Pattern Editor** dialog box is displayed.

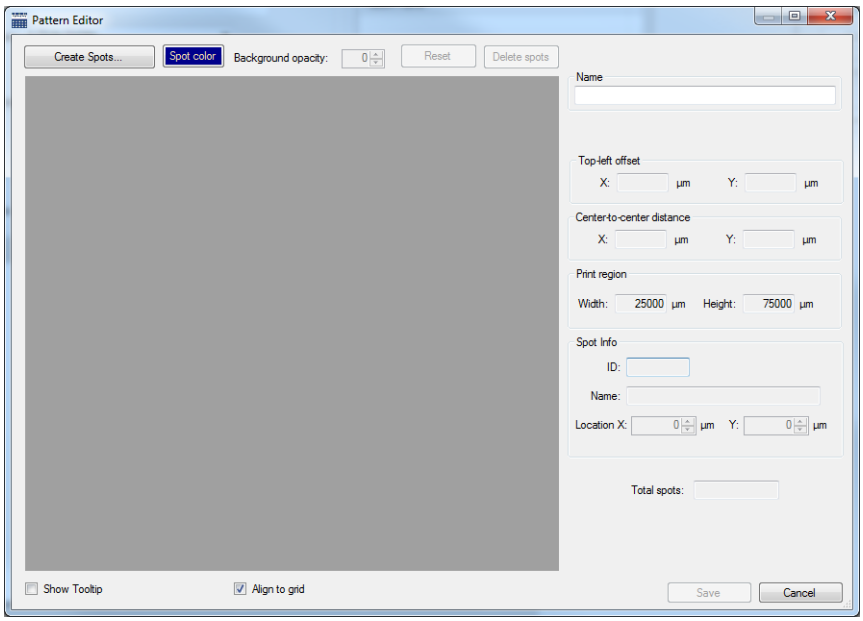

Figure 2.4 Pattern Editor dialog box

2. Enter the **Name** for the pattern.
3. Click **Create Spots**. The **Create Pattern** dialog box is displayed.

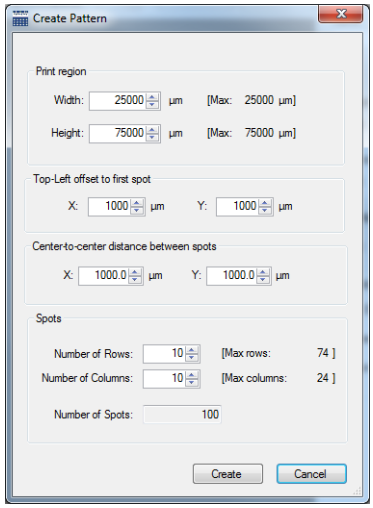

Figure 2.5 Create Pattern dialog box

4. Set the **Print region** dimensions. The **Print region** is defined as the **Width** and **Height** of the area within which the spots will be contained. The **Print region** is constrained by the dimensions of a single array.

   The **Print region** is constrained to a size that is smaller than the actual height of a single array.
5. Set the **Top-left offset to the first spot** coordinates: **X** and **Y** in microns.
6. Set the **Center-to-center distance between spots**: **X** and **Y** in microns.
7. Set the **Number of Spots** implicitly by setting **Number of Rows** and **Number of Columns**. The maximum number of rows and columns are defined by the pattern Center-to-center distance between spots. As the distance between spots increases, the number of possible rows and columns will decrease.
8. Click **Create** to create and save the pattern specified by the previous steps. The **Create Pattern** dialog box is closed and the user is returned to the **Pattern Editor** dialog box.

   Note: Once the pattern is created and saved, the user is returned to the **Pattern Editor** dialog box. If the user hovers the mouse over one of the spots, information is shown in the **Spot Info** fields on the lower right side of the dialog box. If the user clicks on a spot, the editable fields are activated. **Spot ID** is automatically generated and is not editable by the user. Other fields such as **Name**, **Location X** and **Location Y** can be edited and can be used when the need arises to move an individual spot within a pattern.
9. Click **Save** to save the pattern and close the **Pattern Editor**.
10. In the **Patterns** section on the upper right side of the **Destination Array Editor** dialog box, select the pattern to be added to the array.
11. In the **Select** section, select the array in which to add the pattern to.
    - To select a single destination array, click on the array to be selected.
    - To select more than one destination array, use Ctrl+click to select or deselect multiple arrays.

      Dragging the mouse over the desired destination arrays to select multiple arrays can also be used to select multiple destination arrays.
    - To select all of the available destination arrays, click the **All** button.
    - To deselect all of the selected destination arrays, click the **None** button.
12. In the **Patterns to Arrays** section on the lower middle section of the **Array Editor** dialog box, click **Add** to add the selected pattern from step 10 to the array(s) selected in step 11.
13. Click **Save** to save the new **Destination** array.
14. Click **Close** to exit the **Destination Arrays** dialog box.

Creating a Protocol

There are multiple ways to start a new protocol.

1. Select **New** from the **File** menu.
2. Click the **New** icon in the **Toolbar**.
3. Press **CTRL+N** from the keyboard.

After performing one of these steps, the **Protocol Setup** window will appear.

Selecting the Source Plate Type and the Destination Array Type

Note: It is assumed that the required destination arrays have been created.

1. Select the **Plate Format** to be 384PP, 384LDV, or 1536LDV. Based on the plate format chosen, the compatible plate types appear for **Plate Type**.
2. Select the **Plate Type** to set the transfer properties for the **Source Plate**.
3. Select the **Array Type** to set the properties for the **Destination Array**.
4. Click **OK** to save changes and create the specified protocol or **Cancel** to discard changes.

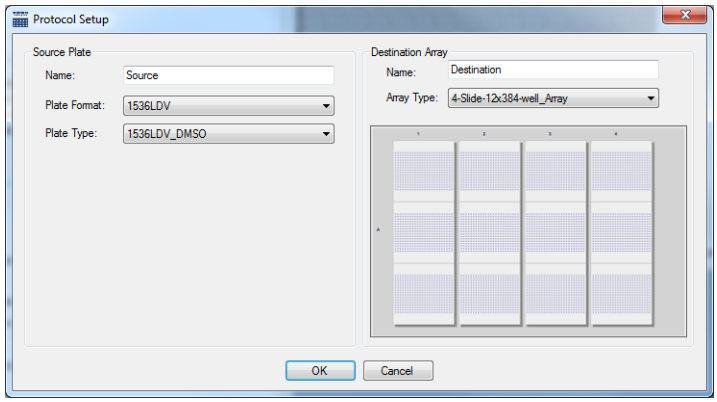

Figure 2.6 Protocol Setup window

Adding a Region

To add transfers from a source region to patterns:

1. In the **main Protocol** window, select the desired wells as the region in the source plate map from which the transfers will occur. This becomes the **Source Region**. The information box for that region is automatically populated.

   In the lower left corner of the **main Protocol** window in the **Region Information** section, the user can select the **Add Region** and **Replicate Region** buttons. These allow the user to determine the way in which the source region is mapped onto the selected destination.

2. In the **main Protocol** window, select the destination pattern or patterns to which the source region will be transferred. To select multiple patterns, use Ctrl + click or click and drag.
3. Click the **Add Region** button to duplicate the selected source region into the selected destination region in a one to one manner.

4. Select another source region and destination pattern, and click **Replicate Region**.

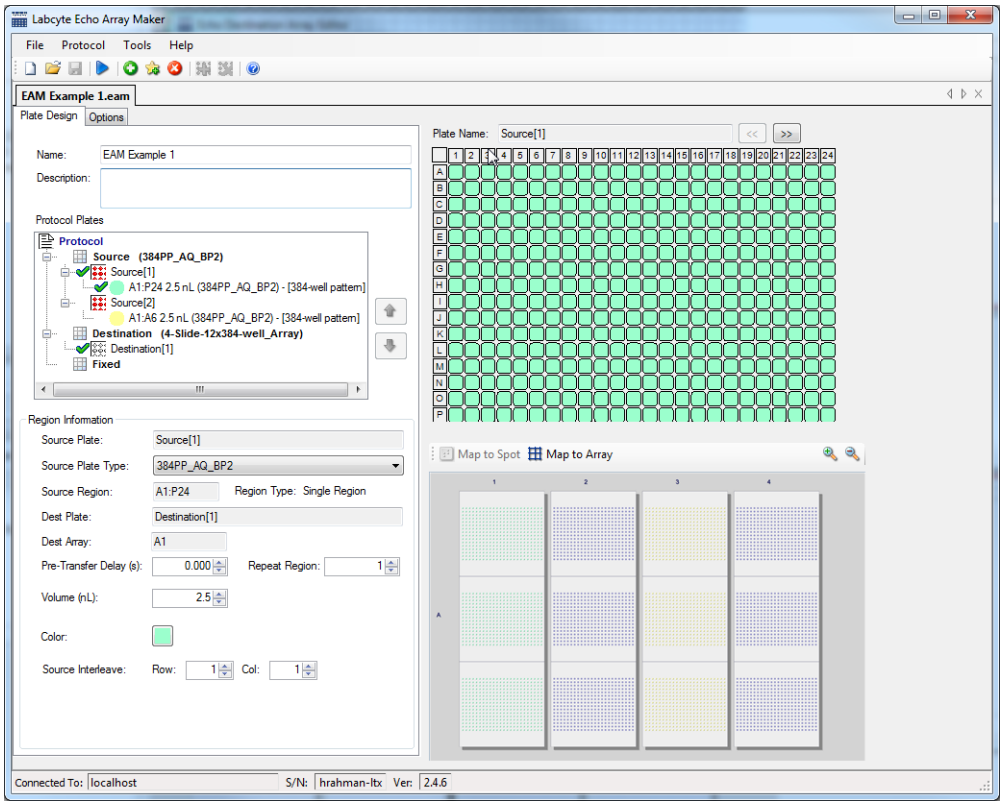

Figure 2.7 Main Protocol window after protocol was created

Saving the Protocol

To save the protocol:

1. Select **Save** from the **File** menu.
2. In the **Save Protocol** dialog box, enter a name for the protocol and click **Save**.

Starting the Protocol

Once the transfer maps for the source plate and fixed plate (if applicable) are complete, the protocol can be run on an Echo system or in simulation.

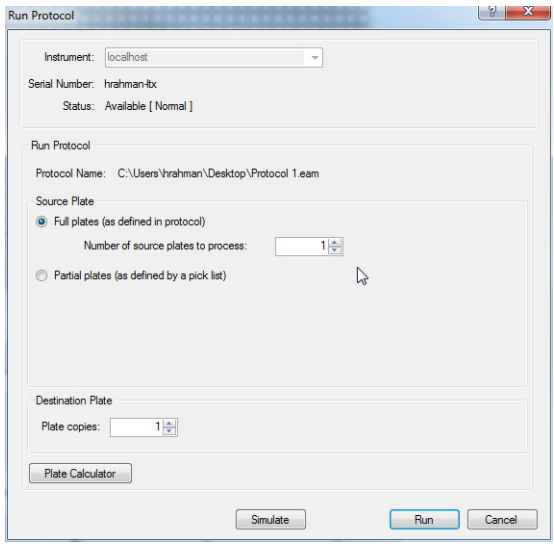

Figure 2.8 Run Protocol dialog box

1. Select **Run** from **Protocol** menu or click the **Run** icon in the **Toolbar**.
2. Select the **Instrument** if it is not already selected.
3. For the **Full Plates** option defined by the protocol, specify the number of source plates to process.
4. Select the number of destination plate copies to produce. If multiple destination plates are defined in the transfer map, each will be copied according to the number selected for **Plate copies**.
5. Click the **Plate Calculator** button to see the number of plates that will be processed during this run.
6. Optionally, click **Simulate** to test the run.
7. Click **Run** to display the **Run Status** window.
8. Click **Start** to execute the protocol.
9. Once the protocol run is completed, click **Close** to exit the **Run Status** window.

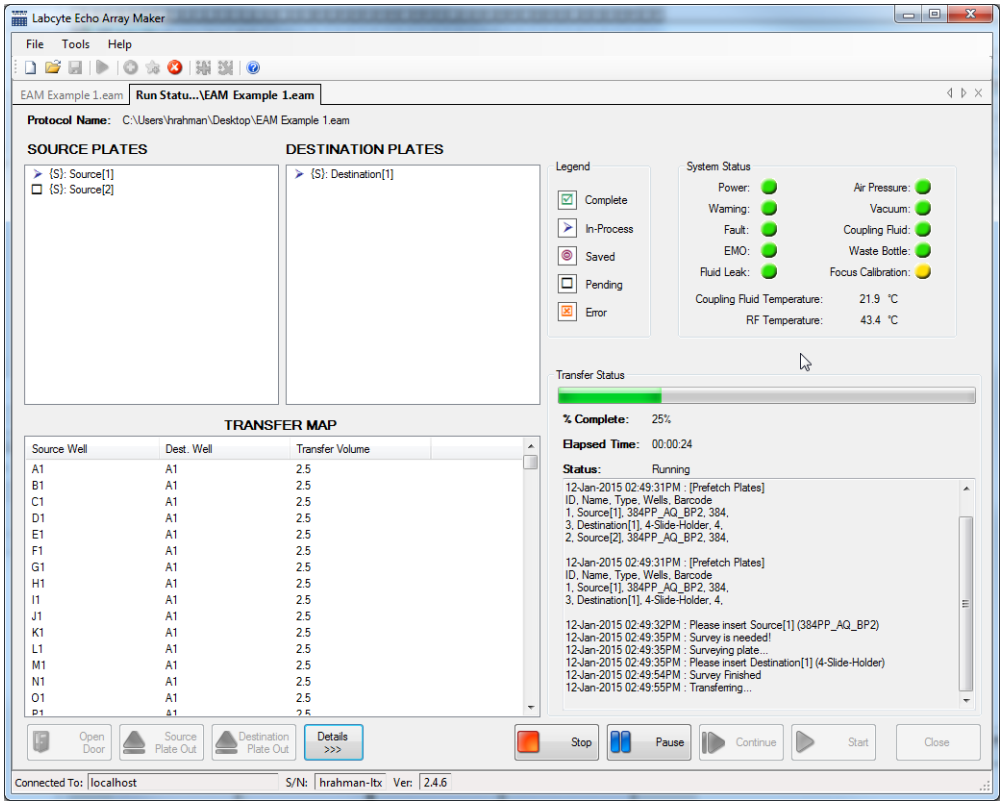

Figure 2.9 Run Status window

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