

USER GUIDE

Echo® Cherry Pick Application

Version 1.7.2

FEBRUARY 2019

FOR RESEARCH USE ONLY



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Documentation for Echo® Cherry Pick Application, Version 1.7.2

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Echo® Liquid Handlers, Applications Software and Automation Systems from Labcyte Inc. are covered by one or more of the following patents:

United States: 6,416,164; 6,548,308; 6,603,118; 6,612,686; 6,642,061; 6,666,541; 6,707,038; 6,710,335; 6,746,104; 6,802,593; 6,808,934; 6,809,315; 6,849,423; 6,855,925; 6,869,551; 6,893,836; 6,893,115; 6,916,083; 6,932,097; 6,938,987; 6,938,995; 6,991,917; 7,070,260; 7,090,333; 7,185,969; 7,270,986; 7,354,141; 7,405,072; 7,405,395; 7,439,048; 7,454,958; 7,481,511; 7,717,544; 7,899,645; 7,900,505; 7,901,039; 8,107,319; 8,389,295; 8,503,266; 8,770,69; 9,212,250; 9,586,215; 9,908,133; 10,112,212; 10,118,186.

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Additional patents are approved and pending in the United States and other countries.

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CHAPTER 1 | Preface

This section provides information about who the intended audience is, the software requirements, technical support resources, and documentation conventions used. It includes the following sections.

- [About this Guide](#)
- [Intended Audience](#)
- [Software Requirements](#)
- [Technical Support Resources](#)
- [Related Documentation](#)
- [Documentation Conventions](#)

About this Guide

This guide describes the key features of the Echo® Cherry Pick application.

Intended Audience

The intended audience for this guide is laboratory personnel. Researchers can use the Echo Cherry Pick application to develop plate transfer protocols for Echo Liquid Handlers.

Software Requirements

To use the Echo® Cherry Pick Application, the following items are required:

- Echo Liquid Handler instrument using server version 2.4.x or later and Echo.Net Framework version 1.7.
- Software license key from Labcyte Inc.
- Computer system meeting the following requirements:
 - **Operating system:** Microsoft® Windows® 7 (32-bit mode or 64-bit mode), and Microsoft® Windows 10 (64-bit mode) which must be run in Windows 7 Compatibility Mode; Windows .Net Framework 4.6



Note: Echo® Cherry Pick Application will run in 32-bit mode on a Windows 64-bit Operating System.

- **CPU:** Intel® Core™ i5 or later
- **Memory:** 4 GB or greater
- **Network connection:** 10/100/1000 BaseT
- **Network protocol:** TCP/IP
- **Hard drive:** 4 GB Free Space Available
- **Video:** 1280 x 1024 resolution

The Echo® Cherry Pick Application works closely with the Echo Liquid Handler Software for Client Computers and should be installed on the same client PC.

The Echo Software Compatibility Matrix table below documents the versions of software supported by this guide and their compatibility.

Table 1: Echo Software Version Compatibility Matrix

Echo Client Software	Echo Application Software	Tempo Automation Control Software	Echo.Net Framework
2.4.5 - 2.5.x	1.5.4 or later	1.5.2 or later	1.5.4 or later
2.4.5 - 2.6.x	1.6.0 or later	1.6.0 or later	1.6.0 or later
2.4.5 - 2.6.x	1.7.0 or later	2.1.x* or later	1.7.0 or later
3.1.x	1.7.2 or later	2.1.x* or later	1.7.2 or later



Note: For information on the compatibility of a specific software version, please contact your local Labcyte representative.

* Check with your Labcyte Sales Representative for availability.

Technical Support Resources

For technical support issues, support requests can be submitted via email to support@labcyte.com.

For telephone support, call (877) 742-6548.

Related Documentation

Labcyte documentation consists of the following publications:

- *Echo Cherry Pick Quick Start Guide*
- *Echo Combination Screen User Guide*
- *Echo Combination Screen Quick Start Guide*
- *Echo Array Maker User Guide*
- *Echo Array Maker Quick Start Guide*
- *Echo Plate Reformat User Guide*
- *Echo Plate Reformat Quick Start Guide*
- *Echo Plate Audit User Guide*
- *Echo Plate Audit Quick Start Guide*
- *Echo Dose-Response User Guide*
- *Echo Dose-Response Quick Start Guide*
- *Echo 21CFR11 Compliance Manager User Guide*
- *Echo 21CFR11 Compliance Manager Quick Start Guide*
- *Echo 21CFR11 Compliance Manager Admin User Guide*
- *Echo 21CFR11 Compliance Manager Admin Quick Start Guide*
- *Echo 500 Series Liquid Handler User Guide*
- *Echo 525 Series Liquid Handler User Guide*
- *Echo 650 Series Liquid Handler User Guide*
- *Echo Software Applications Integration Guide*
- *Echo Liquid Handler Software Integration Guide*
- *Tempo Automation Control Software User Guide*
- *Access Dual Robot System User Guide*

Documentation Conventions

Style	Purpose
<i>blue italicized text</i> (PDF, Web only)	Cross references, link, Web addresses
<code>courier std</code>	Commands, filenames, directories, paths, user input
bold text	Interactive interface objects, keys, buttons
<i>italicized text</i>	Book titles, glossary terms

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CHAPTER 2 | Introduction

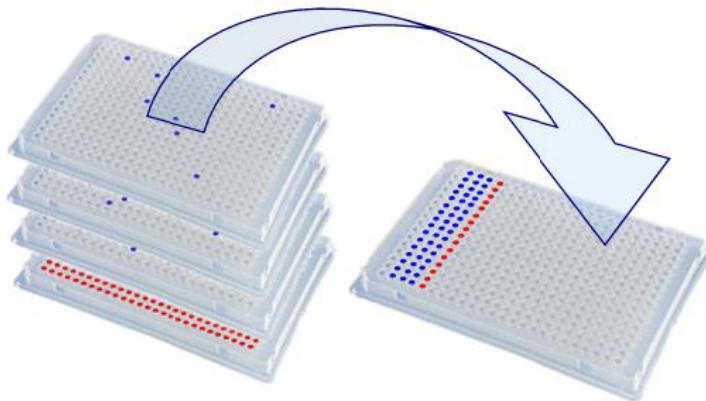
The Echo® Cherry Pick application provides a variety of plate transfer functions to the Echo Liquid Handler and works with all Echo Liquid Handlers. The transfer protocol defines plate parameters and processing order for imported pick lists. Pick lists are used to automate the transfer of selected samples from source plates to destination plates.

The application tracks the transfer process and reports final well positions in customizable reports.

The key features of this application are described below:

- **Pick list transfer** — Imports pick lists to transfer selected samples from source plates to destination plates. Pick lists can be imported during protocol creation or just before run time.
- **Sample consolidation or pooling** — Consolidates samples from several source plates to a single destination well.

Figure 1: Samples and controls from multiple source plates being transferred to a single destination plate



The steps to creating a typical transfer protocol for Echo Cherry Pick Application are shown below.

1. Start a new protocol. For more information, see [Starting a New Protocol](#).
2. Select the source and destination plate types. All protocols start with this step. For more information, see [Selecting Source and Destination Plate Types](#).
3. Set up the transfer protocol. For more information, see [Setting Up a Transfer Protocol](#).
4. Create or import a pick list. For more information, see [Importing a Pick List](#).
5. Edit the protocol. For more information, see [Editing the Protocol](#).
6. Run the protocol. For more information, see [Running a Protocol](#).
7. Manage the transfer data. For more information, see [Understanding Protocol Options](#).

Frequently Used Terms

There are many terms used throughout this guide that refer to parts of the Echo Cherry Pick application. It is useful to know and understand these terms before using the application.

- **Across** — Indicates the ordering of transfers to occur in a row-wise manner.
- **Control plate** — Echo qualified microplates containing controls or reagents for transfer to another microplate serving as a destination plate.
- **Destination plate** — Microplate receiving the transfer contents from one or more source plates.
- **Destination XY offset** — Implements X and Y offset within a well, if defined in the pick list.
- **Down** — Indicates the ordering of transfers to occur in a column-wise manner.
- **Echo qualified microplates** — Microplates manufactured for Labcyte and calibrated for use in Echo Liquid Handlers.
- **Multiple fluid classes on same destination plates** — Transfers samples in different fluid classes to the same destination plate without risk of cross-contamination during fluid transfer. For example, aqueous samples transferred to the same destination plate that contains DMSO or glycerol samples.
- **Pick list** — Subset of samples, based on well location, that will be transferred from one or more source plates.
- **Plate Format** — Defines the physical plate based on the number of wells, plate material (for example, PP, PS), and fluid capacity (for example, LDV).
- **Plate map preview** — Defines and allows a preview of various layouts of the destination plates.
- **Plate replication** — Replicates plates of pick list samples. Applies only to **Next Available Well** mode (non-defined destination well locations).
- **Plate Type** — Defines the transfer methodology appropriate for the contents transferred.
- **Report customization** — Customizes reports to match the user's informatics infrastructure.
- **Run simulation** — Simulates transfer runs before committing valuable samples to a new transfer protocol.
- **Source plate** — Echo qualified microplates containing samples or reagents for transfer to another microplate serving as a *destination plate*.
- **Source plate regions** — Sub-groups of wells within a microplate.
- **Time delay** — Implements time delay if defined in the pick list.
- **Unified control transfer** — Transfers pick list of controls in **Explicit** mode (defined destination well locations) along with samples transferred in both **Explicit** and **Next Available Well** mode.
- **Well replication** — Replicates sample wells. Applies only to **Next Available Well** mode (non-defined destination well locations).

CHAPTER 3 | Getting Started

This chapter describes the basic tasks to start, set up, and exit the Echo Cherry Pick application. It includes the following topics.

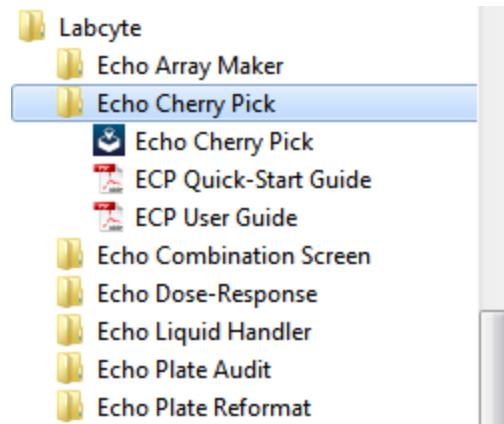
- [Starting the Software](#)
- [Activating the Instrument](#)
- [Understanding the Main Window](#)
- [Setting Up the Software](#)
- [Shutting Down the Software](#)

Starting the Software

To start the Echo Cherry Pick application:

1. Open the **Start** menu.
2. Select **All Programs (or Programs)** > **Labcyte** > **Echo Cherry Pick**.
3. Select the **Echo Cherry Pick** application.

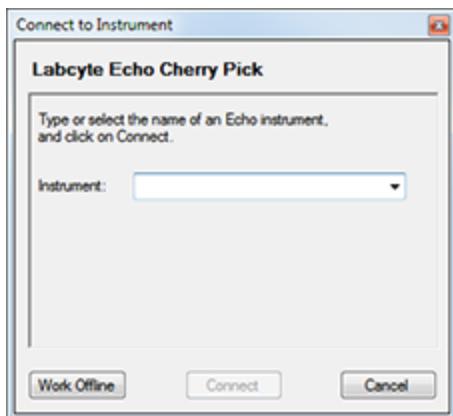
Figure 2: Location of Echo Cherry Pick application



Note: To create a shortcut to the **Echo Cherry Pick** application on the computer desktop, right-click on the **Echo Cherry Pick** icon and select **Send to** and **Desktop**.

After launching the application, the **Connect to Instrument** prompt is displayed.

Figure 3: Connect to instrument dialog box



The **Connect to Instrument** dialog box connects the Echo Cherry Pick application to a specific Echo instrument, if there are multiple instruments. If there are no instruments listed for **Instrument**, it means that the application has never connected to an instrument. After the first time a user connects to the instrument from the application, that Echo instrument will be added to the dropdown list in the application.

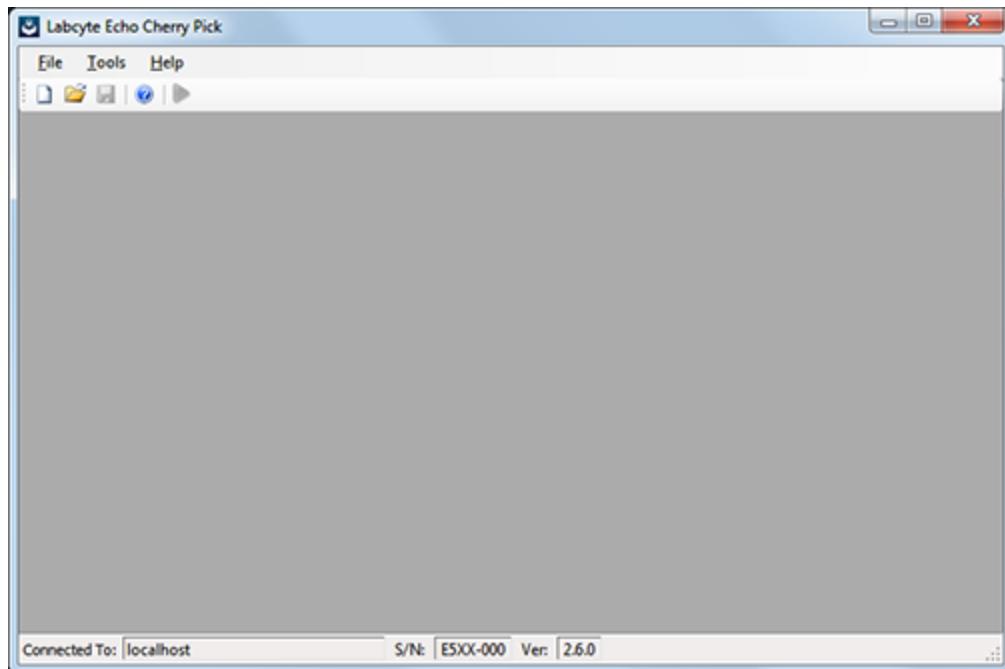


Note: Activating an instrument allows the user to run an actual protocol on a licensed Echo instrument. The user can still connect to the Echo instrument and create a protocol even if the licensing requirements have not been completed, but must click the **Work Offline** button to work offline. The protocol can be created but cannot be run until the licensing requirements have been met. If the user recently installed or upgraded the software, the instrument will need to be activated. See [Activating the Instrument](#) for more information.

4. Choose one of the following start options:

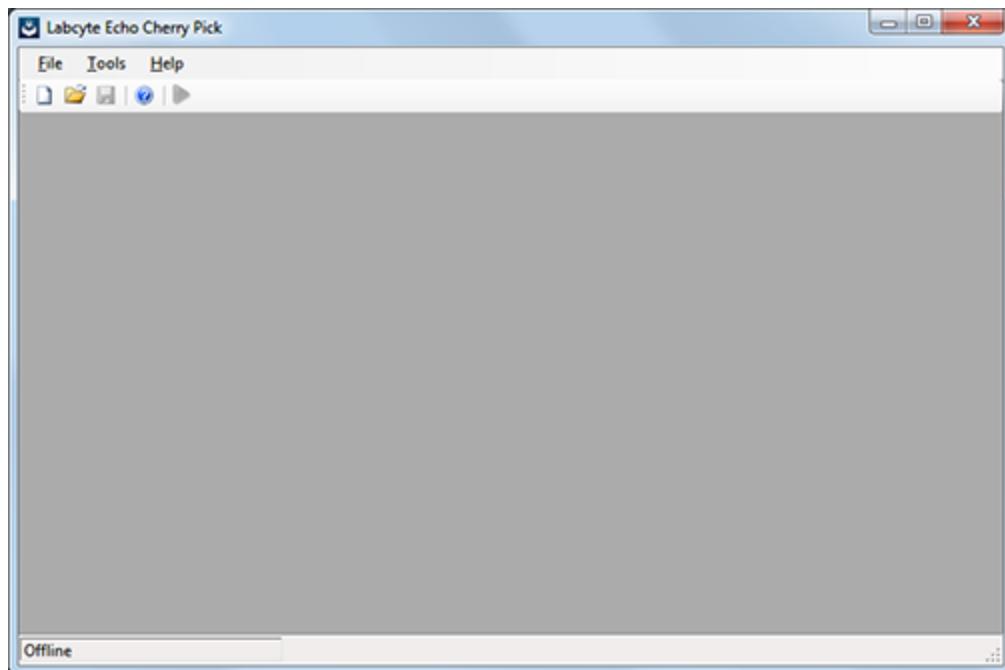
- **Connect:** Select an Echo Liquid Handler from the **Instrument** menu and click **Connect**. The Main Window opens with the connection status and instrument information at the bottom of the screen. This option enables the user to execute the sample or reagent survey as soon as the transfer protocol is ready.

Figure 4: Echo Cherry Pick application connected to an Echo Liquid Handler



- **Work Offline:** Click **Work Offline**. The Echo Cherry Pick application opens with the connection status set to *offline* at the bottom of the screen. This option enables the user to create a transfer protocol and run a simulation without connecting to the Echo Liquid Handler.

Figure 5: Echo Cherry Pick application offline



Activating the Instrument

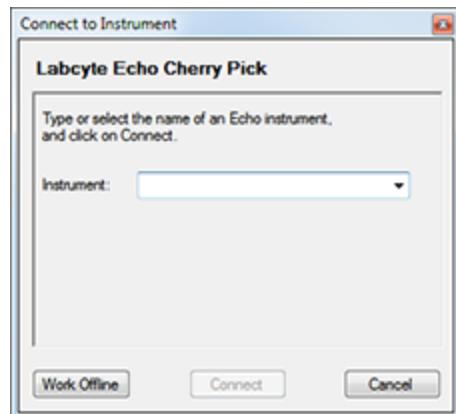
To run a protocol created from the Echo Cherry Pick application on an Echo Liquid Handler, the user must activate this application for each Echo Liquid Handler. Each application has to be activated for the instrument connected.

- The Echo Cherry Pick application must be activated with the software license key provided by Labcyte.
- If the Echo Cherry Pick application was installed with the Echo Liquid Handler by a Labcyte support engineer, the activation step should not be necessary.

To activate the instrument:

1. Start the Echo Cherry Pick application. See [Starting the Software](#) for more information.
2. In the **Connect to Instrument** dialog box, type the name or IP address of the Echo server to connect to and click **Connect**.

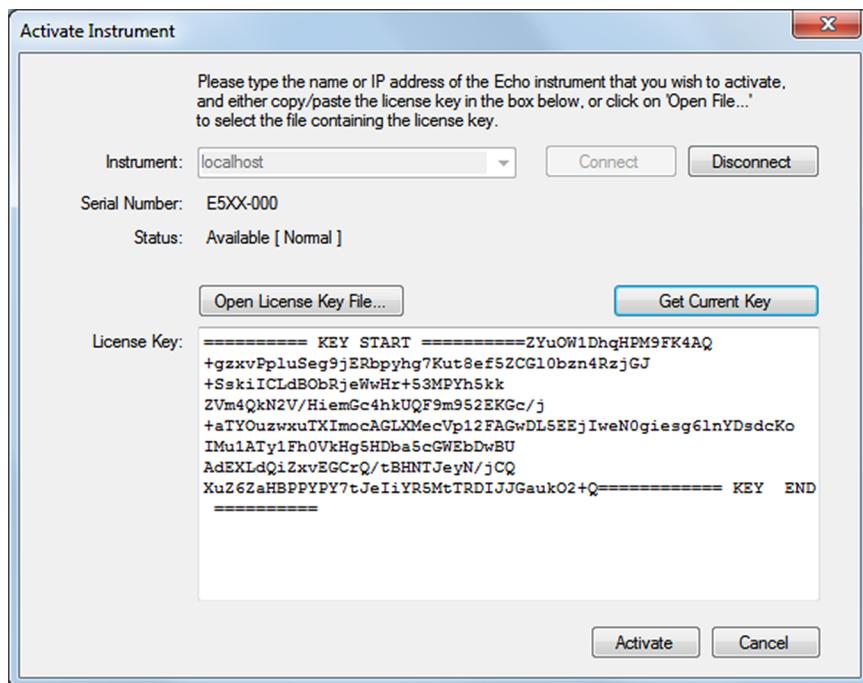
Figure 6: Connect to instrument dialog box



3. Click the **Tools** tab in the **Toolbar** and select the **Activate Instrument** option.
4. Enter the license key. The license key is an encrypted block of text that authorizes the user to run the Echo Cherry Pick application with a specific Echo Liquid Handler.

The license key can be entered in either of the following ways:

- Copy the license key from the file received from Labcyte and paste it into the **License Key** text box.
- Click the **Open License Key File** button and browse for the license key file.

Figure 7: Activate instrument screen

Note: The **Get Current Key** function is a useful troubleshooting tool used to verify that the key is written correctly to the instrument. When the **Get Current Key** button is clicked, the application searches for the license key and inserts it into the **License Key** text box. In case of an error, send the encrypted key to Labcyte to determine if the license key is corrupted or if it applies to a different instrument.

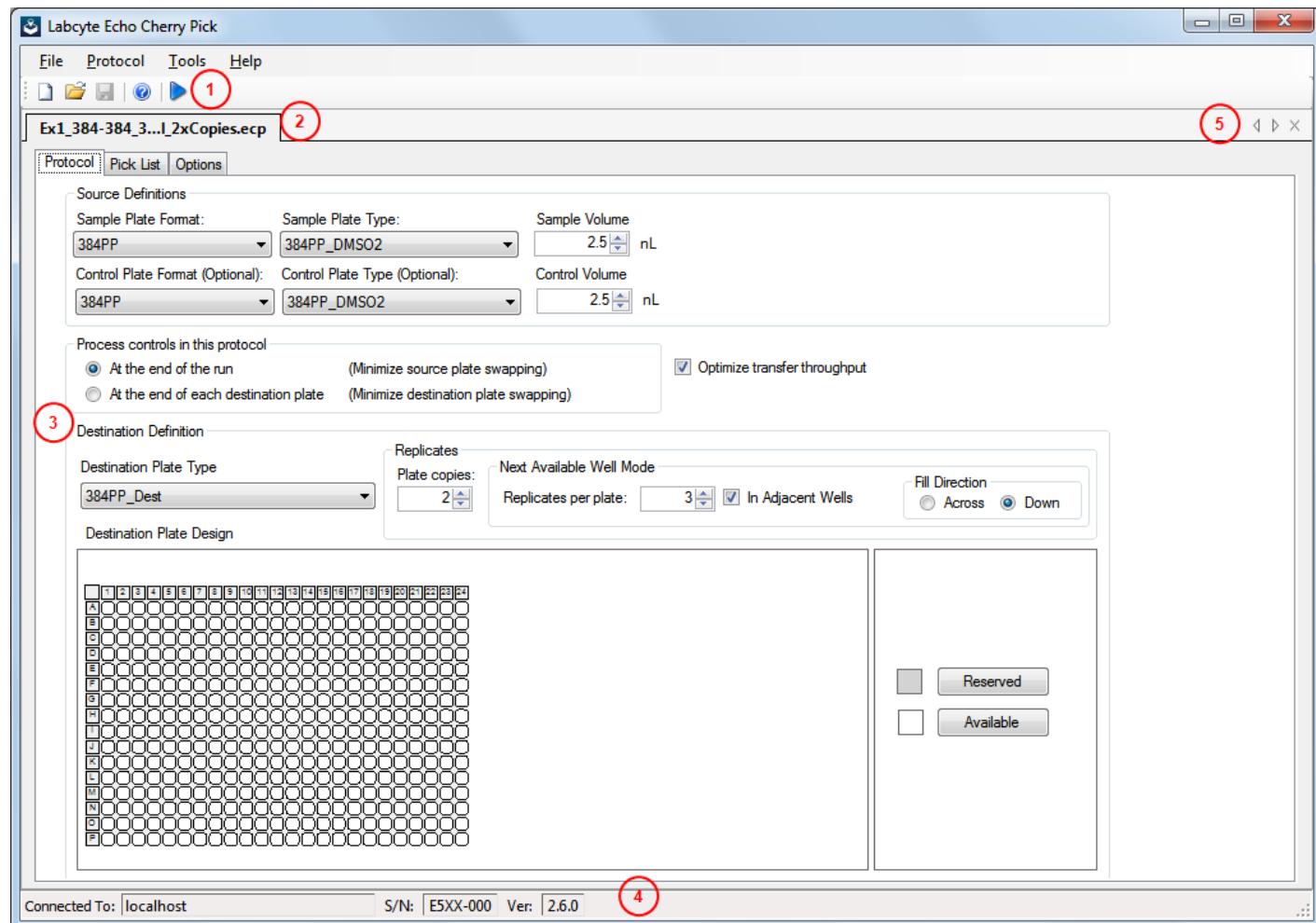
5. Click the **Activate** button.

The Echo Liquid Handler should be activated now. This procedure is not required again unless a different instrument is activated or the application needs to be upgraded.

Understanding the Main Window

When a new or existing protocol is opened, the **main Window** displays the **Protocol** window.

Figure 8: Main Window



The table below describes the buttons/fields or sections in the **Main Window** and their functionality.

Table 2: Callout table for Main Window

Callout Number	Name	Description
1	Toolbar	The toolbar contains software menus that provide options to open and save transfer protocols, set up the software, define Labware, run the protocol, customize protocol options, and display the online Help. The icons in the toolbar provide shortcuts to the most frequently selected options, such as the Run Protocol function. For a detailed description, see Toolbar .
2	Protocol window	The protocol window is labeled with the protocol file name. The software uses an .ecp file extension and stores the file in the default directory: C:\Labcyte\Echo\Protocols. The default directory can be changed to a user specified directory.
3	Protocol window tabs	The window tabs open the following software windows: <ul style="list-style-type: none"> Main Protocol window — The main Protocol window is the first window that is displayed when a new or existing protocol is opened. It contains all of the default protocol data necessary to perform the transfer. For a detailed description, see Protocol Tab. Pick List window — Displays Samples and Controls tabs to import and edit pick list files. Also displays the Plate Preview tab to check source and destination plate maps. For a detailed description, see Importing a Pick List. Options window — The Options window displays protocol-specific options, such as transfer history, output file type, and report formats. For a detailed description, see Protocol Options Tab.
4	Status bar	The status bar displays Echo connection information, such as instrument name, serial number, and the version of Echo client software that is running.
5	Navigation and Exit buttons	The left and right arrows become active when there are too many protocols open to view all of the file names. The arrows shift the protocol tabs left or right to display the file names. The Exit icon closes the displayed protocol.

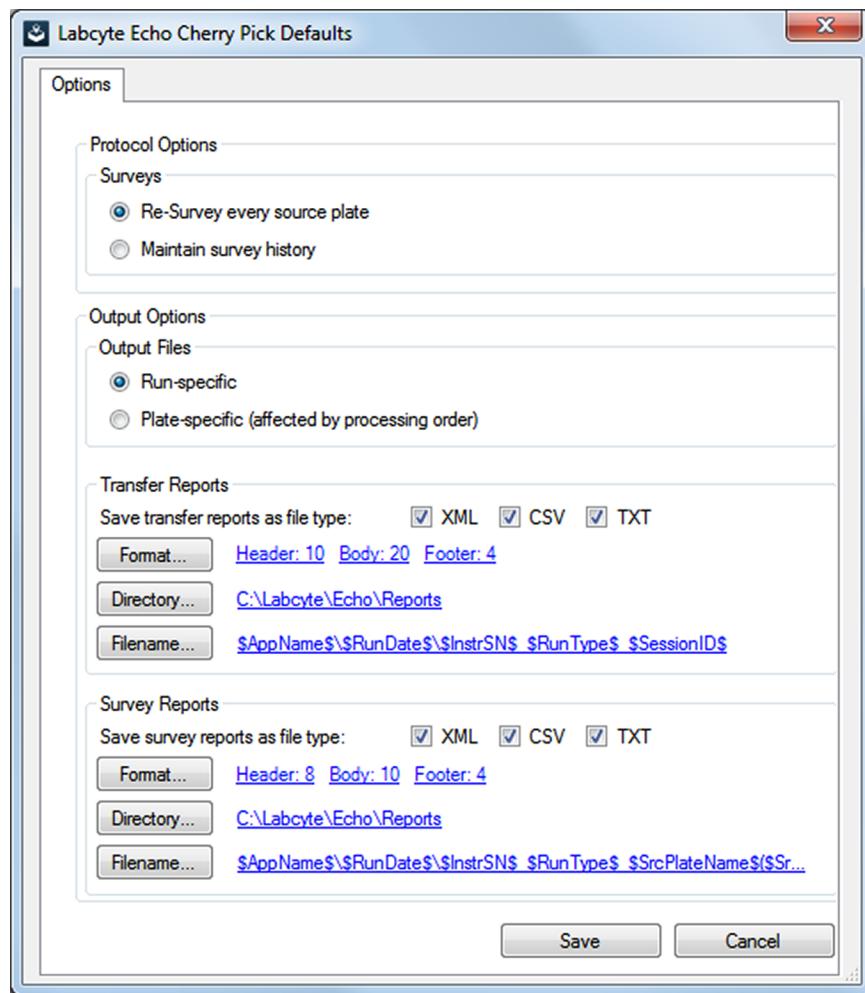
Setting Up the Software

The Echo Cherry Pick application is simple to set up. Default settings, such as output file type and report format, can be modified here. The Echo Cherry Pick application provides survey data in three file formats (csv, xml, and txt) with reporting options that can be customized to meet protocol-specific needs.

To change the default settings, and set up preferences:

1. Open the **Tools** menu and select **Preferences**.

Figure 9: Preferences/Options dialog box



2. Select **Maintain survey history** re-use the current plate survey for more than one transfer operation for a specified period of time. For more information, see [Surveys](#).
3. Select **Run-specific** or **Plate-specific** for the output files.
 - **Run-specific** — Stores all of the transfer results in a file.
 - **Plate-specific** — Stores all of the transfer results in separate files.
4. Customize the transfer and survey reports.
 - **File type** — Select XML, CSV, and/or TXT file formats.
 - **Format** — Customize the transfer/survey report header, body, and footer.
 - **Directory** — Change the directory location for the transfer/survey report.
 - **Filename** — Change the file name for the transfer/survey report.

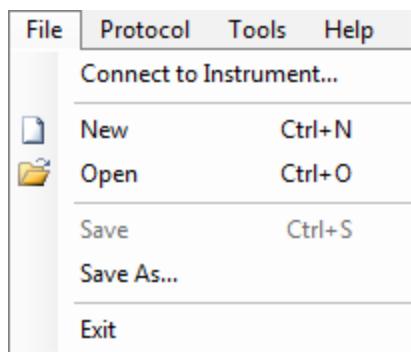
These options are used as default settings for all transfer protocols. To change the options for an individual protocol, use the **Options** tab. For more information, see [Protocol Options Tab](#).

Shutting Down the Software

There are two ways to exit the Echo Cherry Pick application:

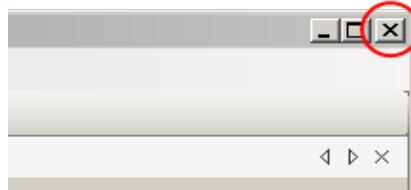
- Open the **File** menu and select **Exit**.

Figure 10: Exit function in the File menu



- Click the **Close** icon in the application.

Figure 11: Close window icon



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CHAPTER 4 | Software Operations

This chapter describes how to use the Echo Cherry Pick application. It includes the following topics.

- [Creating Pick Lists](#)
- [Starting a New Protocol](#)
- [Selecting Source and Destination Plate Types](#)
- [Setting Up a Transfer Protocol](#)
- [Importing a Pick List](#)
 - [Importing a Pick List During Run Protocol](#)
 - [Importing a Samples Pick List](#)
 - [Importing a Controls Pick List](#)
 - [Previewing Source and Destination Plates](#)
- [Editing the Protocol](#)
- [Running a Protocol](#)

Creating Pick Lists

The Echo Cherry Pick application is installed with four sample pick lists in the default directory C:\Labcyte\Echo\Protocols. These samples are described below.

- **384-384_NextAvailableWell.csv** — This is the simplest pick list. Only the source plate barcode and source well locations are needed. In the protocol settings, the user can specify multiple plate copies and multiple sample replicates. Samples are transferred to the *next available* wells of the destination plate.
- **384-384_Explicit.csv** — This pick list explicitly specifies destination well locations, destination plate ID, and transfer volume. In the protocol settings, plate copy and sample replicates must be set to 1.
- **384_Controls.csv** — This pick list is explicit for controls, specifying source plate barcodes, source and destination well locations, and transfer volume. The Control Pick List can be used with both the Explicit and NextAvailableWell pick list.
- **ComplexPickList.csv** — This pick list illustrates source well pooling and specifies source plate barcodes and source plate types, the source well locations which can be a pooled range of wells, the destination plate barcode, a single destination well for each transfer, and the transfer volume.

Table 3: Complex Pick List example explanation

Source Plate Barcode	Source Plate Type	Source Well	Destination Plate	Destination Well	Transfer Volume	Description
SRC-10001	384LDV_DMSO	A1	DST-20001	A1	50	Source well A1 copied to destination well A1
SRC-10002	384PP_DMSO2	B1:B5	DST-20001	P2:P6	500	Source well copied from region B1:B5 to destination well P2:P6
SRC-10002	384PP_AQ_BP2	{A1:P1}	DST-20001	A2	2.5	Source well region {A1:P1} contains identical well content that will be transferred from one of those wells to destination well A2
SRC-10003	1536LDV_DMSO	{A1;A2;A7;A8}	DST-20001	A3	250	Discrete Source wells {A1;A2;A7;A8} contain identical well content that will be transferred from one of those wells to destination well A3

Table 3: Complex Pick List example explanation (continued)

Source Plate Barcode	Source Plate Type	Source Well	Destination Plate	Destination Well	Transfer Volume	Description
SRC-10002	384PP_AQ_GP2	{A1;A2;B6:B16}	DST-20001	A4	2.5	Discrete Source wells {A1;A2} plus source region {B6:B16} contain identical well content that will be transferred from one of those wells to destination well A4
SRC-10001	384LDV_AQ_B2	{C1:C6;K12:K18}	DST-20001	A5	500	Source well regions {C1:C6} and {K12:K18} contain identical well content that will be transferred from one of those wells to destination well A5

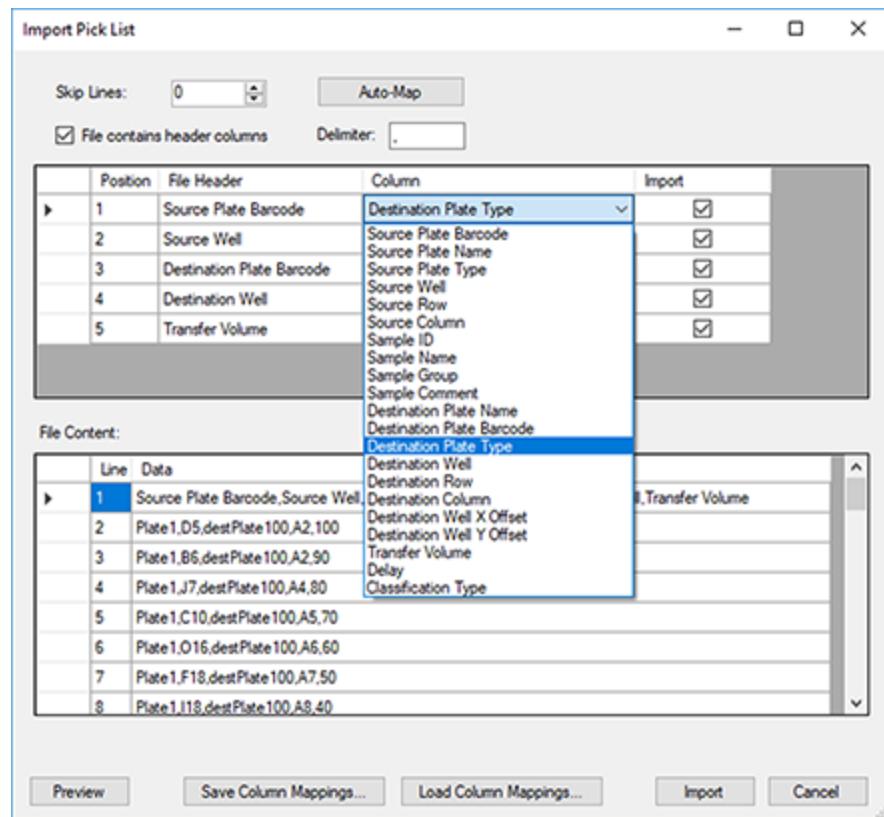
All four pick lists use the same basic pick list structure— file header(1) and file content(2).

Figure 12: Sample pick lists

384-384_NextAvailableWell.csv			384-384_Explicit.csv - Excel					384_Controls.csv - Excel				ComplexPickList.csv - Excel					
A	B	C	A	B	C	D	E	A	B	C	D	A	B	C	D	E	F
Source Plate Barcode	Source Well	1	Source Plate Barcode	Source Well	Destination Plate Barcode	Destination Well	Transfer Volume	Source Plate Barcode	Source Well	Destination Well	Transfer Volume	Source Plate Barcode	Source Type	Source Well	Destination Plate Barcode	Destination Well	Transfer Volume
1 Plate1	D5		1 Plate1	D5	destPlate100	A2	100	2 Ctrl1	A1	A1	50	2 SRC-10001	384LDV_D	A1	DST-20001	A1	50
3 Plate1	B6		3 Plate1	B6	destPlate100	A2	90	3 Ctrl1	A2	A24	100	3 SRC-10002	384PP_DN	B1:B5	DST-20001	P2:P6	500
4 Plate1	J7		4 Plate1	J7	destPlate100	A4	80	4 Ctrl1	A3	P1	150	4 SRC-10002	384PP_AC	(A1:P1)	DST-20001	A2	2.5
5 Plate1	C10		5 Plate1	C10	destPlate100	A5	70	5 Ctrl1	A4	P24	200	5 SRC-10003	1536LDV_I	(A1;A2;A7	DST-20001	A3	250
6 Plate1	O16		6 Plate1	O16	destPlate100	A6	60	6				6 SRC-10002	384PP_AC	(A1;A2;B6	DST-20001	A4	2.5
7 Plate1	F18	2	7 Plate1	F18	destPlate100	A7	50	7				7 SRC-10001	384LDV_A	(C1:C6;K1:	DST-20001	A5	5000
8 Plate1	I18		8 Plate1	I18	destPlate100	A8	40	8				8					
9 Plate1	J19		9 Plate1	J19	destPlate100	A9	30	9				9					
10 Plate1	G20		10 Plate1	G20	destPlate100	A10	20	10				10					
11 Plate1	B21		11 Plate1	B21	destPlate100	A11	10	11				11					
12 Plate3	N5		12 Plate3	N5	destPlate100	B1	100	12				12					
13 Plate3	L6		13 Plate3	L6	destPlate100	B2	90	13				13					
14 Plate3	O7		14 Plate3	O7	destPlate100	B3	80	14				14					

When the pick list is imported, the application identifies the file headers and displays the corresponding file content.

Figure 13: Import pick list dialog box (Explicit.csv) showing the full list of file headers recognized by the application



Note: Classification Type is only available for the Echo 650 Series Liquid Handler instrument.

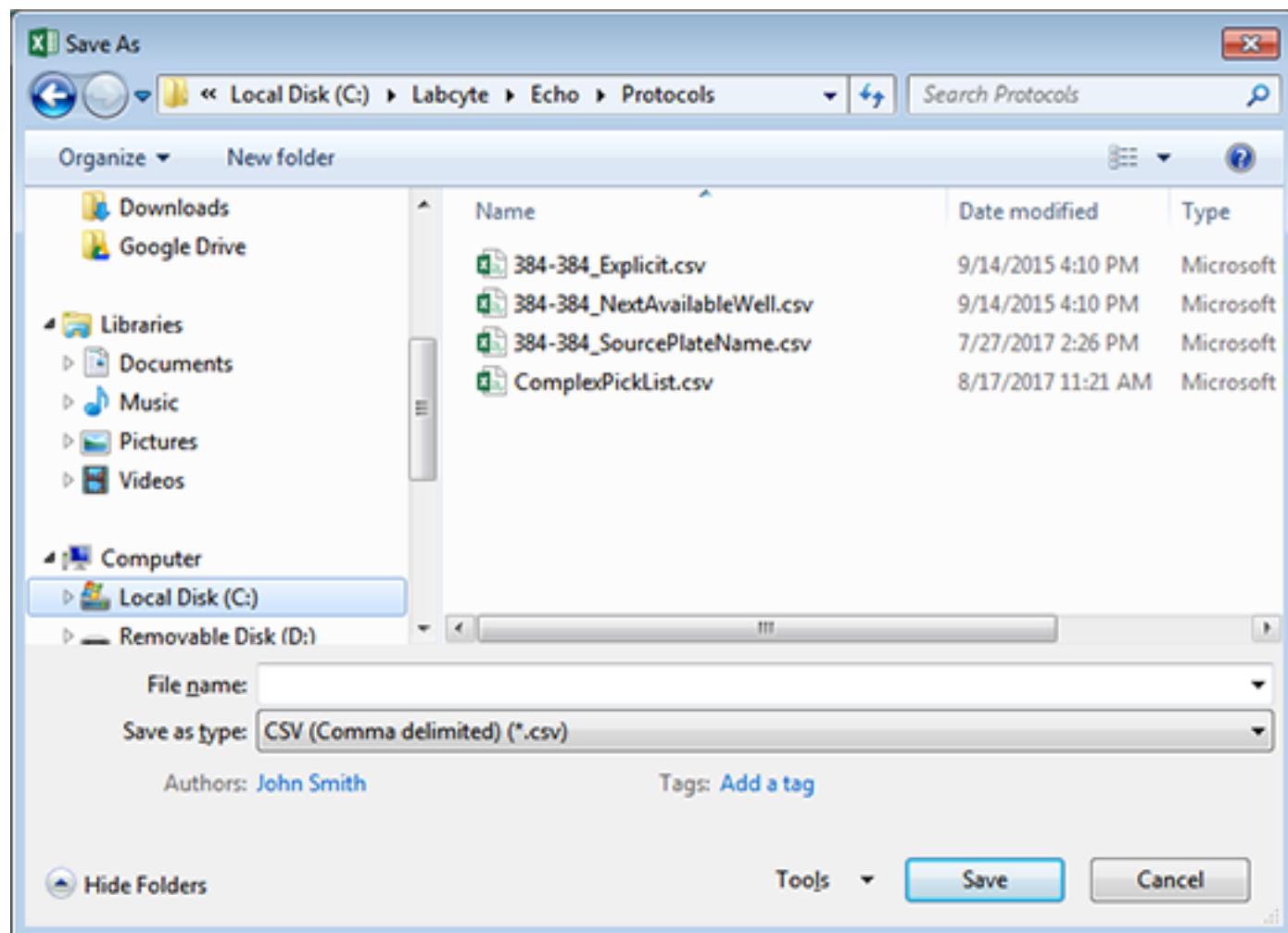
These examples can be used to create pick lists that work well with the Echo Cherry Pick application. Additional information can be added to the file headers shown above. The **Import Pick List** dialog box provides the option to skip these data when the pick list is imported.

The pick list must be saved in .CSV (comma separated values) or .txt file format to be recognized by the Echo Cherry Pick application. This is a common file extension in spreadsheet programs.

Note: The options available from the **Column** drop down menu are functional parameters within the software application. The user must select the appropriate application parameter that corresponds to the file header from the pick list.

Look for the **Save as** menu and select **CSV (Comma delimited) (*.csv)**.

Figure 14: Saving in .csv file format



Starting a New Protocol

There are multiple ways to start a new protocol.

1. Use one of the following ways to start a new protocol.

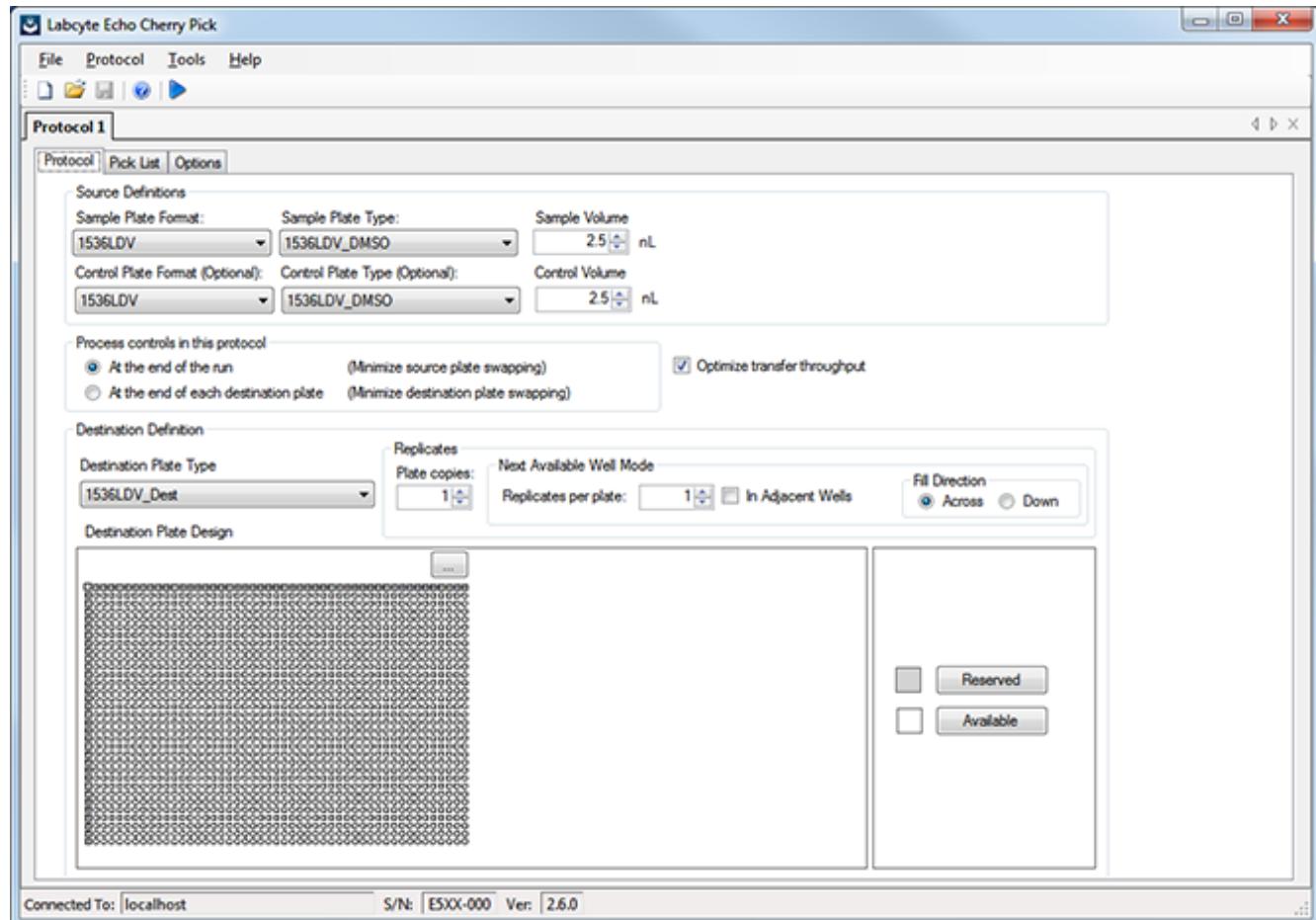
- Select **New** from the **File** menu.

- Click the **New**  icon in the **Toolbar**.
- Press **CTRL+N** from the keyboard.



Note: The new protocol is temporarily labeled *Protocol 1* as the file name until the user saves the protocol with a new name.

Figure 15: Main Protocol window



Note: As information is entered into the template, an * appears next to the file name. This is a reminder that the file has information that has not been saved. Remember to save the protocol after designing the source plate and periodically saving thereafter.

2. Type the **Name** and **Description** of the protocol in the text fields. The description is a useful method to describe a high level outline of the protocol.

Selecting Source and Destination Plate Types

The Echo Liquid Handler dynamically adjusts to different changes in fluid characteristics within a broad fluid class (Dynamic Fluid Analysis). Choosing the plate format determines the physical plate parameters that the Echo Cherry Pick application uses. Choosing the plate type determines the transfer method that the Echo Liquid Handler uses; taking the plate format and fluid properties into account. These settings enable the Echo system to transfer multiple fluid types from the same source plate. For example, using the plate format 384PP and plate type MyBuffer_AQ_GP instructs the Liquid Handler to transfer samples from a 384PP format plate with a transfer method suited for the Glycerol fluid class.

These steps are critical when creating the application protocol.

1. In the **main protocol** window, select the **Sample Plate Format** to be 384PP, 384LDV, or 1536LDV. Based on the plate format chosen, the compatible plate types appear for **Sample Plate Type**.
2. Enter the **Sample Volume** for the sample plate if it is not specified by the pick list.



Note: If the sample pick list chosen during the run has a sample volume specified, the sample volume from the pick list will override the sample volume specified in the protocol setup. The default sample volume is 2.5 nL.

3. Select the **Control Plate Format** to be 384PP, 384LDV, or 1536LDV. Based on the plate format chosen, the compatible plate types appear for **Control Plate Type**.
4. Enter the **Control Volume** for the control plate.



Note: If the control pick list chosen during the run has a control volume specified, the control volume from the pick list will override the control volume specified in the protocol setup. The default control volume is 2.5 nL.

5. Select the **Destination Plate Type** to set the transfer properties for the **Destination Plate**.



Note: Not all plate formats and plate types are available on all instruments. The specific plate requirements per user environment are specified in the purchase agreement and programmed into the instrument prior to shipping.

Figure 16: Source and control plate definitions

Source Definitions		
Sample Plate Format:	Sample Plate Type:	Sample Volume
384LDV	384LDV_AQ_B	2.5 nL
Control Plate Format (Optional):	Control Plate Type (Optional):	Control Volume
384LDV	384LDV_AQ_B	2.5 nL

Setting Up a Transfer Protocol

To set up a transfer protocol:

1. Start a new protocol as explained in section [Starting a New Protocol](#).
2. Select the source plate types and the destination array types as explained in section [Selecting Source and Destination Plate Types](#).
3. Choose one of the options below for **Process controls in this protocol** to define the order in which to process the plates.
 - **At the end of the run** — Process all sample pick list plates first. For example, to minimize the time that the plates are out of storage.
 - **At the end of each destination plate** — Add controls to each destination plate and process the destination plate as soon as possible. For example, to transport the plate to a controlled environment.

Figure 17: Control processing order section

Process controls in this protocol

At the end of the run (Minimize source plate swapping)

At the end of each destination plate (Minimize destination plate swapping)

Optimize transfer throughput

4. Set **Optimize transfer throughput** to allow the application to determine the optimal transfer path. The Echo overrides the order of operation specified in the protocol and reorder transfers to minimize stage and transducer movements.
5. Set **Plate copies** to the number of times the plate should be replicated.
6. Set the values in the **Next Available Well Mode** section.
 - **Replicates per plate** — Number of times a sample is replicated on a plate.
 - **In Adjacent Wells** — Check to indicate the replicates should be next to each other.
 - **Fill Direction (Across or Down)** — Fill direction on the destination plate is across or down.



Note: Settings for the **Next Available Well Mode** are only applied when the destination wells are not defined in the pick list.

If the imported sample pick list has destination wells defined (Explicit format), then the number of replicates must be set to 1; otherwise, the application will display a message that prompts the user to reset the replicate number. The other settings in the **Next Available Well Mode** section are ignored.

The saved protocol does not retain imported pick lists, since they are not valid across transfer runs.



Note: The following rule applies when using **Explicit Pick Lists**:

Pick lists support multiple source plate types and destination plate types in the same pick list. Each source plate type or destination plate type in the pick list must have a unique barcode. The numerical order of the barcode in the pick list determines the assigned source plate type or destination plate type. Any attempt to redefine the plate type for any barcoded plate in the pick list will give an error.

Figure 18: Replicates section

Replicates

Plate copies:

Next Available Well Mode

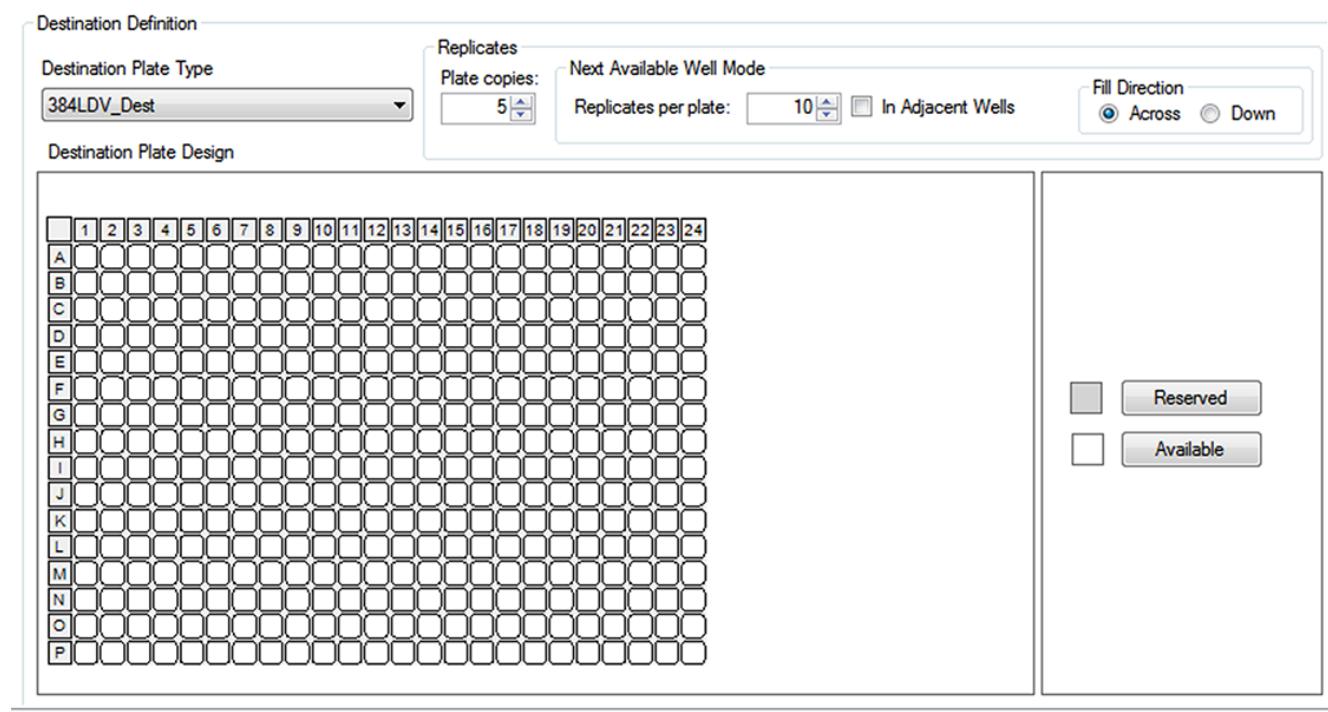
Replicates per plate: In Adjacent Wells

Fill Direction
 Across Down

7. If reserve wells are required, select wells in the destination plate map and click **Reserve**. The application will skip over the reserved wells during a sample transfer.



Note: Reserved wells are ignored if the destination wells are defined in the pick list. For example, see **Explicit** format in [Creating Pick Lists](#).

Figure 19: Selecting reserved wells

8. To save the protocol, select **Save** from the **File** menu and enter a file name in the prompt box. The protocol is saved with the file extension .ecp in the default directory C:\Labcyte\Echo\Protocols.



Note: The protocol file can be saved to different directories. It is recommended to save the protocol often while working on it.

Importing a Pick List

When importing a sample and/or control pick list via the **Run Options** dialog box, the pick list parameters override any plate parameters in the protocol for the run. Importing a control pick list is optional, but a sample pick list is required to run the protocol.



Note: The pick list cannot be saved in the protocol.

The pick list is a table of specific wells that have been selected from a group of wells for analysis. The pick list is typically created in a text or spreadsheet file.

Guidelines for defining pick list:

- Pick lists using row and column location must use the one-based coordinate system, which means that the first well in the upper left corner of the microplate is labeled row 1, column 1, or (1,1).
- Pick list must be saved in .csv or txt file format to be used by the Echo Cherry Pick application.
- It is recommended for sample pick lists to have a **Source Plate Barcode** and/or **Source Plate Name**, although it is only required to have a **Source Well** or (**Source Row** and **Source Column**) to run the Echo Cherry Pick application.
- Control pick lists should minimally have a **Source Plate Barcode** and/or **Source Plate Name**, a **Source Well** or (**Source Row** and **Source Column**), and a **Destination Well** or (**Destination Row** and **Destination Column**).
- Pick list headings should match the headings listed in the **Import Pick List** dialog box to be automatically mapped by the application.



Note: If an error is encountered when importing a pick list, the error message will show the column data that is needed.

Any pick list heading that does not match one of the import column headings can be manually mapped by the user.

To process a pick list, Echo Cherry Pick requires information for the following parameters to be provided in separate columns for the pick list file:

- Required Parameters for a Next Available Well Pick List:
 - Source Plate Barcode and/or Source Plate Name
 - Source Well and/or (Source Row and Source Column)
- Required Parameters for a Explicit Pick List:
 - Source Plate Barcode and/or Source Plate Name
 - Source Well and/or (Source Row + Source Column)
 - Destination Plate Name and/or Dest Barcode
 - Destination Well and/or (Destination Row + Destination Column)
- Required Parameters for the Complex Pick List (updated to support source well pooling):
 - Source Plate Barcode and/or Source Plate Name
 - Source Well - can be one or more
 - Destination Plate Name and/or Dest Barcode
 - Destination Well - must be exactly one
 - Transfer Volume

For more information, see [Creating Pick Lists](#).

Optionally, additional information can be supplied for the following parameters:

- Source Plate Type
- Sample ID
- Sample Name
- Sample Group
- Sample Comment
- Destination Well
- Destination Row
- Destination Column
- Destination Well X Offset

- Destination Well Y Offset
- Destination Plate Type
- Transfer Volume
- Delay
- Classification Type (only available for the Echo 650 Series Liquid Handler instrument)

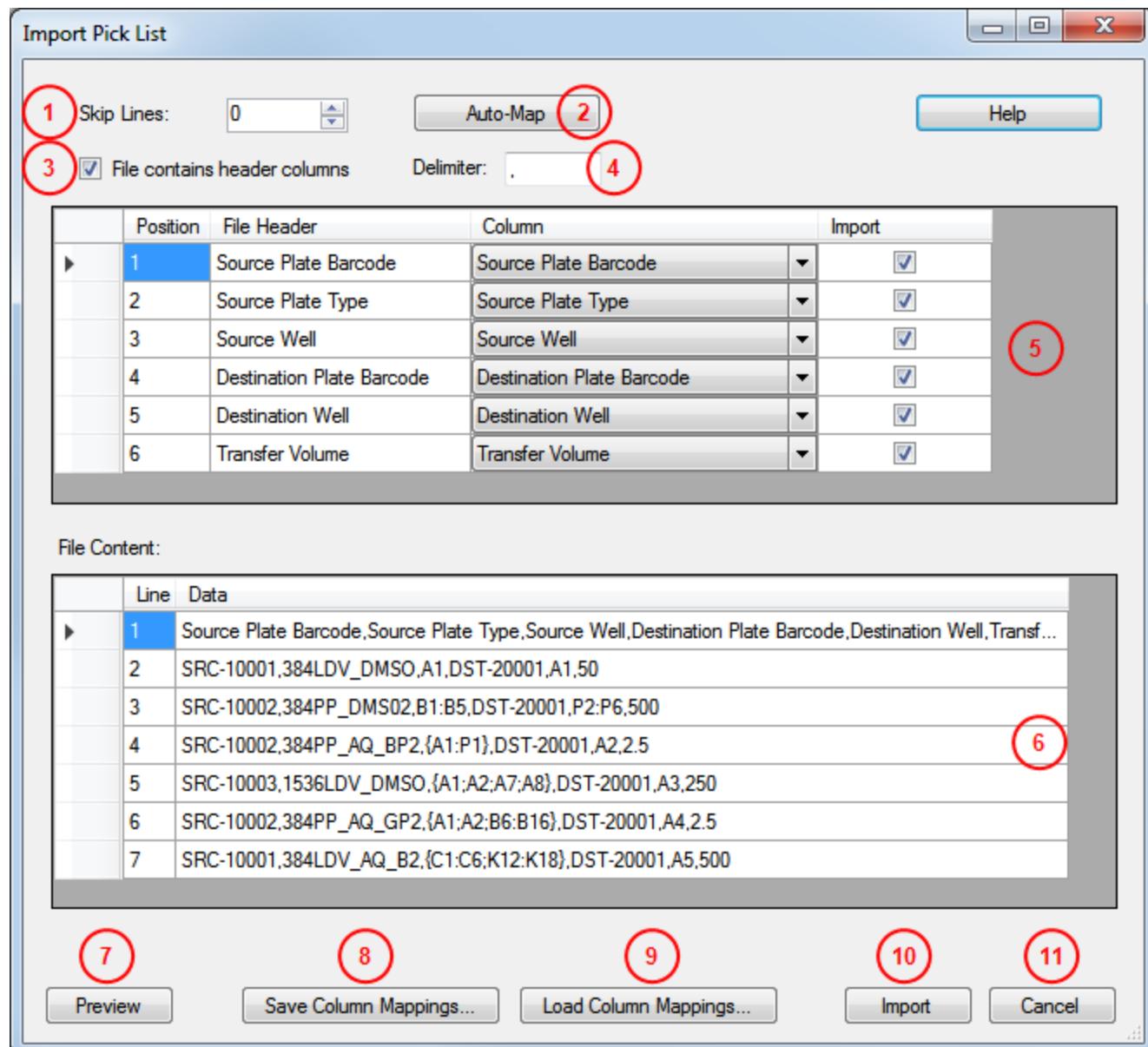
Importing a Pick List During Run Protocol

To import a pick list during a run:

1. Select **Run** from the **Protocol** menu or click the **Run** icon in the **Toolbar**. For more information, see [Running a Protocol](#).
2. Click the **Import Sample List** button to import a .csv pick list indicating the sample wells to be transferred.
3. Browse to the folder that contains the sample pick list and click **Open** to display the pick list in the **Import Pick List** dialog box.
4. Optionally, click the **Import Control List** button to import a .csv pick list indicating the control wells to be transferred.
5. Browse to the folder that contains the control pick list and click **Open** to display the pick list in the **Import Pick List** dialog box.

Understanding Import Pick List Dialog Box

Figure 20: Import Pick List dialog box





Note: If the pick list contains the column headings that the application recognizes, the application displays the Import Pick List dialog box with the pick list data correctly identified. For more information on available column headings, see [Creating Pick Lists](#).

If the pick list contains extra header data or header data that the application does not recognize, the application displays what it finds and allows the user to manually map the headers.

The table below describes the buttons/fields or sections in the **Import Pick List** dialog box and their functionality.

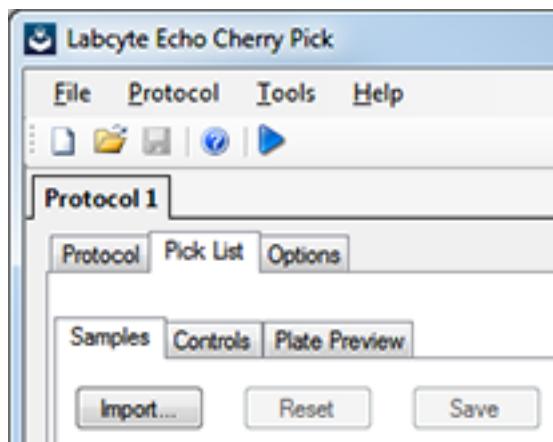
Table 4: Callout table for Import Pick List dialog box

Callout Number	Name	Description
1	Skip Lines	The pick list can contain heading information (for example, assay information, date, etc.), but it should be skipped when importing. Select a numerical value for Skip Lines to skip the number of specified heading lines for the column headings (header line).
2	Auto-Map button	Maps the column headings and data automatically.
3	File contains header columns	If the pick list contains a header line (column headings), select this option.
4	Delimiter	The delimiter used to separate data in the pick list file.
5	Column Details	<ul style="list-style-type: none"> • Position — Specifies the position in the file. • File Header — Specifies the header for the column. • Column — Specifies the column name. This drop-down list defines the columns that can be added to the pick list. • Import — Specifies if the data for the associated column should be imported or not.
6	Preview Result or File Content table	The results for this table are toggled based on if the user clicks the Preview or the File content button.
7	Remove duplicate line entries checkbox	Check this to remove duplicate entries in the source file when creating the pick list.
8	Preview or File content button	Toggles between the preview result showing the IDs, corresponding source wells, and other data available and the file content result showing the line number and corresponding data.
9	Save Column Mapping to File button	Exports the column mappings to a text file.
10	Load Column Mapping from File button	Imports the column mappings to be viewed.
11	Import button	 Note: By clicking Import , the existing protocol data is overwritten and cannot be undone unless the protocol was previously saved.
12	Cancel button	Closes the Import Pick List dialog box without saving any changes.

Importing a Samples Pick List

To import a sample pick list:

1. Click the **Pick List** tab in the **main Protocol** window. This tab displays the import and editing windows for sample and control pick lists.
 - **Samples** — Provides options to import, edit, save, or delete the sample pick list.
 - **Controls** — Provides options to import, edit, save, or delete the control pick list.
 - **Plate Preview** — Displays the source and destination plate layouts that are based on the imported pick lists and protocol settings.

Figure 21: Pick list windows

2. Click **Import** in the **Samples** tab to import the pick list.
3. Browse to the folder that contains the sample pick list and click **Open** to display the pick list in the **Import Pick List** dialog box. For more information on the **Import Pick List** dialog box, see [Importing a Pick List During Run Protocol](#).

Figure 22: Samples Pick List with 384-384_Explicit.csv loaded

File Name: C:\Labcyte\Echo\Protocols\384-384_Explicit.csv

ID	Source Plate Barcode	Source Well	Destination Plate Barcode	Destination Well	Transfer Volume
1	Plate1	D5	destPlate100	A2	100
2	Plate1	B6	destPlate100	A2	90
3	Plate1	J7	destPlate100	A4	80
4	Plate1	C10	destPlate100	A5	70
5	Plate1	O16	destPlate100	A6	60
6	Plate1	F18	destPlate100	A7	50
7	Plate1	I18	destPlate100	A8	40
8	Plate1	J19	destPlate100	A9	30
9	Plate1	G20	destPlate100	A10	20
10	Plate1	B21	destPlate100	A11	10
11	Plate3	N5	destPlate100	B1	100
12	Plate3	L6	destPlate100	B2	90
13	Plate3	O7	destPlate100	B3	80
14	Plate3	C9	destPlate100	B4	70
15	Plate3	D12	destPlate100	B5	60
16	Plate3	D16	destPlate100	B6	50
17	Plate3	E19	destPlate100	B7	40

Connected To: HRAHMAN-LTX S/N: localhost Ver: 2.6.0

The table below describes the buttons/fields or sections in the **Samples Tab** and their functionality.

Table 5: Callout table for Samples Tab

Callout Number	Name	Description
1	Import button	Opens the Import dialog box used to find and select a pick list in .csv or .txt file format. For more information, see Importing a Pick List During Run Protocol .
2	Reset button	Removes the pick list from the protocol.
3	Save button	Overwrites the original pick list with any changes the user has made to the imported pick list.  Note: To ensure no changes are made to the original pick list, import a copy of the pick list. When the protocol is run, the user will be prompted to save the protocol with the copied pick list. Although there is an option to click No in the Save prompt box before the protocol is run, it is recommended to use a copy of the pick list.
4	File Name	Displays the directory location and file name of the imported pick list.
5	Edit window	Displays the pick list data below the file name. The user can edit the pick list in the following ways. <ul style="list-style-type: none"> • Sort by heading — Click a column heading to sort by this heading. An arrow will appear to indicate the direction of the sort. • Edit a single value — Click or double-click any field and enter the new value. Use the scroll bars to view all columns and rows. Use the Tab key or arrow keys to move to the next field. • Select rows — Click any field in the table or click the cell to the left of the first data column to select a single row; click and drag the mouse pointer up or down to select consecutive rows; press the Control key and click any field in the desired rows to select non-consecutive rows.
6	Select All button	Click the Select All button to select all of the fields in the table.
7	Unselect button	Click the Unselect button to unselect all of the fields previously selected in the table.
8	Delete button	Select the table rows or single fields to be deleted and click the Delete button.

Importing a Controls Pick List

To import a control pick list:

1. Click the **Pick List** tab in the **main Protocol** window. This tab displays the import and editing windows for sample and control pick lists.
2. Click **Import** in the **Controls** tab to import the pick list.
3. Browse to the folder that contains the sample pick list and click **Open** to display the pick list in the **Import Pick List** dialog box. For more information on the **Import Pick List** dialog box, see [Importing a Pick List During Run Protocol](#).



Note: Even though control pick lists are explicit (require destination well data), they can be transferred with non-explicit (next available well) sample pick lists.

Figure 23: Controls Pick List with 384_Controls.csv loaded

The screenshot shows the Labcyte Echo Cherry Pick software interface. The main window title is "Labcyte Echo Cherry Pick". The menu bar includes File, Protocol, Tools, and Help. Below the menu is a toolbar with icons for file operations. The main workspace is titled "Protocol 1" and contains a "Samples" tab. Under the Samples tab, there is an "Import..." button, a "Reset" button, and a "Save" button. The "File Name:" field shows the path "C:\Labcyte\Echo\Protocols\384_Controls.csv". A data grid table is displayed, showing four rows of transfer details:

ID	Source Plate Barcode	Source Well	Destination Well	Transfer Volume
1	Qrl1	A1	A1	50
2	Qrl1	A2	A24	100
3	Qrl1	A3	P1	150
4	Qrl1	A4	P24	200

At the bottom of the workspace are buttons for "Select All", "Unselect", and "Delete". The status bar at the bottom of the window shows "Connected To: localhost", "S/N: ESXX-000", and "Ver: 2.6.0".

Previewing Source and Destination Plates

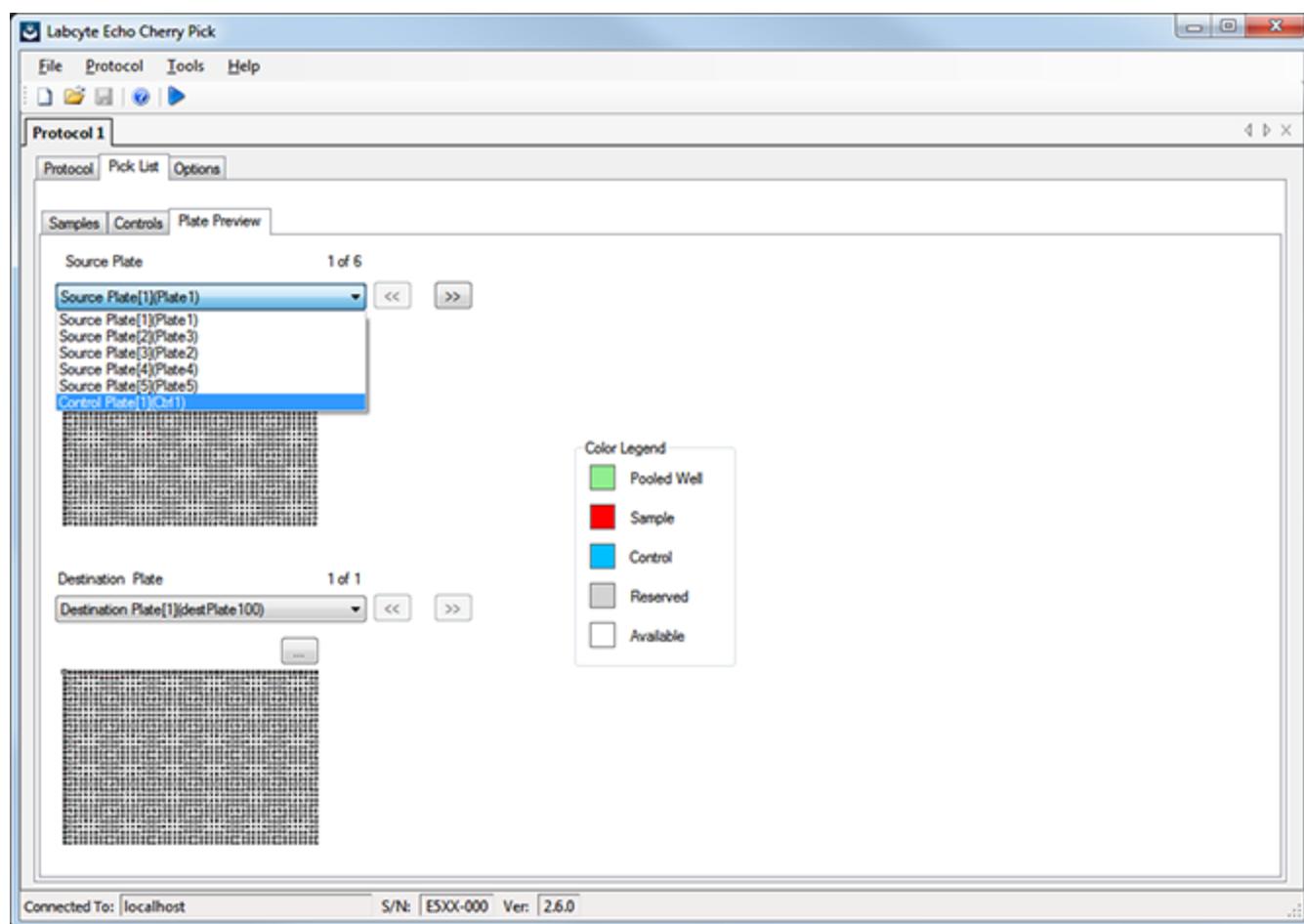
To view the source and destination plates imported via the Samples or Controls tabs:

1. Click the **Pick List** tab in the **main Protocol** window. This tab displays the import and editing windows for sample and control pick lists.
2. Click **Import** in the **Controls** tab or the **Samples** tab to import the pick list.
3. Browse to the folder that contains the sample pick list and click **Open** to display the pick list in the **Import Pick List** dialog box. For more information on the **Import Pick List** dialog box, see [Importing a Pick List During Run Protocol](#).
4. Click the **Plate Preview** tab to view the layout for the source and destination plates described by the imported pick list. The Color Legend identifies the components on the plate map.

The **Plate Preview** tab is useful for designing the layout of the destination plate. For example, if changes are made to the protocol, such as increasing replicates or changes to the processing order, the **Plate Preview** tab reflects those changes.

5. Use the arrow keys of the drop-down(s) for the **Source Plate** and **Destination Plate** to view the plate layout for different source and destination plates.
6. Use the **Color Legend** to identify the fluid in each well.
 - **Pooled Well (green)** — Indicates that more than one sample is in the same well.
 - **Sample (red)** — Indicates a single sample is in the well.
 - **Control (blue)** — Indicates a single control is in the well.
 - **Reserved (gray)** — Indicates a well to be blocked from a sample transfer. This setting is ignored when the destination wells are explicitly called out.
 - **Available (white)** — Indicates an empty well.

Figure 24: Plate Preview tab



Editing the Protocol

There are two ways to edit an existing protocol.

1. Select **Open** from the **File** menu and select the protocol to be edited.

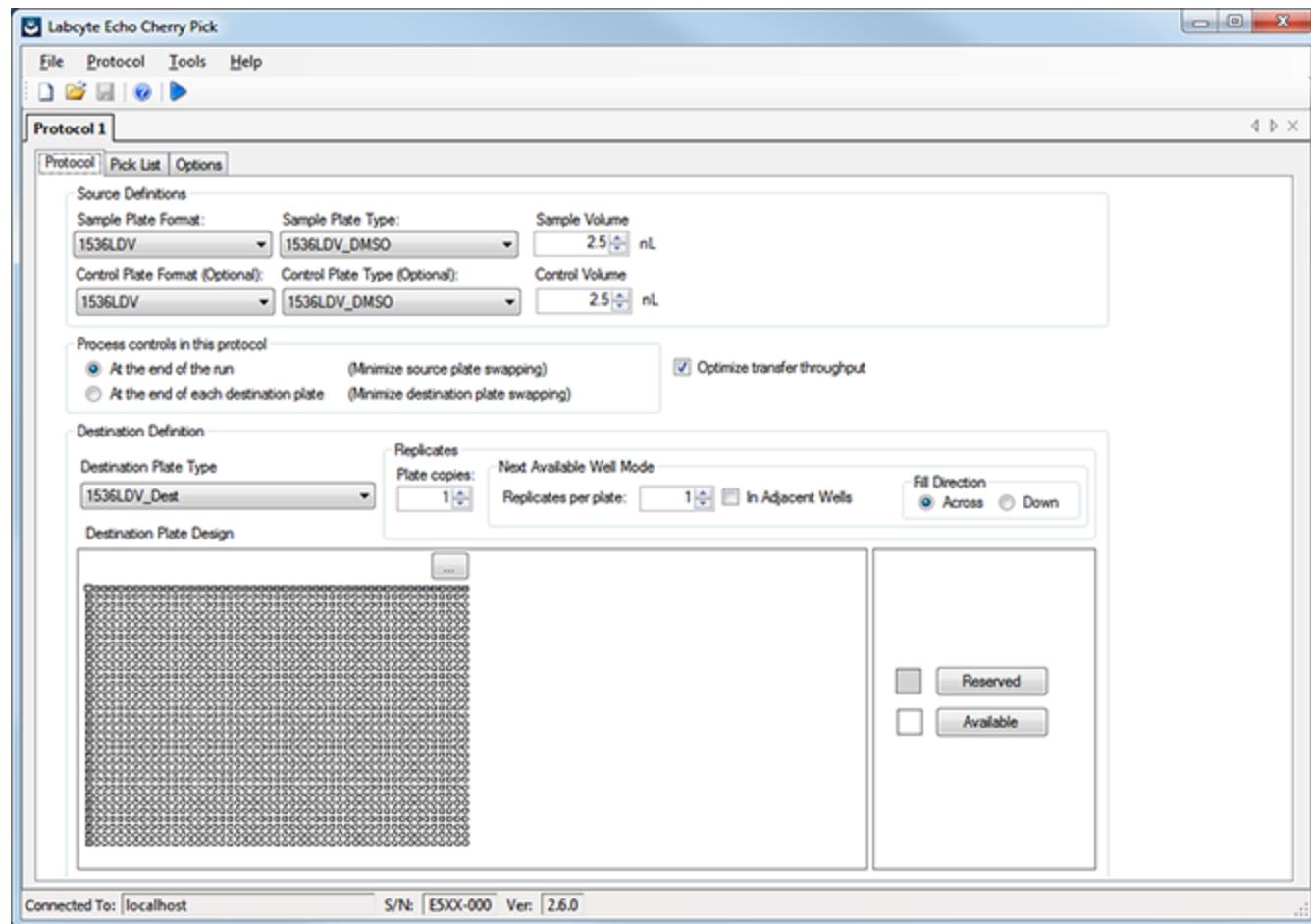
2. Click the **Open**  icon in the **Toolbar** and select the protocol to be edited.

Once the protocol to be edited has been loaded into the **main Protocol** window, the user can change the source plate format, the source plate type, or volume dispensed. The destination plate type can also be modified. The user can also edit any of the other settings entered initially when the protocol was first created.

To edit the protocol:

3. Modify source and destination definitions. For more information, see [Selecting Source and Destination Plate Types](#).
4. Modify fields in the **Process controls in this protocol** section. For more information, see [Setting Up a Transfer Protocol](#).
5. Import a pick list. For more information, see [Creating Pick Lists](#) and [Importing a Pick List](#).

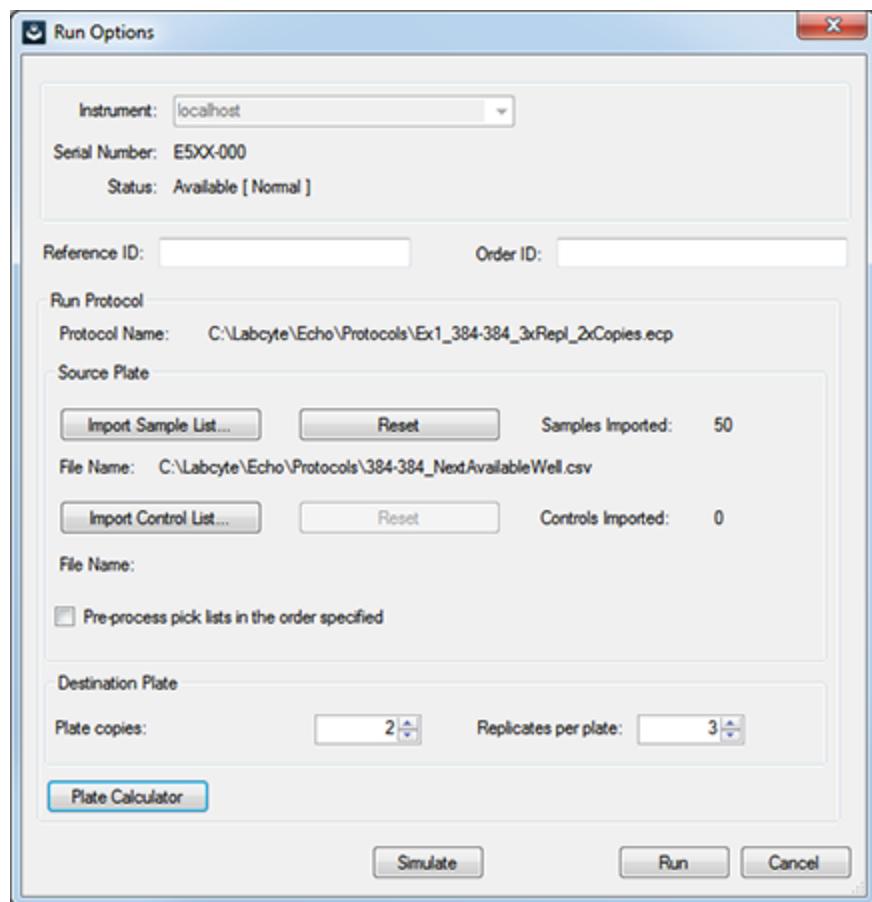
Figure 25: Main Protocol window



Running a Protocol

To begin a protocol simulation or live run:

Figure 26: Run Options dialog box



1. Select **Run** from the **Protocol** menu or click the **Run**  icon in the **Toolbar**.
2. Select the **Instrument**, if it is not already selected.
3. Optionally, enter a **Reference ID** and/or **Order ID** to be used to reference the run in the output report files.
4. Click **Import Sample List** to import a sample list to be used for the run. This step is only needed if a pick list was not previously imported or if the user would like to change the current pick list. For more information on how to define a pick list, see [Importing a Pick List](#).
5. Click **Import Control List** to import a control list to be used for the run. This step is only needed if a pick list was not previously imported or if the user would like to change the current pick list. For more information on how to define a pick list, see [Importing a Pick List](#).
6. Select **Pre-process pick lists in the order specified** to process the pick lists to determine the placement of all compounds in advance of the run.

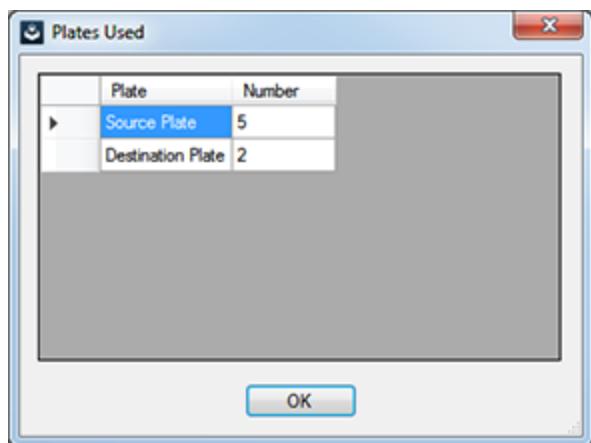


Note: If **At the end of each destination plate** was selected in the **Process controls in this protocol** section in the **Protocol** tab, you must select the **Pre-process pick lists in the order specified** to run the protocol as selected. Otherwise, a message box is displayed informing the user that the protocol will process controls at the end of the run and asks the user if they want to continue or Cancel.

7. In the **Destination Plate** section, change the value for **Plate copies** to override the number of plate copies for the protocol. Changing the **Replicates per plate** value will override the original setting in the protocol for the replicates per plate.

8. Click the **Plate Calculator** button to view the number of plates needed to run the protocol.

Figure 27: Plates Used dialog box



9. Optionally, click **Simulate** to test the run.



Note: Running a simulation is recommended to verify the transfers defined in the protocol before a live run.

10. Click **Run** to execute the protocol. For more information, see [Run Status Window](#).

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CHAPTER 5 | Software Reference

This chapter describes all of the Echo Cherry Pick application screens. It includes the following topics.

- [Toolbar](#)
- [Protocol Tab](#)
- [Protocol Options Tab](#)
- [Preferences](#)
- [Labware Definitions](#)
- [Run Protocol](#)
- [Simulator Window](#)
- [Run Status Window](#)

Toolbar

The **Toolbar** contains the **File**, **Protocol**, **Tools**, and **Help** menus, and individual icons for frequently used functions.

Figure 28: Toolbar

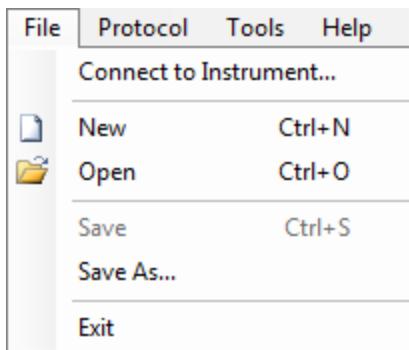


The topics below describe the functions that can be performed using the **Toolbar**.

- [File Menu](#)
- [Protocol Menu](#)
- [Tools Menu](#)
- [Help Menu](#)

File Menu

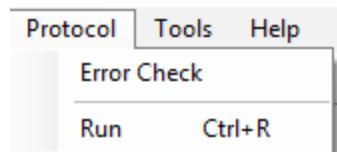
Figure 29: File menu



- **Connect to instrument** — Selects an Echo instrument to connect to the software.
- **New** — Creates a new transfer protocol.
- **Open** — Opens an existing transfer protocol.
- **Save** — Saves the current transfer protocol.
- **Save As** — Copies the current transfer protocol to a different file name.
- **Exit** — Closes the Echo Cherry Pick software.

Protocol Menu

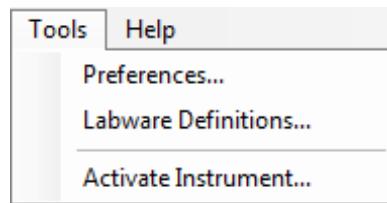
Figure 30: Protocol menu



- **Error Check** — Checks the protocol for inconsistent information.
- **Run** — Executes the transfer protocol that is displayed.

Tools Menu

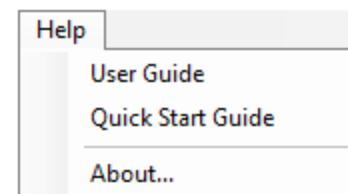
Figure 31: Tools menu



- **Preferences** — Used to set survey, output, and report options for all protocols.
- **Labware Definitions** — Manages existing labware definitions or adds new definitions.
- **Activate Instrument** — Used to enter the software license key to use the Echo Cherry Pick software.

Help Menu

Figure 32: Help menu

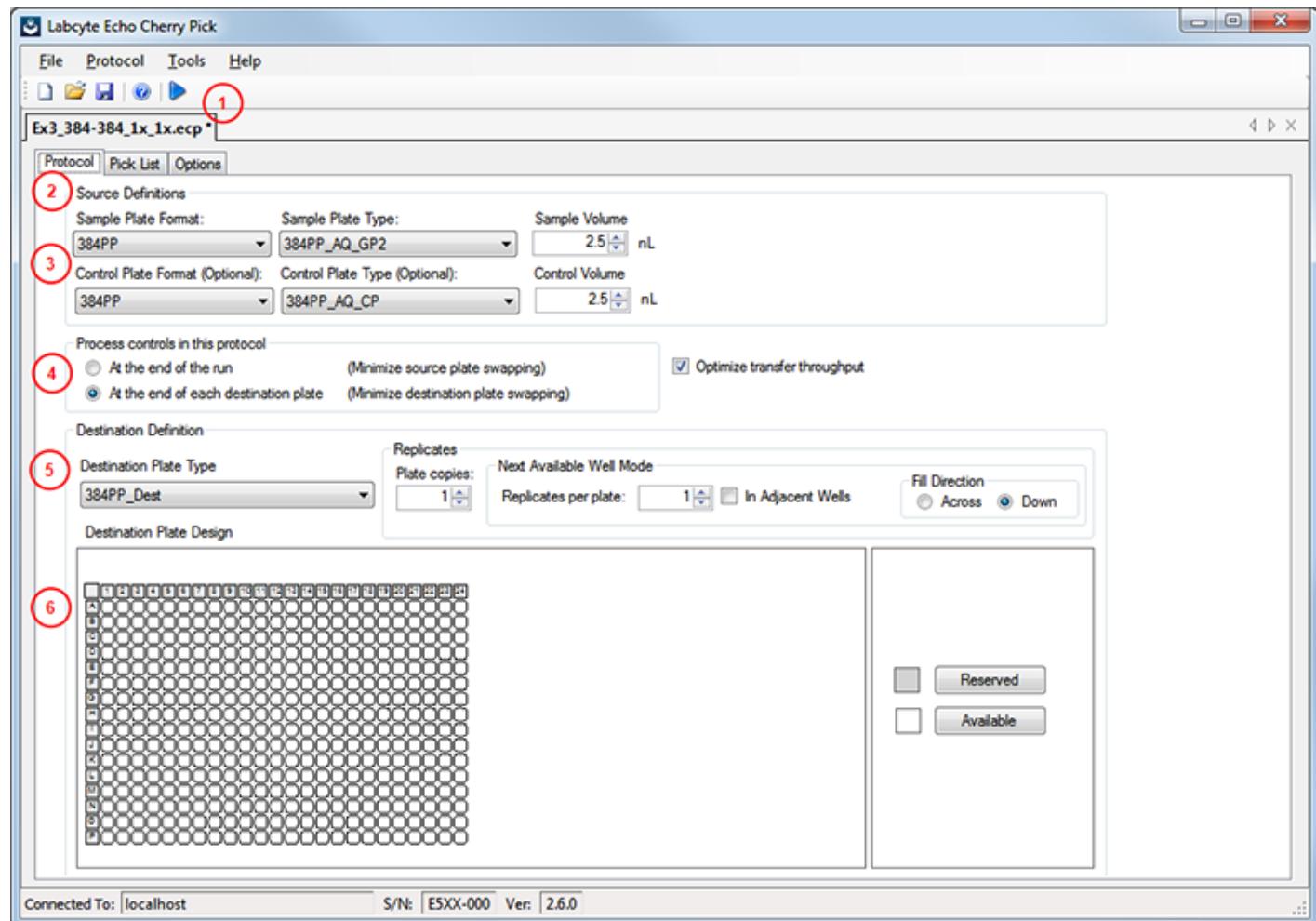


- **User Guide** — Launches the application User Guide in PDF format.
- **Quick Start Guide** — Launches the application Quick Start Guide in PDF format.
- **About...** — Displays the version number of the Echo Cherry Pick software.

Protocol Tab

The **Protocol** tab displays the following information:

Figure 33: Protocol tab



The table below describes the buttons/fields or sections in the **Protocol tab** and their functionality.

Table 6: Callout table for Protocol tab

Callout Number	Name	Description
1	Main Protocol tab	File name of the protocol.
2	Protocol windows	Protocol, Pick List, and Options windows. Details of the Protocol window are described below. For more information on the Pick List window, see Importing a Samples Pick List and Importing a Controls Pick List . For more information on the Options window, see Protocol Options Tab .
3	Source Definitions	Sample Plate Format — List of available source plate formats that match the plate containing sample. Sample Plate Type — List of available plate types that match the sample. Sample Volume — Volume of sample fluid expressed in nanoliters (nL). If the volume is specified in the pick list, it will override the data specified in the protocol. Control Plate Format — List of available source plate formats that match the plate containing controls. Control Plate Type — List of available plate types that match the control. Control Volume — Volume of sample fluid expressed in nanoliters (nL).
4	Process controls in this protocol	At the end of the run — Minimizes swapping of the source plate. At the end of each destination plate — Minimizes swapping of the destination plate. Optimize transfer throughout — Enables the application to determine the most efficient transfer order.
5	Destination Definition	Destination Plate Type — List of destination plate types available for this protocol. Number of Replicates — Number of consecutive wells that will receive the same sample. For example, 10 replicates indicates that each sample in the source plate will be transferred to 10 wells in the destination plate. <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;">  Note: If the imported pick list contains destination plate data, the number of replicates must be set to 1. </div> Fill direction — Direction that the sample will be transferred to the destination plate, either across the plate or down the plate. If the fill direction is specified in the pick list, it will override the data specified in the protocol.
6	Destination Plate Design	Plate template that allows the user to block wells from receiving sample or other fluids. This option is useful for reserving control wells. If the destination plate design is specified in the pick list, it will override the data specified in the protocol. <ul style="list-style-type: none"> • Reserved — Blocks selected wells from receiving transfers. Reserved wells appear gray. • Available — Removes block from reserved wells.

Error Check

The **Error Check** command allows the user to check the protocol for inconsistent information.

To check the current protocol for errors, in the **main Protocol** window, select the **Error Check** menu option.

Run

The **Run** command initiates the transfer protocol that is displayed.

To run the current transfer protocol, in the **main Protocol** window, click the **Run**  icon or select the **Protocol > Run** menu option. For more information, see [Run Protocol](#).

Protocol Options Tab

The **Protocol/Options** window is accessible by clicking the **Options** tab behind the **Protocol** tab. This window enables the user to customize the survey, output, and reporting options for the Echo Cherry Pick application. These settings are automatically used for the protocol created.

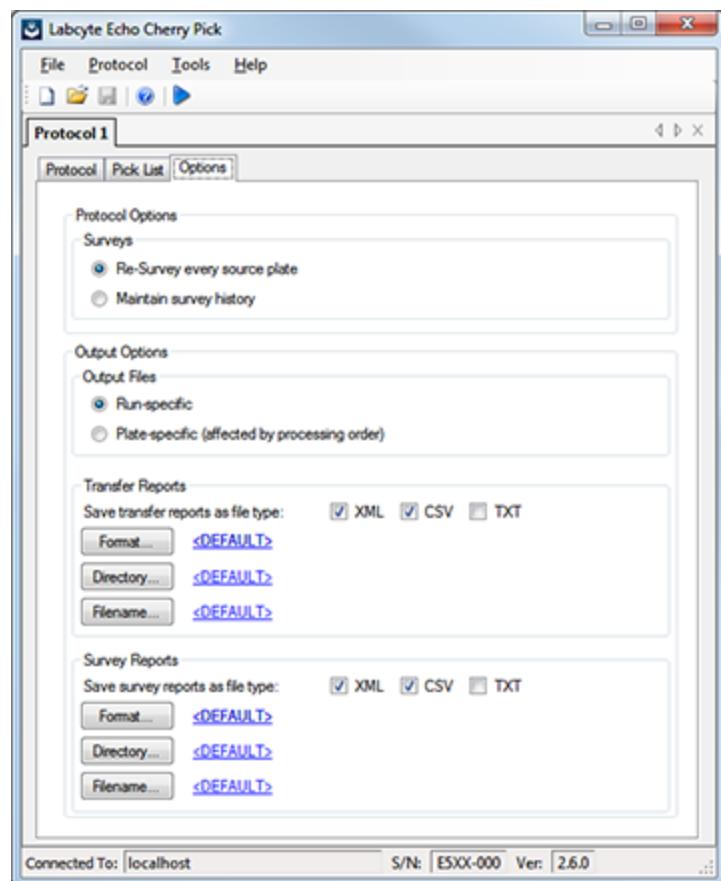
Each of the sections in the **Protocol Options Tab** is explained in the following topics.

- [Understanding Protocol Options](#)
- [Understanding Output Options](#)

Understanding Protocol Options

The **Protocol/Options** window displays the following protocol and output options.

Figure 34: Options tab



Note: The options settings are similar to the **Preferences/Options** window, but apply only to the protocol displayed.

Surveys

There are two ways to manage survey history:

- **Re-Survey every source plate** — Default setting that automatically surveys the source plate every time the protocol is run. Survey history is saved, but not referenced each time.
- **Maintain survey history** — Used to store survey data for source plates.

With **Maintain survey history** chosen, information from the initial survey is referenced for subsequent transfers — eliminating the requirement to resurvey.

This feature can reduce processing time during a protocol run — particularly if the source plate is swapped several times during a protocol run. The user can specify the length of time that the survey data is retained, from a few minutes to never resurvey.

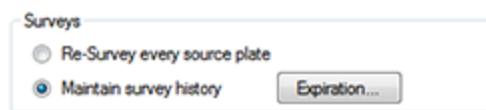
The software stores the survey data by plate barcode; therefore, the data is independent of the protocol and can be used across different protocols until the expiration time.



Note: Various factors can affect the content of the source wells, such as DMSO concentration, humidity, and exposure time during the transfer run; therefore, consider these factors when selecting an expiration time. For additional information, read the user note “*How Long Will A Survey Last When Performing Acoustic Droplet Ejections?*” on <http://www.labcyte.com> (Library > Resources > Notes).

The **Maintain survey history** function is located in the **Options** tab.

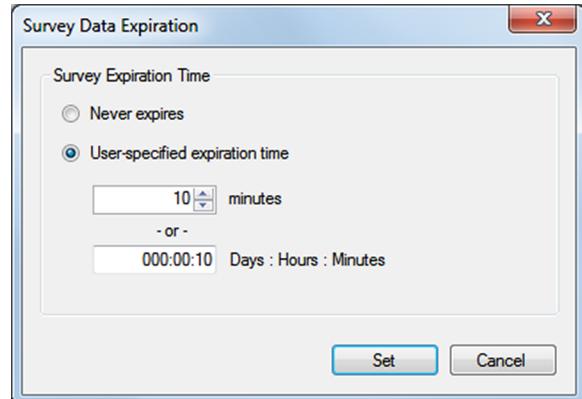
Figure 35: Surveys box



If the user selects **Maintain survey history**, an **Expiration** button appears.

Click **Expiration** to open the **Survey Data Expiration** dialog box and set the expiration values.

Figure 36: Survey Data Expiration dialog box



The following parameters can be set in the **Survey Data Expiration** dialog box:

- **Never expires** — Existing survey data is always re-used.
- **User-specified expiration time** — Existing survey data is re-used for the time that is specified in **minutes** or **Days:Hours:Minutes**.

 **Note:** If a stored survey does not cover the plate area that is required by the protocol (for example, some of the wells were empty when the plate was originally surveyed, but then filled later on), the software will survey the new wells and add this data to the stored survey data.

The stored survey data is instrument-specific. For example, if a source plate is surveyed in instrument A, the stored survey data cannot be used in instrument B.

Although survey history can be used indefinitely, it is not recommended.

Understanding Output Options

The output options are explained in the following topics:

- [Output Files](#)
- [Transfer and Survey Reports](#)

Output Files

The **Output Files** box in the **Options** window organizes the survey and transfer results according to the following criteria:

Figure 37: Output Files options



The following parameters can be set for output files:

- **Run-specific** — All protocol data is stored in one file, in the order that the results are generated.
- **Plate-specific** — Protocol data is stored in separate files, based on source or destination plates, depending on the process order specified in the **main Protocol** window.

Transfer and Survey Reports

File Type

Survey and transfer results can be saved to the following file formats that are compatible with most laboratory information systems:

- **XML** (extensible markup language)
- **CSV** (comma separated values)
- **TXT** (text file)

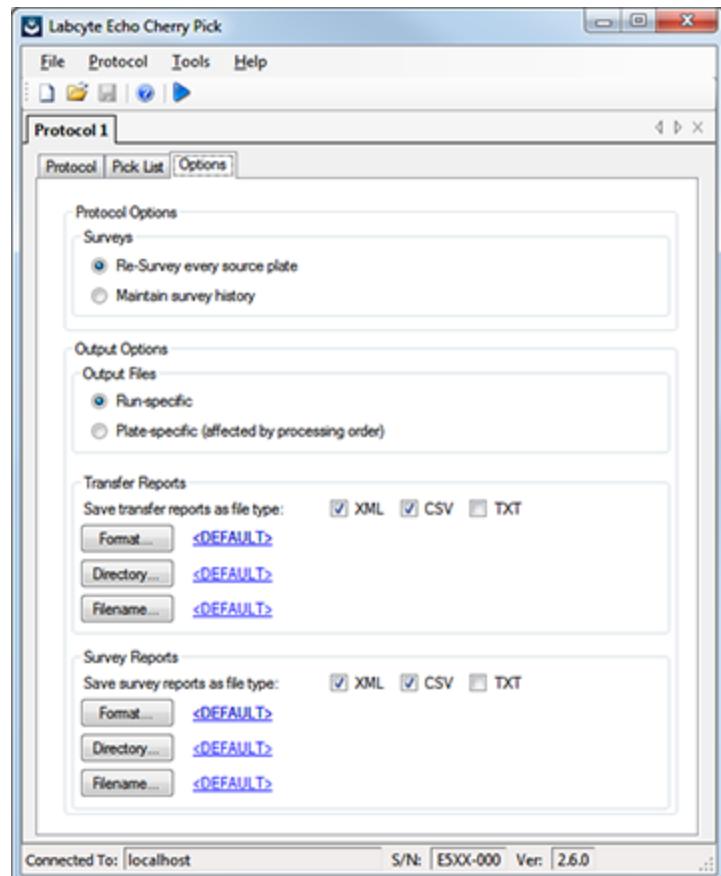
The results are saved in the formats selected, and stored in the directory specified in the **Directory** option.

Report Format

The survey and transfer reports can be customized by clicking the **Format** button in the **Protocol Options** tab.

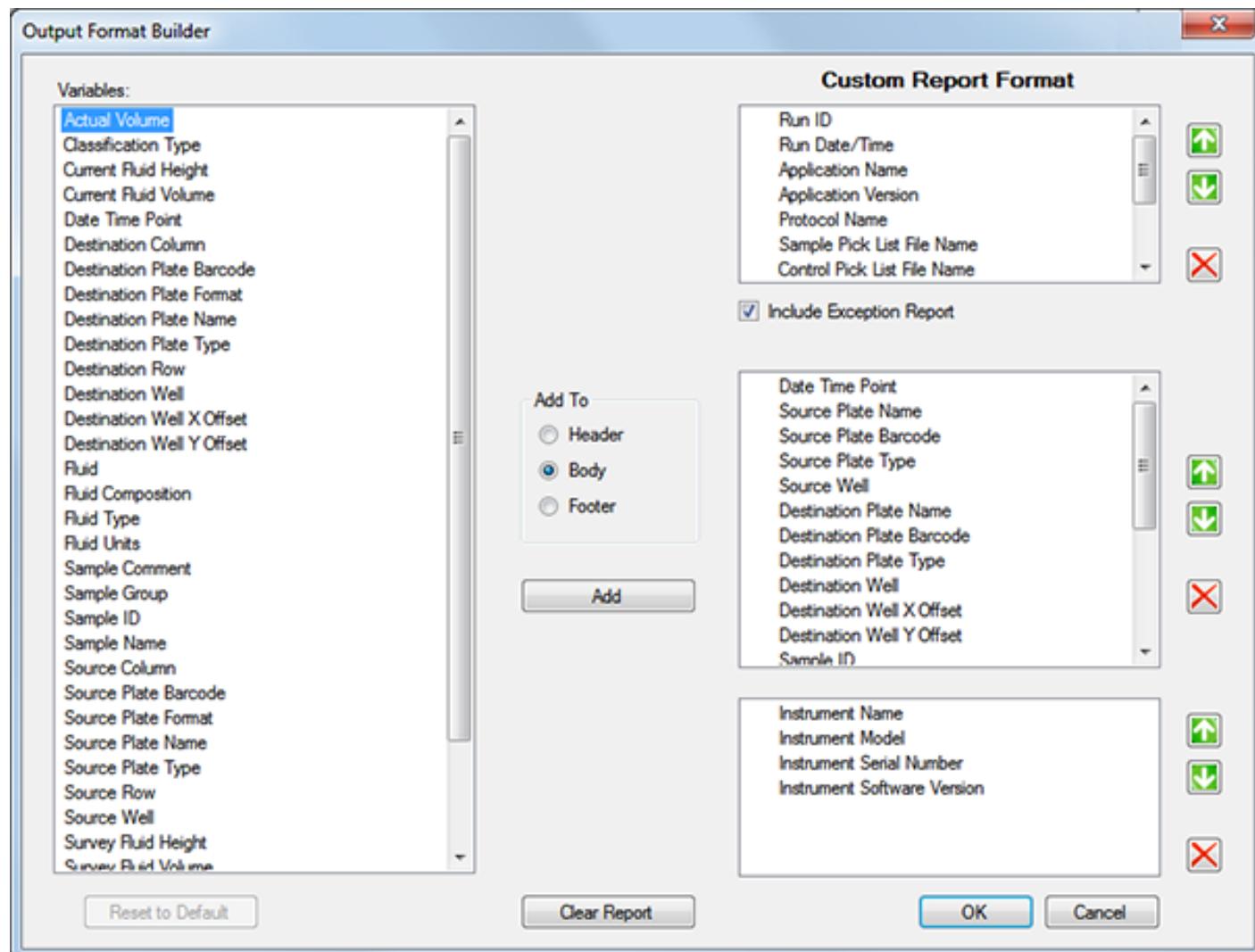
 **Note:** The *DEFAULT* settings in the **Transfer** and **Survey Reports** are from the **Preferences/Options** window.

Figure 38: Report Format Options

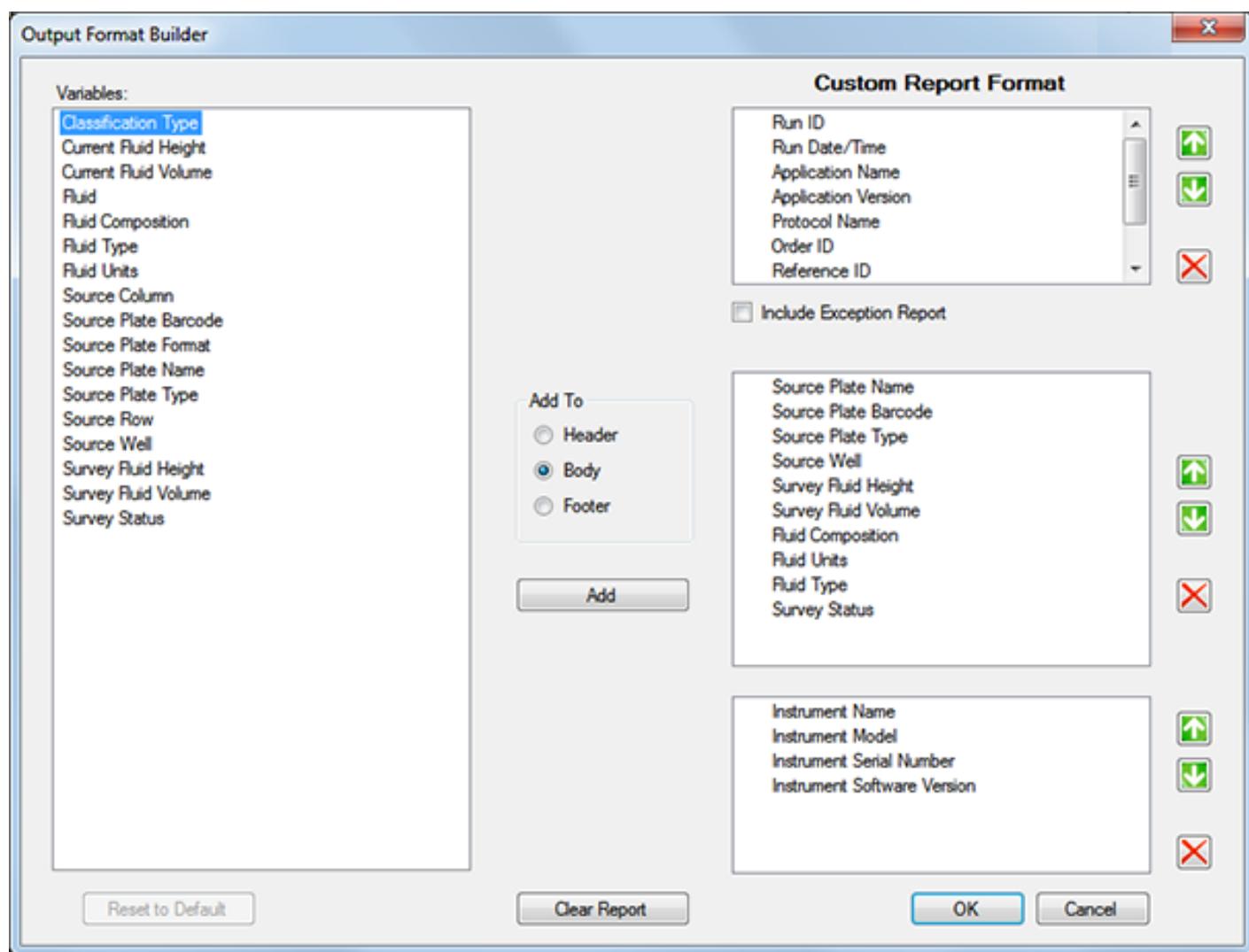


The **Output Format Builder** dialog box shows all the report variables (left selection box) that can be added to the report format (right selection boxes). The list of variables changes with the report area selected.

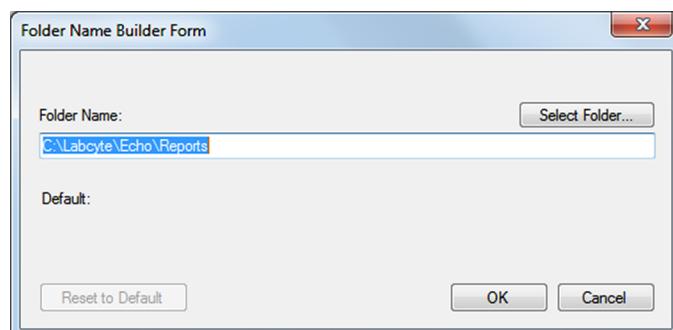
Figure 39: Transfer Output Format Builder



Note: The **Include Exception Report** option parses out any transfers that were not initiated because of a failed survey and promotes them to the top of the output file.

Figure 40: Survey Output Format Builder**Report Directory**

The default report directory for both surveys and transfers is C:\Labcyte\Echo\Reports. A different directory can be specified by clicking the **Directory** button and entering a new location. Use the **Select Folder** button to browse to a different directory.

Figure 41: Folder Name dialog box**Report Filename**

The Echo Cherry Pick application uses the following default formats to report the survey and transfer results:

Survey results file name —

\$AppName\$\\$RunDate\$\\$InstrSN\$_\$RunType\$_\$SrcPlateName\$ (\$\$SrcPlateBarcode\$)

For example:

Labcyte Echo Software\2018-02-04\E5XX-0001_Transfer_Plate1 (1-989992-0)

Transfer results file name —

\$AppName\$\\$RunDate\$\\$InstrSN\$_\$RunType\$_\$SessionID\$

For example:

Labcyte Echo Software\2018-02-04\E5XX-0001_Transfer_123

The survey and transfer formats can be changed by clicking the **Format** button in the **Protocol Options** tab.

Figure 42: Transfer Filename Builder

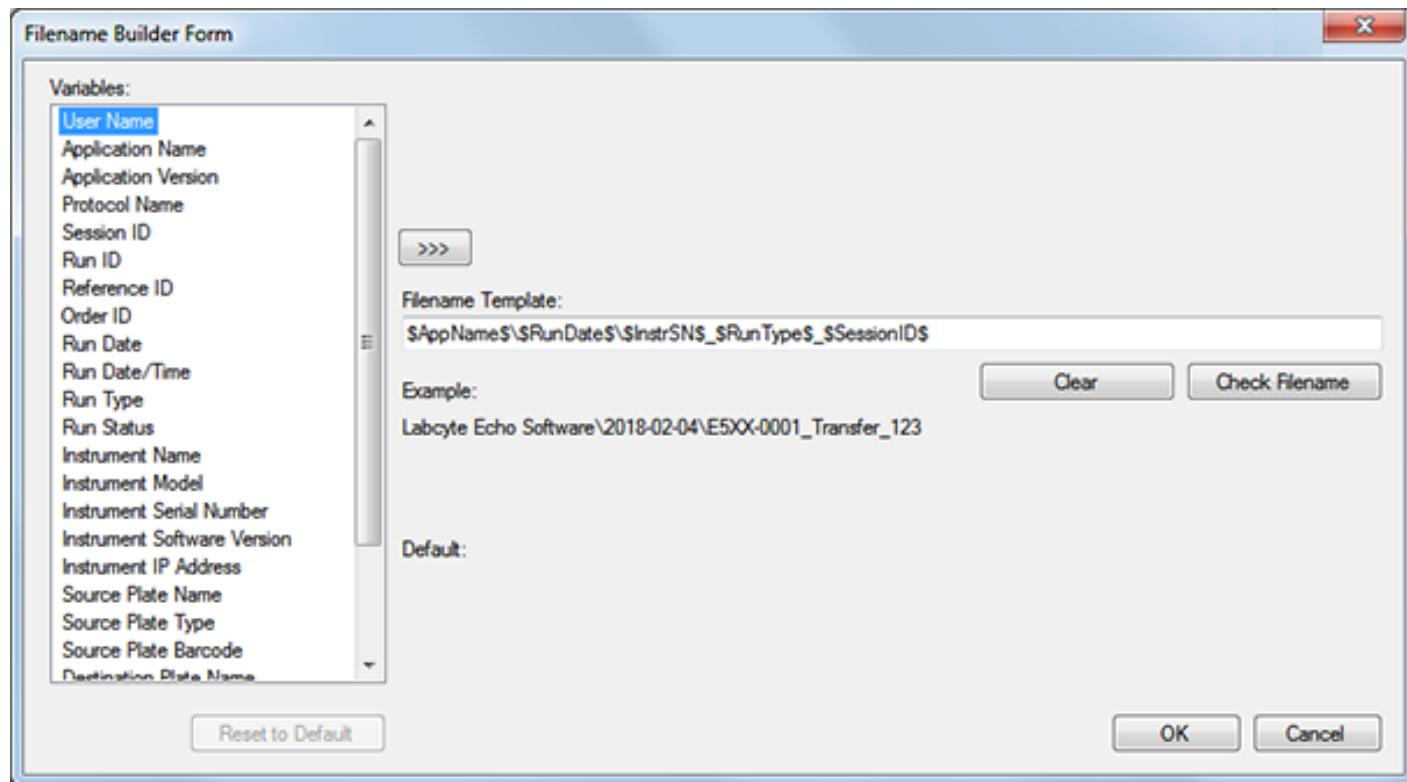
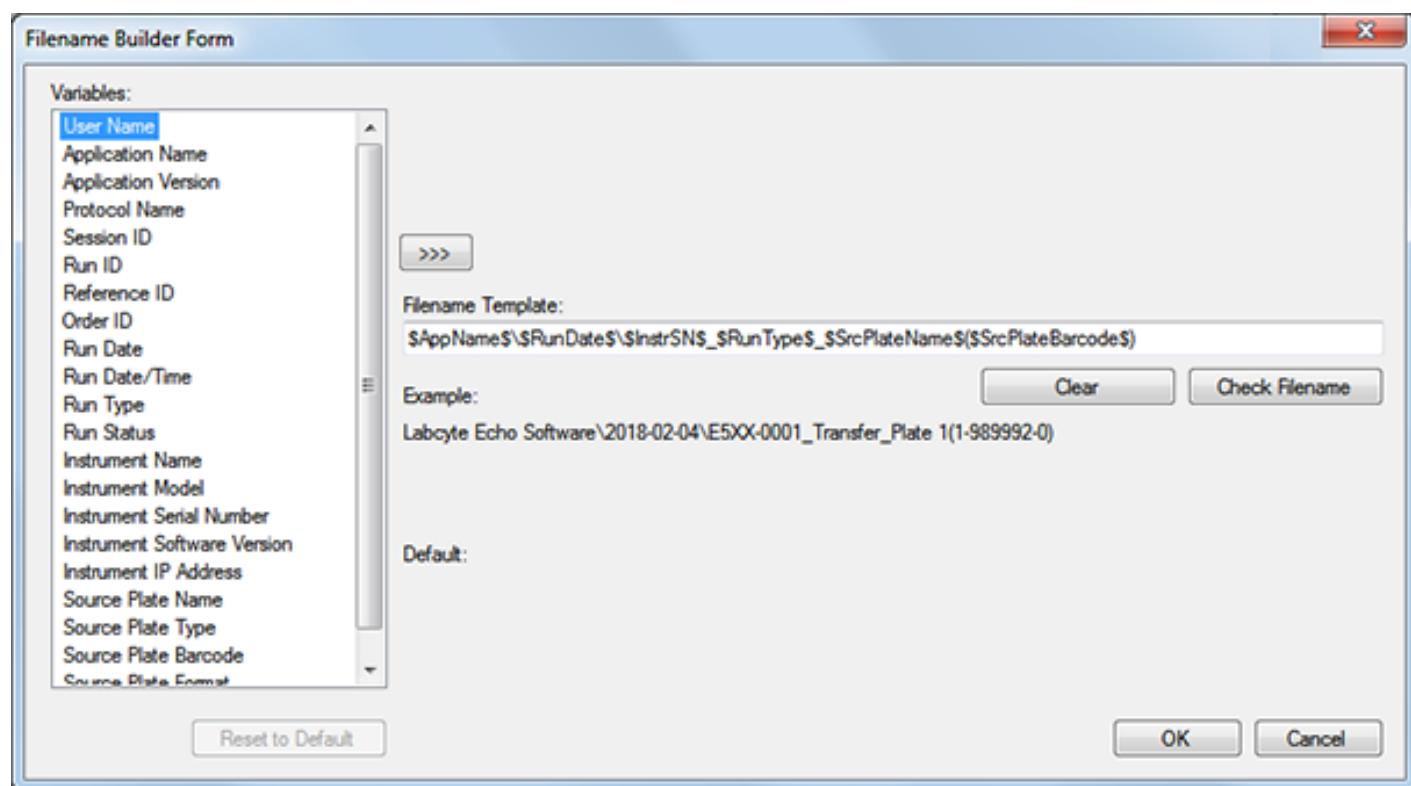


Figure 43: Survey Filename Builder

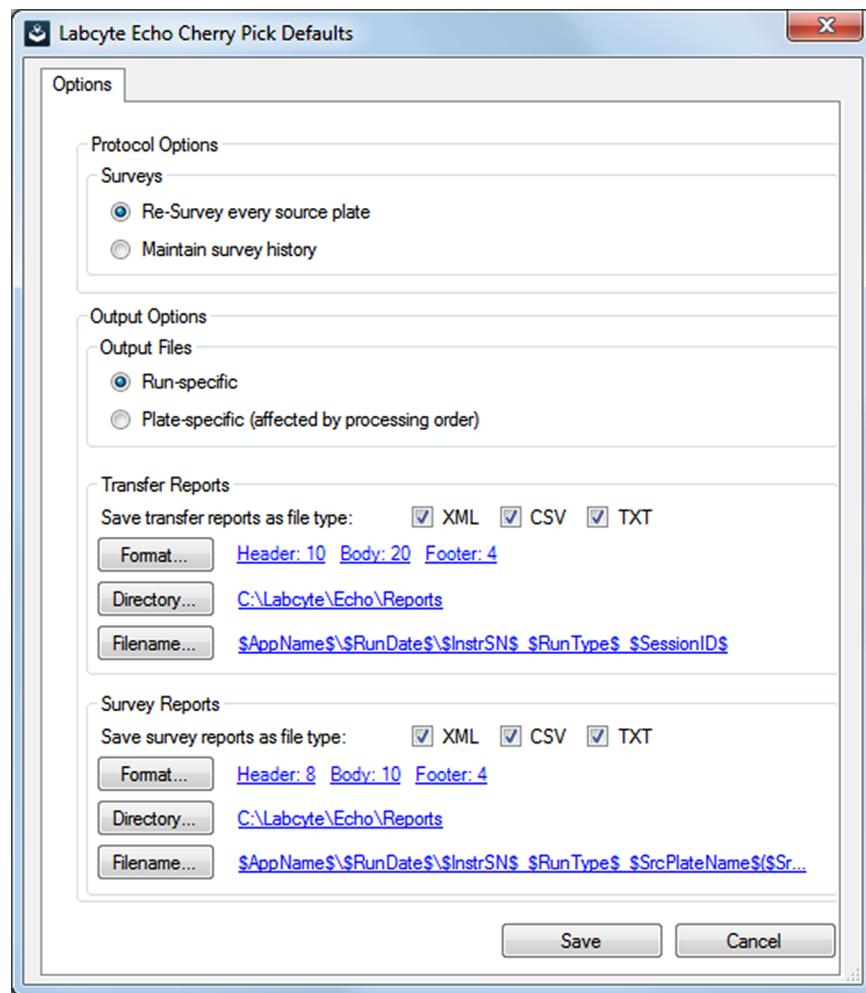
Preferences

The **Preferences/Options** window is accessible from the **Tools** menu. This window is very similar to the **Protocol Options** tab, but with the following differences:

- Settings are automatically applied to all protocols created unless changes were made in the **Protocol Options** window (report formats shown as “default”).
- Accessible from the **Toolbar**.

When the user clicks **Preferences**, the **Options window** opens to display the following protocol and output options:

Figure 44: Preferences/Options Window



Labware Definitions

The Echo Cherry Pick application relies on the Labware definitions resident in the Echo Liquid Handler database. New plate definitions can be added or existing plate definitions can be managed by selecting **Labware Definitions** from the **Tools** menu.

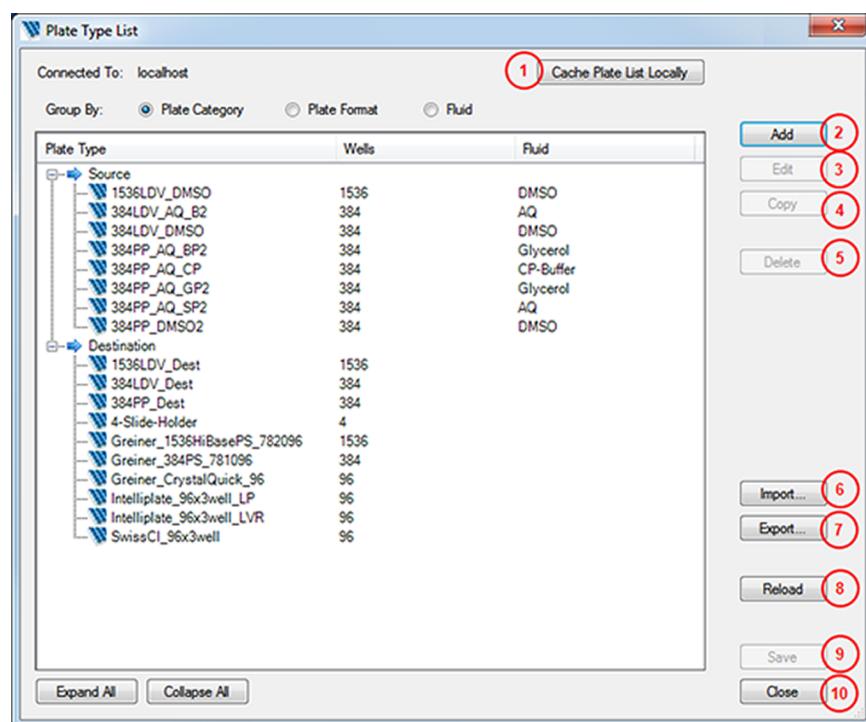
Each of the Labware topics are explained in the following topics.

- [Plate Type List](#)
- [Plate Type Editor](#)
- [Plate Export](#)

Plate Type List

The **Plate Type List** dialog box enables the user to add new plate definitions or manage existing ones.

Figure 45: Plate Type List dialog box



Note: In case of an error message followed by a blank Plate Type List, connect to an Echo Liquid Handler or import the Labware file from the Echo Liquid Handler directory.

The table below describes the buttons/fields or sections in the **Plate Type List** dialog box and their functionality.

Table 7: Callout table for Plate Type List

Callout Number	Name	Description
1	Cache Plate List Locally	Click this button to save the plate list from the Echo Liquid Handler to the Echo® Cherry Pick Application.
2	Add	Adds a plate definition. Only a destination plate can be added. Refer to one of the following options: <ul style="list-style-type: none"> • Add a Labware definition from the Echo® Cherry Pick Application. • Add a plate definition from the Echo Liquid Handler software and reload the updated Labware definition to the Echo® Cherry Pick Application.
3	Edit	Edit a plate definition. Select a plate definition and click the Edit button. <ul style="list-style-type: none"> • Source plate definition: Only the barcode location of the source plate can be edited. • Destination plate definition: Edit any setting in the definition
4	Copy	Copy a plate definition. Select a plate definition and click the Copy button. The user can copy a source or destination plate definition. For a source plate definition, an alias or child plate is created with exact parameters as the parent plate except the user-defined fluid name. For a destination plate, a destination plate definition is created. Alternate source or destination plate names can be created by copying existing plate types .
5	Delete	Delete a plate definition. Select a plate definition and click the Delete button. The user can delete a destination plate definition or an alias or child plate definition previously created for a source plate but not a source plate definition.
6	Import	Import a single plate definition or group of definitions from a specific file location. The file must have an .elwx extension to be imported.
7	Export	Export a single plate definition or group of definitions. This includes any user created alias or child plate definitions for source plates and destination plate definitions that were created.
8	Reload	Reload the plate types that have been edited or deleted since the plate type list was last saved.
9	Save	Save any changes made to the plate type list, such as adding a new plate definition.
10	Close	Close the Plate Type List dialog box.

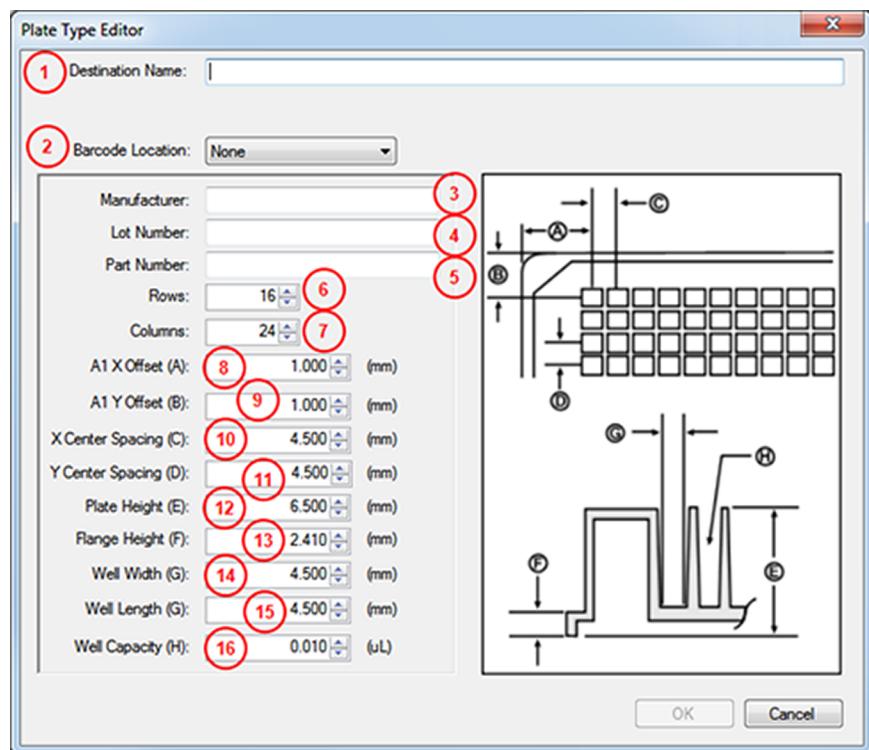


Note: In case of an error message followed by a blank Plate Type List, connect to an Echo Liquid Handler or import the Labware file from the Echo Liquid Handler directory.

Plate Type Editor

The **Plate Type Editor** dialog box is similar to the **Plate Specification** window in the Echo Liquid Handler software.

Figure 46: Plate Type Editor dialog box



Source plate definitions — Source plate definitions require exact specifications to accurately transfer nanoliter volumes; therefore, they are defined specifically for the Echo Liquid Handlers and tested at Labcyte (Echo-qualified). For this reason, source plates cannot be defined by the user. For existing source plates, only the barcode location can be edited. Contact Labcyte to add more source plates.

Destination plate definitions — The Echo Liquid Handler is programmed with several compatible destination plates; however, the user can add destination plates through the Echo® Cherry Pick Application or the Echo Liquid Handler software.

The table below describes the buttons/fields or sections in the **Plate Type Editor** dialog box and their functionality.

Table 8: Callout table for Plate Type Editor

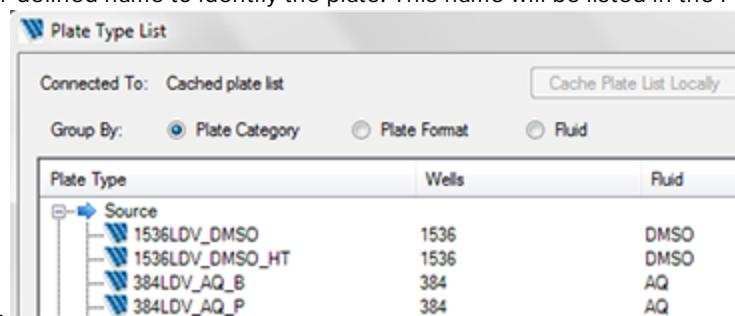
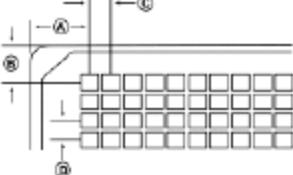
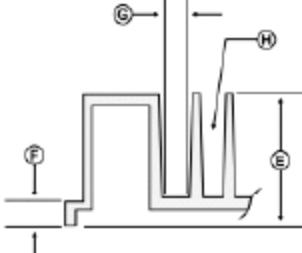
Callout Number	Name	Description
1	Name	User-defined name to identify the plate. This name will be listed in the Plate Type List dialog box. 
2	Barcode Location	Location of barcode label on the destination plate: <ul style="list-style-type: none">• None• Left

Table 8: Callout table for Plate Type Editor (continued)

Callout Number	Name	Description
		<ul style="list-style-type: none"> • Right • Long
3	Manufacturer	Name of the plate manufacturer.
4	Lot Number	Lot number assigned by the plate manufacturer.
5	Part Number	Part number assigned by the plate manufacturer.
6	Rows	Number of rows in the microplate.
7	Columns	Number of columns in the microplate.
8	A1 X Offset	(A)* Distance from left outside edge to center of first column where the left edge of the part will be defined as the two 12.7 mm areas (as measured from the corners) as specified in ANSI SLAS 1-2004 (R2012). Valid range: 0.0 to 128.0 mm.
9	A1 Y Offset	(B) Distance from top outside edge to center of first row where the top edge of the part will be defined as the two 12.7 mm areas (as measured from the corners) as specified in ANSI SLAS 1-2004 (R2012). Valid range: 0.0 to 86.0 mm.
10	X Center Spacing (C)	Column spacing: Each following row/column shall be an additional X.Y mm in distance from the top/left outside edge of the plate as specified in ANSI SLAS 4-2004 (R2012). Valid range: 0.05 to 9.0 mm.
11	Y Center Spacing (D)	Row spacing: Each following row/column shall be an additional X.Y mm in distance from the top/left outside edge of the plate as specified in ANSI SLAS 4-2004 (R2012). Valid range: 0.05 to 9.0 mm. 
12	Plate Height (E)	The overall height of the plate as specified in ANSI SLAS 2-2004 (R2012). Valid range: 6.5 to 14.5 mm.
13	Flange Height (F)**	The height of the flange (skirt) as specified in ANSI SLAS 3-2004 (R2012). Valid choices: 2.41 mm, 6.10 mm, and 7.62 mm.
14	Well Width (G)	The width of the well opening at the bottom (not an SLAS specified dimension). Valid range: 0.0 to 86.0 mm.
15	Well Length (G)	The length of the well opening (not an SLAS specified dimension). Valid range: 0.0 to 128.0 mm.
16	Well Capacity (H)	The overall capacity of the well in microliters. Valid range: greater than 0.0 uL. 



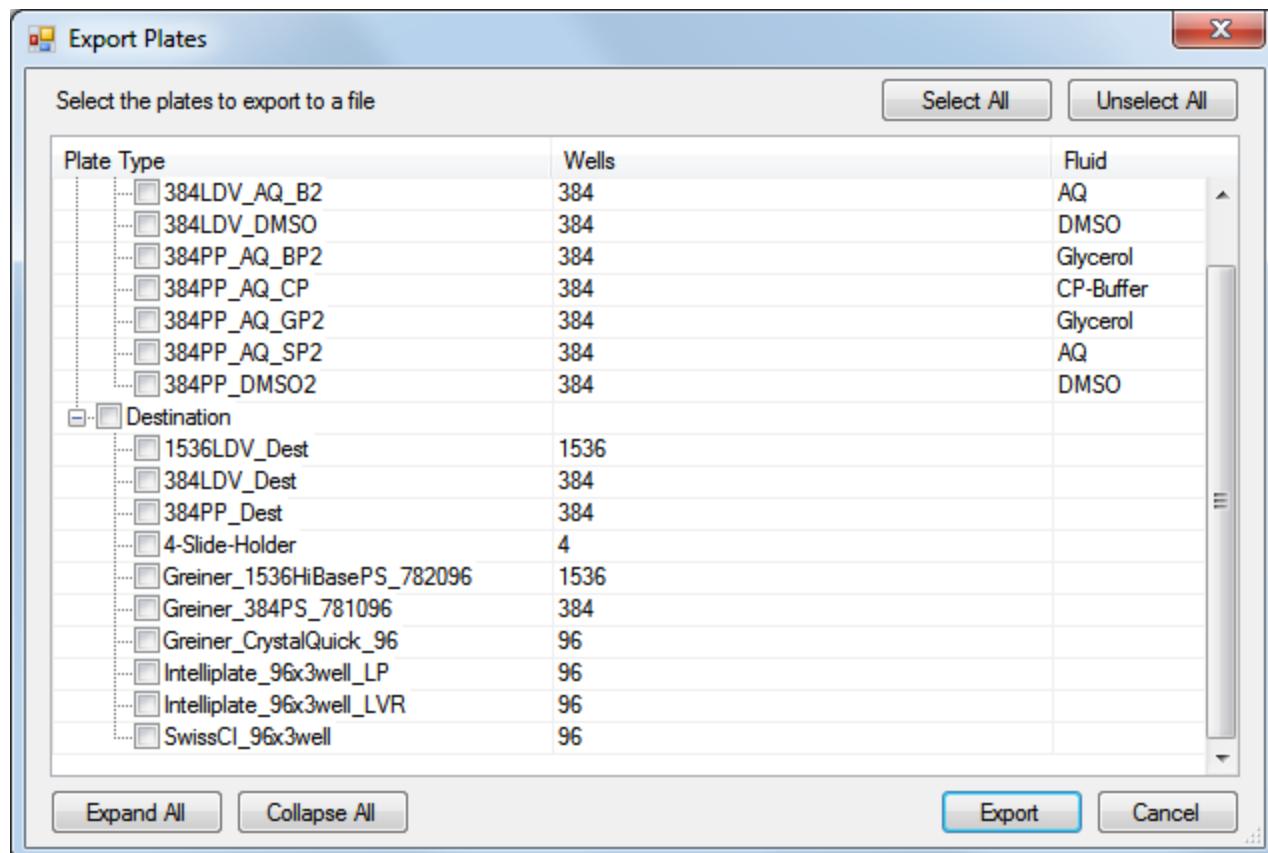
Note: * The items marked A-G are measurements that need to be taken by hand or filled in from the manufacturer's specifications. These dimensions and further details on their definitions can be found at <https://www.slas.org/resources/information/industry-standards/>.

** Currently, the Echo Liquid Handler does not use dimensions F (flange height) and H (well capacity). Any value entered for flange height or well capacity is ignored.

Plate Export

The **Export Plates** dialog box displays the plates currently available in the Echo® Cherry Pick Application. The user can select and export one or more plates to a file (.elwx file extension) for use in another application.

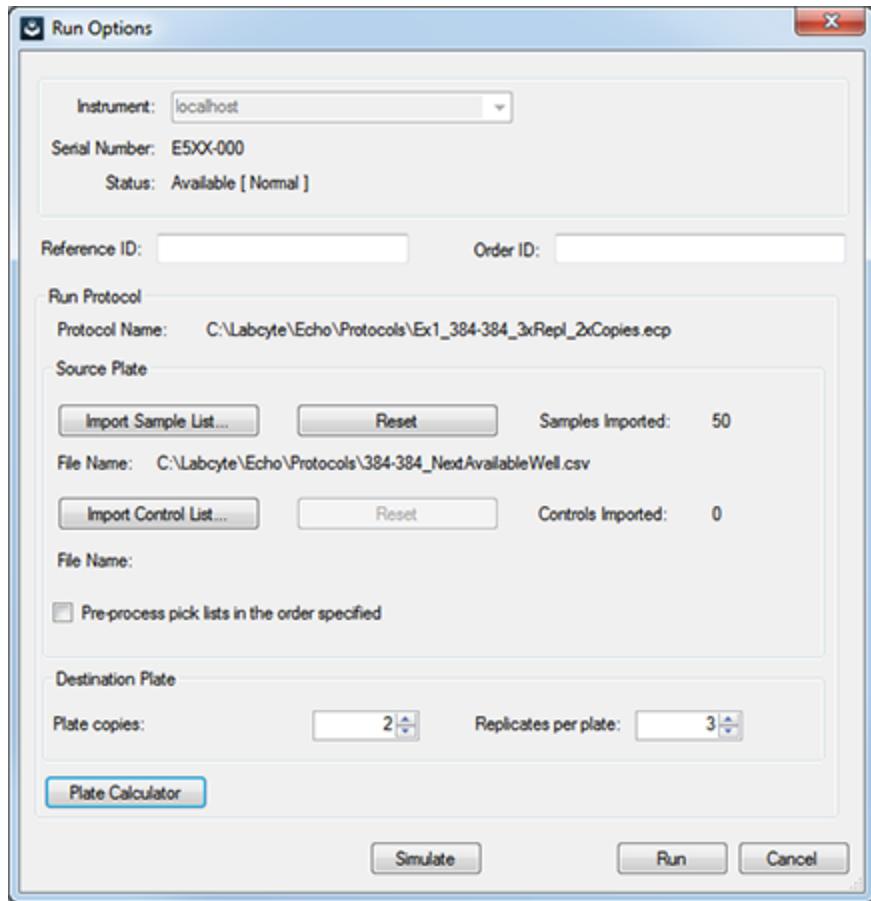
Figure 47: Export Plates dialog box



Run Protocol

The **Run Options** dialog box enables the user to run a simulation of the transfer protocol or run the transfer protocol on the Echo instrument. If the application is not connected to an Echo instrument, this dialog box also provides a connection dialog box.

Figure 48: Run Options dialog box



1. Select **Run** from the **Protocol** menu or click the **Run** icon in the **Toolbar**.
2. Select the **Instrument** if it is not already selected.
3. Optionally, enter a **Reference ID** and/or **Order ID** to be used to reference the run in the output report files.
4. Click **Import Sample List** to import a sample list to be used for the run. This step is only needed if a pick list was not previously imported or if the user would like to change the current pick list. For more information on how to define a pick list, see [Importing a Pick List](#).
5. Click **Import Control List** to import a control list to be used for the run. This step is only needed if a pick list was not previously imported or if the user would like to change the current pick list. For more information on how to define a pick list, see [Importing a Pick List](#).
6. Select **Pre-process pick lists in the order specified** to process the pick lists to determine the placement of all compounds in advance of the run.

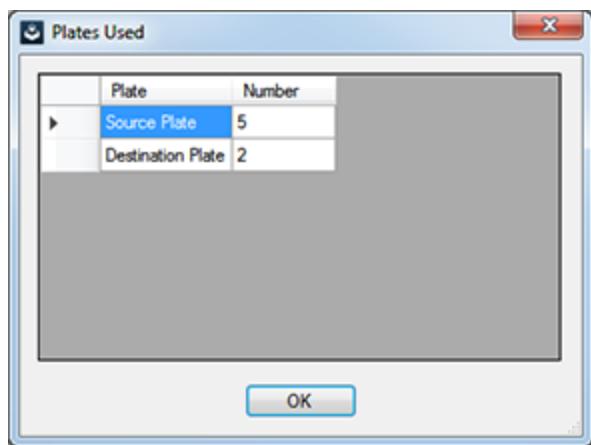


Note: If **At the end of each destination plate** was selected in the **Process controls in this protocol** section in the **Protocol** tab, you must select the **Pre-process pick lists in the order specified** to run the protocol as selected. Otherwise, a message box is displayed informing the user that the protocol will process controls at the end of the run and asks the user if they want to continue or Cancel.

7. In the **Destination Plate** section, change the value for **Plate copies** to override the number of plate copies for the protocol. Change the **Replicates per plate** value to override the original setting in the protocol for the replicates per plate.

8. Click the **Plate Calculator** button to view the number of plates needed to run the protocol.

Figure 49: Plates Used dialog box



9. Optionally, click **Simulate** to test the run.



Note: Running a simulation is recommended to verify the transfers defined in the protocol before a live run.

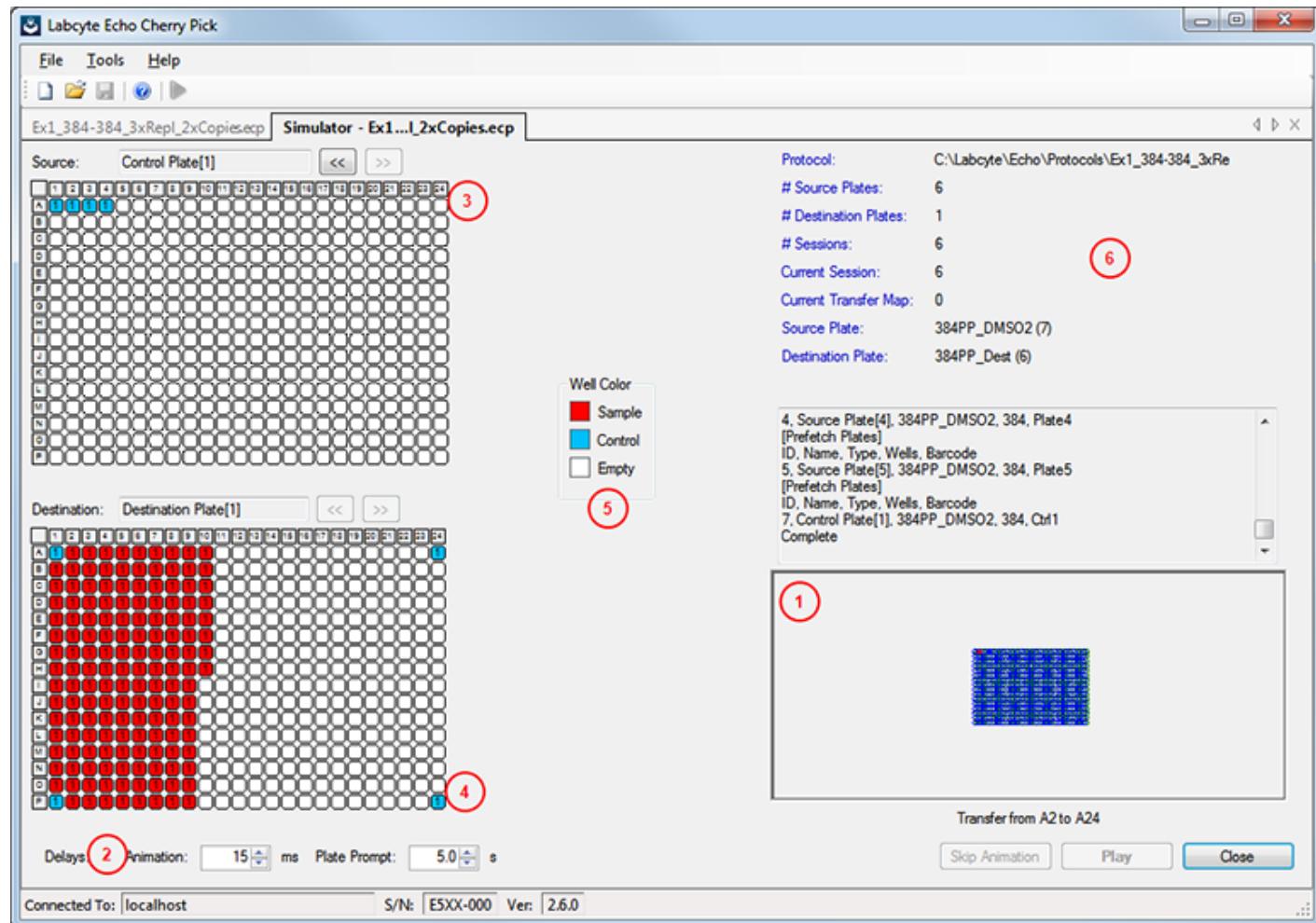
10. Click **Run** to execute the protocol. For more information, see [Run Status Window](#).

Simulator Window

The simulator is an animation of fluid transfer for the selected protocol. The simulation is interactive and allows the user to respond to a prompt box to insert and remove plates. Since this is a simulation, the prompt box appears for only 5 seconds, then the software automatically responds to the prompt and continues to the next step.

The protocol example that is described in this help page uses a pick list of compounds in five source plates and a control plate transferring to a single destination plate. The components of the simulator window are described below.

Figure 50: Simulator Window



The table below describes the buttons/fields or sections in the **Simulator Window** and their functionality.

Table 9: Callout table for Simulator Window

Callout Number	Name	Description
1	Transfer Animation Box	Simulates the movement of the destination plate (green) as it receives liquid from the source plate. Each source-to destination well transfer is documented below the plates.
2	Delays	<p>The following Delays commands are available to manage the transfer animation.</p> <ul style="list-style-type: none"> • Animation (milliseconds) — Controls the speed of the simulated well-by-well transfer. Speed ranges from 500 ms to 0; default is 15 ms. Higher speeds are useful to slow down the animation when transfers jump around the plate. For example, during backfills. • Plate Prompt (seconds) — Controls the time interval that the plate prompt box is displayed, from 30 s to 0. Zero setting is useful to bypass the prompt box entirely and view the animation only. • Skip Animation — Bypasses the animation step and shows only the transfer results for that step. This control enables the user to quickly review the plate mapping after each transfer step. <p> Note: This control does not bypass plate prompts or bulk fill displays.</p> <ul style="list-style-type: none"> • Play — Begins the simulated fluid transfer. • Close — Closes the simulation window. If a simulation is in progress, it will need to be canceled before the window can be closed.
3	Source Plate Type Map Box	Shows the source plate that is selected for transfer. As the simulation runs, each source well shows the number of times a transfer is made from that well.
4	Destination Plate Type Map Box	Shows each well that receives transfers and the number of transfers that are received.
5	Well Color Legend	Indicates the colors used to represent the contents of the wells in the source, intermediate, and destination plates. <ul style="list-style-type: none"> • Red — Sample • Yellow — Solvent • Blue — Control • White — Empty
6	Protocol Information Box	Provides details about the transfer protocol, such as the number of plates that will be needed. As the simulation proceeds, this box is updated to show which plates are currently in use.

Run Status Window

The **Run Status** window is a dynamic window that provides control buttons to run the protocol, and various status windows to show the progress of the compound transfer, the state of the Echo instrument, and the final well positions and volume of the transferred fluid.

Figure 51: Run status window (Echo 55X Series Liquid Handler)

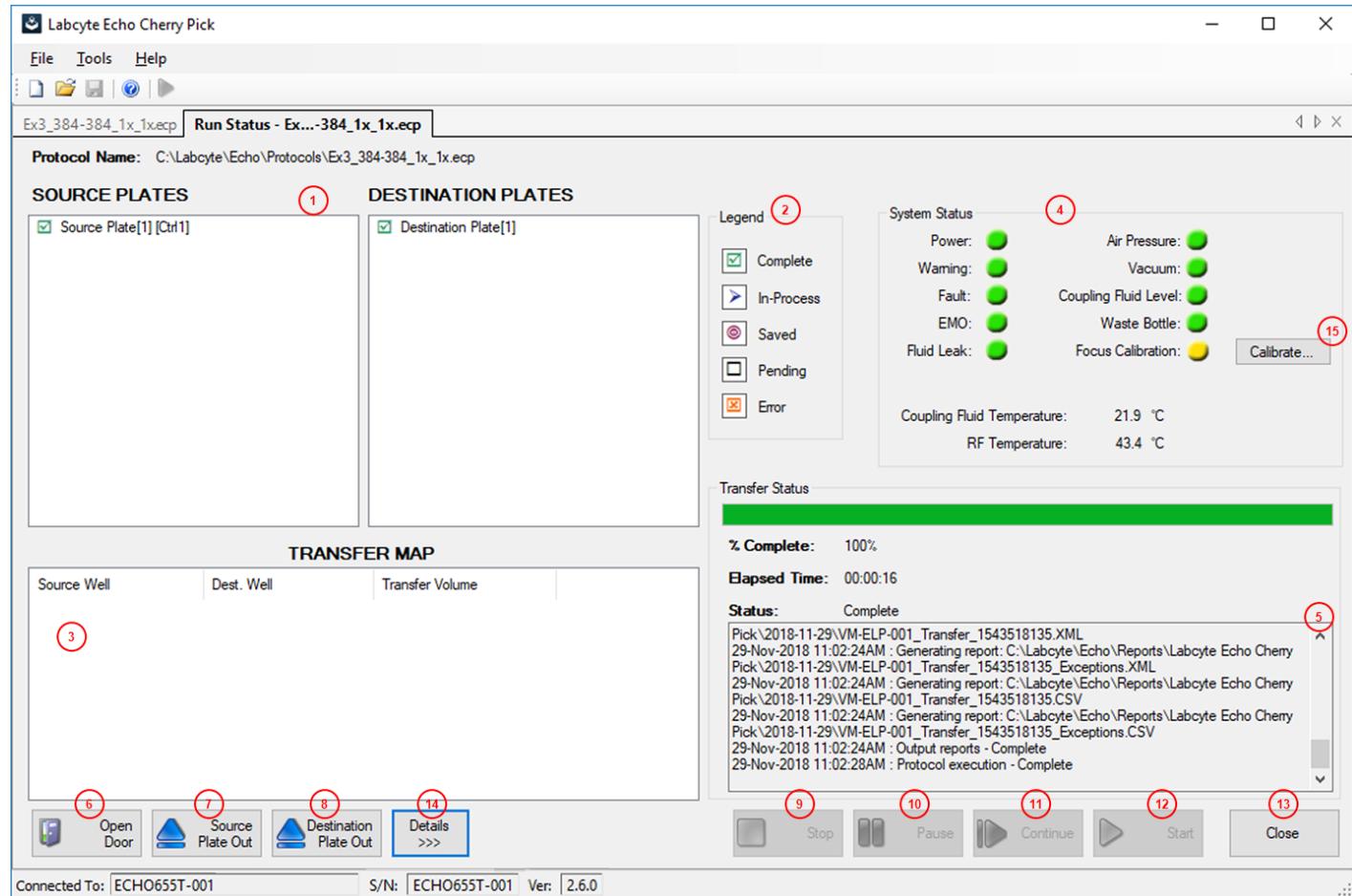
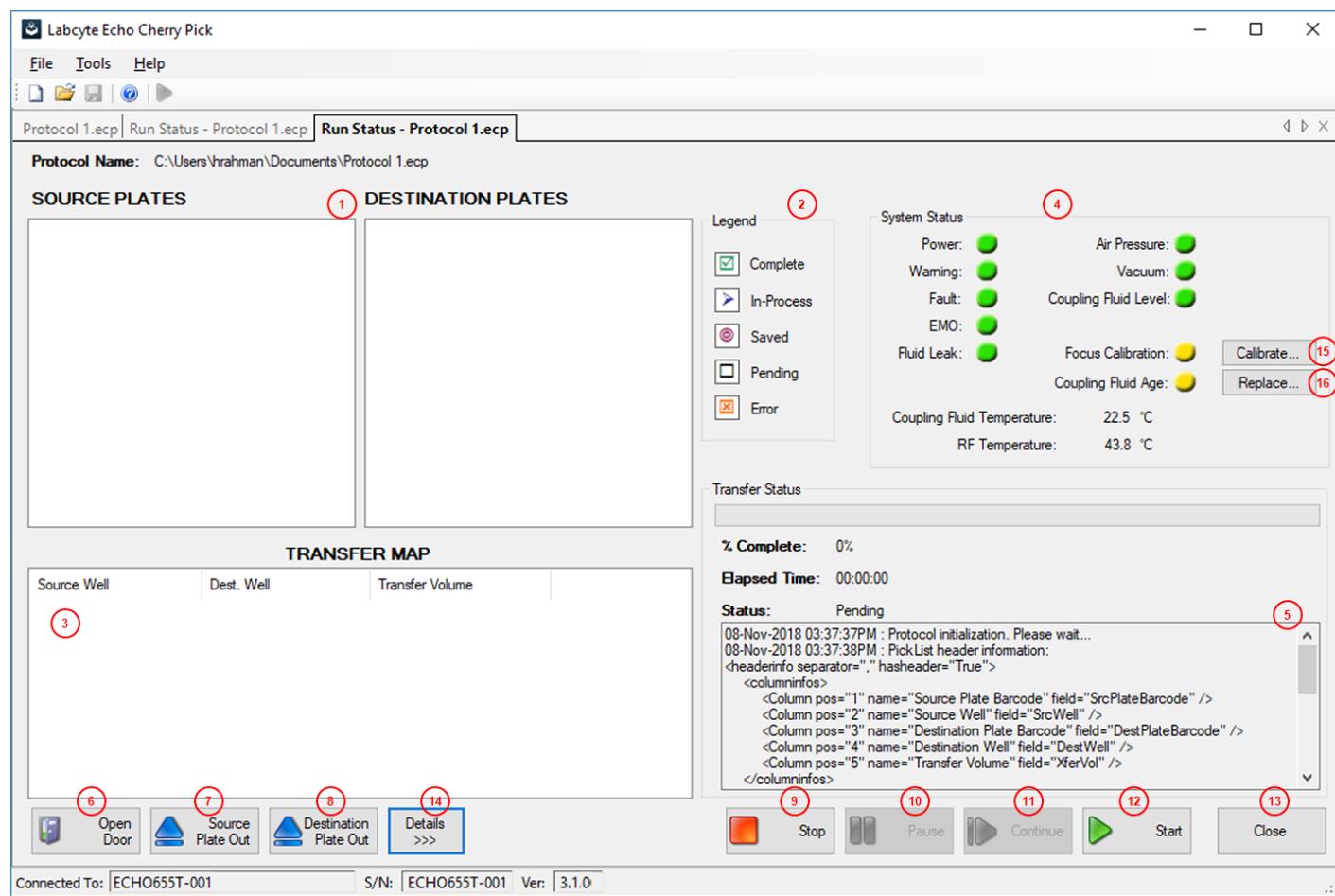


Figure 52: Run status window (Echo 650 Series Liquid Handler)



The table below describes the buttons/fields or sections in the **Run Status** window and their functionality.

Table 10: Callout table for Run Status window

Callout Number	Name	Description
1	Source and Destination Plate windows	Shows the status of each plate as it progresses through the transfer protocol. The Legend interprets the symbols used in the status windows.
2	Legend	Identifies each of the states (Complete, InProcess, Saved, Pending, Error) possible for a source and destination plate during a run.
3	Transfer Map window	Shows the details of each well-to-well transfer.
4	System Status window	Shows the status of the Echo instrument during the transfer run. If a problem occurs, an alert is indicated by the colors turning from green to yellow to red. If it is red, the user needs to do something to fix it.
5	Transfer Status window	Shows a progress bar of the transfer protocol, as well as percent completion and elapsed time. This section also provides a text window that displays all the actions that occur during the run.
6	Open Door button	Opens the process door of the connected Echo Liquid Handler.
7	Source Plate button	Extends the source plate gripper.
8	Destination Plate Out button	Extend the destination plate gripper.
9	Stop button	Stops the transfer protocol that is in progress.
10	Pause button	Pauses the transfer protocol that is in progress.
11	Continue button	Continues the transfer protocol that is in progress.
12	Start button	Begins the transfer protocol.
13	Close button	Closes the Run Status window.
14	Details button	Shows the debugging information for the protocol run.
15	Calibrate button	Starts the focus calibration procedure.
16	Replace button	Starts the coupling fluid replacement procedure (only applies to the Echo 650 Series Liquid Handler).

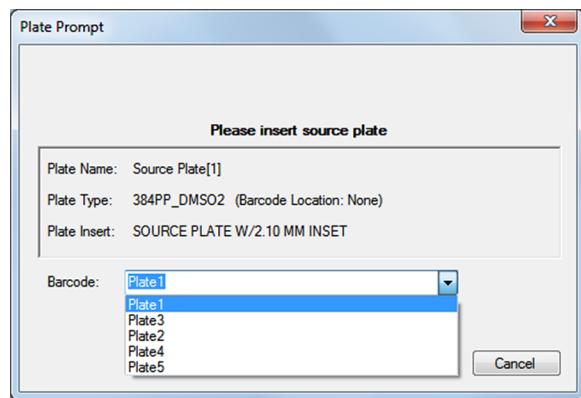
Plate Prompt

The **Plate Prompt** boxes instruct the user to insert or remove a plate. Depending on the protocol, there may be multiple source and destination plate prompts displayed and the order in which they are shown is also dependent on the protocol.

The plate prompt steps are described below:

1. Insert the source plate into the source plate gripper stage and click **OK**.

Figure 53: Insert source plate prompt box



Note: For Echo 650 Series Liquid Handler instruments, the **Plate Insert** will always be **Universal Insert**.

Identify the source plate in one of the following ways:

- **Plate ID** — Select the **Source Plate ID** from the drop-down menu.
- **Barcode** — Select the **Barcode** field and ensure the **Verify Barcode** option is selected. The Echo instrument automatically scans the barcode label on the plate and inserts it into the **Barcode** field.



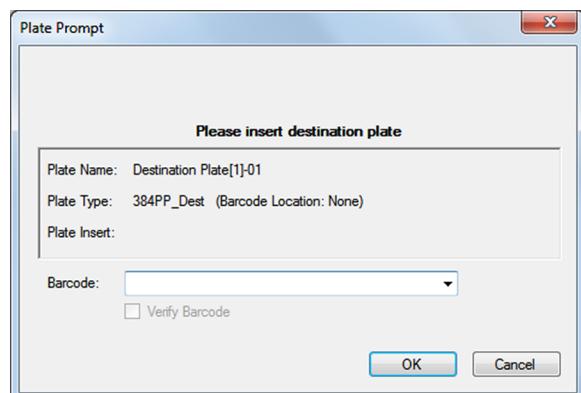
Note: If the **Barcode** field was skipped and **Verify Barcode** was not selected, the software displays a plate read error.

- **Pre-processed pick lists** — Ensure that the pre-processed pick lists option is selected in the Run Option window. If this option was selected, the Barcode field is initialized to display source plates listed in the pick list; therefore this field is not available for text changes (grayed out). However, the **Verify Barcode** option can be disabled to bypass the barcode scan — particularly if user-created plate IDs are being used instead of barcodes to identify the source plates.

After the source plate is processed, the software removes it from the drop-down menu.

2. Insert destination plate and click **OK**.

Figure 54: Insert destination plate prompt box

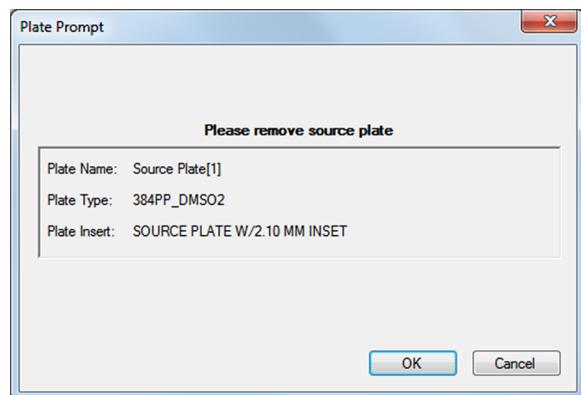


- Select the **Source Plate Barcode** (or plate ID) from the drop-down menu. If there is only one destination plate, the software automatically selects it and disables the **Verify Barcode** option.
- Select **Verify Barcode** (optional) and click **OK**.

After the destination plate is processed, the software removes it from the drop-down menu.

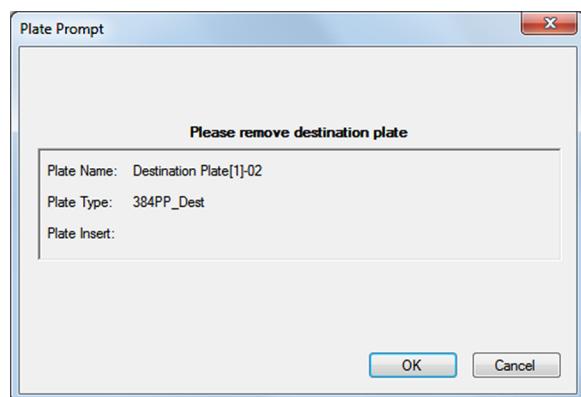
3. Remove the source plate and click **OK**.

Figure 55: Remove source plate prompt box



4. Remove the destination plate and click **OK**.

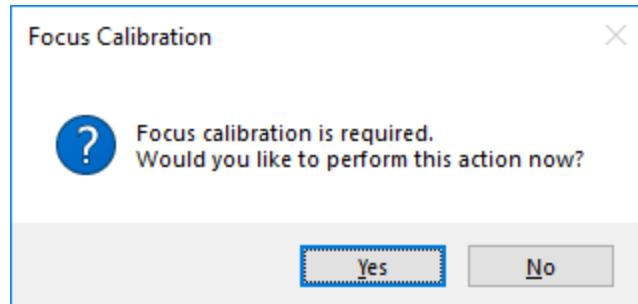
Figure 56: Remove destination plate prompt box



Focus Calibration

The **Focus Calibration** dialog box is automatically displayed when the user selects **Run** in the **Run Options** dialog box if the Echo Liquid Handler requires acoustic transducer calibration. This is also indicated by the yellow warning status indicator for **Focus Calibration** in the **System Status** section.

Figure 57: Focus Calibration Dialog Box



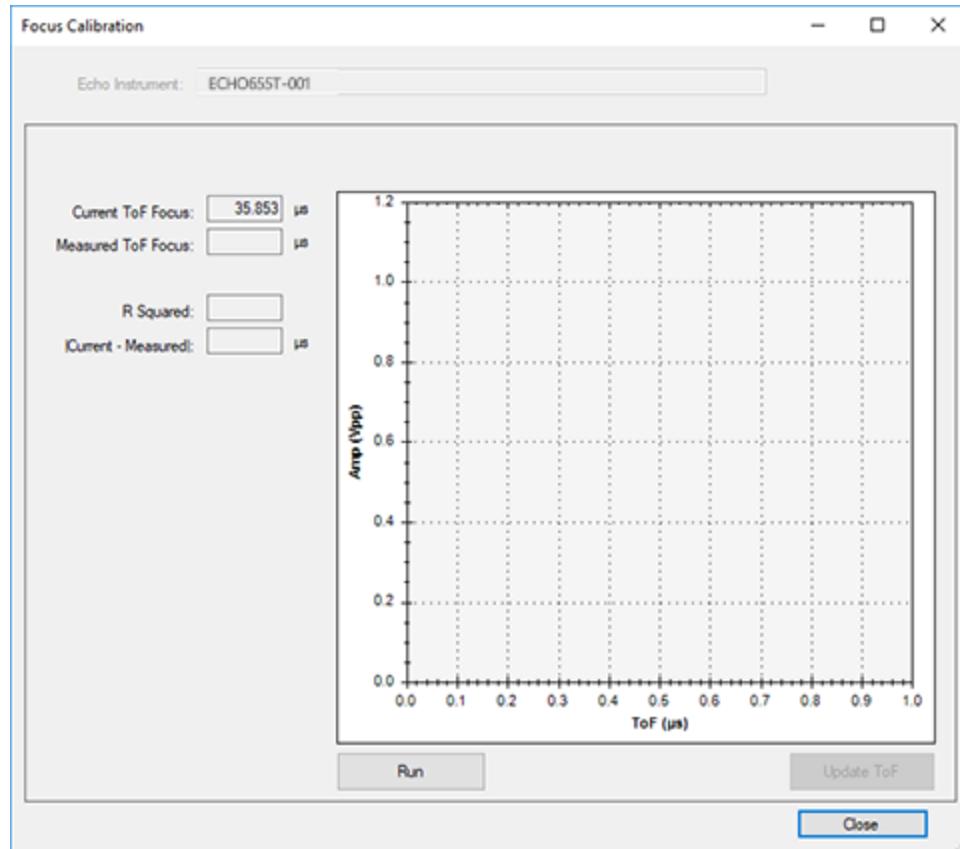
The Focus calibration procedure measures the focal length of the acoustic transducer and compares it to the previous measurement. If the difference between these measurements is minimal, then the system updates its calibration database with the new focal length and the procedure is finished. If the difference is larger than a preset threshold, users should call Labcyte Service and Support to ensure the system is running properly before accepting the focal length new value.

It is recommended to select **Yes** and follow the focus calibration steps. If you choose to delay the focus calibration, you can click the **Calibrate** button next to the **Focus Calibration** status indicator in the **System Status** section in the **Run Status** window to start the focus calibration steps.

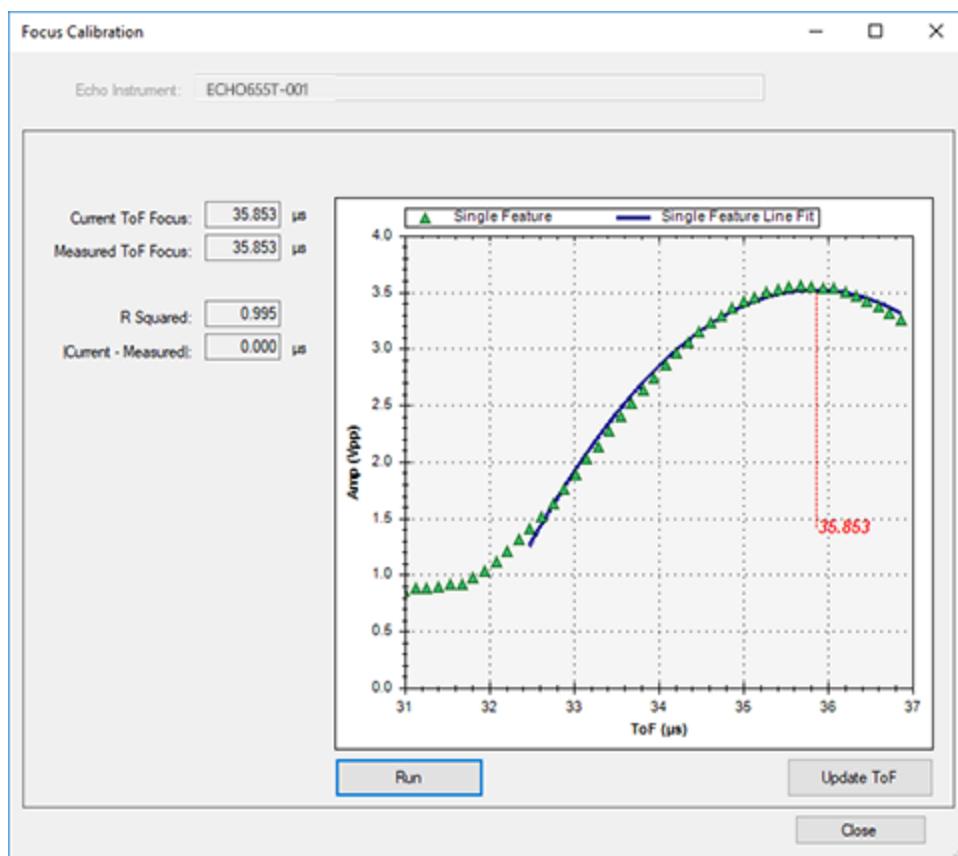
To run the Focus Calibration procedure:

1. Click **Yes** to begin the **Focus Calibration** procedure. The **Focus Calibration** dialog box is displayed.
2. In the **Focus Calibration** dialog box, click **Run**.

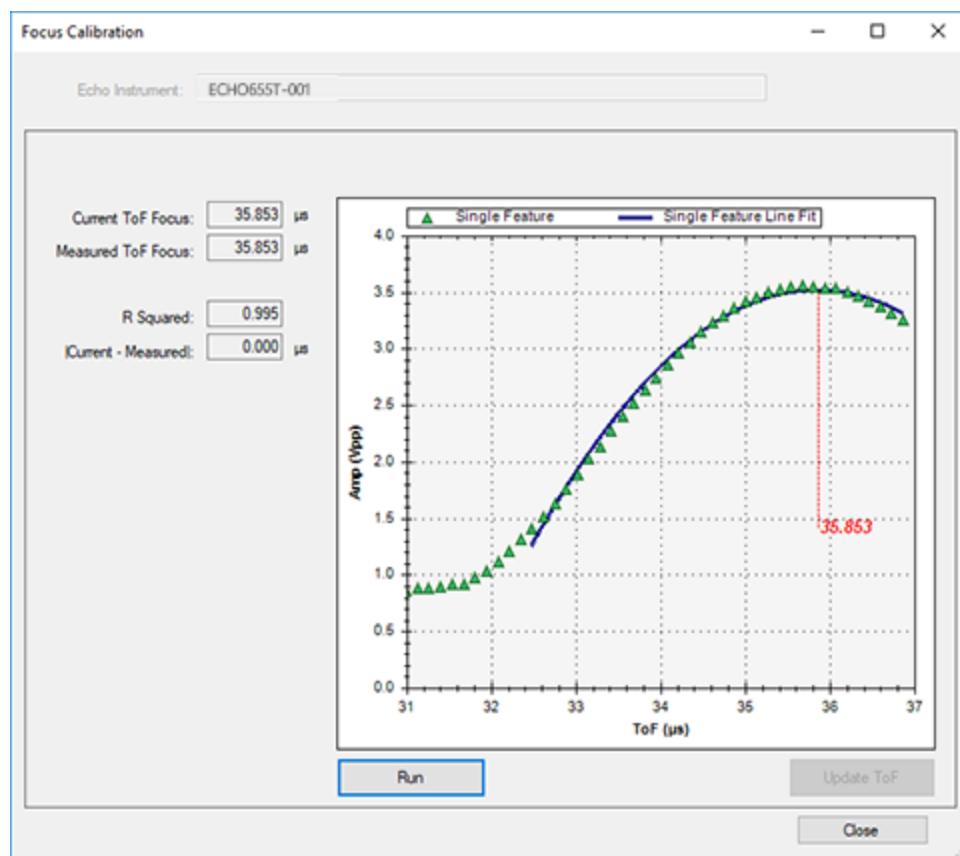
Figure 58: Focus Calibration Dialog Box



3. The new focus calibration values are displayed. If there are no errors, click **Update ToF** to update the focus calibration values. If the focus calibration values are outside the normal range, a red warning box is displayed indicating the focus calibration values are out of range. If the user clicks **Update ToF**, a confirmation dialog box is displayed to ensure the user is aware of committing calibration values that are out of range. Out of range focus calibration values should not be committed unless instructed by Labcyte Service and Support.

Figure 59: Focus Calibration Dialog Box

4. Once the focus calibration values have been committed, the **Update ToF** button is disabled. Click **Close** to exit the **Focus Calibration** dialog box.

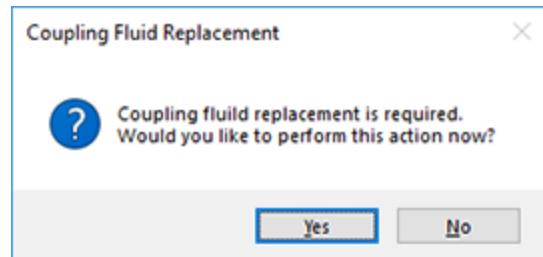
Figure 60: Focus Calibration Dialog Box

Coupling Fluid Replacement

 **Note:** The coupling fluid replacement procedure is only required for the Echo 650 Series Liquid Handler.

The **Coupling Fluid Replacement** dialog box is automatically displayed when the user selects **Run** in the **Run Options** dialog box and if the Echo Liquid Handler needs coupling fluid replacement. This is also indicated by the yellow warning status indicator for **Coupling Fluid Age** in the **System Status** section.

Figure 61: Coupling Fluid Replacement dialog box

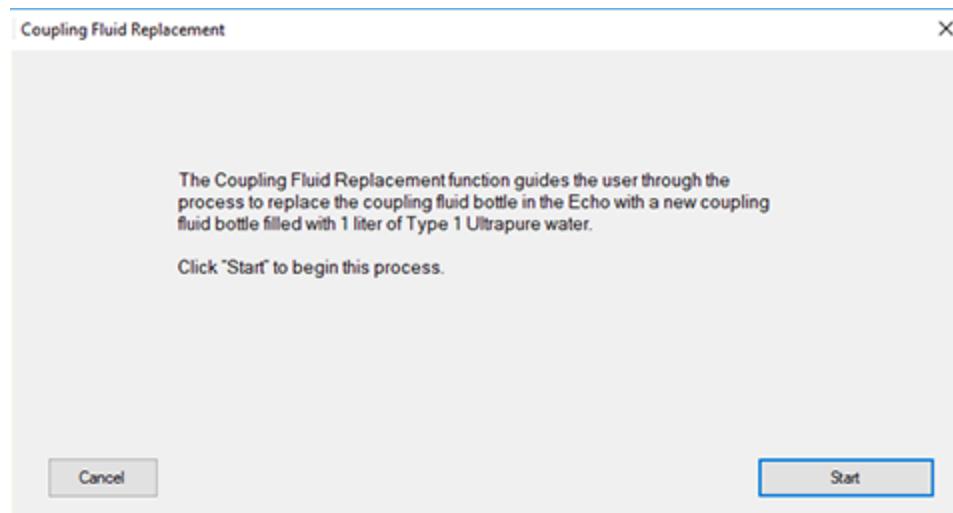


It is recommended to select **Yes** and follow the coupling fluid replacement steps. If you choose to delay coupling fluid replacement, you can click the **Replace** button next to the **Coupling Fluid Age** status indicator in the **System Status** section in the **Run Status** window to start the fluid replacement steps.

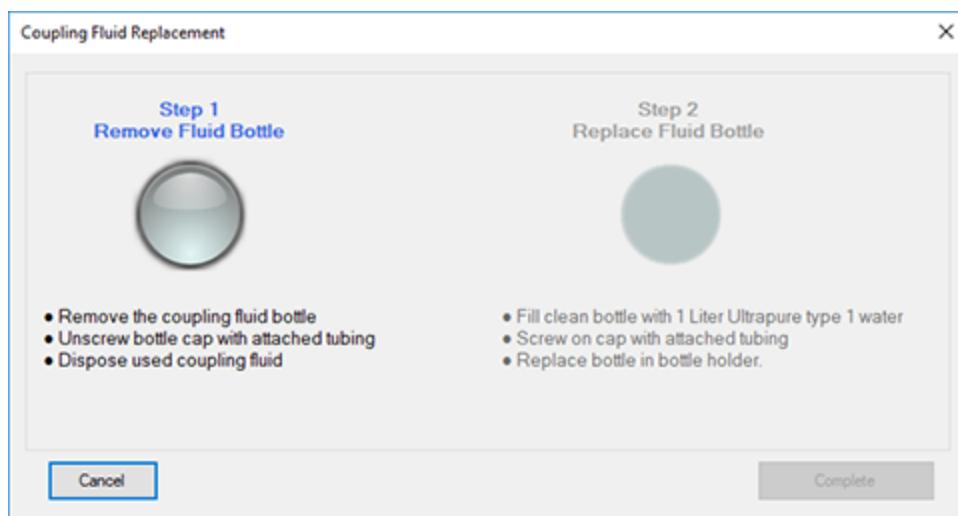
To start the fluid replacement process:

1. Click **Start** to begin the coupling fluid replacement process.

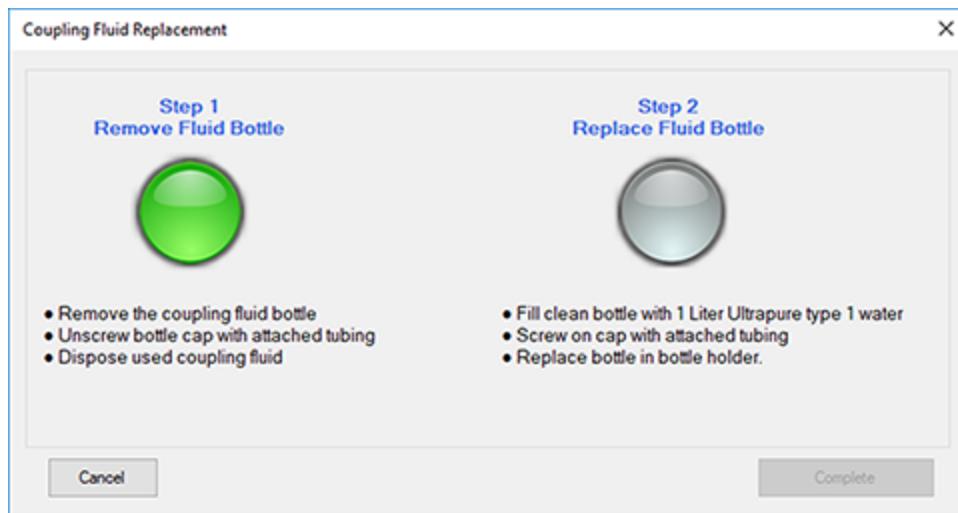
Figure 62: Coupling Fluid Replacement Start dialog box



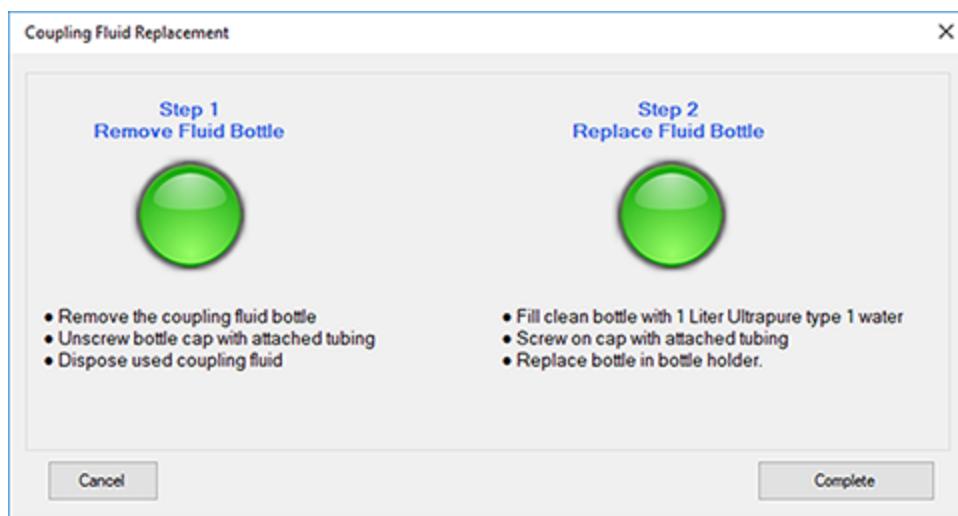
2. The **Fluid Replacement Workflow** is displayed and step 1 in the workflow is enabled. Go to the back of the Echo Liquid Handler and remove the coupling fluid bottle. Unscrew the bottle cap with the attached tubing and then dispose of the used coupling fluid fluid.

Figure 63: Coupling Fluid Replacement Workflow displayed

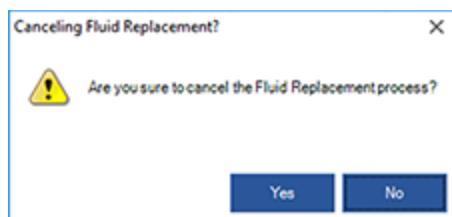
3. After the coupling fluid bottle has been removed, step 2 in the workflow is enabled.

Figure 64: Coupling Fluid Replacement Step 1

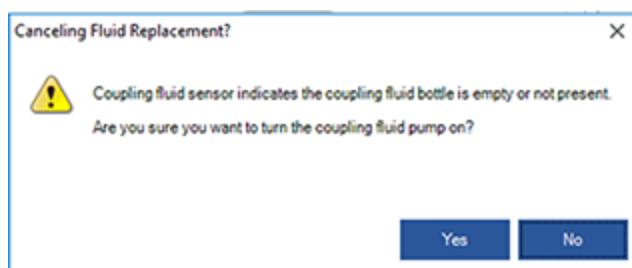
4. Fill a clean coupling fluid bottle with 1 Liter Ultrapure Type 1 water and screw on the bottle cap with the attached tubing. Then replace the coupling fluid bottle in the bottle holder.

Figure 65: Coupling Fluid Replacement Step 2

Once the fluid replacement process is started, if the user clicks the **Cancel** button and the coupling fluid level is sufficient, the following message box is displayed.

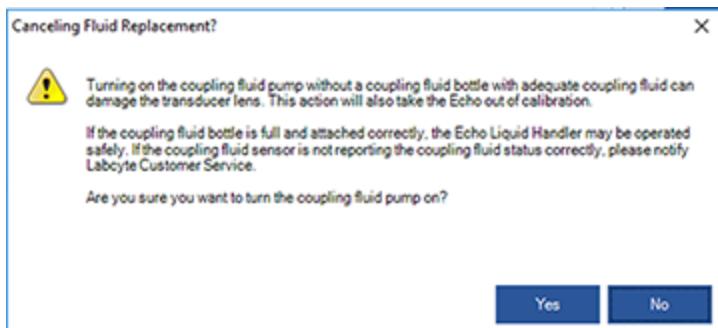
Figure 66: Canceling Fluid Replacement dialog box

Once the fluid replacement process is started, if the user clicks the **Cancel** button and the sensor indicates that either the coupling fluid bottle is empty or not present, the following messages are displayed.

Figure 67: Canceling Fluid Replacement dialog box

A second dialog box is displayed to confirm if the user wants to end the fluid replacement process.

Figure 68: Canceling Fluid Replacement dialog box



5. If the user did not cancel the fluid replacement process, they can click the **Complete** button to finish the fluid replacement process and exit the **Coupling Fluid Replacement** dialog box.

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