applied biosystems
by life technologies

AB Library Builder™ System

User Guide

For Research Use Only. Not intended for any animal or human therapeutic or diagnostic use.

Part Number 4463421 Rev. B

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Contents

About This Guide

Purpose

This user guide provides the following information about the AB Library Builder™ System:

- Unpacking and installation
- Instrument verification instructions
- General operating instructions
- Testing and maintenance
- Troubleshooting
- Instrument details and specifications

For information on running a specific chemistry application on the instrument, refer to the user guide provided with the chemistry kit.

Safety information

Note: For general safety information, see this section and Appendix C, "Safety" on page 79. When a hazard symbol and hazard type appear by a chemical name or instrument hazard, see the "Safety" Appendix for the complete alert on the chemical or instrument.

Safety alert words

Four safety alert words appear in Applied Biosystems user documentation at points in the document where you need to be aware of relevant hazards. Each alert word—**IMPORTANT, CAUTION, WARNING, DANGER**—implies a particular level of observation or action, as defined below:

IMPORTANT! – Indicates information that is necessary for proper instrument operation, accurate chemistry kit use, or safe use of a chemical.

CAUTION! – Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

WARNING! – Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

DANGER! – Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

Except for IMPORTANTs, each safety alert word in an Applied Biosystems document appears with an open triangle figure that contains a hazard symbol. *These hazard symbols are identical to the hazard symbols that are affixed to Applied Biosystems instruments* (see "Safety labels on instruments" on page 8).

SDSs

The SDSs for any chemicals supplied by Applied Biosystems or Ambion are available to you free 24 hours a day. For instructions on obtaining SDSs, see "SDSs" on page 84.

IMPORTANT! For the SDSs of chemicals not distributed by Applied Biosystems or Ambion contact the chemical manufacturer.

Safety labels on instruments

The following CAUTION, WARNING, and DANGER statements may be displayed on Applied Biosystems instruments in combination with the safety symbols described in the preceding section.

Hazard symbol	English	Français
	**CAUTION!** Risk of danger. Consult the user guide for further safety information associated with this symbol.	**ATTENTION!** Risque de danger. Pour plus d'information au sujet des risques associes, consulter le manual d'utilisation.
	**CAUTION!** Hot surface.	**ATTENTION!** Surface brûlante.
	**DANGER!** High voltage.	**DANGER!** Haute tension.
	CAUTION! Risk of electric shock.	**ATTENTION!** Risque de choc electrique.
	**CAUTION!** Risk of injury due to moving parts.	**ATTENTION!** Piece mobile. Risque de blessure.
	**CAUTION!** Sharp points.	**ATTENTION!** Angle tranchant.
	Biohazard.	**DANGER!** Biologique.

1 Unpack and Install the AB Library Builder™ Device

This chapter covers:

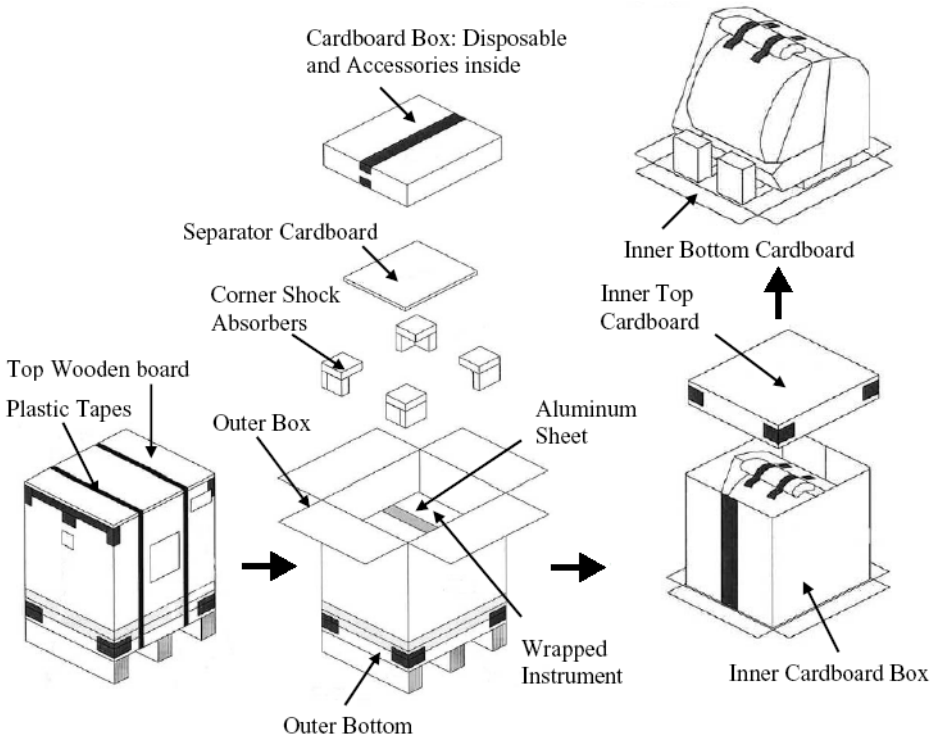
Unpack the instrument

Remove the packaging

Note: The weight of the instrument is 55 kg (121 lb).

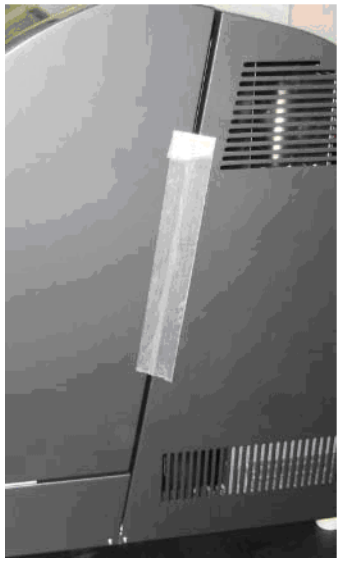
1. Cut the plastic straps and the tape securing the outer box to the outer bottom.
2. Remove the top wooden board, then open the top of the box.
3. Remove the box containing the plastic disposables and instrument accessories.
4. Remove the cardboard separator.
5. Remove the shock absorbers from the four corners.
6. Remove the outer cardboard box by pulling up on the box.
7. Remove the wrapped instrument box from the outer bottom cardboard.
8. Remove the aluminum sheet wrapping the instrument box.
9. Remove the instrument from the inner cardboard box. The instrument is now in a plastic wrap without cover.

   IMPORTANT! Handle the instrument carefully from this point to avoid any damage to the unit.
10. Remove the plastic sheet.



Remove the protectors

1. Remove the adhesive tape on the door and on the card slot.



2. Push up the instrument door until the magnet holds it up.

3. Remove the platform stopper by removing the three screws using a small Phillips head screwdriver.

Verify the components shipped with the instrument

Verify that you received all of the components listed below:

Components shipped with the AB Library Builder™ System (Part no. 4463783):

- AB Library Builder™ Device
- Power cord (for U.S./Canada/Taiwan/Japan, Europe, or U.K.)
- AB Library Builder Fragment Core Kits for SOLiD™ 4 and 5500 Series Protocol Card
- Cartridge rack
- Tip and tube rack
- Bottom tray
- Tips and tip holders (26 sets, for use in the "Axis test" on page 24)
- Empty reagent cartridges (13, for use in the "Axis test" on page 24)

  Note: Do not fill the empty reagent cartridges.

- Sample tubes (52)
- Silicon grease
- D-rings (13)
- AB Library Builder™ D-Ring Tool
- 6.3-A T (time-lag type) fuse
- 3.15-A T (time-lag type) fuse
- Gryphon GD4130 Barcode Reader:

- 1 CD-ROM with CommViewer Barcode Software
- 1 RS232C serial cable

  Note: For instructions on how to install and use the barcode reader, see Chapter 5, "(Optional) Set Up and Use the Barcode Reader" on page 55.

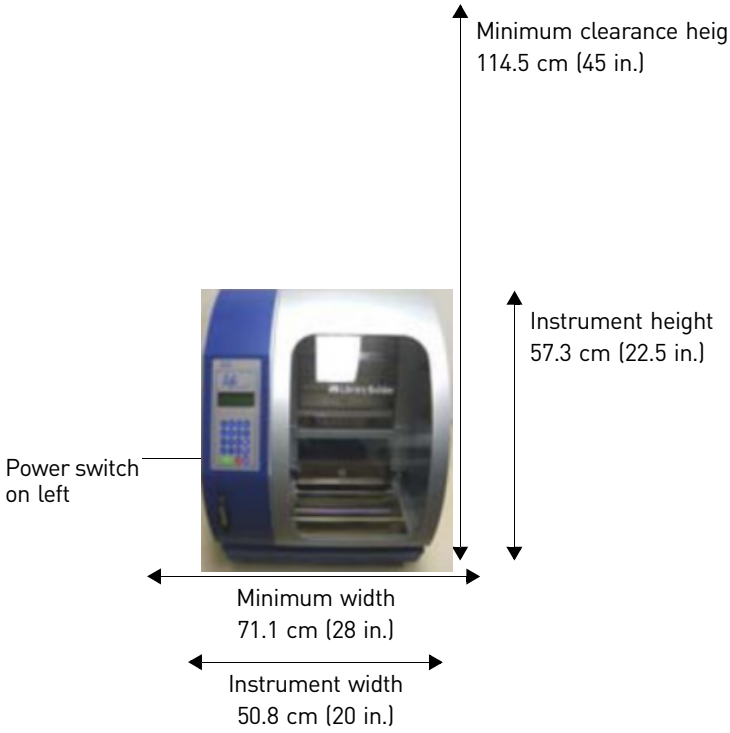
Install the instrument

Place the instrument

The surface on which you install the instrument must support 55 kg (121 lb).

1. Place the AB Library Builder™ Device on a level laboratory bench with the power switch to the left and the AC inlet at the rear of the unit.

2. Make sure there is clearance around the instrument as follows:
   - 10 cm (4 in.) on the right and left side of the instrument to ensure proper ventilation of the unit.
   - Room at the back of the instrument to attach the power cord and access the fuses.
   - Vertical clearance of 114.5 cm (45 in.) to allow Life Technologies Service Representatives to remove the instrument cover if necessary.



Attach the power cord

1. Check the power cord supplied with the unit to ensure that the cord is compatible with the local socket format.

2. With the AC power switch in the OFF position, attach the power cord to the AC inlet and then to the electrical outlet. Use only properly grounded AC outlets and power cords.

   IMPORTANT! Do not turn on the AB Library Builder™ Device until a protocol card is inserted into the instrument as described in "Insert the protocol card, turn on the instrument, remove the packing peanuts" on page 15.

Prepare the instrument for first use

Insert the protocol card, turn on the instrument, remove the packing peanuts

For guidelines on handling protocol cards, see the specifications table on page 74.

1. Confirm that the power switch is in the OFF position.

   Note: If you insert the card while the instrument is on, the instrument does not recognize the card.

2. Open the card slot on the front of the instrument:

3. Insert the protocol card in the slot, with the arrow pointing on the protocol card toward the instrument and the label facing left:

4. Push the card completely into the card slot, then close the card slot.

5. Power on the instrument.

   When the card is fully inserted in the correct orientation, the display briefly shows information including the instrument version, then shows the Main menu.

   IMPORTANT! Do not remove the protocol card while the instrument is on. Removing the card stops the run, and it may cause instrument data file loss. To remove the card, see "Insert or change the protocol card and power on the instrument" on page 31.

6. Open the instrument door (push the door up):

7. Remove the packing peanuts from the instrument.

Clean and insert the instrument components

WARNING! Do not clean the instrument with acids, or bases (such as bleach). Acids and bases can react with the guanidine thiocyanate in the lysis buffer and generate toxic gas.

Note: Do not move instrument components such as the platform, magnets, and syringes while the instrument is powered on.

1. Clean the cartridge rack, tip and tube rack, and bottom tray with a mild detergent before use (see "Clean and decontaminate the instrument" on page 48 for cleaning and maintenance of parts).

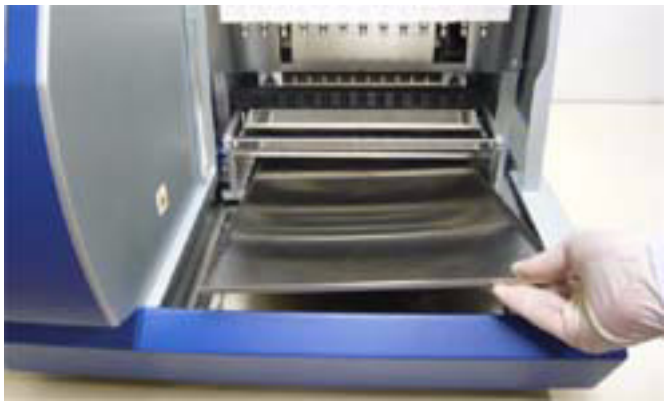
2. Allow the parts to dry.

   Note: If you have more than one AB Library Builder™ Device in your lab, label the racks so that you can identify the instrument to which the racks belong.

3. Insert the bottom tray as follows:

   a. Power off the instrument.

b. Push the platform toward the back of the instrument. Holding the front edge of the tray, insert the tray into the instrument:



4. Insert the cartridge rack into the instrument:

WARNING! Do not touch the surface of the heat block. The temperature of the heat block can reach 95°C. Touching the block can cause burns.

5. Insert the tip and tube rack into the instrument with row E in the front:

Set the instrument date and time

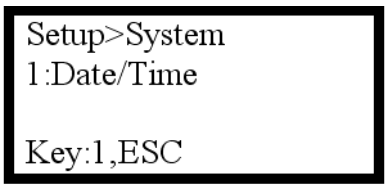
Before setting the date and time, insert the protocol card (see "Insert the protocol card, turn on the instrument, remove the packing peanuts" on page 15), close the instrument door, and power on the instrument.

To move the cursor from the current field to the first character in a field to the:

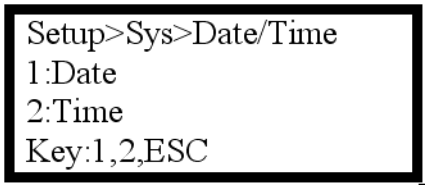
- Left, press **Shift+** 
- Right, press **Shift+** 

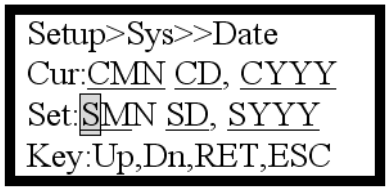
Set the date

1. From the Main menu, press **2** on the keypad to display the Setup screen, press **1** to display the Setup/System screen, then press **1** again to display the Setup/Sys/Date/Time screen.



2. Press **1** to display the Date screen.

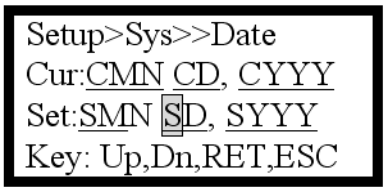




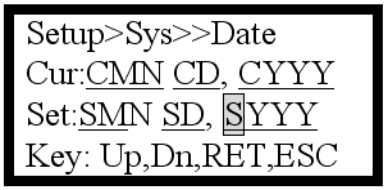
The screen displays:

- Cur – CMN (current month), CD (current date), CYYY (current year)
- Set – SMN (set month), SD (set date), SYYY (set year)

3. Press  to display the months starting with January or press  to display the months starting with December. When the desired month is displayed, press **Shift +**  to select the month and move the cursor to the SD field.



4. Press  to add 1 day to the currently displayed date or press  to subtract 1 day from the currently displayed date until the desired date is displayed. After the desired date is displayed, press **Shift +**  to select the date and move the cursor to the SYYY field.



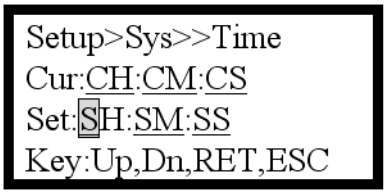
5. Press  to add 1 to the currently displayed year. Press  to subtract 1 from the currently displayed year. The system lets you set the year between 2000 and 2040.

6. Press  to save the settings and display the Main menu.

Set the time

1. From the Main menu, press **2, 1, 1** to display the Date/Time screen. The instrument uses the 24-hour clock.

2. Press **2** to display the Time screen.



The screen displays:

- Cur – CH (current hour), CM (current minute), CS (current second)
- Set – SH (set hour), SM (set minute), SS (and set second)

3. Press  to add 1 to the currently displayed hour or press  to subtract 1 from the currently displayed hour. When the desired hour is displayed, press **Shift +**  to select the hour and move the cursor to the SM field.

4. Press  to add 1 to the currently displayed minute or press  to subtract 1 from the currently displayed minute. When the desired minutes is displayed, press **Shift +**  to select the minute and move the cursor to the SS field.
5. Press  to add 1 to the currently displayed second or press  to subtract 1 from the currently displayed second.
6. Press  to save the settings and display the Main menu.

2 Verify Operation of the AB Library Builder™ Device

This chapter covers procedures for verifying AB Library Builder™ Device operation after installation and before first use:

About instrument verification

After you install and prepare the instrument as described in Chapter 1, "Unpack and Install the AB Library Builder™ Device" on page 9, perform two required tests in the following order:

1. **Axis test** (page 24) – Confirms that the axis settings are correct.
2. **Temperature test** (page 28) – Confirms that the heating block reaches a desired temperature.

These tests are also performed during routine maintenance (see "Perform instrument tests" on page 45).

IMPORTANT! If the instrument fails one or more tests, contact Life Technologies Technical Support (see "Obtaining support" on page 90).

Before you begin

Insert the protocol card (shipped with the instrument) and power on the instrument as follows:

1. Confirm that the power switch is in the OFF position.

   Note: If you insert the card while the instrument is on, the instrument does not recognize the card.

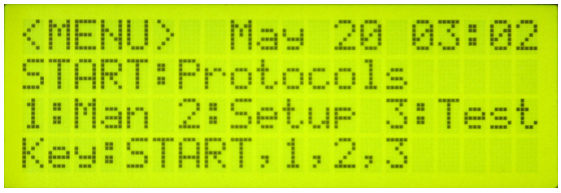
2. Open the card slot on the front of the instrument:

3. Insert the protocol card in the slot, with the arrow on the protocol card pointing toward the instrument and the label facing left:

4. Push the card completely into the card slot, then close the card slot.

5. Power on the instrument. When the card is fully inserted in the correct orientation, the digital display briefly shows information including the instrument version, then shows the Main menu.

   IMPORTANT! Do not remove the protocol card while the instrument is on. Removing the card stops the run, and it may cause instrument data file loss. To remove the card, see "Insert or change the protocol card and power on the instrument" on page 31. If you accidentally remove the protocol card during a run, power off the instrument immediately to minimize potential for instrument data loss:



Axis test

Use the cartridges and tips shipped with instrument.

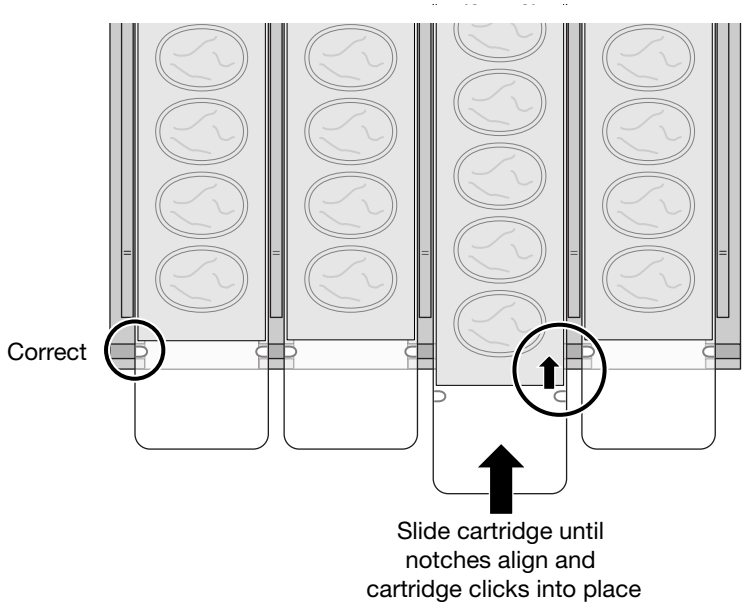
Note: Do not fill the empty reagent cartridges.

To perform the axis test:

1. Confirm that the protocol card is inserted and that the instrument powered on as described in "Before you begin" on page 22.
2. Open the instrument door (push up the door), then remove the cartridge rack and tip and tube rack:

3. Load 13 empty reagent cartridges into the cartridge rack by sliding each reagent cartridge along the groove in the direction of the arrow until the reagent cartridge clicks into place.

   Note: An incorrectly loaded cartridge rack may cause the instrument to stop during a run.

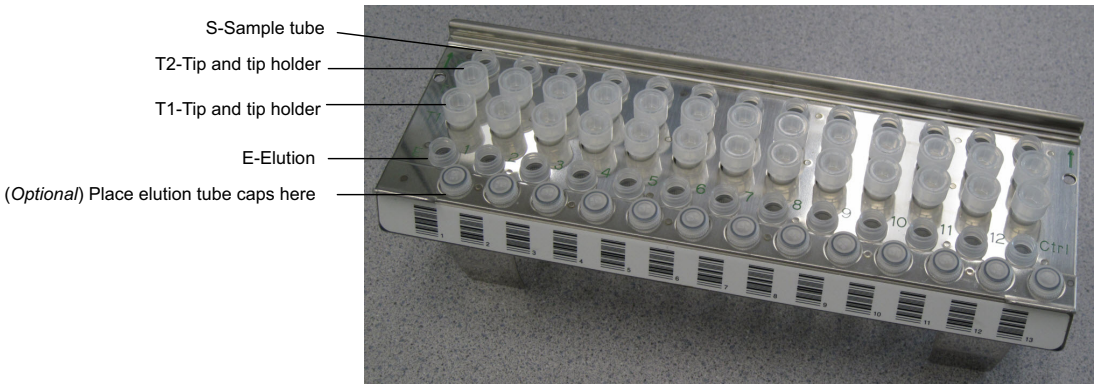


4. Insert the loaded cartridge rack into the instrument:

   WARNING! Do not touch the surface of the heat block. The temperature of the heat block can reach 95°C. Touching the block can cause burns.

5. Using the plastics shipped with the instrument, load the tip and tube rack in the following order:
   a. **Row S** (fourth row): Load 13 sample tubes.
   b. **Row T2** (third row): Load 13 tips inserted into tip holders.
   c. **Row T1** (second row): Load 13 tips inserted into tip holders.

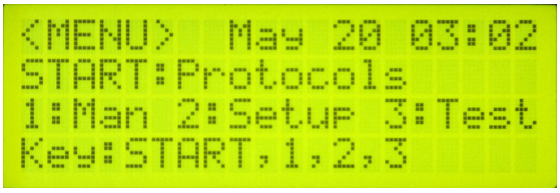
d. **Row E** (first row): Load 13 elution tubes, with the caps open and secured as shown in the photo.



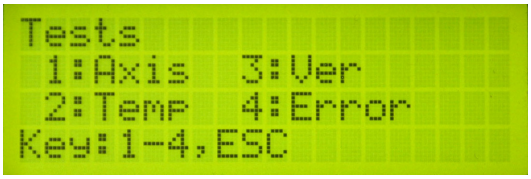
6. Insert the loaded tip and tube rack into the instrument with row E in the front:

7. Confirm that you have inserted the cartridge rack and tip and tube rack correctly, then close the instrument door.

8. In the Main menu, press **3** to display the Tests menu:



9. In the Tests menu, press **1** to display the Axis test screen.



10. Press **Start** to begin the test. The duration of the test is ~3 minutes.

11. At the end of the test, note the following:
    - If the screen displays ALL OK, no problem is detected.
    - If an error screen with an error code is displayed, note the error code, then contact Life Technologies Technical Support.

      Note: See "Error test" on page 47 for the error screen and "Instrument error codes" on page 68 for the list of error codes.

12. Press **ESC** to return to the Tests menu.

    Note: You can leave the cartridge rack and tip and tube rack in the instrument during the next (Temperature) test.

Temperature test

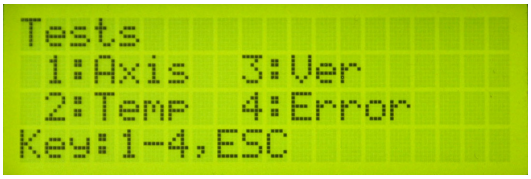
Perform the temperature test after performing the axis text on page 24.

To perform the temperature test:

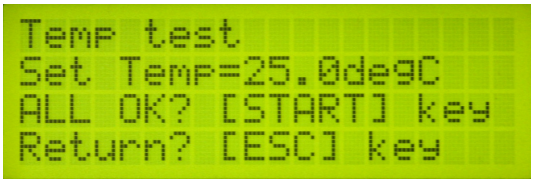
1. Confirm that the protocol card is inserted and that the instrument powered on as described in "Before you begin" on page 22.

2. From the Tests menu, press **2** to display the Temp test screen:

   Note: The default temperature is 25°C.



3. Use  to change the *Set Temp* to **70**°C. The Set Temp is the temperature to enter to test the incubator:



4. Press **Start** to run the test. Within a few minutes:
   - The *Now Temp* value should reach approximately 70°C. The Now Temp is the current temperature of the incubator.
   - The Alarm value should change to 00

   If one or both of these values are not reached, contact Life Technologies Technical Support.

5. Press **ESC** to return to the Tests menu, then press **ESC** again to return to the Main menu.

   IMPORTANT! When the Temperature test is complete, the Set Temp resets to 25°C. The temperature of the heater unit cools down at a rate of about 1°C per minute.

3 Operate the AB Library Builder™ Device

This chapter covers general procedures for operating the instrument. See the user guide for the kit you are using for specific procedures to prepare and run samples on the AB Library Builder™ Device:

Important information about order of operations

To avoid significant problems such as data loss or run cancellation, always perform the following operations:

- Before you insert or remove a protocol card, power OFF the instrument.
- Before you power ON the instrument:
  - Insert the protocol card
  - Close the instrument door
- If you need to pause the instrument during an extraction run, press **Stop** before you open the instrument door.
- When you are *not* performing an extraction run or instrument test, you can open the instrument door with the power OFF or ON.
- Do not move instrument components such as the platform, magnets, and syringes while the instrument is powered ON.

Set up the AB Library Builder™ Device

Before a run, follow these procedures to set up the instrument:

1. "Insert or change the protocol card and power on the instrument" on page 31.
2. "Load and insert the cartridge rack" on page 33.
3. "Load and insert the tip and tube rack" on page 35.

Insert or change the protocol card and power on the instrument

IMPORTANT! Do not remove the protocol card while the instrument is on. Removing the card stops the run, and it may cause instrument data file loss. To remove the card, see step 3 on page 31.If you accidentally remove the protocol card during a run, power off the instrument immediately to minimize potential for instrument data loss.

For guidelines on handling protocol cards, see the specifications table on page 74.

1. Confirm that the power switch is in the OFF position.

   Note: If you insert the card while the instrument is on, the instrument does not recognize the card.

2. Open the card slot:

3. To remove an installed card, push the button located below the card slot (see the photo below), then pull the card out of the slot. Place the card in the plastic cover in the box:

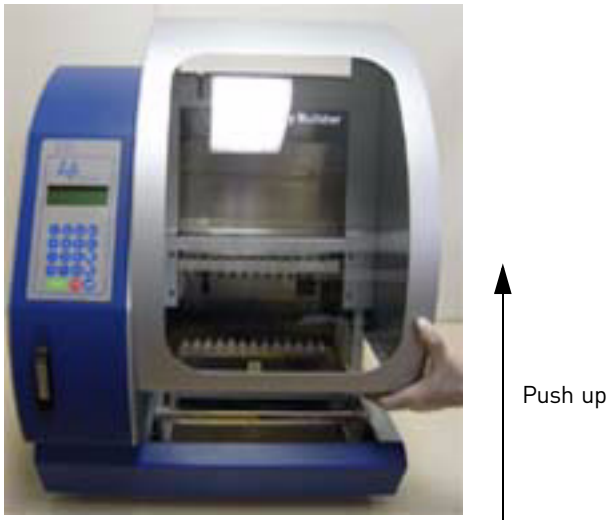
IMPORTANT! Do not remove the protocol card while the instrument is on.

4. Insert the appropriate protocol card in the slot, with the arrow on the protocol card pointing toward the instrument and the label facing left.
5. Push the card completely into the card slot, then close the card slot.
6. Close the door to the AB Library Builder™ Device.
7. Power on the instrument.
   When the card is fully inserted in the correct orientation, the display briefly shows information including the instrument version, then displays the Main menu.
8. Press **Start.**

Load and insert the cartridge rack

Wear gloves when you handle samples or load the cartridges, tips, and tubes in the rack.

1. Open the instrument door (push up the door), then remove the cartridge rack and tip and tube rack:

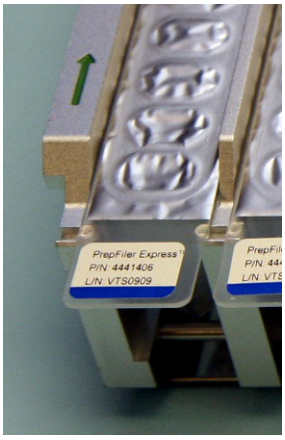


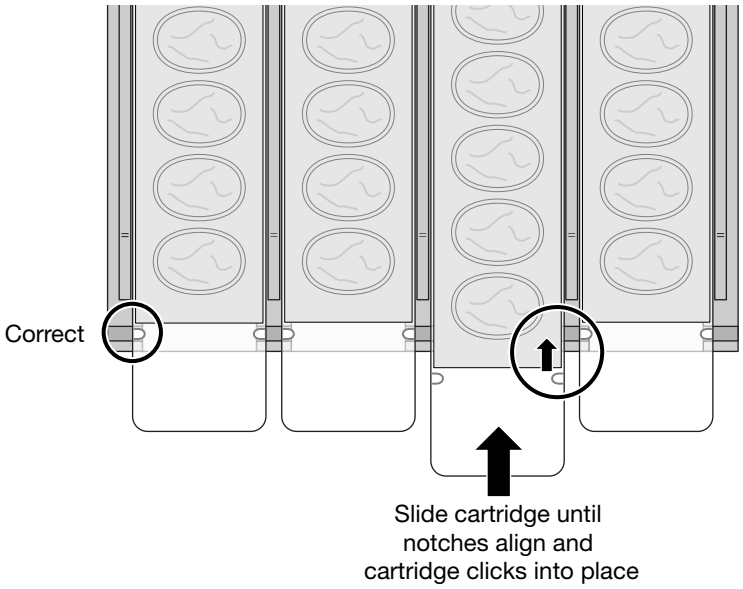
2. Prepare the reagent cartridges as described in the user guide for the kit you are using.

   Note: Use only supported Applied Biosystems reagent cartridges.

3. Load the reagent cartridges into the cartridge rack by sliding each reagent cartridge along the groove in the direction of the arrow until the reagent cartridge clicks into place. Make sure that the notches in the cartridge align with the notches in the cartridge rack.

   Note: An incorrectly loaded cartridge rack may cause the instrument to stop during a run:





4. Insert the loaded cartridge rack into the instrument:

Load and insert the tip and tube rack

IMPORTANT! Insert the cartridge rack before the tip and tube rack.

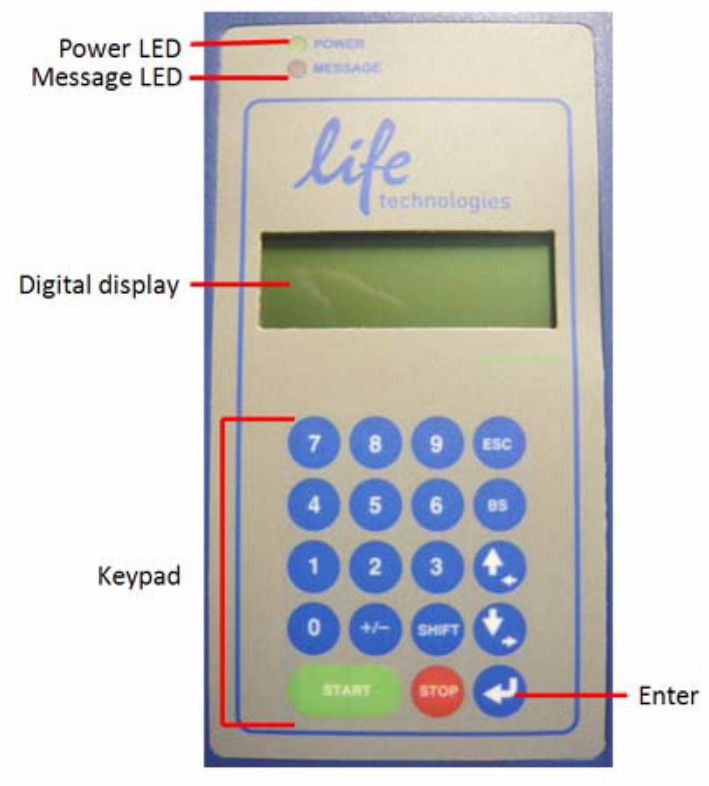
1. Load the tips and tubes into the tip and tube rack as described in the user guide for the kit you are using.

   Note: If you are processing fewer than 13 samples, make sure to load the tips and tubes in the same positions as the reagent cartridges that are loaded in the cartridge rack.

2. Insert the loaded tip and tube rack into the instrument with row E in the front:

Use the front panel

The front panel provides tools for operating the instrument and tools for the service engineer to maintain the instrument:



The front panel contains:

- A digital display that shows the steps of the protocol that is in use.

  The digital display consists of 4 lines of information and menu choices.

  For the Main menu, Tests menu, and Manual menu:

  – The first line shows the current menu name
  – The second and third line show the executable commands for the current menu
  – The fourth line describes the keys to use for executing the commands

  For the protocols screen, the display provides current information on the protocol step and allows you to choose options.
- Two LEDs: Green indicates the power is ON, and blinking red indicates an error code

- The Keypad to enter parameters and operate the instrument:

Key	Description
0–9	To choose menu
ESC	To previous menu
START	To run or resume protocol
STOP	To stop or pause protocol
	Enter (to confirm or enter the next menu)
BS	Backspace key to delete the last digit/character
SHIFT	Shift + Up/Down arrow keys to move the cursor right or left during time/date setup

Run the AB Library Builder™ Device

1. Set up the instrument as described in the user guide for the kit you are using.
2. Confirm that you have loaded and inserted the cartridge rack and tip and tube rack correctly, then close the instrument door.
3. Press  , follow the on-screen prompts, then select the script for the kit you are using.
4. (*Optional*) Scan the sample, elution tube, and sample lane barcodes [see "(Optional) Set Up and Use the Barcode Reader" on page 55].
5. Close the door to the AB Library Builder™ Device.
6. Press **Start**. The screen shows the steps and the approximate run time remaining.

   IMPORTANT! Do not open the door during a protocol run. To pause or cancel the run, see "Pause or cancel a run" on page 40.

   Note: If you lose power or the power cord is unplugged, the run stops. When the power resumes, the digital display shows the Main menu. You cannot resume the run. If the tips are still on the syringe unit when the power resumes, return the tips to the original positions as described on page 40.
7. At the end of the run (the instrument beeps briefly and the digital display shows "Finished Protocol"), remove the samples and consumables:
   a. Press  to return to the Main menu, then open the instrument door.
   b. Remove and store the samples according to the instructions in the user guide for the kit you are using to remove and store the samples.
   c. Properly dispose of the used reagent cartridges, tips, and tubes.

      WARNING! Do not add acids, or bases (such as bleach), to any wastes containing lysis buffer (present in reagent cartridges or tubes). Acids and bases can react with guanidine thiocyanate in the lysis buffer and generate toxic gas.

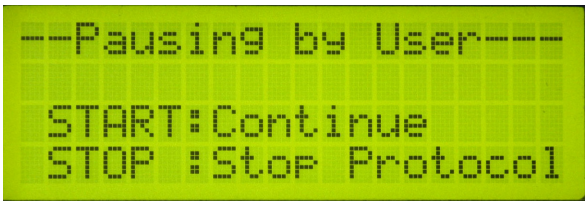
   d. Close the instrument door.

      Note: No cooling period is required between runs. To perform a new run using a different protocol card, power off the instrument, then change the protocol card.

Pause or cancel a run

Pause a run

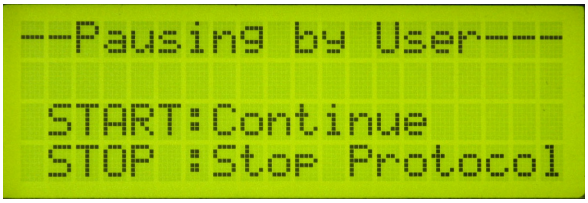
1. Press **Stop** to pause the run.
   The display shows the following:



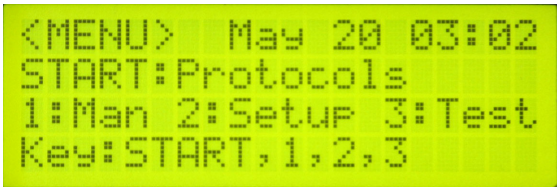
2. To resume the run after a pause, press **Start**.
   The run continues from the last step before the pause.

Cancel a run

1. Press **Stop** to pause the run.
   The display shows the following:



2. Press **Stop** again.
   The instrument stops after the current step is completed. The screen returns to the Main menu.

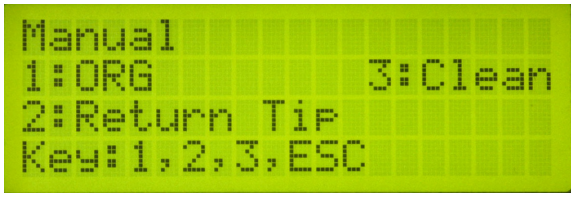


3. Press **1** to go to the Manual screen.

4. Move the axes to the original positions and/or return the tip to the origin as follows:

   Note: When the run is interrupted, the axes and tip do not automatically return to the original positions.

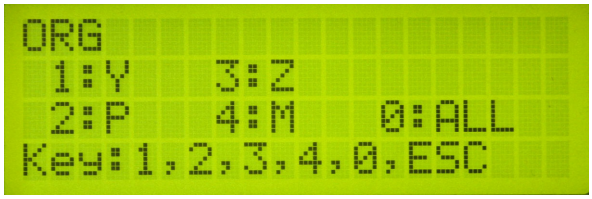
   If the tips need to be returned to the holders – Press **2** (Return Tip) to return the tips to the tip holders and move all axes to the original position:



   If the tips do *not* need to be returned to the holders –

   a. Press **1** (ORG) to go to the ORG screen:

   b. Move each individual axis to the origin by pressing **1**, **2**, **3**, **4**, respectively, or press **0** to return all axes to the origin:



5. Press **ESC** to return to Main menu.

You are now ready to a start a new run.

4 Test and Maintain the AB Library Builder™ Device

This chapter covers instructions for performing tests to ensure the proper functioning of the instrument:

Maintenance schedule

Schedule	Procedure	See
Daily	Clean the piercing unit	"Clean the piercing unit daily" on page 48
Daily or as needed	• Clean the platform surface (racks and bottom tray) • Clean the tip and tube rack • Clean the magnets	"Clean the instrument daily or as needed" on page 48
Every 2 weeks	Maintain the D-rings	"Maintain the D-rings" on page 50
Monthly	Perform axis and temperature tests	"Perform instrument tests" on page 45
Annually	Replace the D-rings	"Replace the D-rings" on page 51
	Planned maintenance	Contact Life Technologies to schedule: • In North America – send an email to **abcc@appliedbiosystems.com**, or call **800-327-3002** option **4**. • Outside North America – contact your local support office. For the latest services and support information for all locations, go to: **www.appliedbiosystems.com**

Perform instrument tests

When to perform

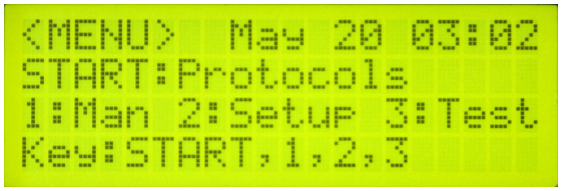
Test	Description	When to perform
Axis	Checks movements of all axes	• During verification (see "Verify Operation of the AB Library Builder™ Device" on page 21) • Monthly
Temp (Temperature)	Displays the heating block temperature	• During verification (see "Verify Operation of the AB Library Builder™ Device" on page 21) • Monthly
Ver (Version)	Displays the firmware version	As needed
Error	Displays the error history including the code of the last error that occurred	As needed

Required materials

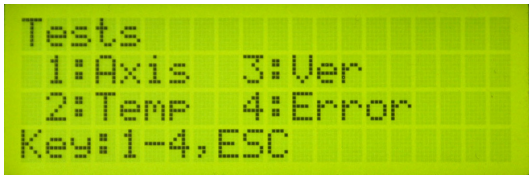
- Protocol card
- For the Axis test (items provided with the instrument):
  - AB Library Builder™ System tips and tip holders
  - Empty reagent cartridges

Access the Tests menu

1. Confirm that the protocol card is inserted into the card slot as described in "Insert or change the protocol card and power on the instrument" on page 31.
2. Power on the instrument. The Main menu is displayed.



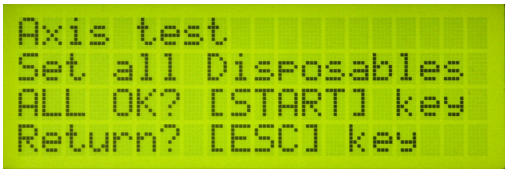
3. Press **3** to display the Tests screen.



4. Follow the instructions for the specific test to perform:
   - "Axis test" on page 46
   - "Temperature test" on page 46
   - "Version test" on page 47
   - "Error test" on page 47

Axis test

1. Press **1** from the Tests menu.
   The Axis test screen is displayed.



2. Load 13 empty reagent cartridges (supplied with the instrument) into the cartridge rack. Insert the loaded rack into the instrument as described in "Load and insert the cartridge rack" on page 33.

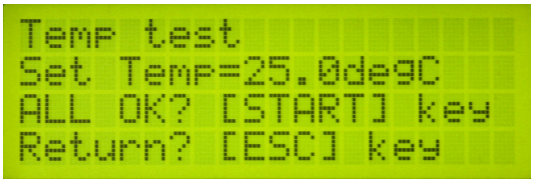
3. Load the instrument tip and tube rack with tips and tubes as described on "Axis test" on page 24. Make sure to load tips with tip holders in rows T1 and T2.

4. Press **Start** to begin the test. The duration of the test is ~3 minutes.
   During the Axis test, all well and hole positions are checked by moving tips on each position. At the end of the test, the screen displays ALL OK if no problem is detected. If a problem is detected, the error screen with the appropriate error code is displayed (see "Error test" on page 47 for the error screen and "Instrument error codes" on page 68 for the list of error codes).

5. Press **ESC** to return to the Tests menu.

Temperature test

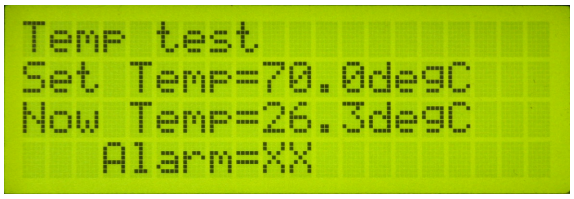
1. Press **2** from the Tests menu (see "Access the Tests menu" on page 45).
   The Temp test screen is displayed.
   Note: The default temperature is 25°C.



2. Use  to change the Set Temp to **70**°C.

3. Press **Start** to run the test.

4. Compare the Now Temp value with the Set Temp value. The Now Temp value should reach the Set Temp value within a few minutes of starting the test. When the Set Value is reached, the Alarm value turns to 00.



5. Press **ESC** to return to the Tests menu. Press **ESC** again to return to the Main menu.

   IMPORTANT! When the Temp test is complete, the Set Temp resets to 25°C. The temperature of the heater unit cools down at a rate of about 1°C per minute.

Version test

1. Press **3** from the Tests menu (see "Access the Tests menu" on page 45).

   The Ver (version) screen shows the firmware version.

2. Press **ESC** to return to the Main menu.

Error test

1. Press **4** from the Tests menu (see "Access the Tests menu" on page 45).

   The Error History screen shows the error code for the last error that occurred. See "Instrument error codes" on page 68 for a list of error codes.

2. Press **ESC** to return to the Main menu.

Maintain the instrument

IMPORTANT! Do not perform repairs or service on the AB Library Builder™ Device other than the procedures in this section. For any other repairs and service, contact Life Technologies Technical Support ("Obtaining support" on page 90).

Clean and decontaminate the instrument

WARNING! Do not clean the instrument with acids, or bases (such as bleach). Acids and bases can react with the guanidine thiocyanate in the lysis buffer and generate toxic gas.

Clean the piercing unit daily

1. From the Main Menu, press **1** to display the Manual screen.
2. Press **3** (Clean), then press **1** to lower the piercing unit.

   CAUTION! The tips of the piercing unit are sharp.

3. Wipe the tips with an alcohol wipe.
4. Press **ESC** to return the piercing unit to the original position.

Clean the instrument daily or as needed

Clean the door panel, racks, bottom tray, and magnets daily or as needed as described below:

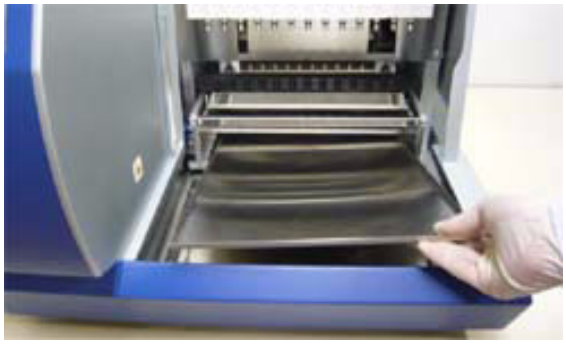
1. Clean the clear door panel with a wet laboratory wipe.

   IMPORTANT! Do not clean the clear door panel with ethanol.

2. Clean the cartridge rack, tip and tube rack, and magnets with mild detergent, then rinse with deionized water. Allow the parts to dry before use.
3. Remove and clean the bottom tray:
   a. Power off the instrument, then push the tray platform toward the back of the instrument.

      IMPORTANT! Make sure that the instrument is powered off before moving the tray platform to the rear of the instrument.

b. Holding the front edge of the tray, remove the tray from the instrument:



c. Clean the tray with mild detergent, then rinse with deionized water.

d. Allow the tray to dry, then place the tray back properly in the bottom of the instrument before use.

Decontaminate the instrument as needed

WARNING! Do not decontaminate the instrument with acids or bases (such as bleach). Acids and bases can react with the guanidine thiocyanate in the lysis buffer and generate toxic gas.

Decontaminate the instrument before moving, long-term storage, disposition, servicing by an engineer, or as needed:

1. Power **OFF** the instrument.
2. Clean the clear door panel with a wet laboratory wipe.

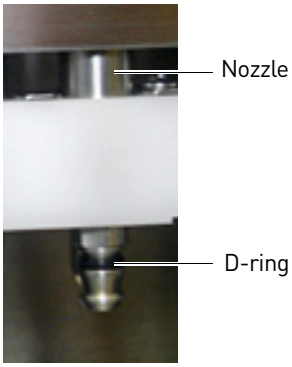
   IMPORTANT! Do not clean the clear door panel with ethanol.
3. Clean the metal bottom tray, cartridge rack, tip and tube rack, nozzles, and piercing unit by wiping with deionized water followed by 70% ethanol.
4. Allow the parts to dry, then place the tray back properly in the bottom of the instrument before use.

Maintain the D-rings

Every two weeks, apply silicon grease (supplied with the instrument) to the nozzle D-rings on the syringe unit to maintain proper attachment of the tips to the nozzles and prevent leakage:

Note: You can use any vacuum-type silicon grease.

1. Place some silicon grease on a gloved finger.
2. Apply the silicon grease on the surface of the D-rings attached to the nozzles. Do not put grease into the nozzles. If you accidentally put grease into a nozzle, remove the grease using a laboratory wipe or a dust-free cloth.



3. Wipe off any excess grease on the edges of the nozzles using a laboratory wipe or a dust-free cloth. Excess grease interferes with the operation of the instrument.

Replace the D-rings

Once a year, replace the nozzle D-rings to maintain proper attachment of the tips to the nozzles and prevent leakage.

Note: One replacement set of 13 D-rings is included with the AB Library Builder™ Device. To obtain more D-rings, see "Accessories" on page 75.

Replace D-rings using D-ring tools

If you are using the AB Library Builder™ D-Ring Tool (Part no.4465603), replace the D-rings as follows:

1. Using the D-ring removal tool as shown below, press the D-ring from behind to create a loop in front. Grab the loop with pliers or a pipette tip, then stretch and remove the D-ring.

2. Using the D-ring installation tool, slip a new D-ring into the nozzle groove. Keep the flat inner surface of the D-ring in contact with the installation tool so that the D-ring does not roll. Ensure that the D-ring is placed properly on the nozzle to prevent leakage.

Replace D-rings without using D-ring tools

If the D-ring removal and installation tools are not available, replace the D-rings as follows:

1. Using a small forceps or pliers, remove each D-ring from the nozzle by pulling out the D-ring and then sliding it from the nozzle.
2. Place some silicon grease on a gloved finger.
3. Apply the silicon grease to each nozzle.
4. Slide a new D-ring on to each greased nozzle. Ensure the D-ring is placed properly on the nozzle to prevent leakage.
5. Wipe off any excess grease on the edges of the nozzles using a laboratory wipe or a dust-free cloth. Excess grease interferes with the operation of the instrument.

Replace the fuse

Extra 3.15-A T (time-lag type)/250 V fuses are supplied with the AB Library Builder™ Device.

WARNING! The 6.3-A T (time-lag type) fuse included with the AB Library Builder™ Device is for internal parts (CPU, motor driver, heater) of the instrument. Do not attempt to change the 6.3-A T fuse for these internal parts. If the 6.3-A T fuse needs replacement, contact Life Technologies Technical Support ("Obtaining support" on page 90).

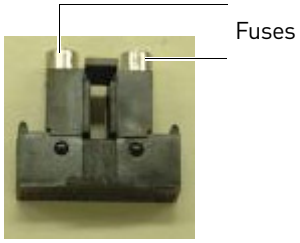
WARNING! FIRE HAZARD. For continued protection against the risk of fire, replace fuses only with fuses of the same type and rating as those currently in the instrument.

To replace the 3.15 A fuse for the main power socket:

1. Power off the instrument and remove the power cord from the rear of the instrument.
2. Open the fuse compartment located on the rear of the instrument using a small flat-blade screwdriver to gently pry open the fuse compartment:

3. Pull the fuse holder out of the compartment and inspect the fuse. If the fuse is burned or there is a break in the fuse element, replace the 3.15 A fuse with the identical type fuse.

4. Place the fuse holder back into the compartment and snap the cover closed.



5 (*Optional*) Set Up and Use the Barcode Reader

This chapter covers instructions on using the barcode reader:

Important information about the barcode reader and CommViewer Barcode software

- Use of the barcode reader with the AB Library Builder™ Device is *optional*.
- The barcode reader is designed to read most standard barcodes including EAN, Code 39, and Code 128. On reading the barcode, the reader provides a positive reading feedback, which includes an audible beep and a green spot on the barcode.
- Ensure that you can connect the AB Library Builder™ Device to a computer using a RS232C serial cable supplied with the barcode reader.
- CommViewer Barcode software system requirements:
  - Compatibility: Microsoft® Windows®, not compatible with Macintosh® computers
  - Operating system: Windows® 98 SE, ME, 2000, and XP
  - Built-in memory: 64 MB or higher
  - Computer: Pentium 233 MHz or higher

Set up the barcode reader

1. Connect the barcode reader to the BCR inlet on the rear of the AB Library Builder™ Device:

2. Connect one end of the RS232C serial cable to the RS232C port of the computer and the other end of the serial cable to PC inlet on the rear of the AB Library Builder™ Device.

   Note: If your computer does not have a RS232C port, use a commercially available USB to serial converter cable. Connect the USB end of the cable into the USB port on the computer and connect the serial end of the cable into the PC port of the AB Library Builder™ Device. You may also need to install the driver software of the converter cable on the computer.

Install the CommViewer Barcode software

1. Insert the CommViewer Barcode software CD-ROM included with the instrument into the CD-ROM drive of the computer, connected to the AB Library Builder™ Device using the RS232C serial cable (see "Set up the barcode reader").

2. Launch the CommViewer-InstallShield Wizard:
   a. Open the CommViewer folder.
   b. Double-click **setup.exe**. The welcome window of the wizard displays.
   c. Click **Next**.

3. Choose the folder to install the program:
   - To install the program in the *default* folder: Click **Next**.
   - To install the program in *another* folder: Click **Change**, select the appropriate folder, then click **Next.**

4. Click **Install** to install the CommViewer software components.

5. After installation is complete, click **Finish** to exit the installation completion window. A shortcut to the CommViewer Barcode software displays on the desktop.

6. Choose the communication port (COM) to link the barcode reader to the AB Library Builder™ Device:
   a. Click the CommViewer shortcut shown below on the desktop.
   b. Select the communication port (COM 1-4) on the computer that connects to the RS232C serial cable from the AB Library Builder™ Device (see "Set up the barcode reader" on page 57). After selecting the port, click **OK**. The CommViewer window displays (see "Scan sample, elution tube, and sample lane barcodes").

      Note: If the computer has only one COM port, the default selection of COM1 may work. If the computer has more than one COM port, select the appropriate COM port. If you use a USB to Serial Converter cable, the COM port is usually COM3 or COM4.

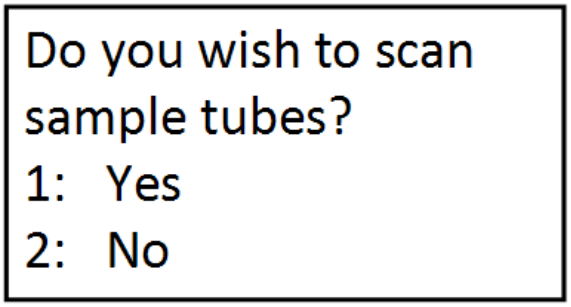
Scan sample, elution tube, and sample lane barcodes

1. Set up the barcode reader and install the software (see page 57).

2. Insert the appropriate protocol card into the AB Library Builder™ Device inlet (see page 15), then select the appropriate protocol.

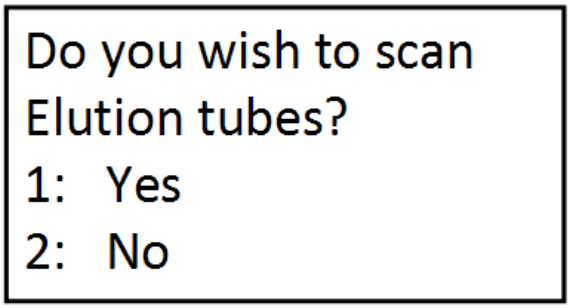
3. Navigate to the CommViewer Barcode software on the computer.

4. On the AB Library Builder™ Device keypad, choose to scan sample and elution tubes:
   a. Select a protocol, then follow the screen prompts until you see the sample barcode option screen (see page 39):

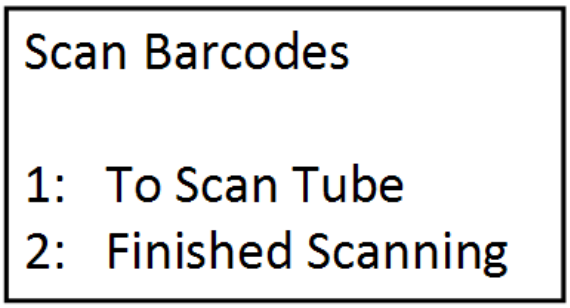


   b. Press **1** to scan sample tube barcodes.

c. Press **1** to scan elution tube barcodes in addition to sample barcodes, or press **2** to scan only sample tube barcodes:

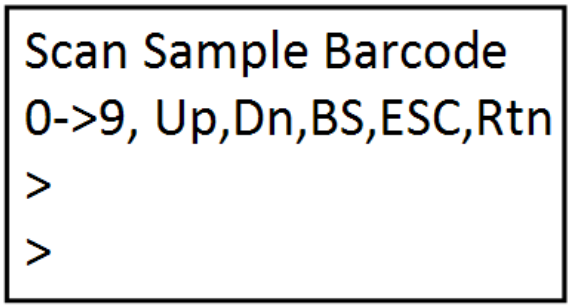


5. Press **1** to begin scanning barcodes:

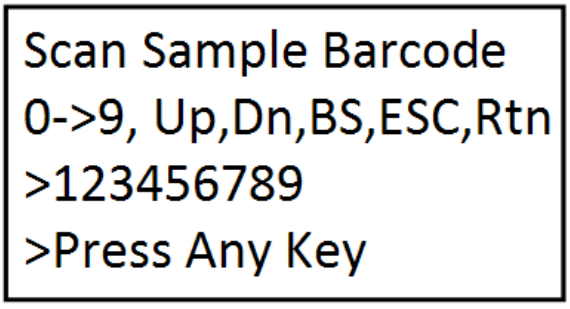


6. Scan the *sample* barcode:

a. Confirm that the keypad displays the sample barcode reading screen:



b. Aim the barcode reader along the barcode of the sample tube, then press the trigger. The barcode reader emits a red LED to read the barcode. After the barcode reader successfully reads the barcode, the barcode reader sounds a tone and emits a green spot on the barcode. The sample barcode appears on line 3 of the keypad screen. For example:



Note:

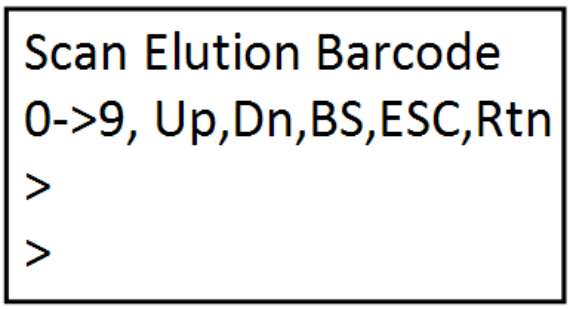
- To record only the sample number without using the barcode reader, use the AB Library Builder™ Device keypad (0-9). Use the number keypad to enter numbers and the up and down arrow keys to enter letters. The BS (backspace) key deletes the last digit/character. Press **Return** to display the sample number.
- To skip barcode reader or manual number entry, press **ESC**.

c. Press any key on the keypad to continue scanning.

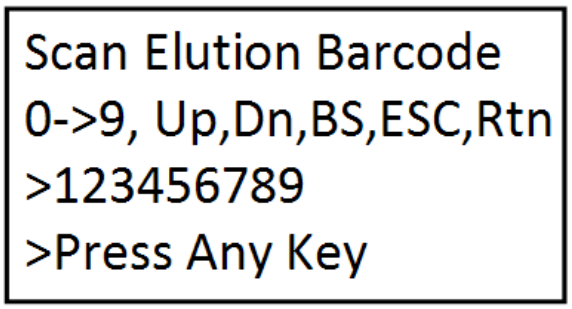
7. If you are not scanning elution tubes, proceed to step 9.

8. Scan the *elution* tube for the sample:

a. Confirm that the keypad displays the elution barcode reading screen:



b. Aim the barcode reader along the barcode of the elution tube for the sample, then press the trigger. Wait for the tone and green spot. The elution barcode appears on line 3 of the keypad screen. For example:

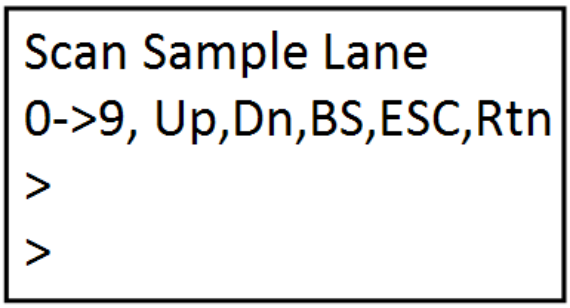


Note:

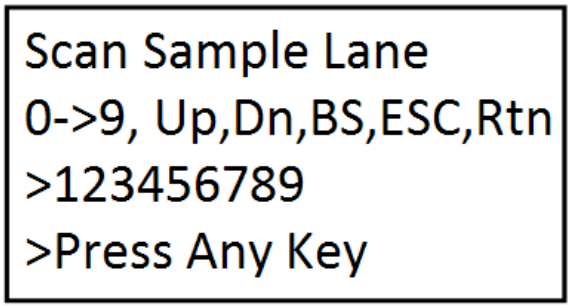
- You can enter the sample lane number with the keypad. Press **Return** to display the number.
- To skip number entry, press **ESC**.

c. Press any key on the keypad to continue scanning.

9. Scan the *sample lane* barcode for the corresponding sample and elution tube:
   a. Confirm that the keypad displays the sample lane barcode reading screen:

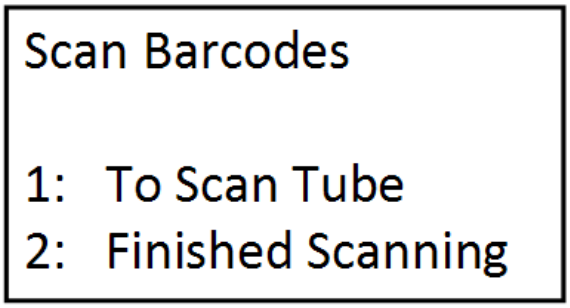


   b. Aim the barcode reader along the sample lane barcode on the tip and tube rack. The sample lane barcode is aligned with the position of the sample and elution tube. Press the trigger, then wait for the tone and green spot. The sample lane barcode appears on line 3 of the keypad screen. For example:

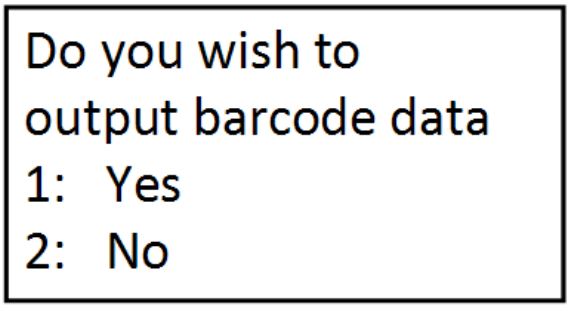


   Note:
   - You can enter the sample lane number with the keypad. Press **Return** to display the number.
   - To skip number entry, press **ESC**.

   c. Press any key on the keypad to display the Scan Barcodes screen:



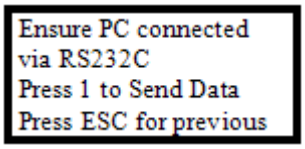
10. Press **1** to continue barcode scanning (repeat steps 6–9), then press **2** to finish. The output barcode data screen displays:



11. Proceed as follows:
    - Transfer barcode data: Set up the CommViewer software (see "Transfer the barcode data"), then press **1**.
    - Prepare the library: Press **2** (see Chapter 3, "Operate the AB Library Builder™ Device" on page 29).

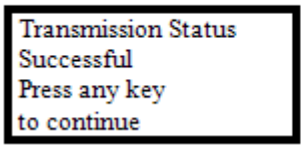
Transfer the barcode data

1. Ensure that the RS232C serial cable is connected between the AB Library Builder™ Device and a computer (see "Set up the barcode reader" on page 57).
2. Ensure that the CommViewer Barcode reader software is installed and opened.
3. While the output data screen displays (see screen above), press **1**. A confirmation screen displays:

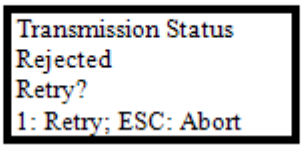


4. Press **1** to continue. Depending on successful or rejected transmissions, the following transmission status screens display on the AB Library Builder™ Device:

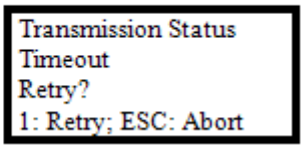
Successful



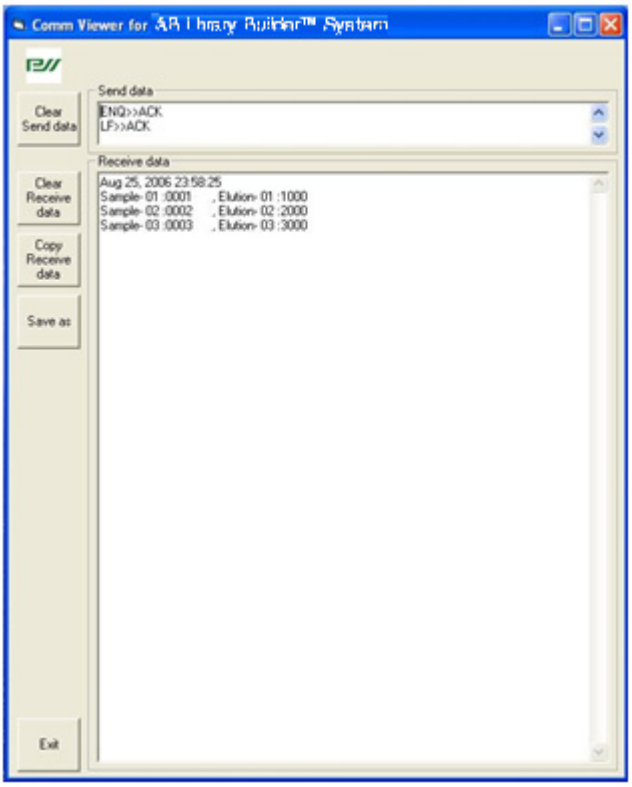
Rejected



Timeout



On pressing **1**, the barcode data read using the barcode reader also appears in the Receive Data window on the CommViewer window of the barcode reader software:



Commands in CommViewer Window	Operations
Clear Receive Data	Clears the data. The received barcode data may include additional information such as time. Remove any additional information using the backspace or delete keys on your computer.
Save as	Saves refined data with a suitable file name in an appropriate folder.
Copy Receive Data	Copies data directly into another program as text or into a spreadsheet. All data displayed in the Receive Data box are copied. Open an editor or spreadsheet program, then paste the barcode data using the **Paste** menu command.
Exit	Closes the CommViewer window. **IMPORTANT!** Closing the CommViewer clears the data. If necessary, copy or save the data first before exiting.

5. Depending on the outcome of the data transfer, troubleshoot the data transfer or continue with library preparation:

Data transfer is	Do the following...
Successful	Press any key to continue with the library preparation run.
Not successful	• Press **1** to retry sending the data. If there is no response from the computer (>3 seconds) when the data is transmitted, the timeout screen is displayed. • Ensure that the computer is ON. • Ensure that the CommViewer software is installed. • Press 1 to retry sending the date. • Press **ESC**. ESC aborts the data but continues with the purification protocol, and the elution volume screen is displayed.

A Troubleshooting

Troubleshoot instrument operation

For symptoms other than those listed in this section, contact Technical Support ("Obtaining support" on page 90).

Observation	Possible cause	Suggested solution
No power (the digital display is blank and the fan does not turn on when you power on)	AC power cord is not connected	Check AC power cord connections at both ends. Use the correct cords.
	Fuse has blown	Check the integrity of the fuse and replace it if necessary ("Replace the fuse" on page 53). If the problem persists after connecting the correct power cord and replacing the fuse, contact Life Technologies Technical Support ("Obtaining support" on page 90).
The digital display is blank, but the fan turns on when you power on	Protocol card is not inserted correctly	Power off the instrument and re-insert the protocol card in the proper orientation into the card slot (see "Insert or change the protocol card and power on the instrument" on page 31). Insert it completely into the slot by manually pushing the card.
	Protocol card was inserted when the instrument was powered on	Power off the instrument, then power on the instrument.
Error code displayed	—	See "Instrument error codes" on page 68.
Reagent cartridges, tips, or tubes are not inserted in the correct positions	Operator error	Press **Stop** to pause the run. Open the door, add the missing items, then press **Start** to resume the run. Do not open the door without pausing the run.
Run stops after an initial start (you may also see an error code).	• Instrument door opened during the run • Reagent cartridges, tips, or tubes incorrectly loaded in the rack • Racks incorrectly loaded on the instrument	**IMPORTANT!** If you open the instrument door while the instrument is running, the run stops, and it cannot be restarted. If you need to open the instrument door during a run, first press **Stop** to pause the run, then open the door. 1. Follow the procedure in "Instrument error codes" on page 68. 2. Before starting a new run, make sure that the reagent cartridges, tips, and tubes are correctly loaded: • Slide the reagent cartridges into the cartridge rack as described on "Load and insert the cartridge rack" on page 33. • Load the cartridge rack before the tip and tube rack for proper positioning. • Do not cap the tubes. 3. If the instrument continues to stop during the run, contact Life Technologies Technical Support.
No DNA yield	No sample added to tube	Add samples to tubes, load new reagent cartridges, then perform the run again.

Observation	Possible cause	Suggested solution
Bubbles formed during run	Sample volume is lower than the recommended volume **Note:** Some bubbles are produced during routine operation when using the recommended sample volume.	In future runs, use the sample volume recommended in the user guide for the kit you are using. Long-term operation with lower-than-recommended sample volumes can lead to issues with liquid handling performance.
During run: No liquid in tip, or liquid in tip not moving	No sample added to tube, leading to wet filter barrier on the tip and blockage of nozzles	Add samples to tubes, load new reagent cartridges, then perform the run again.
After run: No elution volume	Sample volume is lower than the recommended volume, leading to wet filter barrier on the tip and blockage of nozzles **Note:** This is normal during tip-drying steps.	In future runs, use the recommended sample volume in the user guide for the kit you are using. Long-term operation with lower-than-recommended sample volumes can lead to issues with liquid handling performance.
Buffer in the bottom tray	Motor movements are not smooth	Schedule preventive maintenance annually to ensure proper motor movements.
	Reagent cartridges, tips, or tubes incorrectly loaded in the rack	If you are processing fewer than 13 samples, make sure to load the tips and tubes in the same positions as the reagent cartridges that are loaded in the cartridge rack. See below for leakage from tips.
Leakage from tips or uneven liquid handling between nozzles	D-Rings are not greased regularly or they need replacement	You can continue the run, but maintain the D-rings as scheduled ("Maintain the D-rings" on page 50) or replace the D-rings ("Replace the D-rings" on page 51) to prevent leakage.
Blockage of tips	Too much starting material causing clumps or aggregates	Contact Life Technologies Technical Support ("Obtaining support" on page 90). In future runs, use the sample volume recommended in the user guide for the kit you are using.

Instrument error codes

If an extraction run is interrupted by an error, you cannot resume the interrupted run. Follow the procedure below to resolve the error before you start a new run.

If you observe an error code:

1. Make a note of the error code, including the line number. Common error codes are listed in Table 1.
2. Press **ESC** to return to the Main menu.
3. If there are tips attached to the nozzles, press **1** to select the Manual screen, then press 2 to return the tips to the original position (see page 41 for details).
4. Power OFF the instrument, remove the protocol card, wait 5 minutes, insert the protocol card, then power on the instrument.
5. Run the axis test (see "Axis test" on page 46).
6. Review test results. If the axis test:
   - Is successful, start a new extraction run. Use new samples and plastics where required.
   - Is *not* successful, contact Life Technologies Technical Support ("Obtaining support" on page 90).

Table 1 Error codes

Code	Problem	Code	Problem
10	Failed return to origins, protocol cannot run	22	M axis time out, protocol in run
11	Limit error, protocol can not run	23	Y axis time out, protocol in run
12	Failed to return to Z Axis, protocol in run	24	Open door in motion
13	Failed to return to P axis, protocol in run	25	Abnormal input from bottom sensor in motion
14	Failed to return to M axis, protocol in run	26	Failed to initialize heating block
15	Failed to return to Y axis, protocol in run	27	Failed to initialize motion control board
16	Z axis limit error, protocol in run	110	System error; (Assigned greater than 10)
19	Y axis end limit, protocol in run		
20	Z axis time out, protocol in run		
21	P axis time out, protocol in run		

B About the AB Library Builder™ Device

AB Library Builder™ Device features

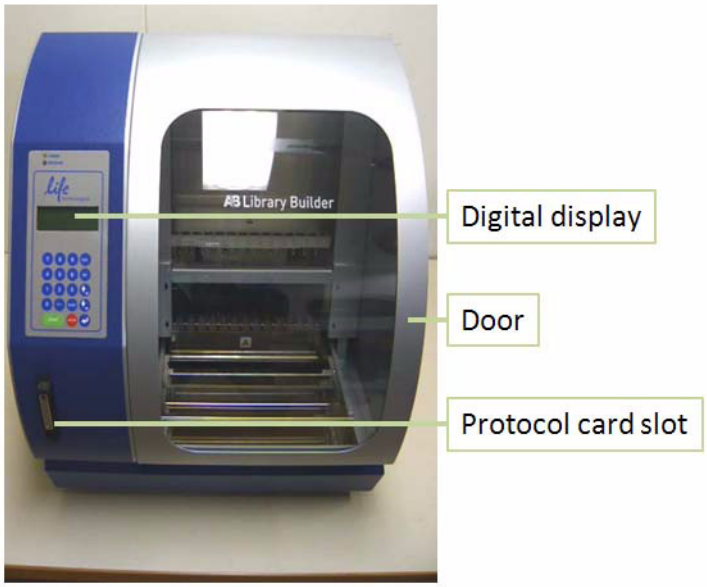
The AB Library Builder™ Device:

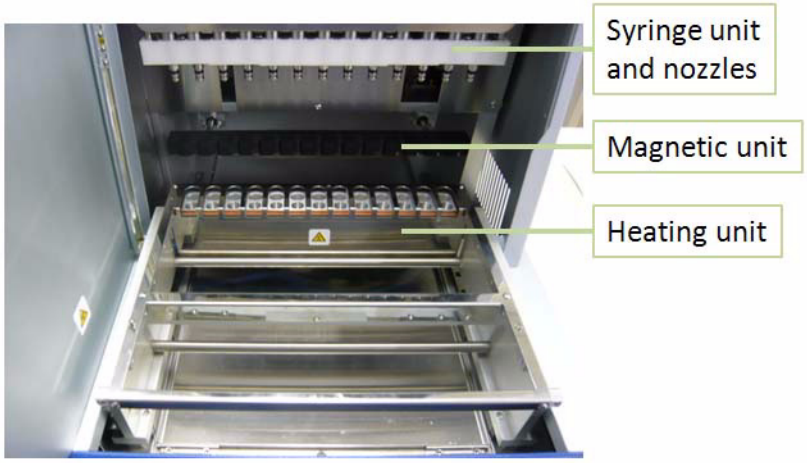
- Minimizes the potential for cross contamination between samples
- Uses pre-programmed protocol cards that contain the preparation protocol, allowing hands-free preparation
- Provides consistent, reliable results due to the simultaneous rapid and accurate dispensing of reagents by 13 nozzles in the syringe unit
- Minimizes the potential carry-over of magnetic particles into the purified DNA
- Includes built-in safety features

AB Library Builder™ Device description

Instrument exterior

The AB Library Builder™ Device is a benchtop, automated library construction and nucleic acid purification device with an integrated magnetic and syringe unit that performs full automation of the labor-intensive steps of library construction and nucleic acid purification for up to 13 samples:





Each AB Library Builder™ Device consists of the magnetic and syringe unit, and a platform. A pre-programmed protocol card controls the protocol parameters such as buffer volumes, mixing steps, size selection, purification, and incubation times. The AB Library Builder™ Device is designed to run for 8–10 hours continuously without any cooling periods between runs.

The AB Library Builder™ Device uses patented Magtration® (magnetic filtration) technology, which traps magnetic particles against the sidewall of the pipetting tip. This technology improves the washing of particles and processed sample recovery compared to other magnetic-based automated systems.

Instrument interior

The interior parts are:

- **Syringe unit** – Contains 13 nozzles that simultaneously move in the Z-axis direction to aspirate and dispense the AB Library Builder™reagents.
- **Magnetic Unit** – Contains 13 magnets (neodymium iron boron type) that align with the instrument tips to simultaneously separate the magnetic particles from up to 13 samples during protocol steps.
- **Piercing unit** (not shown) – Contains 13 piercing rods that move in Z-axis to pierce the foil on the reagent cartridges before the protocol begins.
- **Heating Unit** – Heats samples to up to 95°C.

WARNING! Do not touch the surface of the heat block. The temperature of the heat block may be very high (up to 95°C) and can cause burns.

AB Library Builder™ Device requirements and specifications

Requirement	Specifications
Environmental conditions (operation, transport, and storage)	
Required input power	AC 100-240 V ±10%, 240 VA, 50/60 Hz Grounding is necessary.
Installation site	Indoor use only
Altitude	Up to 2000 meters
Operating conditions	• 5–40°C • 80% maximum relative humidity for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C
Transient category	Installation categories II
Main supply voltage fluctuations	Up to ± 10 percent of nominal voltage
Pollution degree	2
Transport conditions	• –20 to 50°C • Minimum 15% relative humidity, maximum 75% (non-condensing) • Environmental class 2K2 & 2M2 (IEC60721-3-2)
Storage conditions	• 5–40°C • Minimum 15% relative humidity, maximum 75% (non-condensing) • Environmental class 1K2 & 1M2 (IEC60721-3-1)
Specifications	
Instrument type	Benchtop dispenser instrument with 13 nozzles
Sample processing	1–13 samples/run
Processing time	Variable (see kit user guide)
Dispensing volume	5–1000 µL
Dispensing accuracy	DN100N tips: • 25–50 µL: Less than 5% (CV%) • 50–1000 µL: Less than 2% (CV%)
Heat block temperature control†	30–80°C (at ambient ≈ 25°C)
Instrument dimensions	50.8 cm (20 inches) (w) × 55.9 cm (22 in.) (d) × 57.2 cm (22.5 in.) (h)
Weight	55 kg (121 pounds)
Built-in features	Digital display, alarm, light LED

Requirement	Specifications
Protocol card	Flash, 512 KB memory card pre-programmed with the purification protocol that directs the volume of reagents used, mixing steps, and incubation time. Store in the plastic cover, in its box, protected from light. Handling: • Do not drop or bend the card • Do not wipe or clean the card using volatile chemicals such as alcohol or equivalent • Do not expose the card to water or any solution
Bottom tray	Stainless steel 42.672 cm (16.8 in.) (l) x 27.432 cm (10.8 in.) (w) x 0.635 cm (0.25 in.) (d)
Cartridge rack	Stainless steel, aluminum alloy 27.432 cm (10.8 in.) (l) x 13.9 cm (5.5 in.) (w) x 5.9 cm (2.3 in.) (d) **Note:** The cartridge rack is designed to hold Applied Biosystems reagent cartridges only. Do not load reagent cartridges from other manufacturers on the AB Library Builder™ Device cartridge rack.
Reagent cartridges	See the user guide for the kit you are using
Tip and tube rack	Stainless steel 28.702 cm (11.3 in.) (l) x 10.16 cm (4 in.) (w) x 7.62 cm (3 in.) (d) • Row 1 – E – hinged elution tubes • Rows 2 and 3 – T1 and T2 – tips • Row 4 S – sample tubes
Tips and holders	• Tip – Polypropylene with filter barriers • Tip holder – Polypropylene, 5–1000 µL, 9.906 cm (3.9 in.) (l) × 1.092 cm (0.43 in.) (d)
Barcode reader	Reads most standard barcodes including UPC-A, EAN-13, Code 32, Code 39, and Code 128.
Built-in features	Digital display, alarm, light LED

† The listed temperature is for the heating block and may not reflect the actual temperature of the sample/solution in a tube.

Barcode reader specifications

Maximum scan rate	270 scans/sec
Maximum resolution	0.076 mm
Reading indicators	Beep and a green spot on the code
Sensor	CCD solid state
Illuminator	LED array
Wavelength	630-670 nm
Reading angle	Skew: ±80°
Operating temperature	0–55 °C
Weight	≈ 200 g

Accessories

The following AB Library Builder™ Device accessories are available separately from Applied Biosystems./Life Technologies.

For more information, go to **www.appliedbiosystems.com** or contact Life Technologies Technical Support ("Obtaining support" on page 90).

Product name†	Vendor
AB Library Builder™ Tips and Tip Holders	4463781
AB Library Builder™ and Tube Rack	4463776
AB Library Builder™ Cartridge Rack	4463782
AB Library Builder™ D-Ring Tool	4465603
AB Library Builder™ Barcode Reader	4465657
AB Library Builder™ Sample Tubes	4463779
AB Library Builder™ D-Rings	4465602

† Applied Biosystems/Life Technologies has validated this protocol using this specific material. Substitution may adversely affect system performance.

Instrument warranty information

Limited product warranty

Computer configuration

Applied Biosystems supplies or recommends certain configurations of computer hardware, software, and peripherals for use with its instrumentation. Applied Biosystems reserves the right to decline support for or impose extra charges for supporting nonstandard computer configurations or components that have not been supplied or recommended by Applied Biosystems. Applied Biosystems also reserves the right to require that computer hardware and software be restored to the standard configuration prior to providing service or technical support. For systems that have built-in computers or processing units, installing unauthorized hardware or software may void the warranty or service plan.

Limited warranty

Applied Biosystems (AB) warrants that all standard components of its AB Library Builder™ Device will be free of defects in materials and workmanship for a period of one (1) year from the date the warranty period begins. AB will repair or replace, at its discretion, all defective components during this warranty period. Warranty repairs, at AB's option, may be performed at an AB repair center or on-site at Customer's location. If AB opts to perform warranty services at a repair center, customer must contact AB for instructions on handling and shipping the AB Library Builder™ Device to the designated AB repair center. Cost of shipping instrument from customer's site to AB's repair center and back to customer will be borne by AB.

After this warranty period, repairs and replacement components may be purchased from AB at its published rates. AB also provides service agreements for post-warranty coverage. AB reserves the right to use new, repaired, or refurbished instruments or components for warranty and post-warranty service agreement replacements. Repair or replacement of products or components that are under warranty does not extend the original warranty period.

AB warrants that all optional accessories supplied with its AB Library Builder™ Device, such as barcode readers and spare racks, will be free of defects in materials and workmanship for a period of ninety (90) days from the date the warranty begins. AB will repair or replace, at its discretion, defective accessories during this warranty period. After this warranty period, AB will pass on to the buyer, to the extent that it is permitted to do so, the warranty of the original manufacturer for such accessories.

With the exception of consumable and maintenance items, replaceable products or components used on or in the instrument are themselves warranted to be free of defects in materials and workmanship for a period of ninety (90) days.

AB warrants that chemicals and other consumable products will be free of defects in materials and workmanship when received by the buyer, but not thereafter, unless otherwise specified in documentation accompanying the product.

AB warrants that for a period of ninety (90) days from the date the warranty period begins, the tapes, diskettes, or other media bearing the operating software of the product, if any, will be free of defects in materials and workmanship under normal use. If there is a defect in the media covered by the above warranty and the media is returned to AB within the ninety (90) day warranty period, AB will replace the defective media.

AB does not warrant that the operation of the instrument or its operating software will be uninterrupted or error free.

Warranty period effective date

Any applicable warranty period under these sections begins on the earlier of the date of installation or ninety (90) days from the date of shipment for hardware and software installed by Applied Biosystems (AB) personnel. For all hardware and software installed by the buyer or anyone other than AB, and for all other products, the applicable warranty period begins the date the product is delivered to the buyer.

Warranty claims

Warranty claims must be made within the applicable warranty period, or, for chemicals or other consumable products, within thirty (30) days after receipt by the buyer.

Warranty exceptions

The above warranties do not apply to defects resulting from misuse, neglect, or accident, including without limitation: operation with incompatible solvents or samples in the system; operation outside of the environmental or use specifications or not in conformance with the instructions for the instrument system, software, or accessories; improper or inadequate maintenance by the user; installation of software or interfacing, or use in combination with software or products, not supplied or authorized by Applied Biosystems (AB); modification or repair of the product not authorized by AB, relocation or movement of the instrument by Customer or any third party not acting on behalf of AB; or intrusive activity, including without limitation computer viruses, hackers or other unauthorized interactions with instrument or software that detrimentally affects normal operations. Without limiting the above mentioned and for avoidance of doubt, computer hardware, monitors, accessories, software or other products not purchased from or supplied by AB (Non-AB Product") are not covered under the foregoing warranty even if such Non-AB Product is integral to functional use of an AB product.

Warranty limitations

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THIS WARRANTY IS LIMITED TO THE BUYER OF THE PRODUCT FROM APPLIED BIOSYSTEMS AND IS NOT TRANSFERABLE.

Some countries or jurisdictions limit the scope of or preclude limitations or exclusion of warranties, of liability, such as liability for gross negligence or wilful misconduct, or of remedies or damages, as or to the extent set forth above. In such countries and jurisdictions, the limitation or exclusion of warranties, liability, remedies or damages set forth above shall apply to the fullest extent permitted by law, and shall not apply to the extent prohibited by law.

Damages, Claims, and Returns

Damages

If shipping damage to the product is discovered, contact the shipping carrier and request inspection by a local agent. Secure a written report of the findings to support any claim. Do not return damaged goods to Applied Biosystems (AB) without first securing an inspection report and contacting AB Technical Support for a Return Authorization (RA) number.

Claims

After a damage inspection report is received by AB, AB will process the claim unless other instructions are provided.

Returns

Do not return any material without prior notification and authorization.

If for any reason it becomes necessary to return material to AB, contact AB Technical Support or your nearest AB subsidiary or distributor for a return authorization (RA) number and forwarding address. Place the RA number in a prominent location on the outside of the shipping container, and return the material to the address designated by the AB representative.

C Safety

This appendix covers:

Instrumentation safety

Symbols on instruments

Electrical symbols on instruments

The following table describes the electrical symbols that may be displayed on Applied Biosystems instruments.

Symbol	Description
	Indicates the **On** position of the main power switch.
	Indicates the **Off** position of the main power switch.
	Indicates a standby switch by which the instrument is switched on to the **Standby** condition. Hazardous voltage may be present if this switch is on standby.
	Indicates the **On/Off** position of a push-push main power switch.
	Indicates a terminal that may be connected to the signal ground reference of another instrument. This is not a protected ground terminal.
	Indicates a protective grounding terminal that must be connected to earth ground before any other electrical connections are made to the instrument.
	Indicates a terminal that can receive or supply alternating current or voltage.

Safety labels on instruments

See "Safety labels on instruments" on page 8.

Environmental symbols on instruments

The following symbol applies to all Applied Biosystems electrical and electronic products placed on the European market after August 13, 2005.

Symbol	Description
	**Do not dispose of this product as unsorted municipal waste.** Follow local municipal waste ordinances for proper disposal provisions to reduce the environmental impact of waste electrical and electronic equipment (WEEE). **European Union customers:** Call your local Applied Biosystems Customer Service office for equipment pick-up and recycling. See **www.appliedbiosystems.com** for a list of customer service offices in the European Union.

General instrument safety

WARNING! PHYSICAL INJURY HAZARD. Using the instrument in a manner not specified by Applied Biosystems may result in personal injury or damage to the instrument.

Moving and lifting the instrument

CAUTION! PHYSICAL INJURY HAZARD. Do not attempt to lift or move the instrument without the assistance of others, the use of appropriate moving equipment, and proper lifting techniques. Improper lifting can cause painful and permanent back injury. Depending on the weight, moving or lifting an instrument may require two or more persons.

Operating the instrument

Ensure that anyone who operates the instrument has:

- Received instructions in both general safety practices for laboratories and specific safety practices for the instrument.
- Read and understood all applicable Safety Data Sheets (SDSs). See "About SDSs" on page 84.

Cleaning or decontaminating the instrument

CAUTION! Using a cleaning or decontamination method other than that specified by the manufacturer may result in damage to the instrument. If using a cleaning or decontamination method other than specified, it is the operator's responsibility to ensure that the compatibility of the cleaning or decontamination agents with parts of the equipment or with material contained in it. The manufacturer of the instrument and/or the manufacture of the agents used should be consulted in case of doubt regarding the compatibility.

Physical hazard safety

Moving parts

WARNING! PHYSICAL INJURY HAZARD. Moving parts can crush and cut. Keep hands clear of moving parts while operating the instrument. Disconnect power before servicing the instrument.

Solvents and pressurized fluids

WARNING! PHYSICAL INJURY HAZARD. Always wear eye protection when working with solvents or any pressurized fluids.

Electrical safety

WARNING! ELECTRICAL SHOCK HAZARD. Severe electrical shock can result from operating the AB Library Builder™ Device without its instrument panels in place. Do not remove instrument panels. High-voltage contacts are exposed when instrument panels are removed from the instrument.

Fuses

WARNING! FIRE HAZARD. Improper fuses or high-voltage supply can damage the instrument wiring system and cause a fire. Before turning on the instrument, verify that the fuses are properly installed and that the instrument voltage matches the power supply in your laboratory.

WARNING! FIRE HAZARD. For continued protection against the risk of fire, replace fuses only with fuses of the type and rating specified for the instrument.

Power

WARNING! ELECTRICAL HAZARD. Grounding circuit continuity is required for the safe operation of equipment. Never operate equipment with the grounding conductor disconnected.

WARNING! ELECTRICAL HAZARD. Use properly configured and approved line cords for the voltage supply in your facility.

WARNING! ELECTRICAL HAZARD. Plug the system into a properly grounded receptacle with adequate current capacity.

Overvoltage rating

The AB Library Builder™ Device has an installation (overvoltage) category of II, and is classified as portable equipment.

Workstation safety

Correct ergonomic configuration of your workstation can reduce or prevent effects such as fatigue, pain, and strain. Minimize or eliminate these effects by configuring your workstation to promote neutral or relaxed working positions.

CAUTION! MUSCULOSKELETAL AND REPETITIVE MOTION HAZARD. These hazards are caused by potential risk factors that include but are not limited to repetitive motion, awkward posture, forceful exertion, holding static unhealthy positions, contact pressure, and other workstation environmental factors.

To minimize musculoskeletal and repetitive motion risks:

- Use equipment that comfortably supports you in neutral working positions and allows adequate accessibility to the keyboard, monitor, and mouse.
- Position the keyboard, mouse, and monitor to promote relaxed body and head postures.

Safety and electromagnetic compatibility (EMC) standards

This section provides information on:

U.S. and Canadian safety standards

The AB Library Builder™ Device has been tested to and complies with standard:

UL 61010-1/CSA C22.2 No. 61010-1, "Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements."

UL 61010-2-010, "Particular Requirements for Laboratory Equipment for the Heating of Materials."

The bar code scanner provided with the AB Library Builder™ Device is a class 1 laser device.

Canadian EMC standard

This instrument has been tested to and complies with ICES-001, Issue 3: "Industrial, Scientific, and Medical Radio Frequency Generators."

European safety and EMC standards

Safety

This instrument meets European requirements for safety (Low Voltage Directive 2006/95/EC). This instrument has been tested to and complies with standards EN 61010-1:2001, "Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part 1: General Requirements."

EN 61010-2-010, "Particular Requirements for Laboratory Equipment for the Heating of Materials."

EN 61010-2-081, "Particular Requirements for Automatic and Semi-Automatic Laboratory Equipment for Analysis and Other Purposes."

EMC

This instrument meets European requirements for emission and immunity (EMC Directive 2004/108/EC). This instrument has been tested to and complies with standard EN 61326 (Group 1, Class B), "Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements."

Australian EMC Standards

This instrument has been tested to and complies with standard AS/NZS 2064, "Limits and Methods Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific, and Medical (ISM) Radio-frequency Equipment."

Chemical safety

General chemical safety

Chemical hazard warning

WARNING! CHEMICAL HAZARD. Before handling any chemicals, refer to the Safety Data Sheet (SDS) provided by the manufacturer, and observe all relevant precautions.

WARNING! CHEMICAL STORAGE HAZARD. Never collect or store waste in a glass container because of the risk of breaking or shattering. Reagent and waste bottles can crack and leak. Each waste bottle should be secured in a low-density polyethylene safety container with the cover fastened and the handles locked in the upright position. Wear appropriate eyewear, clothing, and gloves when handling reagent and waste bottles.

Chemical safety guidelines

To minimize the hazards of chemicals:

- Read and understand the Safety Data Sheets (SDSs) provided by the chemical manufacturer before you store, handle, or work with any chemicals or hazardous materials. (See "About SDSs" on page 84.)
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing). For additional safety guidelines, consult the SDS.
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with adequate ventilation (for example, fume hood). For additional safety guidelines, consult the SDS.
- Check regularly for chemical leaks or spills. If a leak or spill occurs, follow the manufacturer's cleanup procedures as recommended in the SDS.
- Comply with all local, state/provincial, or national laws and regulations related to chemical storage, handling, and disposal.

SDSs

About SDSs

Chemical manufacturers supply current Safety Data Sheets (SDSs) with shipments of hazardous chemicals to new customers. They also provide SDSs with the first shipment of a hazardous chemical to a customer after an SDS has been updated. SDSs provide the safety information you need to store, handle, transport, and dispose of the chemicals safely.

Each time you receive a new SDS packaged with a hazardous chemical, be sure to replace the appropriate SDS in your files.

Obtaining SDSs

The SDS for any chemical supplied by Applied Biosystems is available to you free 24 hours a day. To obtain SDSs:

1. Go to **www.appliedbiosystems.com**, click **Support**, then select **SDS**.
2. In the Keyword Search field, enter the chemical name, product name, SDS part number, or other information that appears in the SDS of interest. Select the language of your choice, then click **Search**.

3. Find the document of interest, right-click the document title, then select any of the following:
   - **Open** – To view the document
   - **Print Target** – To print the document
   - **Save Target As** – To download a PDF version of the document to a destination that you choose

Note: For the SDSs of chemicals not distributed by Applied Biosystems, contact the chemical manufacturer.

Chemical waste safety

Chemical waste hazards

CAUTION! HAZARDOUS WASTE. Refer to Safety Data Sheets and local regulations for handling and disposal.

WARNING! CHEMICAL WASTE HAZARD. Wastes produced by Applied Biosystems instruments are potentially hazardous and can cause injury, illness, or death.

WARNING! CHEMICAL STORAGE HAZARD. Never collect or store waste in a glass container because of the risk of breaking or shattering. Reagent and waste bottles can crack and leak. Each waste bottle should be secured in a low-density polyethylene safety container with the cover fastened and the handles locked in the upright position. Wear appropriate eyewear, clothing, and gloves when handling reagent and waste bottles.

Chemical waste safety guidelines

To minimize the hazards of chemical waste:

- Read and understand the Safety Data Sheets (SDSs) provided by the manufacturers of the chemicals in the waste container before you store, handle, or dispose of chemical waste.
- Provide primary and secondary waste containers. (A primary waste container holds the immediate waste. A secondary container contains spills or leaks from the primary container. Both containers must be compatible with the waste material and meet federal, state, and local requirements for container storage.)
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing). For additional safety guidelines, consult the SDS.
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with adequate ventilation (for example, fume hood). For additional safety guidelines, consult the SDS.
- Handle chemical wastes in a fume hood.
- After emptying a waste container, seal it with the cap provided.
- Dispose of the contents of the bottom tray and waste bottle in accordance with good laboratory practices and local, state/provincial, or national environmental and health regulations.

Waste disposal

WARNING! Do not add acids, or bases (such as bleach), to any wastes containing lysis buffer (present in reagent cartridges or tubes). Acids and bases can react with guanidine thiocyanate in the lysis buffer and generate toxic gas.

If potentially hazardous waste is generated when you operate the instrument, you must:

- Characterize (by analysis if necessary) the waste generated by the particular applications, reagents, and substrates used in your laboratory.
- Ensure the health and safety of all personnel in your laboratory.
- Ensure that the instrument waste is stored, transferred, transported, and disposed of according to all local, state/provincial, and/or national regulations.

  IMPORTANT! Radioactive or biohazardous materials may require special handling, and disposal limitations may apply.

Biological hazard safety

General biohazard

WARNING! BIOHAZARD. Biological samples such as tissues, body fluids, infectious agents, and blood of humans and other animals have the potential to transmit infectious diseases. Follow all applicable local, state/provincial, and/or national regulations. Wear appropriate protective equipment, which includes but is not limited to: protective eyewear, face shield, clothing/lab coat, and gloves. All work should be conducted in properly equipped facilities using the appropriate safety equipment (for example, physical containment devices). Individuals should be trained according to applicable regulatory and company/institution requirements before working with potentially infectious materials. Read and follow the applicable guidelines and/or regulatory requirements in the following:

- U.S. Department of Health and Human Services guidelines published in *Biosafety in Microbiological and Biomedical Laboratories* (**www.cdc.gov/od/ohs/biosfty/bmbl5/bmbl5toc.htm**)
- Occupational Safety and Health Standards, Bloodborne Pathogens (29 CFR§1910.1030; **www.access.gpo.gov/ nara/cfr/waisidx_01/29cfr1910a_01.html**).
- Your company's/institution's Biosafety Program protocols for working with/handling potentially infectious materials.

Additional information about biohazard guidelines is available at:

www.cdc.gov

Safety alerts

For the definitions of the alert words **IMPORTANT**, **CAUTION**, **WARNING**, and **DANGER**, see "Safety alert words" on page 7.

Specific alerts for instrumentation

WARNING! Do not touch the surface of the heat block. The temperature of the heat block may be very high (up to 95°C) and can cause burns.

Documentation and Support

Related documentation

Certificate of Conformity

To obtain a Certificate of Conformity on-line, go to:
www.appliedbiosystems.com
or email us at:
cofareques@lifetech.com.

Guides

Portable document format (PDF) versions of this guide and the following related guide are available at:
http://www.appliedbiosystems.com/librarybuilderguides.

Document	Part number	Description
AB Library Builder™ System Site Preparation Guide	4465106	Procedures for preparing libraries.
Applied Biosystems SOLiD™ 4 System Library Preparation Guide	4445673	Procedures for preparing libraries.
Applied Biosystems SOLiD™ 4 System Library Preparation Quick Reference Card	4445674	Brief, step-by-step procedures for preparing libraries.
Library Builder™ Fragment Library Preparation for 5500 SOLiD™ User Guide	4460965	Step-by-step instructions for using the Automated Fragment Library Preparation Protocol Kit for automated extraction and isolation of genomic DNA on AB Library Builder™ Device for later sequencing on 5500 Series SOLiD™ Sequencers.
Library Builder™ Fragment Library Preparation for 5500 SOLiD™ Quick Reference Card	4461307	Concise instructions for using the Automated Fragment Library Preparation Protocol Kit for automated extraction and isolation of genomic DNA on AB Library Builder™ Device for later sequencing on 5500 Series SOLiD™ Sequencers.

To open the user documentation available at **www.appliedbiosystems.com/librarybuilder**, use the Adobe® Acrobat® Reader® software available from **www.adobe.com**

Note: For additional documentation, see "Obtaining support" on page 90.

Obtaining support

For the latest technical services and support information for all locations, go to:

www.appliedbiosystems.com

At the Applied Biosystems website, you can:

- Access worldwide telephone and fax numbers to contact Applied Biosystems Technical Support and Sales facilities.
- Search through frequently asked questions (FAQs).
- Submit a question directly to Technical Support.
- Order Applied Biosystems user documents, SDSs, certificates of analysis, and other related documents.
- Download PDF documents.
- Obtain information about customer training.
- Download software updates and patches.

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