USER GUIDE

applied biosystems® by life technologies™

Applied Biosystems® 3130/3130*xl* Genetic Analyzers

3130 Series Data Collection Software 4

MAINTENANCE, TROUBLESHOOTING, AND REFERENCE

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life technologies™

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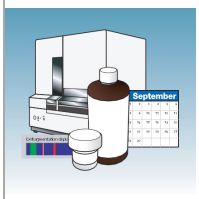
Contents



Maintenance

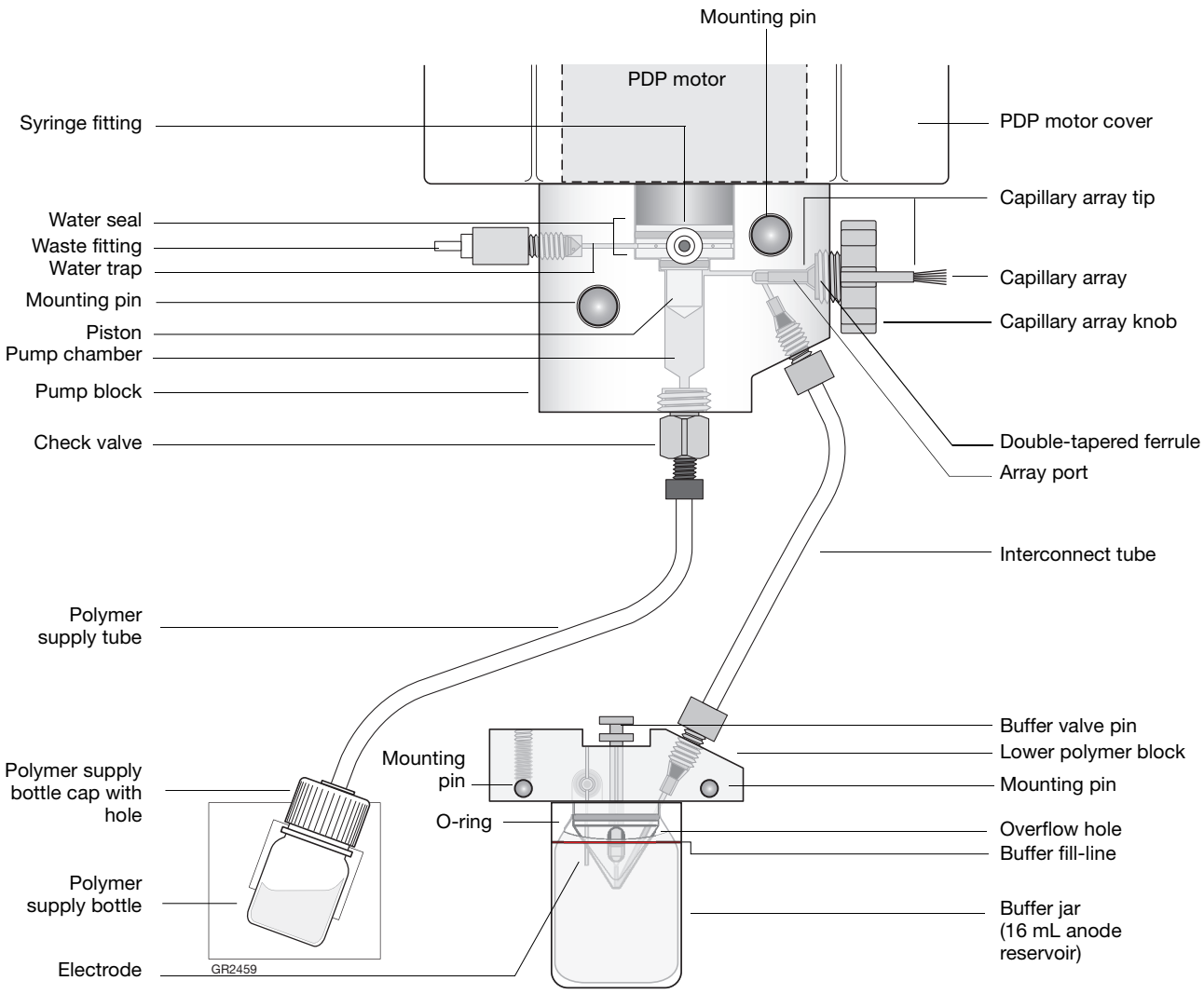
Overview

This chapter covers the following topics:

Notes

Polymer Delivery Pump

Components of the polymer delivery pump (PDP) are identified in the drawing below.



Notes

Performing Maintenance Tasks

Overview

This section lists common tasks required to maintain your Applied Biosystems 3130/3130*xl* Genetic Analyzers in good working condition. The tasks are divided into tables based on how often you should perform each task.

WARNING Wear appropriate protection, including gloves, laboratory goggles, and coat whenever you work with the fluids used on this instrument, or parts that may come into contact with these fluids.

Daily Tasks

Perform these tasks at least once per day.

Maintenance Task	Frequency
Ensure adequate levels of buffer and water in reservoirs.	Before each run
Ensure the plate assemblies are properly assembled. **IMPORTANT!** The holes in the plate retainer must align with the holes in the septa, or the capillary tips will be damaged.	Before each run
Ensure the plate assemblies are positioned on the plate deck properly. Plates should sit snugly on the deck. **IMPORTANT!** Never use warped plates.	Before each run
Check the level of buffer in the buffer jar. Ensure that the overflow hole faces the front of the instrument and is not occluded.	Before each run
Change the water and 1X run buffer in the reservoirs on the instrument and ensure that the outside of the assemblies are dry. Do not simply 'top off' liquids. Full replacement is critical.	Every 48 hours
Check for bubbles in the pump block, lower polymer block, interconnect tube, polymer supply tube, and channels. Remove all bubbles with the Bubble Remove Wizard.	Daily or before each run
Check the loading-end header to ensure the capillary tips are not crushed or damaged.	Daily or before each run
Check the level of polymer in the bottle to ensure sufficient volume for runs.	Daily or before each run
Check the pump block and the lower polymer block to ensure they fit securely on the instrument.	Daily
Clean the instrument surfaces.	Daily
Check for leaks around the array knob, interconnecting tube nuts, and check valve.	Daily

Notes

Weekly Tasks

Perform these tasks at least once per week.

Maintenance Task	Frequency
Replace the polymer using the Replenish Polymer Wizard.	Weekly or as needed
Flush the water trap. See "Flushing and Filling the Water Trap" on page 17.	Weekly
Check the storage conditions of the used arrays.	Weekly
Restart the computer and instrument.	Weekly
Check hard disk space.	Weekly

Monthly Tasks

Perform these tasks at least once per month.

Maintenance Task	Frequency
Run the Water Wash Wizard. Flush the array port during this Wizard, whether or not bubbles are present in the array port.	Monthly or as needed
Defragment the hard drive.	Monthly

As-Needed Tasks

Perform these tasks as needed.

Maintenance Task	Frequency
Clean the drip tray.	As needed
Change the array.	As needed
Remove any dried polymer from the capillary tips. Use a lint-free wipe moistened with deionized water.	As needed
Clean buffer and water reservoirs each time before using a different polymer.	As needed

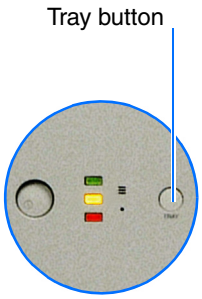
Notes

Routine Cleaning

General Cleaning

1. Ensure the oven and instrument doors are closed.
2. Press the Tray button on the front of the instrument to move the autosampler to the forward position.

   IMPORTANT! Never use organic solvents to clean the instrument.



3. Wipe off any liquid on or around the autosampler using a lint-free tissue.
4. Clean off any polymer build-up (crystals) on the instrument including the capillary tips and the stripper plate with deionized water and lint-free tissue.
5. Clean the array port knob, plug, or opening threads of these parts with moistened lab wipes.
6. Clean out the drip trays with deionized water and lint-free tissue.

Resetting the Instrument

Reset the instrument when:

- A fatal error as indicated by the red status light
- The instrument does not respond to the 3130 Series Data Collection Software 4

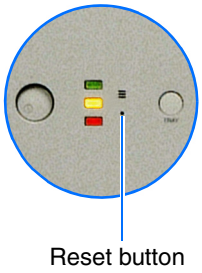
Notes

Two procedures can reset the instrument:

- Press the reset button through the pin hole on the front of the instrument to dump and reload the firmware and to reset the electronics. Try this method first.
- Shut down and restart the computer and the instrument.

Resetting With the Reset Button

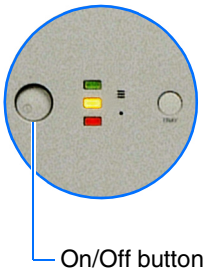
1. Close the instrument doors.
2. Using a long narrow implement, such as a straightened paper clip, press the reset button on the front of the instrument.



Resetting by Powering Down

1. Close the instrument doors.
2. Power off the instrument by pressing the on/off button on the front of the instrument.
3. Restart the computer.
   a. Select **Start** > **Turn off Computer**.
   b. In the dialog box, select **Restart**, then click **OK**.

   IMPORTANT! Wait until the computer has completely restarted before proceeding.
4. Turn on the instrument, then wait for the solid green light.
5. Launch the Data Collection software (Service Console applications start automatically).



Notes

Moving and Leveling the Instrument

CAUTION **PHYSICAL INJURY HAZARD.** Do not attempt to lift the instrument or any other heavy objects unless you have received related training. Incorrect lifting can cause painful and sometimes permanent back injury. Use proper lifting techniques when lifting or moving the instrument. Two or three people are required to lift the instrument, depending upon instrument weight.

1. Remove the following components from the instrument:
   - Any plate assemblies from the autosampler.
   - Water and buffer reservoirs from the autosampler.
   - Capillary array, by selecting Instrument Shutdown Wizard. (See "Performing a Long-Term Shutdown" on page 14.)
   - Anode buffer reservoir.
2. Switch off the breaker on the back of the instrument.
3. Disconnect the power cord and the Ethernet cable.

   IMPORTANT! While moving the instrument, avoid any shock or vibration.

4. Move the instrument.
5. Place the bubble level on the autosampler deck.
6. Turn the instrument legs to level the instrument.

To move the instrument corner ...	Turn the leg ...
up	right (clockwise)
down	left (counterclockwise)

Notes

Shutting Down the Instrument

Perform the appropriate shutdown procedure based on the information in the following table:

If the instrument will be unattended for ...	Perform this shutdown procedure ...
no more than 1 week with a full buffer reservoir	Short-term **IMPORTANT!** The key to a successful short-term shutdown is keeping the capillary array in 1X running buffer. This prevents the polymer from drying in the capillaries.
for more than 1 week	Long-term

Performing a Short-Term Shutdown

Fill the Capillary With Fresh Polymer Using Manual Control

1. Ensure the oven and instrument doors are closed.
2. Collect polymer waste**:**
   a. Click **GA Instruments** > **ga3130** or **ga3130*xl***> *instrument name*> **Manual Control**.
   b. In the Send Defined Command drop-down menu, select **Autosampler**.
   c. In the Command Name drop-down menu, select **Move autosampler to site**.
   d. In the Value menu, select **Waste**.
   e. Click **Send Command**. Wait for the autosampler to stop moving and Send Command becomes active, before proceeding.
3. Fill the capillaries:
   a. In the Send Defined Command for drop-down menu, select **Polymer Delivery Pump**.

Notes

b. In the Command Name, select the appropriate Fill <length> cm capillary array length.

c. Click **Send Command**.The array fill is finished when Send Command becomes active.

d. Return the buffer reservoir to the capillaries.

Cleaning the Reservoirs

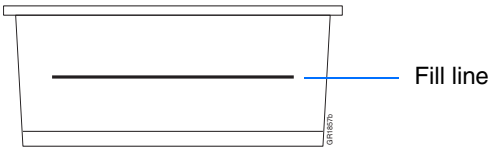
1. Press the Tray button to move the autosampler forward.

2. Open the doors, then remove the:
   - Plates
   - Cathode buffer reservoir and water reservoirs

3. Dispose of remaining fluids and rinse out the reservoirs with deionized water.

   Note: Follow your company's waste disposal practices for appropriate disposal procedures.

4. Rinse the cathode reservoir with 1X running buffer, and then fill to the line with 1X running buffer (about 16 mL).



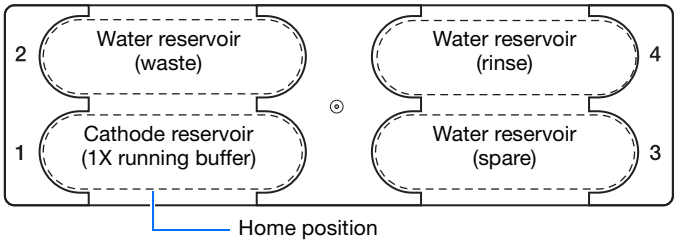
5. Fill the three water reservoirs to the line with quality deionized water (about 16 mL).

CAUTION Ensure that the septa fit snugly and flush on the tops of the reservoirs to prevent damaging the capillary tips.

6. Place a clean reservoir septa on each reservoir, and dry the outside of the reservoirs using a lint-free wipe.

Notes

7. Place the reservoirs into position on the autosampler as shown below.



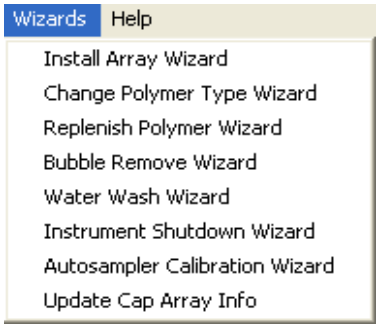
8. Close the instrument doors.

Note: Closing the doors returns the autosampler to the home position, placing the tips of the capillaries in buffer.

9. Shut down the computer and turn off the instrument.

Performing a Long-Term Shutdown

Select **Instrument Shutdown** Wizard and follow the prompts.



IMPORTANT! Make sure all parts are completely dry before long-term storage.

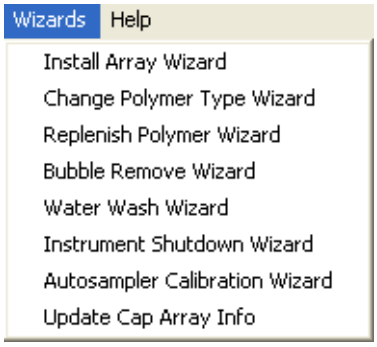
Notes

Wizards

Accessing Wizards

In the tree pane of the Data Collection software, click **GA Instruments** > **ga3130** or **ga3130*xl*** > *instrument name* or any topic name below instrument name to see Wizards in the menu bar.

The Wizards in the Data Collection software guide you through several maintenance procedures.



If plates are linked in the Run Scheduler and you complete a Wizard, the plates automatically unlink. You will get a warning dialog box. Click OK, and then relink the plate if applicable.

Notes

General Use Guidelines

The following table lists the Wizards and when to use them.

Wizard	Use to...
Install Array	• Install a capillary array: – On a new instrument – To reactivate an instrument that has been shut down • Replace an installed capillary array with another capillary array
Change Polymer Type	• Change to a different polymer type than the one presently being used
Replenish Polymer	• Replenish the polymer supply • Replace the polymer in the PDP with polymer of the same or different lot • Enter polymer information when Data Collection software is installed or upgraded
Bubble Remove	Remove bubbles in the PDP chamber, channels, and tubing
Water Wash	• Wash the PDP chamber, lower polymer block[a], channels, and tubing with water: – As part of a monthly maintenance protocol – To remove any suspected contaminants in the PDP – To remove persistent bubbles (followed by the Bubble Remove Wizard, if needed) – To replace old polymer in the PDP
Instrument Shutdown	Prepare the instrument for a period of disuse of greater than one week
Autosampler Calibration	Calibrate the autosampler positions
Update Cap Array Info	• Update the capillary array information and the serial number • Correct an entry mistake after using a Wizard

a The lower polymer block is cleaned on the instrument using this Wizard and should not be removed.

IMPORTANT! Use of CAP polymer requires a dedicated array. CAP polymer is not compatible with any other POP polymer. Even trace amounts of CAP polymer with other polymers will irreparably damage the array and pump and void any service contract or warranty for the instrument. It is important to dedicate a capillary array, polymer block, and syringe for CAP polymer use exclusively. Also, buffer and water reservoirs should be cleaned every time a different polymer is used.

After you use the Change Polymer Type Wizard, ensure that you choose a proper spectral calibration as the active spectral calibration, or that you run a new spectral calibration.

Notes

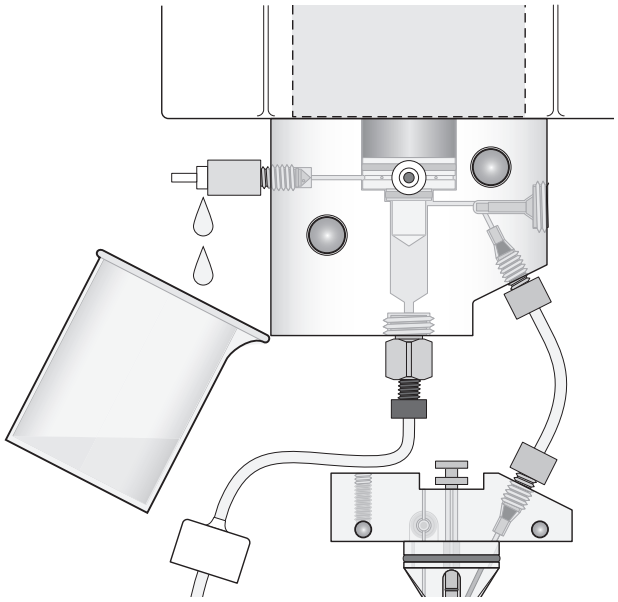
Flushing and Filling the Water Trap

Overview

The PDP water trap should be flushed with either distilled or deionized water at least once per week to wash out any diluted polymer and to clear bubbles. Leave the trap filled with either distilled or deionized water.

To flush the water seal trap:

1. Fill the supplied 20 mL, all-plastic Luer lock syringe (in the PDP Cleaning kit, Part no. 4359572) with distilled or deionized water. Expel any bubbles from the syringe.
2. Do not use a syringe smaller than 20 mL. Doing so can generate excessive pressure within the trap.
3. Attach the syringe to the forward-facing Luer fitting at the top of the pump block. Hold the fitting with one hand while threading the syringe onto the fitting with the other hand.
4. Open the Luer fitting by grasping the body of the fitting and turning it and the attached syringe approximately one-half turn counterclockwise.
5. Open the exit fitting at the top left side of the pump block by turning it approximately one-half turn counterclockwise.



Notes

6. Hold an empty tube or beaker under the exit fitting to receive approximately 5 mL of waste. Flush the trap by pushing steadily on the syringe plunger.

IMPORTANT! DO NOT USE EXCESSIVE FORCE when you push the syringe plunger as this may damage the trap seals. Take approximately 30 seconds to flush 5 mL of either distilled or deionized water through the trap.

Note: Because the water trap volume is approximately 325 µL, a relatively small volume of water is adequate for complete flushing. However, a larger volume only improves flushing as long as force and flow rate are kept within the limits given above.

7. Close the fittings in this order by turning each clockwise until the fittings seal against the block:
   a. Luer fitting
   b. Exit fitting

IMPORTANT! Do not over-tighten the fittings. Very little pressure develops within the trap during pump operation, so the fittings require only enough tightening to prevent water leaks. Excessive tightening can damage the fittings.

   c. Remove the syringe from the Luer fitting. Hold the fitting with one hand while turning the syringe counterclockwise with the other hand.

Notes

Fluids and Waste

Scheduling the Buffer Change

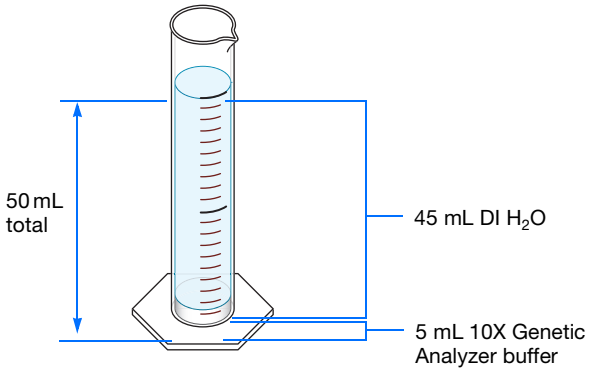
CAUTION CHEMICAL HAZARD.
10X Genetic Analyzer Buffer with EDTA may cause eye, skin, and respiratory tract irritation. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

Change the buffer before each batch of runs or at least every 24 hours. Do not simply 'top off' buffer. Full replacement is critical.

Making Buffer for a Single Run

To prepare 50 mL of 1X running buffer:

1. Add 5 mL of 10X Genetic Analyzer buffer into a graduated cylinder.
2. Add deionized water to bring the total volume up to 50 mL.
3. Mix well.



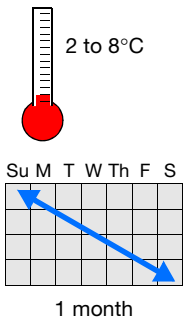
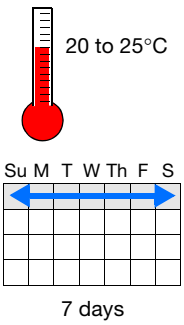
50 mL graduated cylinder

Storing the Buffer

The 1X running buffer can be stored at:

- 2 to 8°C for up to 1 month
- Room temperature for 1 week

Buffer Storage Conditions

Option A	Option B
	
2 to 8°C	20 to 25°C
Su M T W Th F S	Su M T W Th F S
1 month	7 days

Notes

Polymer

Storing Polymer

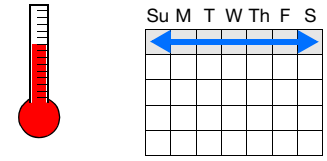
Store any remaining POP™ polymer at 2 to 8°C until the expiration date printed on the jar.

Note: Warm ambient temperature will shorten the working life of the polymer.

When to Change the Polymer

Change the polymer weekly. The polymer is stable on the instrument for 7 days. (The specified ambient temperature for instrument operation is 15–30°C.)

POP-4® or POP-6™ Polymer Storage Conditions



Before Using the Polymer

1. Remove the polymer from 4°C storage.
2. Loosen the cap and bring the polymer to room temperature.
3. To dissolve deposits, tighten the cap and gently swirl the polymer.

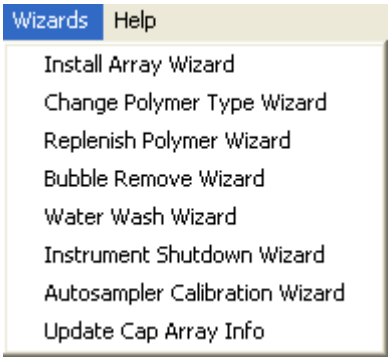
Replenishing the Polymer

WARNING **CHEMICAL HAZARD**. POP™ Polymers cause eye, skin, and respiratory tract irritation. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

IMPORTANT! Wear gloves when you handle the polymer.

Notes

1. Click **Wizards** > **Replenish Polymer Wizard.**



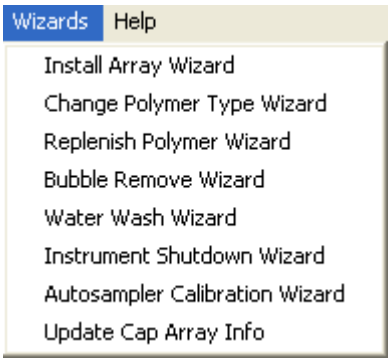
2. Follow the directions given in the Wizard to load fresh polymer on the instrument.
3. Relink plate(s), if applicable.

Changing to a Different Polymer Type

WARNING **CHEMICAL HAZARD**. POP™ Polymers cause eye, skin, and respiratory tract irritation. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

IMPORTANT! Wear gloves when you handle the polymer.

1. Click **Wizards** > **Change Polymer Type Wizard.**
2. Follow the Wizard prompts.



Notes

Capillary Array

When to Change a Capillary Array

A capillary array should last approximately 100 runs.

The following problems may indicate that a new capillary array is required:

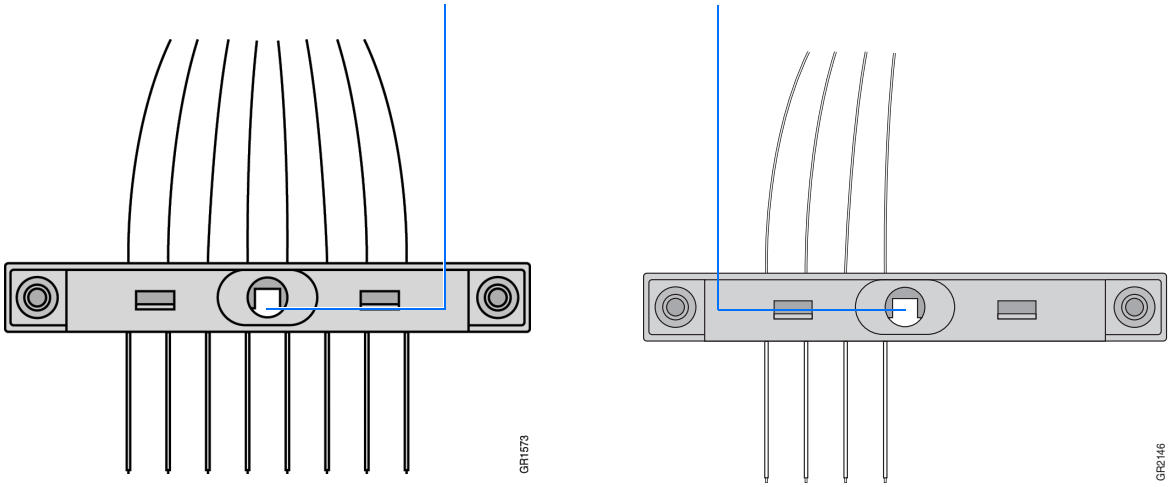
- Poor sizing precision or allele calling
- Poor resolution and/or decreased signal intensity

Checking the Cathode Bar

WARNING **ELECTRICAL SHOCK/FIRE HAZARD.** Do not leave liquid on the cathode header. This can lead to electric shock or even fire if not properly maintained.

When placing a used array back on the instrument, be sure that the cathode bar is dry (see figure below). A wet bar can lead to arcing.

Back view: Ensure the cathode header is dry – especially in the center



3130*xl* capillary array

3130 capillary array

Notes

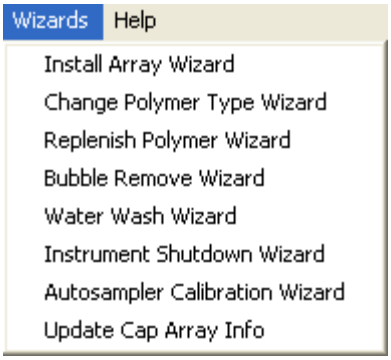
Installing, Removing, or Replacing a Capillary Array

IMPORTANT! Wear gloves when you handle the polymer blocks.

WARNING **CHEMICAL HAZARD. POP™ polymers** cause eye, skin, and respiratory tract irritation. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

1. Close the oven and instrument doors, and then press the Tray button.
2. Select **Wizards** > **Install Array Wizard**.

   IMPORTANT! The capillary array length defined in the Wizard must match the array length you are using.



3. Open instrument and oven doors.
4. Follow the directions given in the Wizard to install or replace an array.
5. Click Finish when done.
6. Close and lock the oven door, then close the instrument doors.

   IMPORTANT! If you installed or replaced an array that is a different length than the one you were using, you must reset the active spectral calibration or create a new spectral calibration for the dye set and array length combination (see "Activating a Spectral Calibration" in the *Applied Biosystems 3130/3130xl Genetic Analyzers Getting Started Guide*).

7. Relink plate(s), if applicable.

Notes

Updating Capillary Array Information

Use the Update Cap Array Info Wizard to:

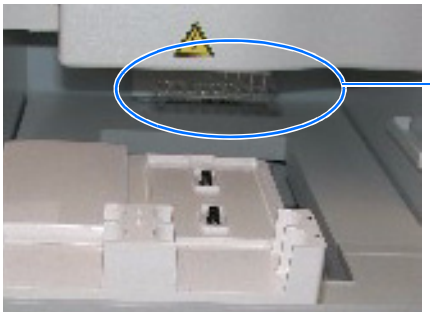
- Update the capillary array length and serial number information into the database
- Correct an entry error after using another Wizard

IMPORTANT! The capillary array length defined in the Wizard must match the array length you are using.

Caring for the Capillary Array and Work Area

Follow these guidelines to properly care for the capillary array and area:

- Wear gloves and handle the capillary array gently.
- Do not touch the detection cell.
- Keep the ends of the capillary array wet at all times.
- Do not overtighten the capillary array knob.
- Clean off any polymer buildup (crystals) on the instrument, including the capillary electrodes and the stripper plate, with deionized water and lint-free tissue.



WARNING **CHEMICAL HAZARD**. **POP polymer** causes eye, skin, and respiratory tract irritation. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

Note: When cleaning the capillary electrodes, be careful not to bend them out of position. If the electrodes bend, follow the procedure "Storing Capillary Arrays" on page 25.

IMPORTANT! Never use organic solvents to clean the instrument.

Filling the Capillary Array Using Manual Control

See "Fill the Capillary With Fresh Polymer Using Manual Control" on page 12.

Notes

Storing Capillary Arrays

Storing a Capillary Array on the Instrument

Store the capillary array on the instrument only when the capillary array will be unused for less than 1 week.

To store the capillary array on the instrument, follow the instructions to perform a short-term shutdown described on page 12.

Storing a Capillary Array off the Instrument

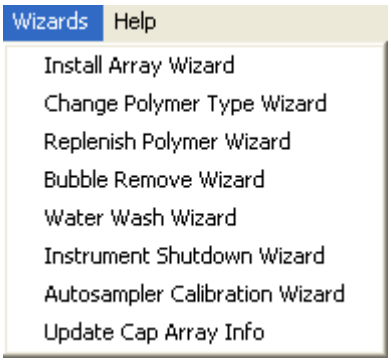
Store the capillary array off of the instrument when the capillary array will be unused for longer than 1 week.

IMPORTANT! Before storing the capillary array for long periods, fill the capillaries with fresh polymer.

IMPORTANT! Wear gloves while performing the following procedure, and any other time you handle the capillary array, septa, or buffer reservoirs.

WARNING **CHEMICAL HAZARD. POP Polymer** causes eye, skin, and respiratory tract irritation. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

1. Remove the capillary array from the instrument by selecting **Install Array Wizard**.
2. Select **Store Array** and follow the prompts.
3. Replace the cover over the detection cell.
4. Fill a buffer reservoir with fresh 1X running buffer and cover with a septa strip. Insert the capillary tips into the buffer.
5. Fill the shipping vial with fresh 1X running buffer and insert the detection end of the capillary array.



Notes

6. Store the capillary array upright.

7. Check the 1X running buffer level in the reservoir and tube weekly and replenish the buffer as needed.

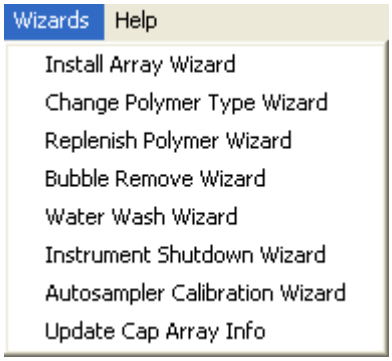
Removing Bubbles from the Polymer Blocks

Bubbles may be found in the polymer system, especially after a polymer change or array installation.

Remove the bubbles from all parts of the polymer system including the pump chamber, the pump block channel, polymer supply and interconnect tubing and the lower polymer block channel.

To clear bubbles:

1. Select **Wizards** > **Bubble Remove Wizard** to clear bubbles.



IMPORTANT! Remove bubbles from the interconnect tubing and the channel of the lower polymer block. These areas are part of the electrophoresis current path. Absence of bubbles in the current path is important for problem-free electrophoresis.

2. Replace the buffer if excess polymer is expelled into the anode buffer jar during bubble removal.

Notes

Autosampler Calibration

When to Calibrate the Autosampler

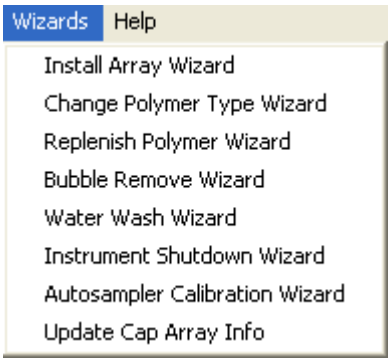
Calibrate the autosampler only as needed.

Symptoms of autosampler alignment problems may include:

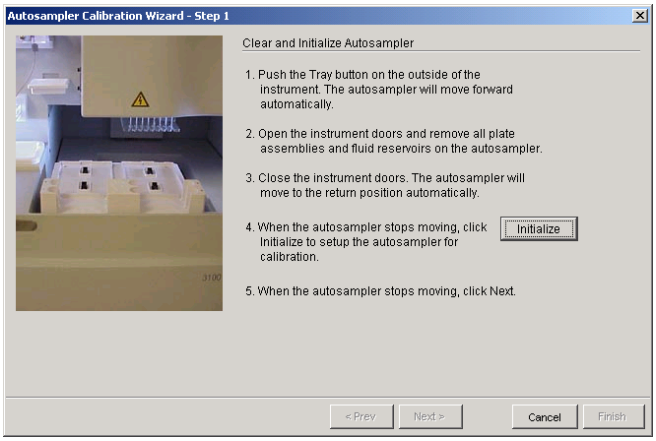
- Poor injection for a small number of capillaries
- Low signal strength
- No evidence of sample

Calibrating the Autosampler

1. Close the oven and instrument doors.
2. Select **Wizards** > **Autosampler Calibration Wizard**.



3. If plates are linked in the Run Scheduler, the plates automatically are unlinked. In the Warning dialog box, click OK.
4. Follow the directions given in the Wizard to calibrate the autosampler.



5. Click Finish and turn the instrument power off for 10 sec then on.

Notes

Manual Control

Note: Manual control is active only if the oven and instrument doors are closed.

Table of Commands

The following table displays the manual control options in the Data Collection software.

Command Function	Command Options	Value
Electrophoresis	Turn On/Off power supply	• On • Off
	Set voltage	A number between 0.0 and 15 kV
	Read voltage	N/A
	Read current	
Laser	Set laser state	• Idle • On • Off
	Set laser power	A number between 0 and 25 mW
	Read laser power setting	N/A
	Read laser power	
	Read laser current	
	Open/Close shutter	• Open • Closed
Oven	Set state	• On • Off
	Set temperature	A number between 18 and 65°C
Autosampler[a]	Initialize autosampler	N/A
	Bring autosampler to forward position	
	Initialize and return to previous position	
	Move autosampler up/down	A number between –500 and 500 steps
	Move autosampler to site	• Buffer (left, front for 1X running buffer), home position • Water1 (left, rear for deionized water) • Water2 (right, front for deionized water) • Waste (right, rear for deionized water)

Notes

Command Function	Command Options	Value
Polymer Deliver Pump	Initialize polymer delivery pump	N/A
	Home piston	
	Read piston position	
	Move piston down	1 to 38,000 counts
	Move piston up	1 to 38,000 counts
	Fill capillary array	1 to 38,000 counts
Buffer Valve	Close/Open buffer valve	• Close • Open
Detection Cell Heater	Turn On/Off detection cell heater	• On • Off
	Read detection cell heater temperature	N/A
Oven	Turn On/Off oven	• On • Off
	Set oven temperature	A number between 18 and 70°C
	Read oven temperature	N/A

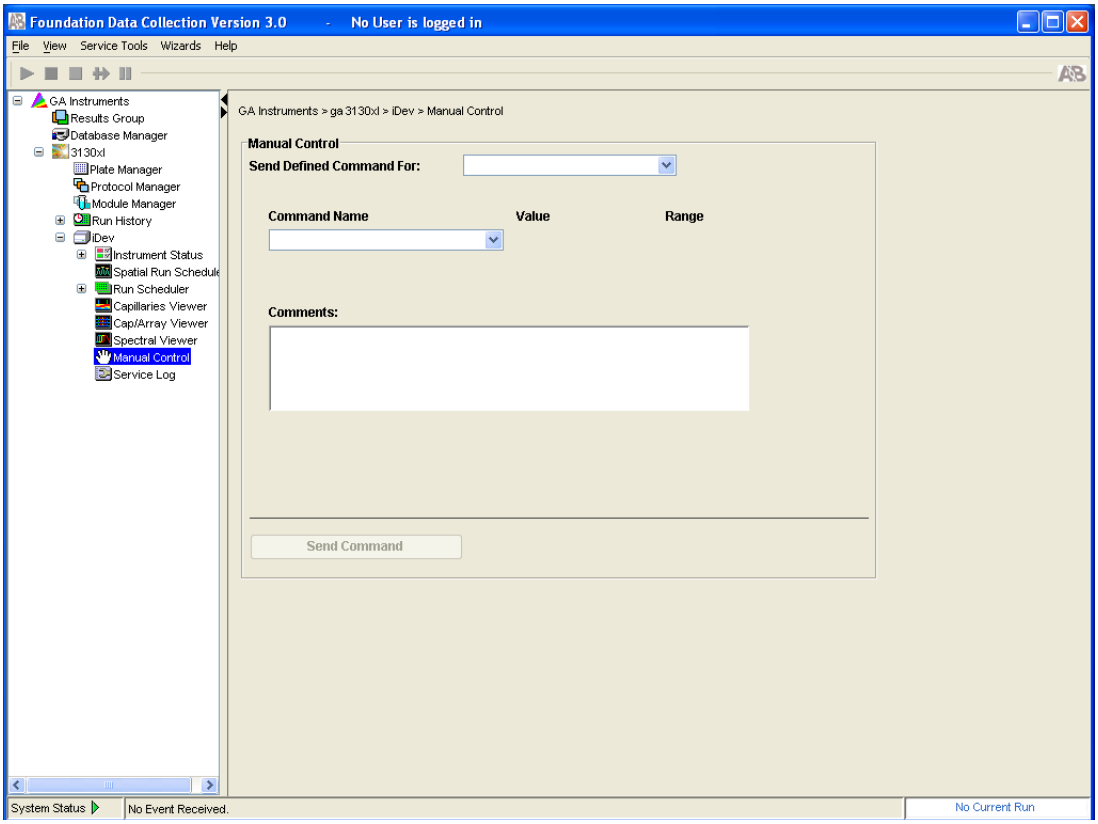
a Use the manual control of the autosampler feature with care. Give attention to the autosampler position when you use Manual Control to move the autosampler. If the autosampler reaches its maximum travel position, a fatal instrument error is generated. The software needs to be re-started after this error.

Notes

Using Manual Control

Note: Manual control functions cannot be used during a run.

1. In the tree pane of the Data Collection software, click **GA Instruments** > **ga3130** or **ga3130*xl*** > *instrument name*> **Manual Control**.



2. In the Send Defined Command For drop-down list, select a function.
3. In the Command Name drop-down list, select a command and enter a value, if required.

   Note: The command names are filtered based the function selected in step 2.

4. Click **Send ...**.

Notes

Computer Maintenance

Overview

This chapter covers the following topics:

Notes

Computer Task Lists

Weekly Tasks

Perform this task at least once per week.

Maintenance Task	Frequency
Check database space.	Weekly
Delete plate records from the instrument database and archive sample files.	
Restart the computer and instrument.	

Working With Drives

Checking Available Space on All Drives

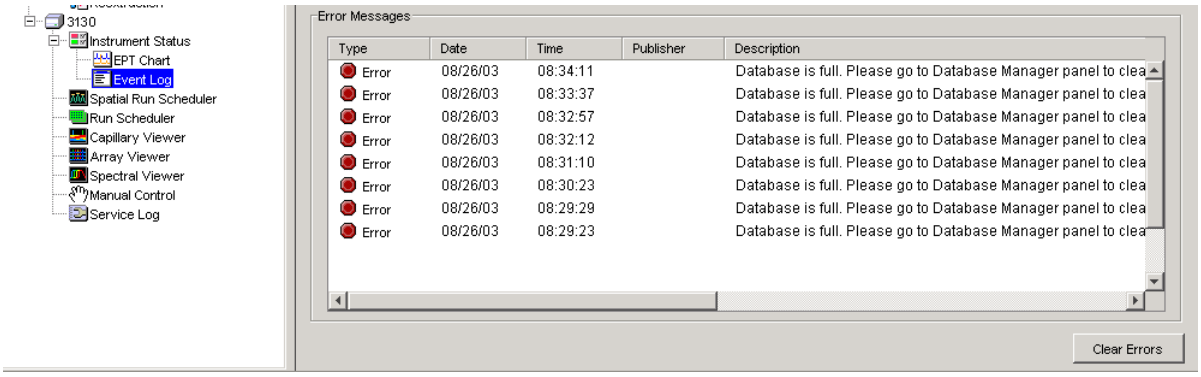
Before a run or batch of runs, the Data Collection software checks the space on drives C, D, E, and F to ensure that there is sufficient space to store the newly created database and sample file data. The Data Collection software sends a warning message:

- Remove data– the drive is getting full
- Clean up the database (when the database is getting full, ~70–75% of capacity)

Search for generated errors in the View the Errors pane's Instrument Status window and in the Event Log window. Check the status light in the bottom left corner of the data collection window to see if it flashes red.

Full Database Error

To view the error messages, click **GA Instruments** > **ga3130** or **ga3130*xl*** > *instrument name* > **Instrument Status**> **Event Log**.

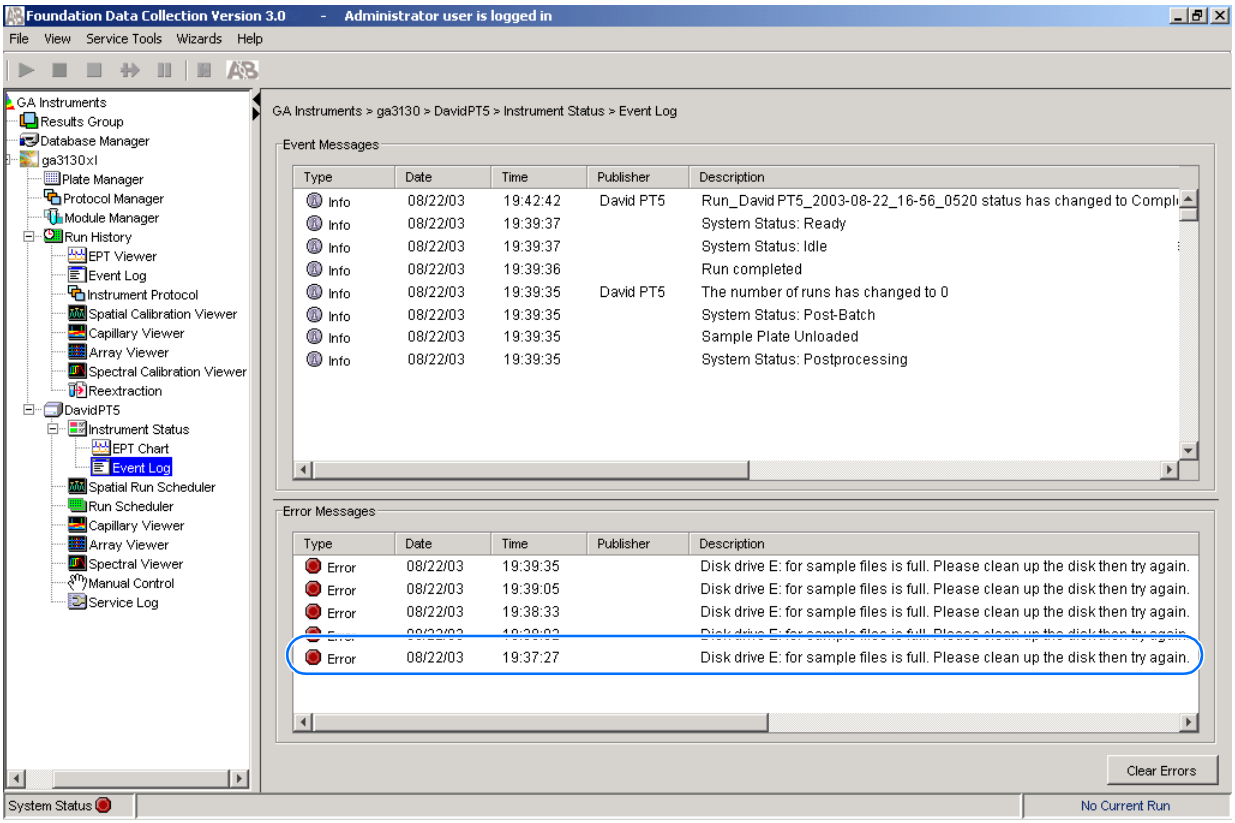


"Database is full" error message

Notes

Disk Drive Full Error

To view the error messages, click **GA Instruments** > **ga3130** or **ga3130*xl*** > *instrument name* > **Instrument Status** > **Event Log**.



"Disk drive is full" error message

Runs cannot start until data is removed from the drive and/or database is cleaned up.

Cleaning Drives

Ensure that you have sufficient drive space by regularly:

- Archiving data
- Deleting unneeded files
- Emptying the trash
- Defragmenting the drives

Notes

Hard Disk and Database Status

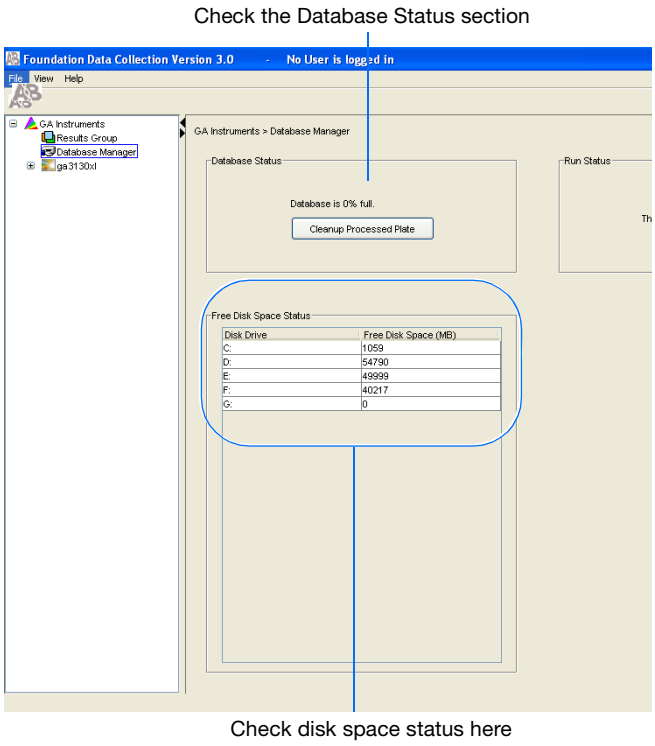
Manually Checking Available Disk Space on E Drive

1. In the tree pane of the Data Collection software, click **GA Instruments** > **Database Manager** to open the Database Manager.

2. Check the Database Status section. The Data Collection software will prompt you when it is 70–75% full. At 78% full, the software will not start a run.

3. If there is insufficient space:
   a. Archive the sample files to a CD-RW (see page 35) or another volume.
   b. Delete the sample file data from the E drive and empty the contents of the Recycle Bin.

IMPORTANT! Data Collection software might not recover data properly if the free disk space on the E:\ drive is less than 2 GB. To prevent this error, perform regular file system maintenance. Move files from the E:\ drive to archival locations regularly.



Notes

Archiving Data

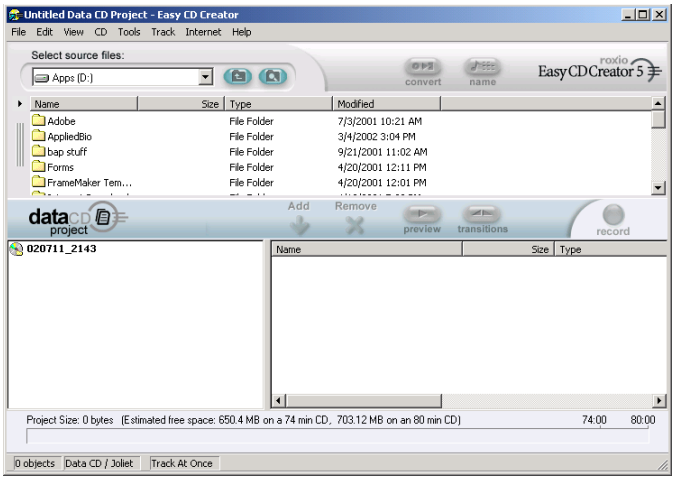
A basic version of Roxio Easy CD Creator™ 5 software is loaded on your Dell™ computer. Use this software to archive data to a CD. The software is also part of the CD set you received with your Dell computer.

Creating a Data CD

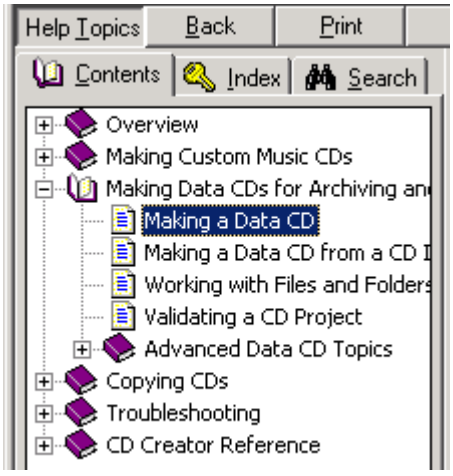
1. Select **Start** > **All Programs** > **Roxio Easy CD Creator 5** > **Applications** > **Easy CD Creator**.

   The Untitled - Easy CD Creator dialog box opens.

   Optional: For help creating a data CD, select **Help Topics> Contents** tab.



2. In the left tree pane, select **Making Data CDs for Archiving and Sharing > Making a Data CD**.



Notes

3. Follow the instructions to create the CD.

Making a Data CD

With Easy CD Creator, you can make a data CD to store computer data such as the files and folders on your hard disk. This is especially useful for archiving your important files or sharing them with your colleagues. Unlike a music CD, a data CD is used for data storage only and cannot be played on your home or car stereo CD player.

To make a data CD:

1. Start a new data CD project. From the File menu, point to **New CD Project**, then select **Data CD**.
2. Insert a blank CD into your CD-Recorder (the destination drive).
3. In the Select Source Files drop-down list box, select the folder where your files are located; a list of all files in the folder appears in the Source window.
4. Select the file (hold down the Ctrl or Shift key to select multiple files) in the Source window, and then click **Add** 

. The file is added to the data CD project.

   Note: Up to 650 MB (74-minute CD) or 700 MB (80-minute CD) of files and folders can be added to a data CD project.
5. Click **Record** 

. The Record CD Setup dialog box appears.
6. Click **Start Recording**.

See Also

- Working with Files and Folders in the Data CD Project
- Making a Data CD from a CD Image

Instructions for creating a data CD

Notes

Defragmenting the Computer Hard Drive

The fragmentation of files decreases the performance of both the Data Collection software and the computer operating system. Programs take a longer time to access files by performing multiple search operations of the fragments.

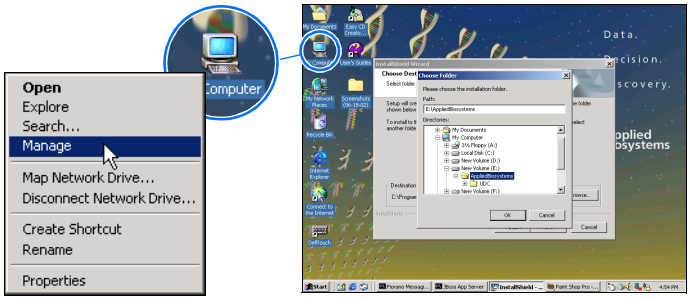
When to Defragment the Computer Hard Drive

Defragment the computer hard drive:

- At least once every month.
- Before fragmentation reaches 10%.

Defragmenting the Drives

1. In the Windows desktop, right-click **My Computer**, then select **Manage**.

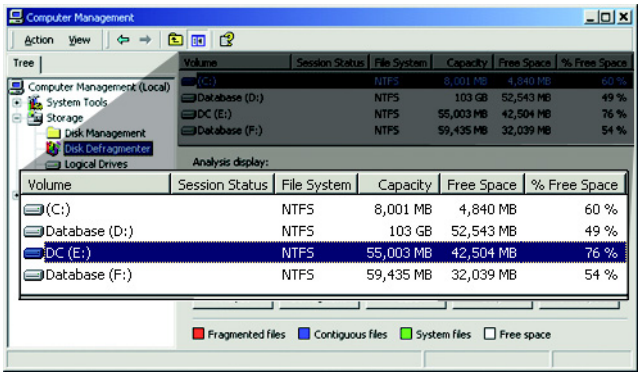


2. In the tree tab of the Computer Management dialog box, click **Computer Management (Local)** > **Disk Fragmenter**.

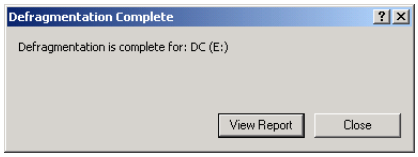
3. Select the **E** drive.

4. Click Defragment.

   The computer displays the Defragmentation Complete dialog box after completing the defragmentation.



5. In the Defragmentation Complete dialog box, click Close.



6. In the Computer Management dialog box, click ×.

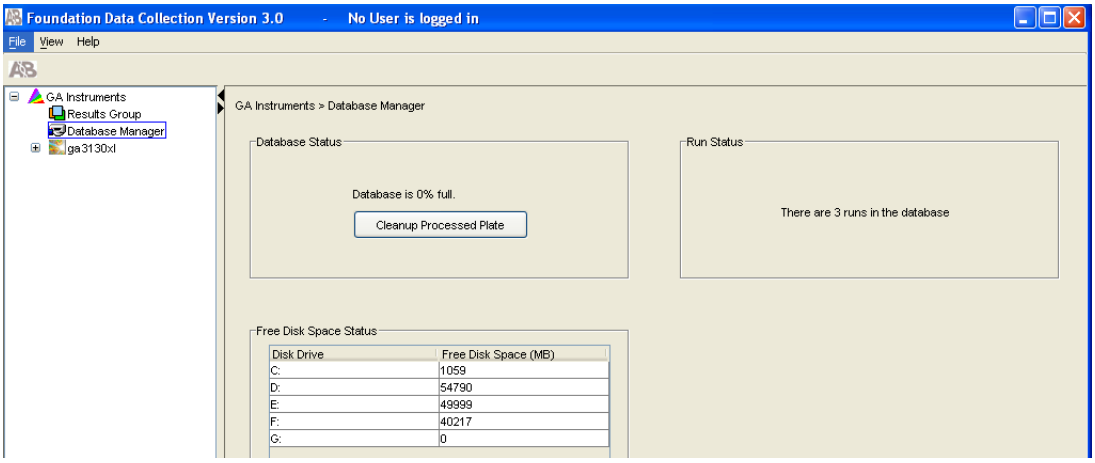
Notes

Deleting Records from the Database

Deleting Processed Frame Data

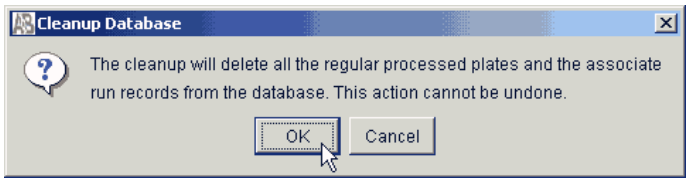
CAUTION The Cleanup Database utility deletes all run data and plate records in the database. Before running the utility, be sure that all runs have been extracted from the database.

1. In the tree pane of the Data Collection software, click **GA Instruments** > **Database Manager** to view the Database Manager.



2. Click **Cleanup Processed Plate**.

   The following dialog box opens.



3. Click OK.

Note: The spatial and spectral calibrations are not deleted.

Note: It may take several minutes to clean up the database if it contains a lot of data or is full.

Notes

Deleting a Spectral Calibration

- Spectral calibrations can be deleted by deleting the spectral plate associated with the spectral calibration only after deleting all processed plates associated with the spectral plate.

  Processed plates are associated with a spectral plate if the plates used the spectral plate's calibration as the active calibration when it was processed.
- Delete spectral plates that are not associated with any processed plates directly in the Plate Manager.

Option one: Delete a spectral plate after performing the Cleanup Processed Plate procedure.

Note: Use this option if you want to delete many spectral plates, and you don't mind deleting all processed plate data from the database.

1. Clean up all processed plates by using the Database Manager. See "Deleting Processed Frame Data" on page 38.
2. Select the Plate Manager view.
3. Select the spectral plate that you want to delete.
4. Click **Delete**.
5. Repeat steps 3 and 4, as needed.

Notes

Option two: Delete a spectral plate after manually deleting the associated processed plates.

Note: Use this option if you are trying to delete one or two spectral plates but do not want to delete all the processed plates in the database.

1. Select the Plate Manager view.
2. Search for and select a processed plate associated with the spectral calibration you are trying delete.
3. Click **Delete** to delete the processed plate.
4. Repeat steps 2 and 3 until all associated processed plates are deleted.
5. Search for and select the spectral plate that you want to delete.
6. Click **Delete**.

Notes

Managing Software License for 3130 Series Data Collection Software 4

Overview

This chapter covers the following topics:

Notes

Manage software licenses

The 3130 Series Data Collection Software 4 requires a license to run.

IMPORTANT! If you replace or add a network card in the computer running the software, or relocate the software to a new computer, contact Life Technologies to update your license for the new network card or computer.

Obtain and activate a software license

The 3130 Series Data Collection Software 4 Software Activation dialog box is displayed when you start the software if no license is installed and activated on your computer.

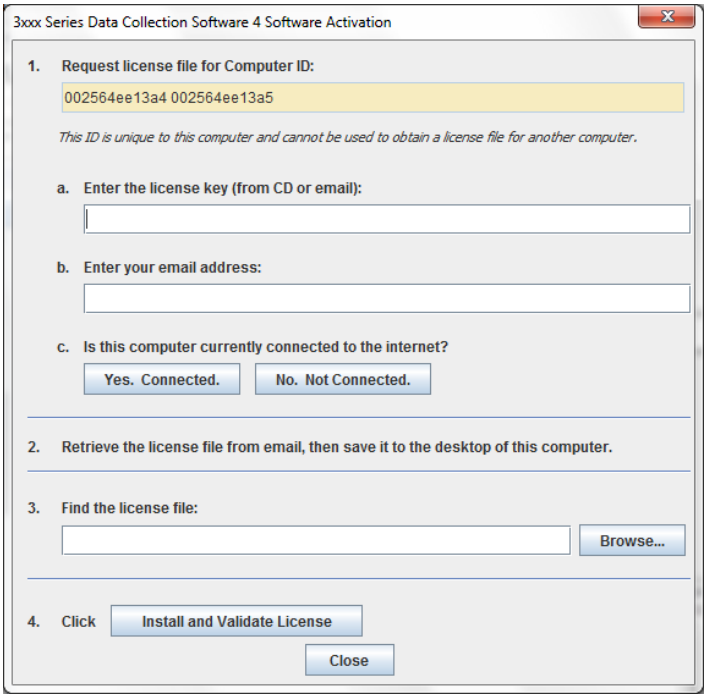
This task is typically performed by the Life Technologies service representative during installation of the instrument.

1. Ensure that all network cards in the computer are enabled.

   IMPORTANT! You can run the 3130 Series Data Collection Software 4 using only the network cards enabled when you activate the software license. For example, if you activate the software when your wireless network card is disabled, you will not be able to run the software when the wireless network card is enabled.

Notes

2. Display the Software Activation dialog box by starting the 3130 Series Data Collection Software 4.



3. Obtain the license key. The license key is provided on the 3130 Series Data Collection Software 4 CD case, or in an email from Life Technologies.

4. Request the software license file by performing steps **1a**, **1b**, and **1c** as listed on the activation screen.

   IMPORTANT! Keep a record of the email address used to activate the software license. You must use the same email address to renew the software license when it expires.

5. Obtain the software license file from your email.

6. Make a copy of the software license file and keep in a safe location.

7. Copy the software license file to the desktop of the 3130 Series Data Collection Software 4 computer.

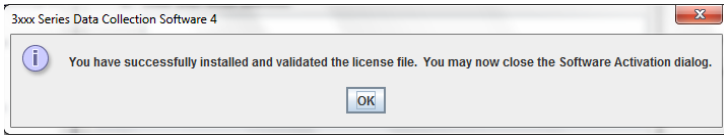
Notes

8. If the Software Activation dialog box has closed, start the 3130 Series Data Collection Software 4 to open it.

9. Click **Browse**, then navigate to the software license file saved on your computer.

10. Click **Install and Validate License**. A message is displayed when the license is installed and validated.

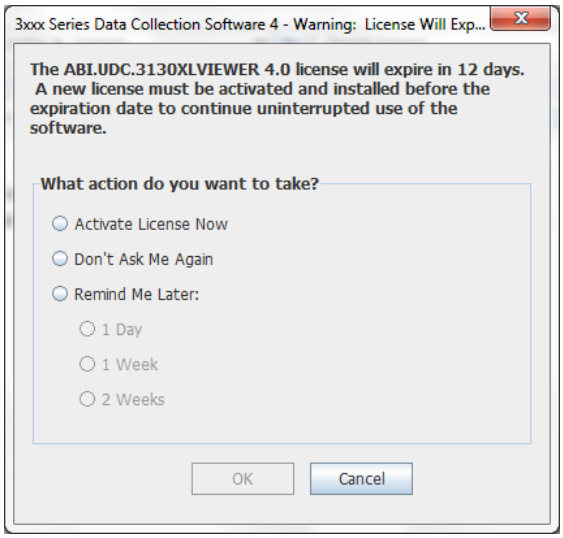
11. Click **Close**.



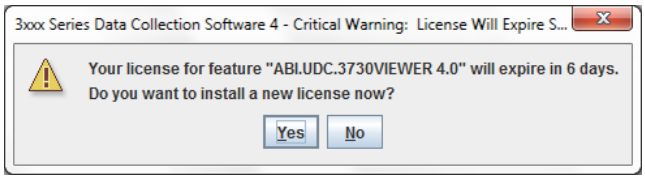
Renew a software license

1. Ensure that all network cards in the computer are enabled.

2. Display the Software License Renewal dialog box by doing either of the following:
   – Select **Activate License Now** in the Warning: License Will Expire Soon dialog box that is displayed 8–30 days prior to expiration.

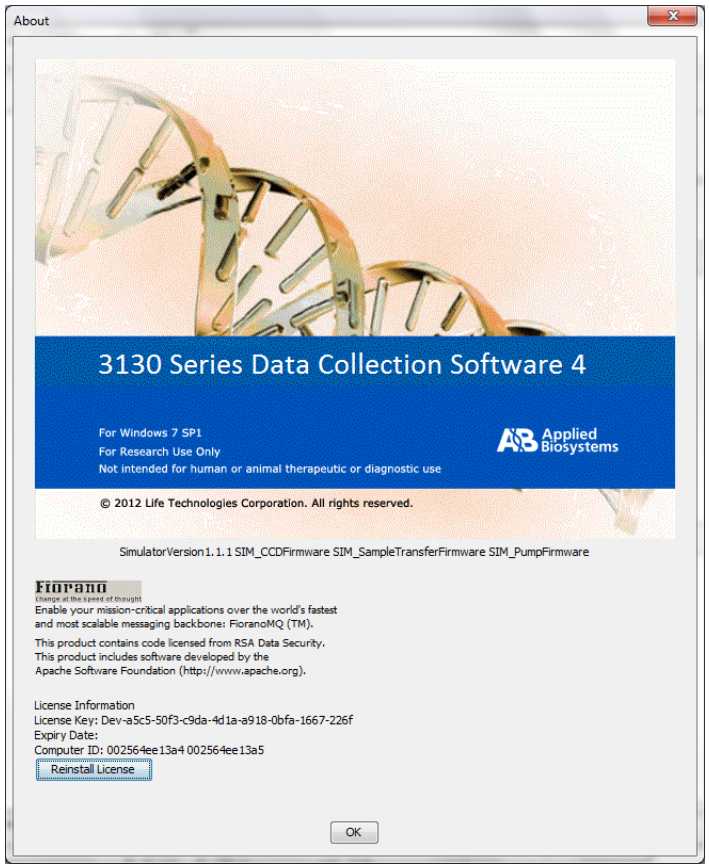


   – Click **Yes** in the Critical Warning: License Will Expire Soon dialog box that is displayed within 7 days of expiration.



Notes

3. Choose **Activate/Install License Now** to display page shown at right. Click **Reinstall License** in the lower-left Corner.



Notes

4. Complete the License Renewal dialog box as described below:

5. Enter the email address used to activate the software license.

   IMPORTANT! You must use the same email address to activate and renew the software license. If you do not have the activation email address available, enter any email address, click the licensing link in the Software Renewal dialog box, then click **Contact Support** in the License Renewal web page displayed.

6. Request the renewed software license file by performing step **1c** as listed on the renewal screen.

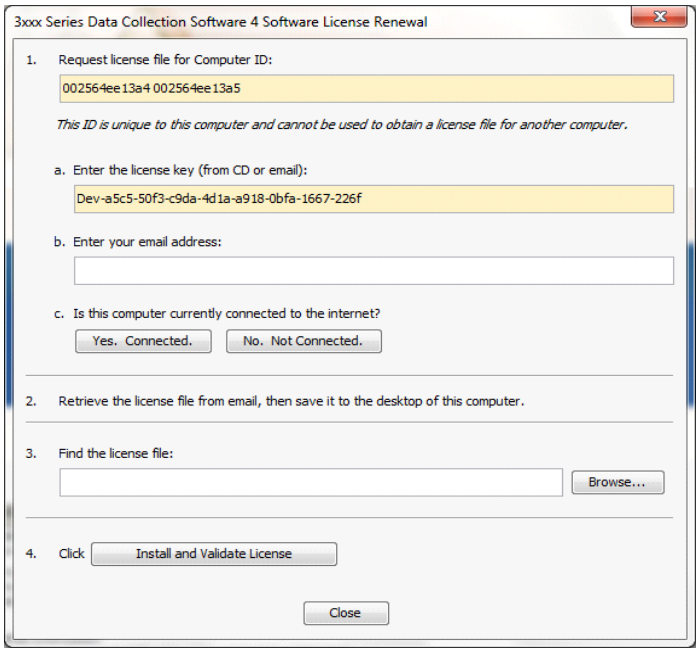
7. Obtain the renewed software license file from your email.

8. Copy the renewed software license file to the desktop of this computer.

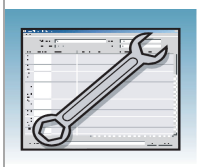
9. Click **Browse**, then navigate to the renewed software license file saved on your computer.

10. Click **Install and Validate License**. A message is displayed when the license is installed and validated.

11. Click **Close**.



Notes



Troubleshooting

Overview

This chapter includes troubleshooting the following topics:

Notes

Instrument Startup

Troubleshooting instrument startup (see also H1-Heading1"Instrument Status" on page 49)		
Observation	**Possible Cause**	**Recommended Action**
No communication between the instrument and the computer. The event viewer is blank.	Incorrect Ethernet configuration.	Check the configuration of the IP address. 1. Select **Start** > **All Programs** > **Accessories** > **Command Prompt**. 2. At the C**:** prompt, type **IPconfig /all**. 3. Press **Enter**. The command prompt window displays information on the network. 4. Ensure the IP address for Ethernet adapter 1 is set for the machine (*i.e.*, the motherboard Ethernet connection). The correct IP address is: **192.168.0.1** **Note:** The local IT group should use Adapter 2 for networking.
Instrument red light is blinking.	Incorrect start up procedure.	Start up in the following sequence: 1. Log out of the computer. 2. Turn off the instrument. 3. Boot up the computer. 4. After the computer has booted completely, turn the instrument on. Wait for the green status light to come on. 5. Launch the Data Collection software.
Data Collection software will not launch.	Applications in the Service Console did not start properly. (It takes several minutes before data collection software opens.)	Restart the computer.
Computer screen is frozen.	Communication error.	There will be no loss of data. However, if the instrument is in the middle of a run, wait for the run to stop. Then, exit the Data Collection software and restart as described above.
Autosampler does not move to the forward position.	Possible communication error.	Restart the system, and then press the Tray button.
	Oven or instrument door is not closed.	1. Close and lock the oven door. 2. Close the instrument doors. 3. Press the Tray button.
Instrument does not respond to commands immediately after closing the doors.	Autosampler reinitializes its location.	Wait for the autosampler to home before continuing.

Notes

Instrument Status

Troubleshooting instrument status (see also H1-Heading1"Instrument Startup" on page 48)

Observation	Possible Cause	Recommended Action
The yellow light in the LED panel on the bottom left corner of the instrument remains solid yellow.	A Power override is enabled.	Cycle power on the system in the following order: a. Boot/Reboot the computer workstation. b. Log in to the computer workstation. c. Ensure that the buffer, water, and waste reservoirs are in their appropriate stations. d. Close the oven door. e. Close the stacker drawer. f. Close the instrument doors. g. Cycle power on the Applied Biosystems 3130 Series Genetic Analyzer.
	The account password for User name "3130User" has changed or has been entered with the wrong case (the user name and password are case-sensitive).	1. Boot/Reboot the instrument and computer workstation. 2. Log in, taking care to type 3130User with the capitalization shown here.
	The account password for User name "3130User" is expired or corrupt.	Start up in the following sequence: 1. Log out of the computer and turn off the instrument. 2. Boot up the computer. 3. After the computer has booted completely, turn the instrument on. Wait for the green status light to come on. **IMPORTANT!** Do not launch the Data Collection software. 4. Reset the account password: a. Right click "My Computer". b. Click "Manage". c. In the Computer Management window, click "Local Users and Groups", then click "User". d. On the right side of the window, right-click "3130User", then select "Set Password". e. Set the password to "3130User", confirm the password entry, then click "OK". f. In the Computer Management window, right-click "3130User" and select "Properties". g. Confirm "User cannot change password" and "Password never expires" are selected. Click "OK" then exit out of the Computer Management window.

Notes

Troubleshooting instrument status (see also H1-Heading1"Instrument Startup" on page 48) *(continued)*

Observation	Possible Cause	Recommended Action
The yellow light in the LED panel on the bottom left corner of the instrument remains solid yellow. *(continued)*	The original communication cable is loose, has been replaced with a standard cable or is improperly attached.	• Only the communication cable shipped with the instrument can be used as it is specifically designed for the instrument. • Confirm that the original communication cable is attached snugly, with the "computer"-labeled end attached to computer and "instrument"-labeled end attached to instrument.
	Computer network configuration or access has changed.	Confirm the following are unchanged: • The name of the computer workstation • The firewall/antiviral software on the computer workstation • The original IP address of the computer/network card • The computer configuration for network access • The Operating System/Service Pack • The 3130 Series Data Collection Software 4 runs on Windows 7 SP 1 professional 32-bit operating system
	The instrument software cannot find the "3130calib.ini" file.	Confirm that the Instrument Data Collection Software "3130calib.ini" file is in the appropriate location: C:/AppliedBiosystems/Firmware
	If the problems persists, contact Applied Biosystems Technical Support or Technical Assistance Center.	

Notes

Spatial Calibration

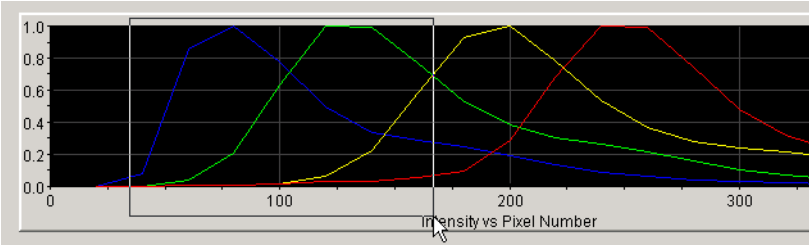
Troubleshooting spatial calibration		
Observation	**Possible Cause**	**Recommended Action**
Unusual peaks or a flat line for the spatial calibration.	The instrument may need more time to reach stability. An unstable instrument can cause a flat line with no peaks in the spatial view.	Repeat the spatial calibration.
	Improper installation of the detection cell.	Reinstall the detection cell to reposition and make sure it fits in the proper position. If the calibration fails again: 1. Fill the capillaries with polymer. 2. Repeat the spatial calibration.
	Broken capillary resulting in a bad array fill.	Check for a broken capillary, particularly in the detection cell area. If necessary, replace the capillary array using the Install Array Wizard.
Persistently bad spatial calibration results.	Bad capillary array.	Replace the capillary array, and then repeat the calibration. Call Technical Support if the results do not improve.

Notes

Spectral Calibration

Tip: Magnifying the Spectral Profile or Raw Data

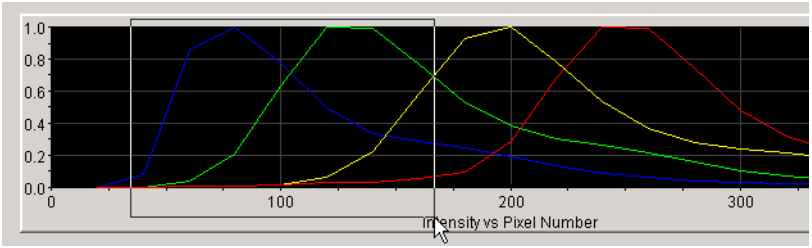
1. In the tree pane of the Data Collection software, click **GA Instruments** > **ga3130*xl*** or **ga3130** > *instrument name* > **Spectral Viewer**.
2. In the spectral profile or raw data display, click-drag the cursor to create a box around the area of interest.



Selecting an area to magnify in a spectral profile

3. Release the mouse button.

   The Data Collection software displays the selected region.
4. Press the **r** key to reset the view.



Magnified area of that spectral profile

Troubleshooting spectral calibration

Observation	Possible Cause	Recommended Action
No signal.	Incorrect preparation of sample.	Replace samples with fresh samples prepared with fresh Hi-Di™ formamide. **⚠ WARNING CHEMICAL HAZARD.** **Formamide** causes eye, skin, and respiratory tract irritation. It is a possible reproductive and birth defect hazard. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.
	Bubbles in sample tray.	Centrifuge samples to remove bubbles.
	Autosampler not correctly aligned. The capillary tips may be hitting the bottom of the wells, or they may not be touching the samples.	Check the autosampler calibration. If necessary, recalibrate the autosampler using the Autosampler Calibration Wizard.

Notes

Troubleshooting spectral calibration *(continued)*

Observation	Possible Cause	Recommended Action
If the spectral calibration fails, or if a message displays "No candidate spectral files found."	Blocked capillary.	Refill capillary array. You may have to install a fresh array or consider that capillary non-usable for purposes of planning your runs.
	Incorrect chemistry file, dye set, and/or run module selected.	Correct the files and rerun the calibration.
	Insufficient filling of array.	Check for broken capillaries and refill the capillary array.
	Expired matrix standards or old reagents.	Check the expiration date and storage conditions of the matrix standards and/or reagents. If necessary, replace with a fresh lot.
Data Error - One or more peaks fall below the minimum required amplitude of 750.	One or more peaks fall below the minimum required amplitude of 750.	Rerun the spectral standards, and if necessary, increase the amount of spectral standard added.
Spikes in the data or "Bad dye order detected" error message.	Expired polymer.	Replace the polymer with a fresh lot using the Replenish Polymer Wizard. **⚠ WARNING CHEMICAL HAZARD. POP-4, POP-6, and POP-7 polymers** cause eye, skin, and respiratory tract irritation. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.
	Bubbles in the polymer system.	Select the Bubble Remove Wizard to clear the bubbles.
	Possible contaminant or crystal deposits in the polymer.	Properly bring the polymer to room temperature; do not heat to thaw rapidly. Swirl to dissolve any solids. Replace the polymer if it has expired.

Notes

Troubleshooting failing capillaries

Failing Capillary assigned a spectral profile

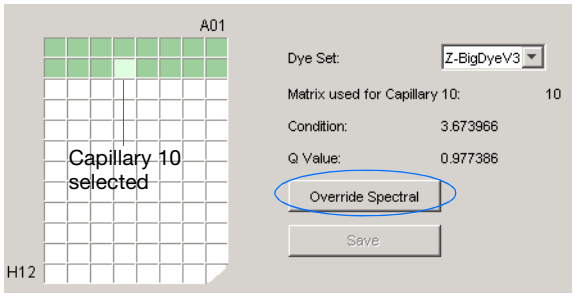
If a capillary fails, it is automatically assigned the spectral profile of its nearest passing capillary.

For applications where pull-up and pull-down peaks cause critical errors, repeat the spectral calibration and use a unique spectral for each capillary array length and polymer type.

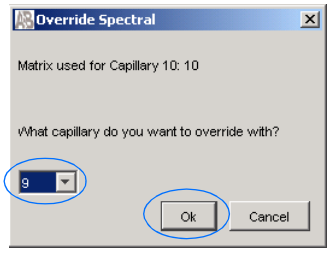
Manually Overriding a Spectral Profile

To override a spectral calibration profile:

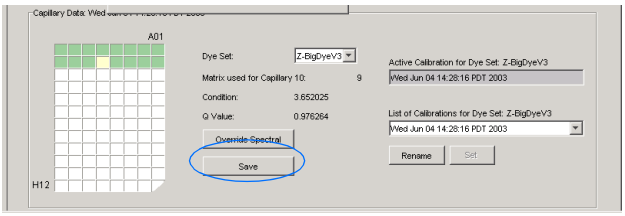
1. Review the data.
2. In the plate diagram, select the capillary spectral profile you want to override.
3. Click **Override Spectral**. The Override Spectral dialog box opens.



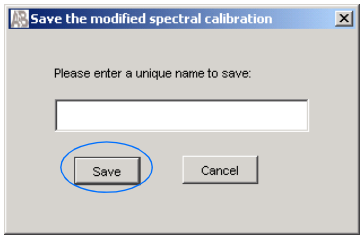
4. Select a new capillary value from the drop-down list.
5. Click **OK**.



6. Click **Save**.



7. In “Save the modified spectral calibration” dialog box, enter a new name, then click **Save**.
8. Select the just saved spectral calibration and click **Set** to activate the spectral calibration.



When a Calibration Fails

If the spectral calibration failed, or if you do not like the appearance of the passed calibration, try one or more of the following:

- Verify that the correct chemistry and run module were selected. If not, correct, and then repeat the run.
- Verify the freshness of the reagents used.

Notes

Troubleshooting failing capillaries *(continued)*

If All Capillaries Fail

If all capillaries fail, no spectral profiles are created. However, the raw data can still be viewed.

Viewing the Raw Data for a Failed Spectral Calibration

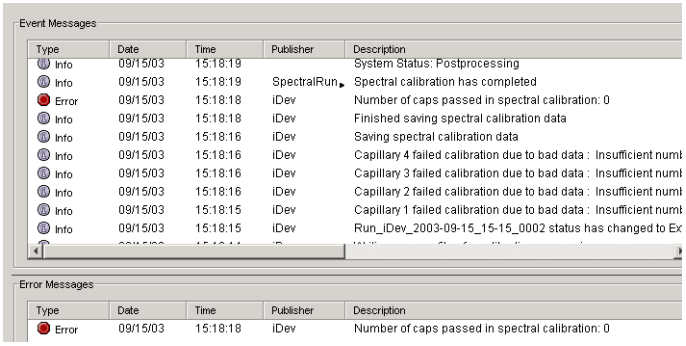
1. In the tree pane of the Data Collection software, click **GA Instruments** > **ga3130** or **ga3130*xl*** > *instrument name* > **Spectral Viewer**, then review the spectral data.

   You observe:

   – The window displays data from the previous passing spectral calibration.

   – This System Status is blinking red.

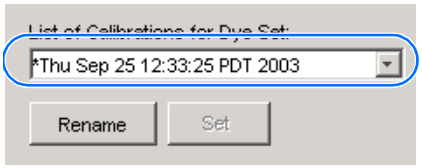
2. Click **Instrument Status** > **Event Log** to view the Event and Errors messages.



3. Click **Spectral Viewer**.

4. In the Dye Set drop-down list, select the dye set for the failed calibration.

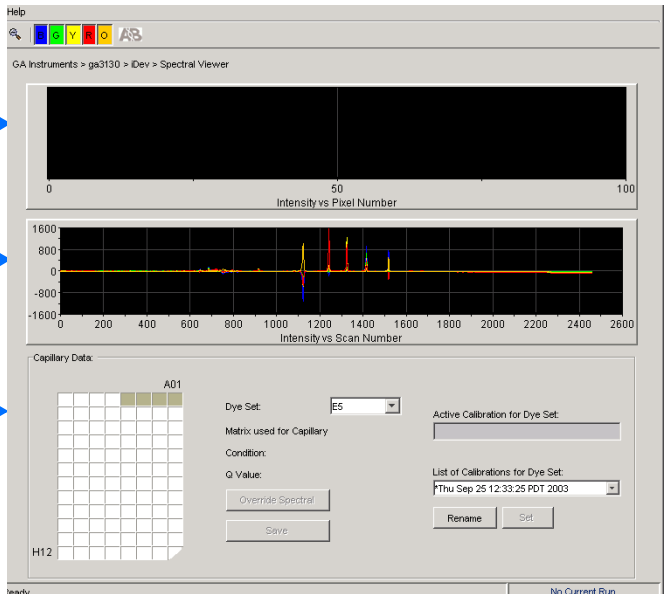
5. In the List of Calibrations drop-down list, select the failing run. The failing run has an asterisk (*) next to its name.



Notes

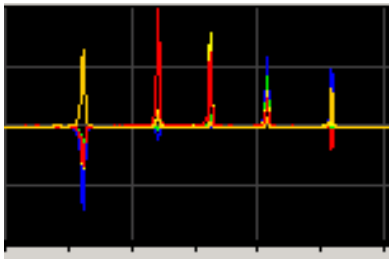
Troubleshooting failing capillaries *(continued)*

The window is updated with the information from the failed E5 spectral calibration.

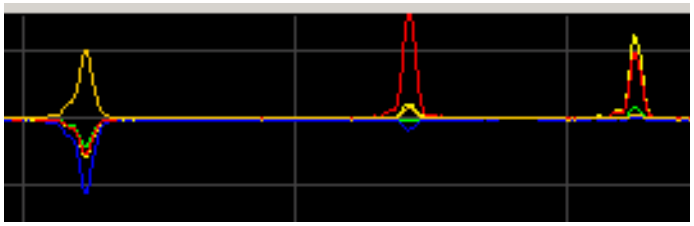


6. Use the list of questions below when reviewing the raw data to determine the cause of the failure.
   - How many peaks?
   - Any extraneous peaks?
   - Peak order?
   - Peak shape and signal strength?
   - Negative peaks?
   - Additional peaks (positive or negative) under the main color peak?

Note: It is helpful to magnify the raw data for the review process (see THL-TableHeadLeft"Tip: Magnifying the Spectral Profile or Raw Data" on page 52).



Raw data



Magnified raw data

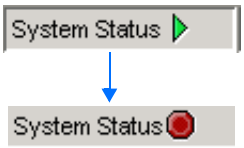
Notes

Plate Linking

Troubleshooting plate linking		
Plate does not link.	Spatial calibration was not performed. 	1. Perform a spatial calibration. 2. Relink the plate(s) in the Run Scheduler.
The plates in the Run Scheduler were linked, but now are unlinked.	A Wizard was used after linking a plate, but before starting a run – automatically unlinking the plate. 	Relink the plate(s) in the Run Scheduler.

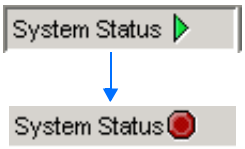
Notes

Troubleshooting plate linking *(continued)*

The plate links, but System Status changes from green to red. 	A different length capillary array was installed, and the appropriate active spectral calibration was not selected or does not exists.	1. View the error messages in the Event Log. 2. In the Spectral Calibration Viewer, set the active spectral calibration for the dye set and array length. 3. If one does not exist, create a new spectral calibration for the dye set and array length you are using, then set it as the active spectral calibration. 4. Relink the plate(s) in the Run Scheduler.
	The capillary array length and/or polymer type selected in the Instrument Protocol does not match capillary array length and/or polymer type stored in the database.	Correct the Instrument Protocol, or 1. Use the Wizards to update the information in the database. 2. Set or create an active spectral calibration. 3. Relink the plate.
	The database and/or E drive is full.	To check the available space: 1. View the error messages in the Event Log. 2. Proceed to H1a-Heading1_anywhere"Hard Disk and Database Status" on page 34. 3. Make more space. 4. Relink the plate(s) in the Run Scheduler.

Notes

Run Performance

Troubleshooting using Run validation tests		
Run Validation All validation tests must pass before the run starts.		
The Test checks...	**Look For**	**Corrective Action**
The capillary array length and/or polymer type in the Instrument Protocol against the capillary array length and/or polymer type in the database.	1. System Status changes from green to red.  2. View the error messages in the Event Log.	Correct the Instrument Protocol, or 1. Use the Wizards to update the information in the database. 2. Set or create an active spectral calibration. 3. Relink the plate, then click ▶.
The available space in the database and E drive.		To correct: 1. See H1a-Heading1_anywhere"Hard Disk and Database Status" on page 34 to access information on databases and sample data storage. 2. Make more space. 3. Click ▶.
If a different length capillary array was installed, and the appropriate active spectral calibration was not selected or does not exist.		To correct: 1. In the Spectral Calibration Viewer, set the active spectral calibration for the dye set and array length you are using. 2. If one does not exist, create a new spectral calibration for the dye set and array length you are using, then set as the active spectral calibration. 3. Click ▶.

Notes

Troubleshooting run performance		
Observation	**Possible Cause**	**Recommended Action**
No peaks in any sample file.	Bubbles in the system. No sample injection.	Visually inspect the polymer block for bubbles. Remove bubbles using the Bubble Remove Wizard. 1. If bubbles persist, select the Water Wash Wizard. 2. If necessary, select the Replenish Polymer Wizard to install fresh polymer. **⚠ WARNING CHEMICAL HAZARD.** **POP-4, POP-6 and POP-7 polymers** cause eye, skin, and respiratory tract irritation. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.
	Possible contaminant in the polymer path.	Select the Water Wash Wizard.
	Possible contaminant or crystal deposits in the polymer bottle.	Bring the polymer to room temperature, swirl to dissolve any deposits. Replace the polymer if it has expired. **⚠ WARNING CHEMICAL HAZARD.** **POP-4, POP-6 and POP-7 polymers** cause eye, skin, and respiratory tract irritation. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.
No signal.	Autosampler calibration is not optimal.	Check the injection with 20-µL samples. • If the 20-µL samples have adequate signal level, then recalibrate the autosampler using the Autosampler Calibration Wizard. **IMPORTANT!** You must power on the instrument to use the new values. • If the 20-µL samples still have no signal then check the other possible causes.
	Bubble at bottom of sample tube.	Centrifuge the sample tubes.
	Bent capillary array tips.	Replace the capillary array and recalibrate the autosampler using the Autosampler Calibration Wizard.
	Failed reaction.	Repeat reaction.
	Cracked or broken capillary.	Visually inspect the capillary array, including the detector window area for signs of breakage.

Notes

Troubleshooting run performance *(continued)*

Observation	Possible Cause	Recommended Action
No signal.	Blocked capillary.	Refill capillary array. You may have to install a fresh array or consider that capillary non-usable for purposes of planning your runs.
Signal too high.	Sample concentration is too high.	Dilute the sample. Decrease the injection time.
	Too much DNA added to the reaction, resulting in uneven signal distribution.	Optimize reaction conditions.
Low signal strength.	Degraded formamide.	Use a fresh aliquot of Hi-Di formamide. **⚠ WARNING CHEMICAL HAZARD.** **Formamide** causes eye, skin, and respiratory tract irritation. It is a possible reproductive and birth defect hazard. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.
	Pipetting error; not enough sample.	Increase the amount of DNA added. Recalibrate the pipets.
	Sample has high salt concentration.	Dilute with distilled or deionized water. Desalt using a column purification method.
	Insufficient mixing.	Vortex the sample thoroughly, and then centrifuge the tube to condense the sample to the bottom of the tube.
	Autosampler out of calibration.	Check the injection with 20-µL samples. If the 20-µL samples have adequate signal levels, then recalibrate the autosampler using the Autosampler Calibration Wizard. Power off and on the instrument to use the new calibration values.
	Weak amplification of DNA.	Reamplify the DNA. Check DNA quality.

Notes

Troubleshooting run performance *(continued)*		
Observation	**Possible Cause**	**Recommended Action**
Elevated baseline.	Possible contaminant in the polymer path.	Select the Water Wash Wizard.
	Possible contaminant or crystal deposits in the polymer.	Bring the polymer to room temperature, swirl to dissolve any deposits. Replace the polymer if it has expired. **⚠ WARNING CHEMICAL HAZARD.** **POP-4, POP-6, and POP-7 polymers** cause eye, skin, and respiratory tract irritation. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.
	Poor spectral calibration.	Perform new spectral calibration.
Loss of resolution.	Too much sample injected.	Dilute the sample and re-inject.
	Poor quality water.	Use distilled or deionized water.
	Poor quality or dilute running buffer.	Prepare fresh running buffer from 10X 3130 buffer with EDTA. **⚠ CAUTION CHEMICAL HAZARD.** **10X Genetic Analyzer Buffer with EDTA** may cause eye, skin, and respiratory tract irritation. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.
	Degraded polymer.	Use a fresh supply of polymer.
	Capillary array used for more than 100 injections.	Replace with new capillary array.
	Degraded formamide.	Prepare fresh Hi-Di formamide and re-prepare samples. **⚠ WARNING CHEMICAL HAZARD.** **Formamide** causes eye, skin, and respiratory tract irritation. It is a possible reproductive and birth defect hazard. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.
	High salt concentration in samples.	Use a recommended protocol for salt removal. Dilute salts with water.

Notes

Troubleshooting run performance *(continued)*

Observation	Possible Cause	Recommended Action
Poor resolution in some capillaries.	Insufficient filling of capillary array.	Refill the capillary array and look for polymer leakage. If problem persists contact Technical Support.
		Re-inject the same samples.
	Poor quality samples.	Check the sample preparation.
No current.	Water placed in buffer reservoir position 1.	Replace with fresh 1X running buffer.
	Not enough buffer in anode reservoir.	Add buffer up to the fill line.
	Buffer too dilute.	Prepare 1X running buffer. Add 3 mL 10X Genetic Analyzer Buffer with EDTA to 27 mL deionized water. **⚠ CAUTION CHEMICAL HAZARD.** **10X Genetic Analyzer Buffer with EDTA** may cause eye, skin, and respiratory tract irritation. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.
	Bubble(s) present in the lower polymer block and/or the array and/or tubing.	Pause run and inspect for bubbles hidden in the tubing connectors. Select the Bubble Remove Wizard to remove the bubbles.
Elevated current.	Degraded polymer.	Open fresh supply of polymer and use Replenish Polymer Wizard.
	Incorrect buffer dilution.	Prepare 1X running buffer. Add 3 mL 10X Genetic Analyzer Buffer with EDTA to 27 mL deionized water. **⚠ CAUTION CHEMICAL HAZARD.** **10X Genetic Analyzer Buffer with EDTA** may cause eye, skin, and respiratory tract irritation. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.
	Arcing in the lower polymer block.	Inspect the lower polymer block for discoloration or damage. Replace the lower polymer block if necessary.
Fluctuating current.	Bubble in polymer block.	Pause run and inspect for bubbles hidden in the tubing connectors. Select Bubble Remove Wizard to remove the bubbles.

Notes

Troubleshooting run performance *(continued)*

Observation	Possible Cause	Recommended Action
	A slow leak may be present in the system.	Check polymer blocks for leaks. Tighten all fittings.
	Incorrect buffer concentration.	Prepare 1X running buffer. Add 3 mL 10X Genetic Analyzer Buffer with EDTA to 27 mL deionized water. **⚠ CAUTION CHEMICAL HAZARD.** **10X Genetic Analyzer Buffer with EDTA** may cause eye, skin, and respiratory tract irritation. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.
	Not enough buffer in anode reservoir.	Add buffer up to the fill line.
	Arcing.	Check for moisture in and around the septa, the reservoirs, the oven, and the autosampler.
Poor performance of capillary array used for fewer than 100 runs.	Poor quality samples, possible cleanup problems.	Desalt samples using a recommended purification protocol.
	Poor quality formamide.	Prepare fresh Hi-Di formamide and re-prepare samples. **⚠ WARNING CHEMICAL HAZARD.** **Formamide** causes eye, skin, and respiratory tract irritation. It is a possible reproductive and birth defect hazard. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.
	Incorrect buffer.	Use 10X Genetic Analyzer Buffer with EDTA to prepare 1X running buffer. **⚠ CAUTION CHEMICAL HAZARD.** **10X Genetic Analyzer Buffer with EDTA** may cause eye, skin, and respiratory tract irritation. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.
Migration time becomes progressively slower.	Leak in system.	Tighten the tubing connectors and array knob.
	Improper filling of the system with polymer.	Polymer delivery pump may need to be serviced. Call a service representative.
	Expired polymer.	Check expiration of polymer. If necessary, change the lot.

Notes

Troubleshooting run performance *(continued)*

Observation	Possible Cause	Recommended Action
Migration time becomes progressively faster.	Water in polymer system, resulting in diluted polymer.	Use Bubble Remove Wizard to add polymer to system.
	Buffer valve leakage	Check the buffer valve pin and see if it closes correctly.
Extra peaks in the electropherogram.	Data off scale.	Dilute the sample and re-inject the sample.
	Possible contaminant in sample.	Re-amplify the DNA.
	Sample renaturation.	Heat-denature the sample in good-quality formamide and immediately place on ice. **⚠ WARNING CHEMICAL HAZARD.** **Formamide** causes eye, skin, and respiratory tract irritation. It is a possible reproductive and birth defect hazard. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.
Peaks exhibit a shoulder in GeneMapper software applications.	Sample renaturation.	Heat-denature the sample in good-quality formamide and immediately place on ice. **⚠ WARNING CHEMICAL HAZARD.** **Formamide** causes eye, skin, and respiratory tract irritation. It is a possible reproductive and birth defect hazard. Read the SDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.
Error message, “Leak detected” appears. The run aborts.	Bubbles in the polymer system.	Select the Bubble Remove Wizard to clear bubbles.
	Leak in the polymer system.	Check for evidence of leaks. Tighten the tubing connectors and array knob.
	Buffer valve leakage.	Check the buffer valve pin and see if it closes correctly.
Buffer jar overflows very quickly with polymer.	Bubbles in the polymer path. (Overuse of the Bubble Remove Wizard)	Check for bubbles and remove if present.

Notes

Troubleshooting run performance *(continued)*

Observation	Possible Cause	Recommended Action
Detection cell comes out while replacing the capillary array. Replacing the cell in the correct orientation is difficult.	Improperly placed detection cell.	Loosen the array knob. Close the detection block door. Retighten the array knob.
Detection cell stuck. It is difficult to remove when changing the capillary array.		To loosen the detection cell: 1. Undo the array knob and pull the polymer block towards you to first notch. 2. Hold both sides of the capillary array around the detection cell area, and apply gentle pressure equally on both sides. 3. Remove the capillary comb from the holder in oven. 4. Release.

Notes

Data Collection Software Advanced Functions

Overview

This chapter covers the following topics:

Notes

Customizing Run Modules

You can modify default run modules to suit your particular needs.

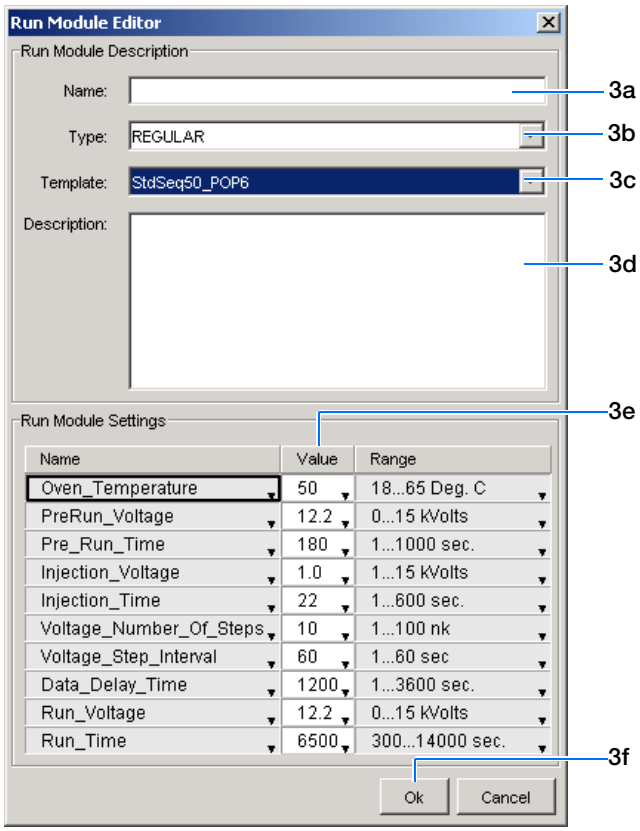
1. Click **GA Instruments** > **ga3130*xl* or ga3130** > *instrument name* > **Module Manager**.

2. Click New... . The Run Module Editor dialog box opens.

3. Complete the Run Module Editor dialog box:
   a. Enter a name for your new module.
   b. In the Type drop-down list, select the type of module (Regular, Spatial, or Spectral).
   c. In the Template drop-down list, select a template module as a basis for the new module.

   Note: You cannot edit a default module installed with the 3130 Series Data Collection Software 4.

4. Optional: Enter a description of your new run module.



Notes

5. Change to the desired module parameters using allowable ranges shown in the table below:

Name	Range	Comment
Oven_Temperature	18–65°C	Temperature setting for main oven throughout run.
Poly_Fill_Vol	variable to 38000 counts	Check for amount of polymer available in the PDP.
Current_Stability	0–2000 µAmp	Maximum current variation during electrophoresis
PreRun_Voltage	0–15 kV	Pre run voltage setting before sample injection.
PreRun_Time	1–1000 sec	Prerun voltage time.
Injection_Voltage	0–15 kV	Injection voltage setting for sample injection.
Injection_Time	1–600 sec	Sample injection time.
Run_Voltage	0–15 kV	Final run voltage.
Voltage_Number_Of_Steps	0–100 steps	Number of voltage ramp steps to reach Run_Voltage. Applied Biosystems recommends that you do not change this value.
Voltage_Step_Interval	0–60 sec	Dwell time at each voltage ramp step. We recommend that you do not change this value.
Data_Delay_Time	1–3600 sec	Time from the start of separation to the start of data collection.
Run_Time	300–14000 sec	Duration data is collected after Data_Delay_Time.

6. Click **OK**.

Notes

Run Priority Scheduling

Priority Values

The user-definable run priority scheduling function allows you to schedule runs in custom order providing flexibility when scheduling runs.

A default value of 100 is assigned to each sample in the plate record. Changing the value to a smaller number causes that set of 16 or 4 samples to run before the others in the injection list.

Scheduling Examples

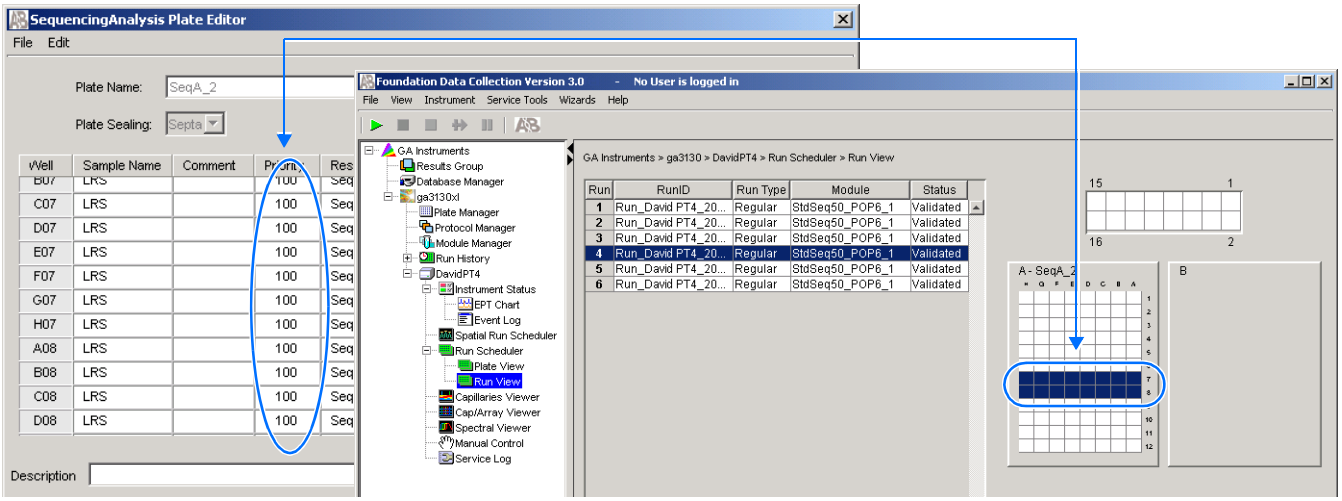
Default Run Scheduling

Using a 96-well Plate and 16 Capillary Array

In this example, 100 is the priority value for all samples in the plate record and the default run priority schedule is used (see table below). Samples A07–H08 called out on the plate record, correspond to Run 4 as displayed in the Run Scheduler > Run View window.

Well Numbers	Run Number Priority
A01–H02	1
A03–H04	2
A05–H06	3

Well Numbers	Run Number Priority
A07–H08	4
A09–H10	5
A11–H12	6



Default run priority schedule, samples in wells A07–H08 are scheduled as Run 4.

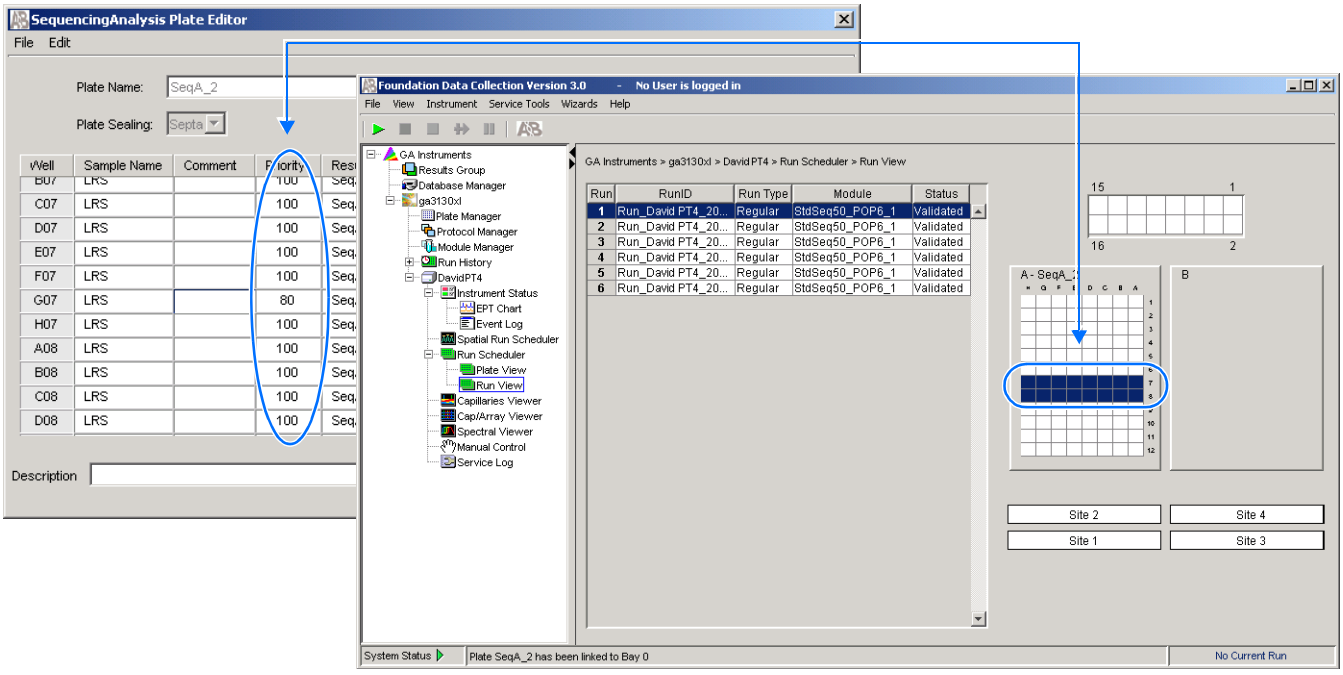
Notes

User-definable Run Priority Scheduling

In this example, the priority value for sample G07 is arbitrarily set to 80, a lower number than 100, forcing the software to give the sample a higher run priority. All other samples remain 100. Sample well G07 is contained in the A07–H08 injection set. All 16 samples now correspond to Run 1, as displayed in the Run Scheduler > Run View window.

The table below shows the change in the run priority schedule.

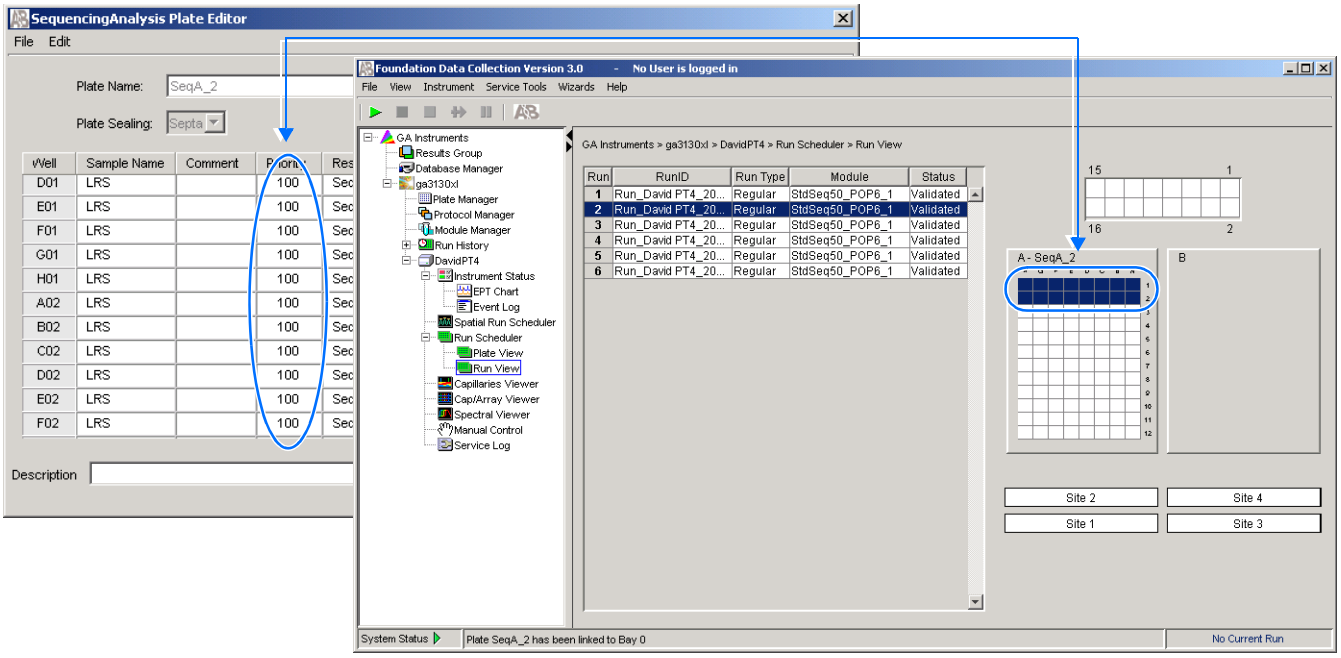
Well Numbers	Run Number Priority
A07–H08	1
A01–H02	2
A03–H04	3
A05–H06	4
A09–H10	5
A11–H12	6



User defined run priority schedule, samples in wells A07–H08 are scheduled as Run 1 due to G07 sample assigned a value of 80.

Notes

The rest of the samples are run after the samples in wells A07–H08. Samples in wells A01–H02 are now scheduled as Run 2.



User defined run priority schedule, samples in wells A01–H02 are now scheduled as Run 2.

Notes

Edit > Fill Down Special Option for Plate Records

Using Fill Down Special Option

Based on your plate type (96- or 384-well) and capillary array (16 or 4 capillaries), the software automatically fills in the appropriate well positions for a single run.

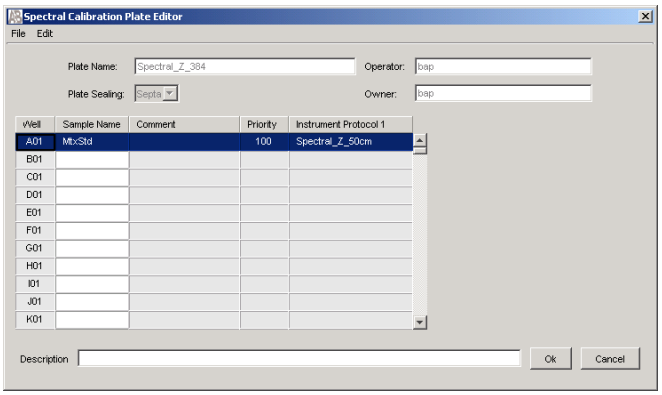
The Fill Down Special option works with all plate records (Spectral, Sequencing Analysis, GeneMapper®software, and Mixed plates).

Creating and Completing the Plate Record

1. In the tree pane of the Data Collection software, click **GA Instruments** > **ga3130** or **ga3130*xl*** > **Plate Manager**.
2. Click New... to open the New Plate Dialog dialog box.
3. Complete the information in the New Plate Dialog box, then click OK to open the Plate Editor.
4. Complete the columns for a single well position.

   Note: You can start at any well position, the software automatically fills up or down based on the default run scheduling patterns.

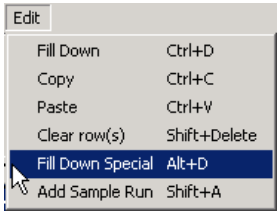
5. Highlight the entire row.



5

Notes

6. Select **Edit > Fill Down Special**.

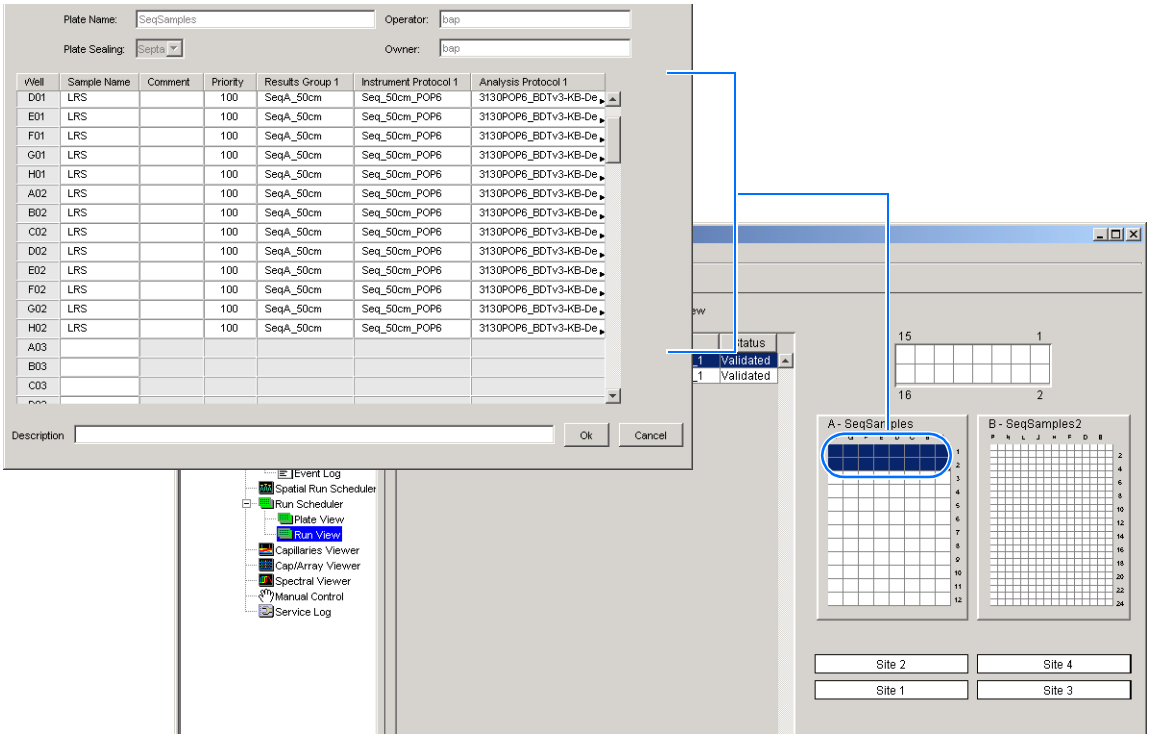


7. Click OK to save the plate record.

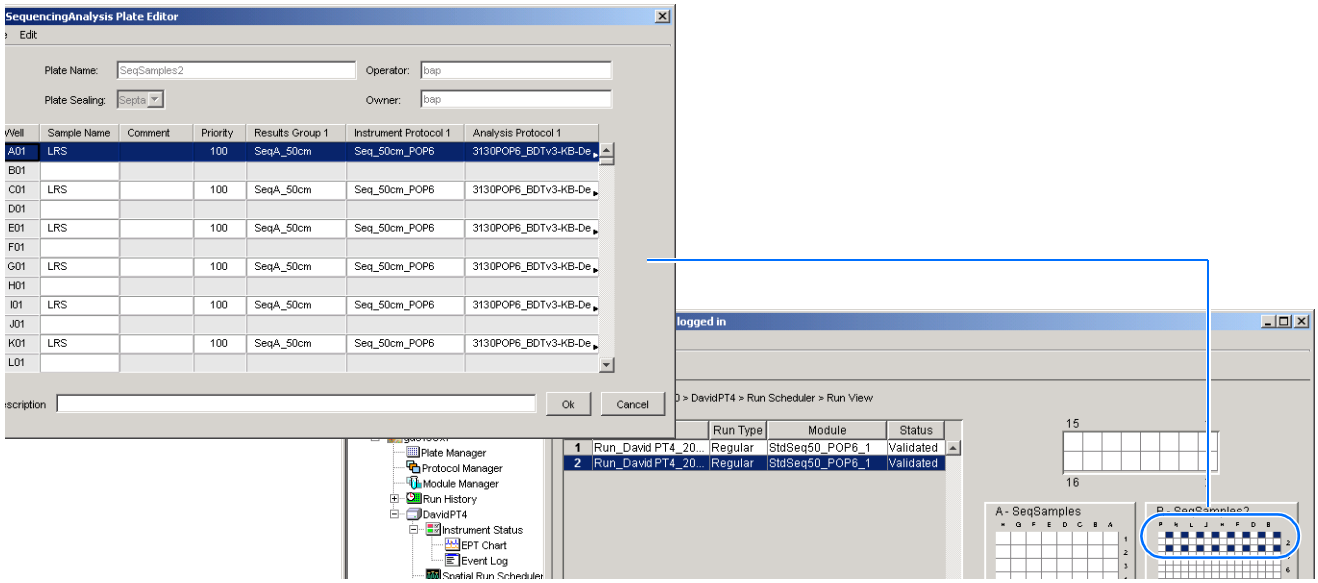
Notes

Examples of Fill Down Special

Examples of completed plate records and run scheduling for the 3130 and 3130*xl* instruments, and 96- and 384-well plates are shown below.

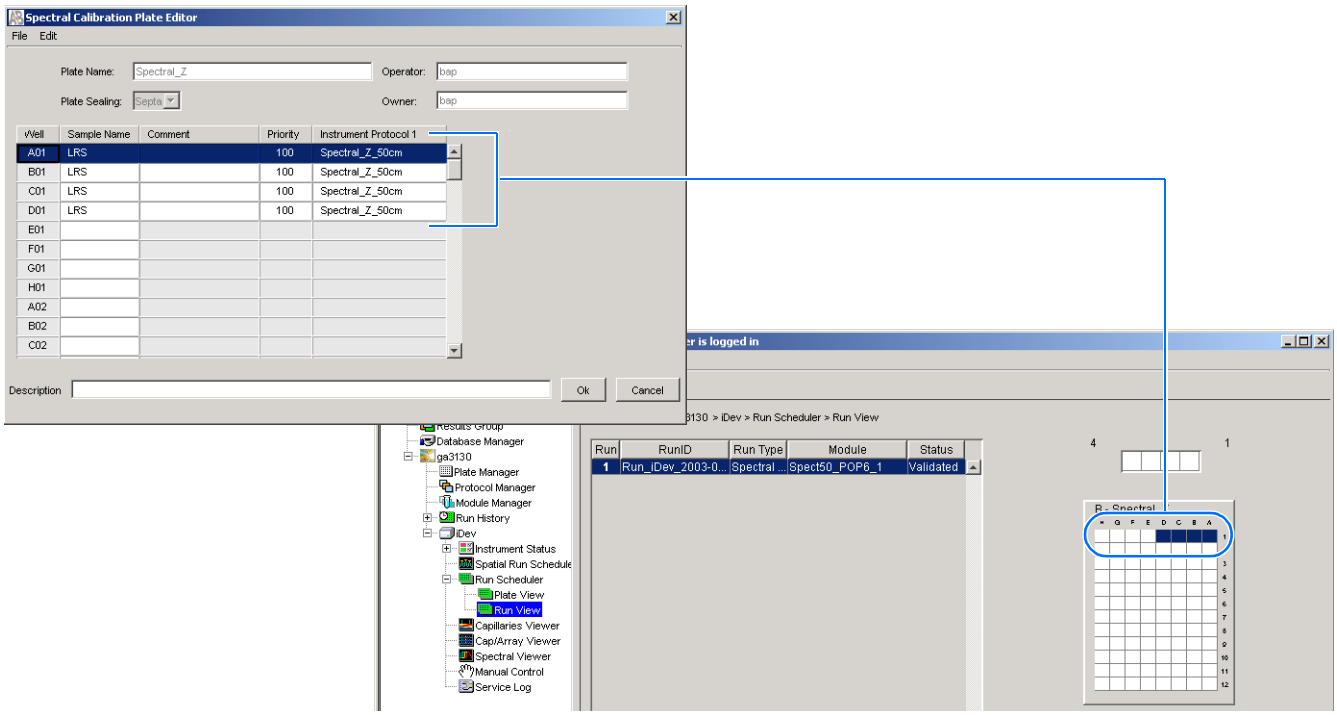


96-well plate on a 3130*xl* genetic analyzer

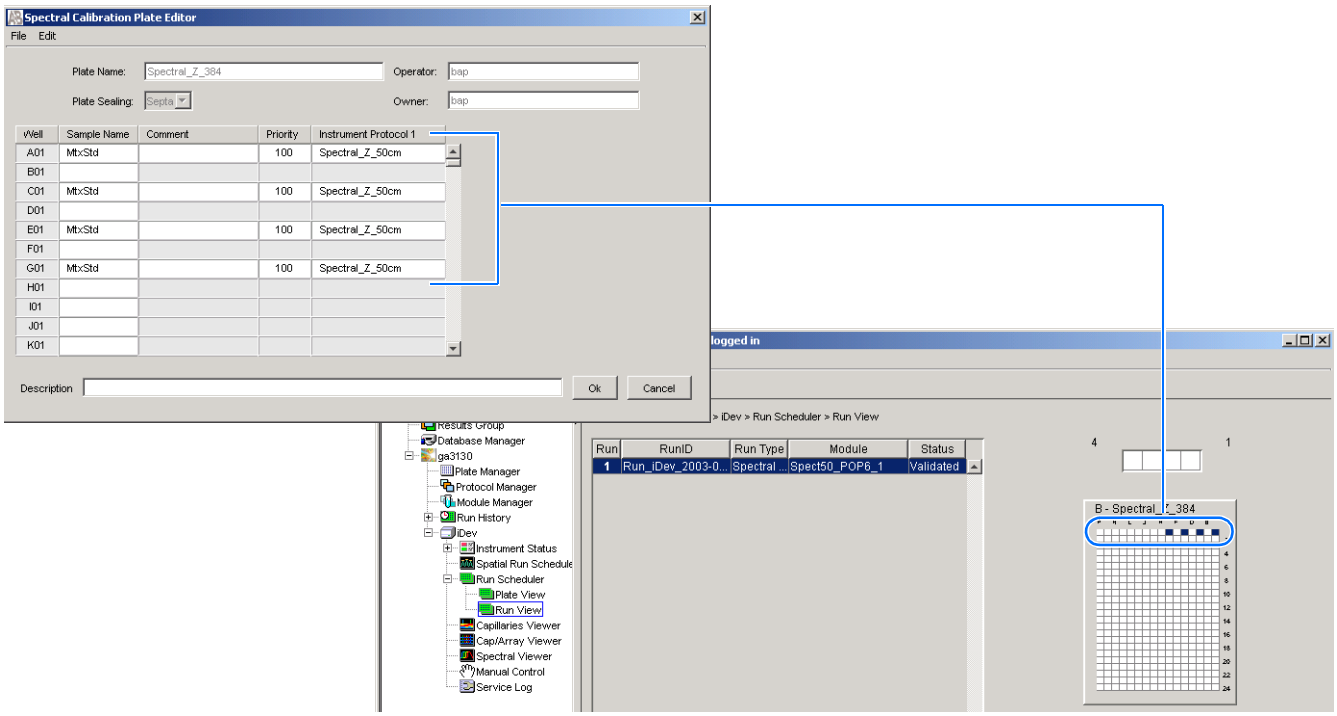


384-well plate on a 3130*xl* genetic analyzer

Notes



96-well plate on a 3130 genetic analyzer



384-well plate on a 3130 genetic analyzer

Notes

Multi-application (Mixed) Plate Record

Protocols for a Mixed Plate Record

To run a mixed plate containing sequencing and fragment analysis samples, the following files are required:

- Sequencing analysis
  - Results Group
  - Instrument Protocol
  - Analysis Protocol
- Fragment analysis
  - Results Group
  - Instrument Protocol
  - Files created in GeneMapper software

Creating Spectral Calibrations

For every dye set and capillary array length combination you use, a separate spectral calibration *must be* created.

Setting the Active Spectral Calibration

If you changed the capillary array length to run multi-application samples, you must set the active spectral calibration for each dye set used. See the *Applied Biosystems 3130/3130xl Genetic Analyzers Getting Started Guide* (Part no. 4477796) on how to set the active calibrations once calibrations are performed for each dye set on each capillary length.

Notes

Creating and Completing a Mixed Plate Record

1. In the tree pane of the Data Collection software, click **GA Instruments** > **ga3130** or **ga3130*xl*** > **Plate Manager**.

2. Click New....

   The New Plate Dialog dialog box opens.

3. Complete the information in the New Plate Dialog:

   a. Type a name for the plate.

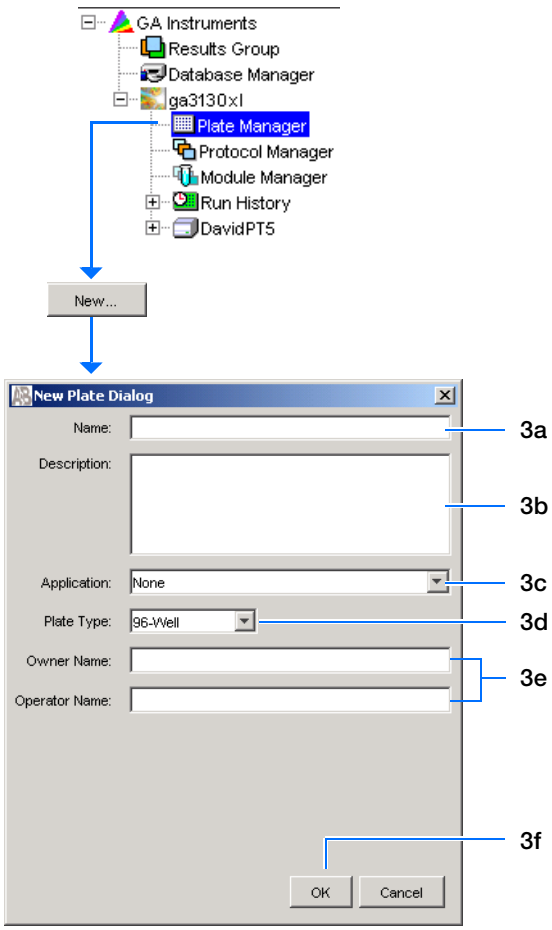
   b. Type a description for the plate (optional).

   c. Select **Mixed** in the Application drop-down list.

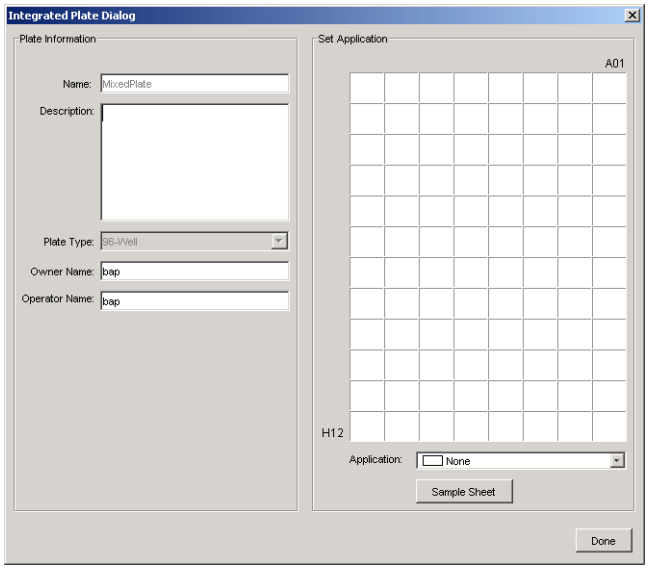
   d. Select **96-well** or **384-well** in the Plate Type drop-down list.

   e. Type a name for the owner and operator.

   f. Click OK.



The Integrated Plate Dialog box opens.

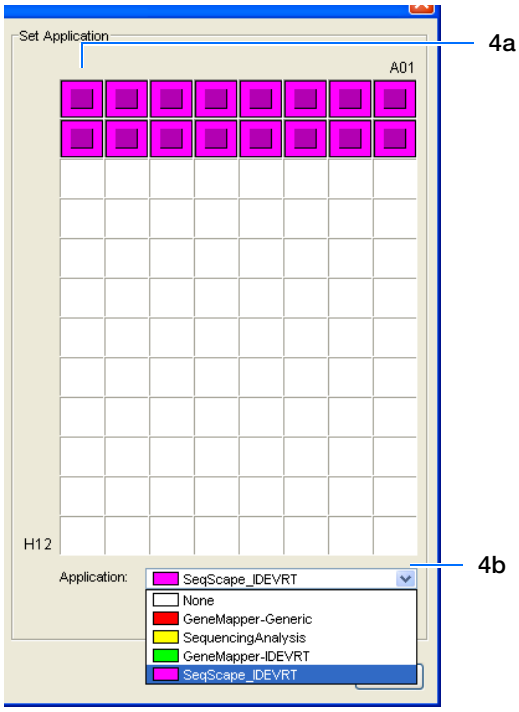


Notes

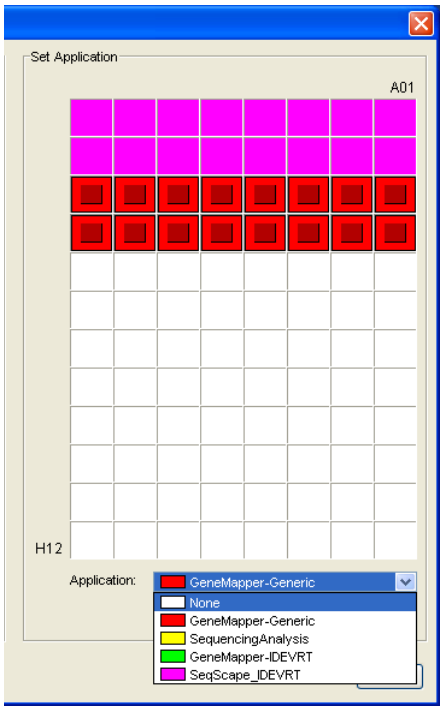
4. In the Set Application pane:

a. On the plate map, click a well position. The run of 16 or 4 capillaries is outlined.

b. In the Application drop-down list select the appropriate application.



c. Repeat the process for additional samples and applications.

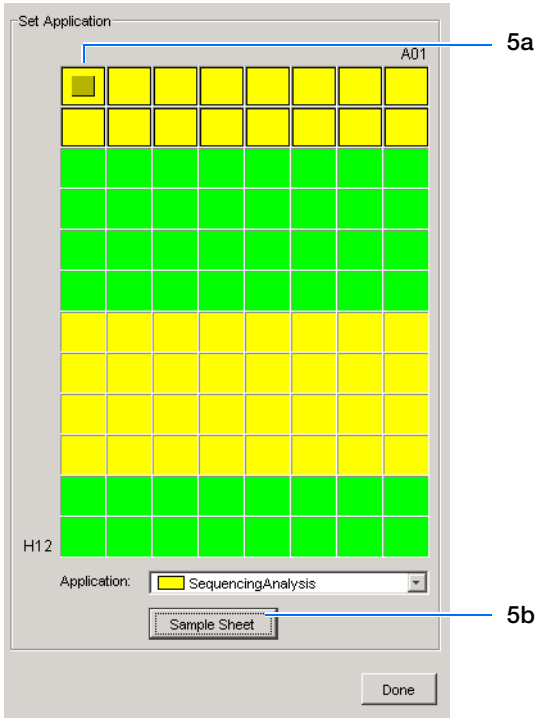


Notes

5. Create the Sequencing sample sheets (plate record).

   a. On the plate map, click a well position that represents a sequencing sample.

   b. Click **Sample Sheet**.

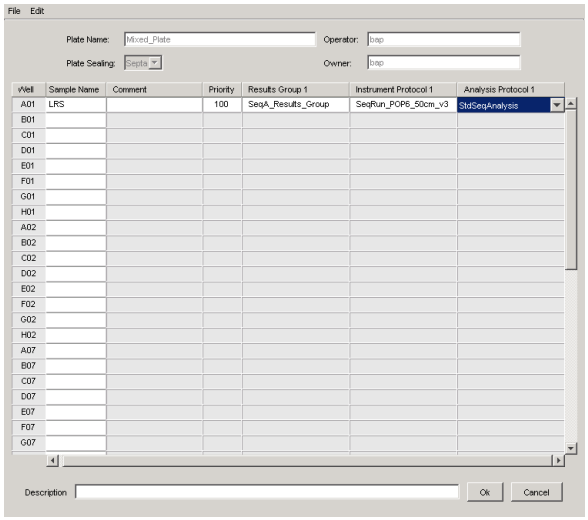


   The Sequencing Analysis Plate editor opens.

   c. Complete the plate record.

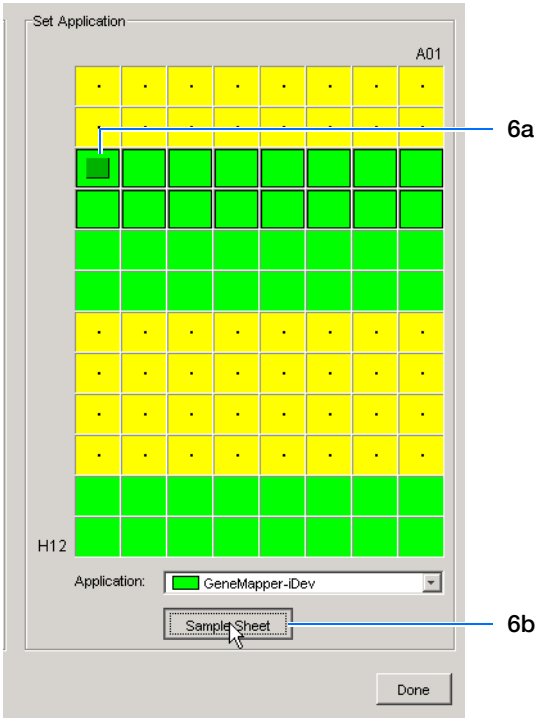
   Note: The well column contains only those wells that were designated as sequencing samples on the plate map.

   d. Click OK. You are automatically returned to the Integrated Plate dialog box.



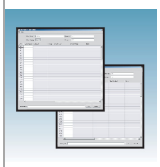
Notes

6. Create the GeneMapper software sample sheet (plate record).
   a. On the plate map, click a well position that represents a GeneMapper software sample.
   b. Click **Sample Sheet** to open the GeneMapper software Plate editor.
   c. Complete the plate record.
   d. Click **OK**.
7. Click **Done**.



Notes

Notes



Reference Tables

Overview

This chapter covers the following topics:

Notes

Sequencing Summary Tables

Performance Table — Sequencing Resolution Performance and Specification

Type of Run	Capillary Length (cm)	Polymer Type	Run Module[a]	Run Time (min)	24 hr Throughput (number of samples)		KB™ Basecaller QV_{20} LOR[b] [c]
					3130 Genetic Analyzer	3130*xl* Genetic Analyzer	
Ultra rapid	36	POP-4®	UltraSeq36_POP4	40	144	576	400
		POP-7™	UltraSeq36_POP7	35	164	656	500
Rapid	36	POP-6™	RapidSeq36_POP6	60	96	384	500
		POP-7™	RapidSeq36_POP7		96	384	600
Fast	50	POP-7™	FastSeq50_POP7	60	96	384	700
Standard	50	POP-4®	StdSeq50_POP4	100	56	224	600
		POP-6™	StdSeq50_POP6	150	36	144	600
		POP-7™	StdSeq50_POP7	120	48	192	850
Long read	80	POP-4®	LongSeq80_POP4	210	24	96	700
		POP-7™	LongSeq80_POP7	170	32	128	950

a When using the BigDye® XTerminator Purification Kit, choose the BDx version of the Run Modules; for example, BDx_UltraSeq36_POP7.
b Length of Read (LOR) is the usable range of high-quality or high-accuracy bases determined by Quality Values (QV) generated by KB Basecaller v1.2. The LOR is determined by using a sliding window of 20 bases, which has an average QV > 20.
c 98.5% basecalling accuracy, less than 2% Ns.

Notes

Calibration Standard Table

Sequencing Dye Sets, Calibration Standards, and Chemistry File

Sequencing Chemistry	Dye Set	Spectral Calibration Standard	Chemistry File
• BigDye® Terminator v3.1 Cycle Sequencing Kit • BigDye® Direct Cycle Sequencing Kit • dGTP BigDye® Terminator v 3.0 Cycle Sequencing Ready Reaction Kit[a]	Z_BigDyeV3	BigDye® v3.1 Matrix Standards	Matrix Standard
		BigDye® v3.1 Terminator Sequencing Standard	Sequence Standard
• BigDye® Terminator v1.1 Cycle Sequencing Kit • BigDye® Primer Cycle Sequencing Kits • dGTP BigDye® Terminator v1.0 Cycle Sequencing Ready Reaction Kit[a]	E_BigDyeV1	DS-01 Matrix Standards	Matrix Standard
		BigDye® v1.1 Terminator Sequencing Standard	Sequence Standard
• dRhodamine Dye Terminator Cycle Sequencing Kit		dRhodamine Matrix Standards Kit	Matrix Standard

a dGTP kits are not supported on capillary electrophoresis instruments due to compressions on certain sequence context regions; you can run the kits if you do not care about the compression issues.

Dye Set and Run Modules

Sequencing Kits, Dye Sets, Polymer Type and Run Modules

		POP-4® Polymer			POP-6™ Polymer		POP-7™ Polymer				
Sequencing Chemistry	**Dye Set**	**UltraSeq36**	**StdSeq50**	**LongSeq80**	**RapidSeq36**	**StdSeq50**	**UltraSeq36**	**RapidSeq36**	**FastSeq50**	**StdSeq50**	**LongSeq80**
BigDye® Terminator v3.1 Cycle Sequencing Kit	Z_BigDye V3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
BigDye® Direct Cycle Sequencing Kit		–	–	–	–	–	✓	✓	✓	✓	–
dGTP BigDye® Terminator v3.0 Cycle Sequencing Ready Reaction Kit		–	–	–	–	–	–	–	–	–	–
BigDye® Terminator v1.1 Cycle Sequencing Kit	E_BigDye V1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
dGTP BigDye® Terminator v1.0 Cycle Sequencing Ready Reaction Kit		–	–	–	–	–	–	–	–	–	–
dRhodamine Dye Terminator Cycle Sequencing Kit		✓	✓	✓	✓	✓	–	–	–	–	–
BigDye® Primer Cycle Sequencing Kits		–	–	–	✓	✓	–	–	–	–	–

6

Notes

KB Basecaller Table

Basecaller and DyeSet/Primer Files Using KB Basecalling

3130/3130xl Genetic Analyzer Basecaller and DyeSet/Primer Files Used with BigDye® Terminator Chemistry and KB Basecalling

DNA Sequencing Chemistry	Polymer	KB Basecalling Run Module	DyeSet/Primer	Basecaller
BigDye® Terminator v1.1 Cycle Sequencing Kit	**POP-4®**	UltraSeq36_POP4	KB_3130_POP4_BDTv1.mob	**KB.bcp**
		StdSeq50_POP4		
		LongSeq80_POP4		
	POP-6™	RapidSeq36_POP6	KB_3130_POP6_BDTv1.mob	
		StdSeq50_POP6		
	POP-7™	UltraSeq36_POP7	KB_3130_POP7_BDTv1.mob	
		RapidSeq36_POP7		
		FastSeq50_POP7		
		StdSeq50_POP7		
		LongSeq80_POP7		
BigDye® Terminator v3.1 Cycle Sequencing Kit	**POP-4®**	UltraSeq36_POP4	KB_3130_POP4_BDTv3_.mob	
		StdSeq50_POP4		
		LongSeq80_POP4		
	POP-6™	RapidSeq36_POP6	KB_3130_POP6_BDTv3.mob	
		StdSeq50_POP6		
	POP-7™	UltraSeq36_POP7	KB_3130_POP7_BDTv3.mob	
		RapidSeq36_POP7		
		FastSeq50_POP7		
		StdSeq50_POP7		
		LongSeq80_POP7		
BigDye® Direct Cycle Sequencing Chemistry	**POP-7™**	UltraSeq36_POP7	KB_3130_POP7_BDTv3direct.mob	
		RapidSeq36_POP7		
		FastSeq50_POP7		
		StdSeq50_POP7		

Notes

ABI Basecaller Table and Dye Terminator Kits

Basecaller and DyeSet/Primer Files Using ABI Basecalling with Dye Terminator Chemistry

Basecaller and DyeSet/Primer Files Used with BigDye® Terminator Chemistry and ABI Basecalling

DNA Sequencing Chemistry	Polymer	ABI Basecalling Run Module	Basecaller	DyeSet/Primer
BigDye® Terminator v1.1 Kit	POP-4®	UltraSeq36_POP4	Basecaller-3130POP4UR.bcp	DT3130POP4LR{BD}v1.mob
		LongSeq80_POP4	Basecaller-3130POP4_80cmv3.bcp	
	POP-6™	RapidSeq36_POP6	Basecaller-3130POP6RRv2.bcp	DT3130POP6{BD}v2.mob
		StdSeq50_POP6	Basecaller-3130POP6SR.bcp	
BigDye® Terminator v3.1 Cycle Sequencing Kit	POP-4®	UltraSeq36_POP4	Basecaller-3130POP4UR.bcp	DT3130POP4{BDv3}v1.mob
		LongSeq80_POP4	Basecaller-3130POP4_80cmv3.bcp	
	POP-6™	RapidSeq36_POP6	Basecaller-3130POP6RRv2.bcp	DT3130POP6{BDv3}v1.mob
		StdSeq50_POP6	Basecaller-3130POP6SRv2.bcp	
dRhodamine Dye Terminator Cycle Sequencing Kit	POP-4®	UltraSeq36_POP4	Basecaller-3130APOP4UR.bcp	DT3130POP4{dRhod}v2.mob
		LongSeq80_POP4	Basecaller-3130POP4_80cmv3.bcp	
	POP-6™	RapidSeq36_POP6	Basecaller-3130POP6RRv2.bcp	DT3130POP6{dRhod}v2.mob
		StdSeq50_POP6	Basecaller-3130POP6SR.bcp	

Notes

ABI Basecaller Table and Dye Primer Kits

Basecaller and DyeSet/Primer Files Using ABI Basecalling with Dye Primer Chemistry

3130*x*/ Basecaller and DyeSet/Primer Files Used for Dye Primer Chemistry

DNA Sequencing Chemistry	Polymer	ABI Basecalling Run Module	Basecaller	DyeSet/Primer
BigDye® Primer Cycle Sequencing Kit	POP-6™	**RapidSeq36_POP6**	Basecaller-3130POP6RRv2.bcp	DP3130POP6{BD-21M13}v1.mob
		StdSeq50_POP6	Basecaller-3130POP6SR.bcp	DP3130POP6{BD-21M13Rev}v1.mob

Notes

Fragment Analysis Run Module Specifications

Run Modules	Capillary Length (cm)	Polymer Type	Run Time (min)	24 hr Throughput (GT[b])	
				3130 Analyzer	3130*xl* Analyzer
High Throughput, Small Size Fragment Analysis					
FragmentAnalysis22_POP4	22	POP-4®	20	5,760	23,040
SNP22_POP4	22		20	5,760	23,040
Standard Fragment Analysis					
FragmentAnalysis36_POP4	36	POP-4®	45	2,560	10,240
HIDFragmentAnalysis36_POP4			45	2,560	10,240
SNP36_POP4			30	3,840	15,360
FragmentAnalysis36_POP7		POP-7™	35	3,290	13,170
FragmentAnalysis50_POP4	50	POP-4®	65	1,760	7,040
FragmentAnalysis50_POP6		POP-6™	90	1,200	4,800
FragmentAnalysis50_POP7		POP-7™	50	2,300	9,220
Large Size Fragment Analysis					
GS1200_36_POP7	36	POP-7™	125	880	3,520
GS1200_50_POP7	50	POP-7™	135	800	3,200
Fragment Analysis using Non-Denaturing Polymer					
ConformationAnalysis36_CAP	36	CAP	[a]		

a Run time depends on customized polymer formulation and run module.
b 20 GT (Genotypes)/capillary/injection.

Notes

Fragment Analysis Application/Kit and Run Modules

The table below lists the Applied Biosystems kit types, with the available run module(s) and dye sets.

Application/Kit	Module										
	SNP22_POP4	SNP36_POP4	HTSNP36_POP7	FragmentAnalysis22_POP4	FragmentAnalysis36_POP4	FragmentAnalysis36_POP7	FragmentAnalysis50_POP4	FragmentAnalysis50_POP6	FragmentAnalysis50_POP7	HIDFragmentAnalysis36_POP4	ConformationAnalysis36_CAP
SNaPshot® Multiplex System	E5	E5									
Custom oligos				D, F, G5	D, F, G5	D, F, G5	D, F, G5	D, F, G5	D, F, G5		
Single Strand Conformation Polymorphism (SSCP) Analysis using non-denaturing Conformational Analysis Polymer (CAP)											G5[a]
4-Dye Stockmarks® Kits (bovine and canine)					F						
5-Dye Stockmarks® Kit (equine)					G5						
AFLP® Kits					F						
4-Dye AmpFℓSTR® Kits										F	
5-Dye AmpFℓSTR® Kits										G5	

a Adjust Dye Set depending on dyes used. Use filter set G5 if using the GeneScan 600 LIZ Size Standard, along with the Matrix Standard Set DS-33. Use filter set D if using the Gene Scan 500 ROX Size Standard.

AmpFℓSTR Kit Table

Kits	HIDFragmentAnalysis36_POP4
AmpFℓSTR® COfiler® Kit	F
AmpFℓSTR® Profiler Plus® Kit	
AmpFℓSTR® Profiler Plus® *ID* Kit	
AmpFℓSTR® Profiler® Kit	
AmpFℓSTR® SGM Plus® Kit	
Other 4-Dye AmpFℓSTR® Kits	

Notes

Kits	HIDFragmentAnalysis36_POP4
AmpF*ℓ*STR® SEfiler Plus™ Kit AmpF*ℓ*STR® Identifiler® Kit AmpF*ℓ*STR® Yfiler™ Kit AmpF*ℓ*STR® Identifiler® Plus Kit AmpF*ℓ*STR® Identifiler® Direct Kit AmpF*ℓ*STR® Sinofiler™ Kit AmpF*ℓ*STR® MiniFiler™ Kit AmpF*ℓ*STR® NGM™ Kit AmpF*ℓ*STR® NGM Select™ Kit Other 5-Dye AmpF*ℓ*STR® Kits	G5

Notes

Calibration Standards Table

Fragment Analysis Dye Sets, Calibration Standards, and Chemistry File

Fragment Analysis Chemistry	Dye Set	Spectral Calibration Standard	Chemistry File
• Custom oligos	D	DS-30 Matrix Standards	Matrix Standard
• Custom oligos	D	DS-31 Matrix Standards	
• AFLP® kits • Stockmarks® Kits 4-dye (bovine and canine) • AmpFℓSTR® COfiler® Kit • AmpFℓSTR® Profiler® Kit • AmpFℓSTR® Profiler Plus® Kit • AmpFℓSTR® Profiler Plus® *ID* Kit • AmpFℓSTR® SGM Plus® Kit • Other 4-Dye AmpFℓSTR Kits	F	DS-32 Matrix Standards	
• SNaPshot® Multiplex System	E5	DS-02 Matrix Standards	
• Stockmarks® Kit 5-dye (equine) • Custom oligos • AmpFℓSTR® SEfiler Plus™ Kit • AmpFℓSTR® Yfiler™ Kit • AmpFℓSTR® Identifiler Direct® Kit • AmpFℓSTR® Identifiler Plus® Kit • AmpFℓSTR® MiniFiler Kit • AmpFℓSTR® NGM Kit • AmpFℓSTR® NGM Select® Kit • Other 5-Dye AmpFℓSTR® Kits	G5	DS-33 Matrix Standards	

Notes

Run Modules

Spectral Run Modules

Polymer Type	Capillary Array Length (cm)	Run Module
POP-4®	22	Spect22_POP4
	36	Spect36_POP4
		SpectSQ36_POP4
	50	Spect50_POP4
	80	Spect80_POP4
POP-6™	36	Spect36_POP6
	50	Spect50_POP6
POP-7™	36	Spect36_POP7
	50	Spect50_POP7
	80	Spect80_POP7
CAP	36	Spect36_CAP

Sequencing Run Modules

Polymer	Capillary Array Length (cm)	Run Module[a]
POP-4®	36	UltraSeq36_POP4
	50	StdSeq50_POP4
	80	LongSeq80_POP4
POP-6™	36	RapidSeq36_POP6
	50	StdSeq50_POP6
POP-7™	36	UltraSeq36_POP7
		RapidSeq36_POP7
	50	FastSeq50_POP7
		StdSeq50_POP7
	80	LongSeq80_POP7

a When using the BigDye® XTerminator Purification Kit, choose the BDx version of the Run Modules; for example, BDx_UltraSeq36_POP7.

Notes

Fragment Analysis Run Modules

See "Fragment Analysis Run Module Specifications" on page 89 and "Fragment Analysis Application/Kit and Run Modules" on page 90 for available fragment analysis run modules.

Notes

Parts List

Capillary Arrays

Description	Part Number
3130 Genetic Analyzer	
22-cm capillary array	4333463
36-cm capillary array	4333464
50-cm capillary array	4333466
80-cm capillary array	4333465
3130*xl* Genetic Analyzer	
22-cm capillary array	4319898
36-cm capillary array	4315931
50-cm capillary array	4315930
80-cm capillary array	4319899

Reagents and Standards

Description	Part Number
10X Genetic Analyzer Buffer with EDTA	402824
31xx BigDye® Terminator v1.1 Matrix Standards	4336824
31xx BigDye® Terminator v3.1 Matrix Standards	4336974
BigDye® Terminator v1.1 Cycle Sequencing Kit (100 Reactions)	4337450
BigDye® Terminator v3.1 Cycle Sequencing Kit (100 Reactions)	4337455
BigDye® Direct Cycle Sequencing Kit (100 Reactions)	4458687
BigDye® Terminator v1.1 Sequencing Standard	4336791
BigDye® Terminator v3.1 Sequencing Standard	4336935
GeneScan™ 120 LIZ® Size Standard	4324287
GeneScan™ 500 LIZ Size Standard	4322682
GeneScan™ 600 LIZ Size Standard	4366589
GeneScan™ 500 ROX Size Standard	401734
GeneScan™ HD400 ROX Size Standard	402985
Hi-Di™ Formamide	4311320
Matrix Standard DS-01	4315974

Notes

Description	Part Number
Matrix Standard DS-02	4323014
Matrix Standard DS-30 (Dye Set D)	4345827
Matrix Standard DS-31 (Dye Set D)	4345829
Matrix Standard DS-32 (Dye Set F)	4345831
Matrix Standard DS-33 (Dye Set G5)	4345833
Performance Optimized Polymer 4 (POP-4® Polymer)	4316355
Performance Optimized Polymer 6 (POP-6™ Polymer)	4352757
Performance Optimized Polymer 7 (POP-7™ Polymer)	4352759
POP Conformational Analysis Polymer (CAP)	4340379

Spare Parts

Description	Part Number
Array comb holders	628-0164
Array port plug	628-3776
Buffer reservoir, 16 mL	4358351
Buffer/water/waste reservoir	628-0163
Ferrule knob	628-3730
Ferrule sleeves	628-0165
Polymer bottle	4362387
Polymer tubing assembly	628-3732
Septa strip, buffer reservoir	4315932

Notes

Documentation and Support

Related Documentation

The following related documents are shipped with the system:

Document title	Pub. Part no.
Applied Biosystems® 3130/3130xl Genetic Analyzer Getting Started Guide	4477796
Applied Biosystems® 3130/3130xl Genetic Analyzer Quick Reference Card	4477795
Applied Biosystems® 3730/3730xl DNA Analyzer and 3130/3130xl Genetic Analyzers AB Navigator Software Administrator Guide	4477853

Portable document format (PDF) versions of this guide and the documents listed above are also available on the Applied Biosystems® 3130 Series Data Collection Software 4 CD.

Note: To open the user documentation included on the Applied Biosystems® 3130 Series Data Collection Software 4 CD, use the Adobe® Reader® software available from **www.adobe.com**.

Note: For additional documentation, see "Obtaining Support" on page 98.

Obtaining SDSs

Safety Data Sheets (SDSs) are available from **www.lifetechnologies.com/support**.

Note: For the SDSs of chemicals not distributed by Life Technologies Corporation, contact the chemical manufacturer.

Obtaining Support

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

www.lifetechnologies.com/support

At the website, you can:

- Access worldwide telephone and fax numbers to contact Technical Support and Sales facilities
- Search through frequently asked questions (FAQs)
- Submit a question directly to Technical Support
- Search for user documents, SDSs, vector maps and sequences, application notes, formulations, handbooks, certificates of analysis, citations, and other product support documents
- Obtain information about customer training
- Download software updates and patches

Computer Configuration

Life Technologies Corporation supplies or recommends certain configurations of computer hardware, software, and peripherals for use with its instrumentation. Life Technologies Corporation 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 Life Technologies Corporation. Life Technologies Corporation 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 Product Warranty

Life Technologies and/or its affiliate(s) warrant their products as set forth in the Life Technologies' General Terms and Conditions of Sale found on Life Technologies Corporation' website at **www.lifetechnologies.com/termsandconditions**. If you have any questions, please contact Life Technologies Corporation at **www.lifetechnologies.com/support**.

If for any reason it becomes necessary to return material to Life Technologies, contact Life Technologies Technical Support or your nearest Life Technologies 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 Life Technologies representative.

Safety

WARNING **GENERAL SAFETY.** Using this product in a manner not specified in the user documentation may result in personal injury or damage to the instrument or device. Ensure that anyone using this product has received instructions in general safety practices for laboratories and the safety information provided in this document.

- Before using an instrument or device, read and understand the safety information provided in the user documentation provided by the manufacturer of the instrument or device.
- Before handling chemicals, read and understand all applicable Safety Data Sheets (SDSs) and use appropriate personal protective equipment (gloves, gowns, eye protection, etc). To obtain SDSs, see "Obtaining Support" on page 98".
- All testing should be performed in accordance with local, regional and national acceptable laboratory accreditation standards and/or regulations.

Symbols on instruments

Symbols may be found on the instrument to warn against potential hazards or convey important safety information. In this document, the hazard symbol is used along with one of the following user attention words described:

- 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.

Symbol	English	Français
	Caution, risk of danger Consult the manual for further safety information.	Attention, risque de danger Consulter le manuel pour d'autres renseignements de sécurité.
	Caution, hot surface	Attention, surface chaude
	Caution, risk of electrical shock	Attention, risque de choc électrique
	Laser radiation	Rayonnement laser
	Caution, piercing hazard	Attention, danger de perforation

Symbol	English	Français
	Potential biohazard	Danger biologique potentiel
	Ultraviolet light	Rayonnement ultraviolet
	On	On (marche)
	Off	Off (arrêt)
	On/Off	On/Off (marche/arrêt)
	Protective conductor terminal (main ground)	Borne de conducteur de protection (mise à la terre principale)
	Terminal that can receive or supply alternating current or voltage	Borne pouvant recevoir ou envoyer une tension ou un courant de type alternatif
	Terminal that can receive or supply alternating or direct current or voltage	Borne pouvant recevoir ou envoyer une tension ou un courant continu ou alternatif
	**Do not dispose of this product in unsorted municipal waste**. Follow local municipal waste ordinances for proper disposal provisions to reduce the environmental impact of waste electrical and electronic equipment  To minimize negative environmental impact from disposal of electronic waste, do not dispose of electronic waste in unsorted municipal waste. Follow local municipal waste ordinances for proper disposal provision and contact customer service for information about responsible disposal options.	Ne pas éliminer ce produit avec les déchets usuels non soumis au tri  Pour minimiser les conséquences négatives sur l'environnement à la suite de l'élimination de déchets électroniques, ne pas éliminer ce déchet électronique avec les déchets usuels non soumis au tri sélectif. Se conformer aux ordonnances locales sur les déchets municipaux pour les dispositions d'élimination et communiquer avec le service à la clientèle pour des renseignements sur les options d'élimination responsable.

Conformity mark	Description
	Indicates conformity with safety requirements for Canada and U.S.A.

Safety alerts on this instrument

The following table shows the location of safety alerts found on the instrument. See "Symbols on instruments" on page 99 for more information.

English	French translation	Location on Instrument
Class 3B (III) visible and/or invisible laser radiation present when open and interlocks defeated. Avoid exposure to beam.	**DANGER!** Rayonnement laser visible ou invisible de classe 3B (III) présent en position ouverte et avec les dispositifs de sécurité non enclenchés. Éviter toute exposition au faisceau.	Detection cell cover 

Instrument safety

General

CAUTION **Do not remove instrument protective covers.** If you remove the protective instrument panels or disable interlock devices, you may be exposed to serious hazards including, but not limited to, severe electrical shock, laser exposure, crushing, or chemical exposure.

Physical injury

CAUTION **Moving and Lifting Injury.** The instrument is to be moved and positioned only by the personnel or vendor specified in the applicable site preparation guide.

Improper lifting can cause painful and permanent back injury.

Things to consider before lifting or moving the instrument or accessories:

- Depending on the weight, moving or lifting may require two or more persons.
- If you decide to lift or move the instrument after it has been installed, do not attempt to do so without the assistance of others, the use of appropriate moving equipment, and proper lifting techniques.
- Ensure you have a secure, comfortable grip on the instrument or accessory.
- Make sure that the path from where the object is to where it is being moved is clear of obstructions.
- Do not lift an object and twist your torso at the same time. Keep your spine in a good neutral position while lifting with your legs.
- Participants should coordinate lift and move intentions with each other before lifting and carrying.
- For smaller packages, rather than lifting the object from the packing box, carefully tilt the box on its side and hold it stationary while someone else slides the contents out of

the box.

CAUTION **Moving Parts.** Moving parts can crush, pinch and cut. Keep hands clear of moving parts while operating the instrument. Disconnect power before servicing.

Electrical

WARNING **Fuse Installation.** Before installing the instrument, verify that the fuses are properly installed and the fuse voltage matches the supply voltage. Replace fuses only with the type and rating specified for the unit. Improper fuses can damage the instrument wiring system and cause a fire.

DANGER **ELECTRICAL SHOCK HAZARD.** Severe electrical shock can result from operating the Applied Biosystems 3130/3130*xl* Genetic Analyzers without its instrument panels in place. Do not remove instrument panels. High-voltage contacts are exposed when instrument panels are removed from the instrument.

WARNING **Voltage Selector Switch.** Before installing the instrument, verify that the voltage selector switch is set for the supply voltage. This will prevent damage to the instrument, reduce risk of fire, and enable proper operation.

WARNING **Ensure appropriate electrical supply.** For safe operation of the instrument:

- Plug the system into a properly grounded receptacle with adequate current capacity.
- Ensure the electrical supply is of suitable voltage.
- Never operate the instrument with the ground disconnected. Grounding continuity is required for safe operation of the instrument.

WARNING **Power Supply Line Cords.** Use properly configured and approved line cords for the power supply in your facility.

WARNING **Disconnecting Power.** To fully disconnect power either detach or unplug the power cord, positioning the instrument such that the power cord is accessible.

Overvoltage Rating

The Applied Biosystems 3130/3130*xl* Genetic Analyzers have an installation (overvoltage) category of II, and is classified as portable equipment.

Laser

WARNING **LASER HAZARD.** Under normal operating conditions, the Applied Biosystems 3130/3130*xl* Genetic Analyzers are categorized as a Class I laser product. However, removing the protective covers and (when applicable) defeating the interlock(s) may result in exposure to the internal Class 3B laser. Lasers can burn the retina, causing permanent blind spots. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
To ensure safe laser operation:

- Never look directly into the laser beam.
- Do not remove safety labels, instrument protective panels, or defeat safety interlocks.
- The system must be installed and maintained by an Applied Biosystems Technical Representative.

Applied Biosystems Technical Representatives are instructed to:

- Remove jewelry and other items that can reflect a laser beam into your eyes or those of others
- Wear proper eye protection and post a laser warning sign at the entrance to the laboratory if the laser protection is defeated for servicing.
  DO NOT operate the laser when it cannot be cooled by its cooling fan; an overheated laser can cause severe burns on contact.

Note the laser warnings provided in "Safety alerts on this instrument" on page 100.

CAUTION **LASER HAZARD, Bar Code Scanner**. The bar code scanner included with the instrument system is a Class 2 laser. To avoid damage to eyes, do not stare directly into the beam or point into another person's eyes.

Laser Classification

The Applied Biosystems 3130/3130*xl* Genetic Analyzers use an Argon laser. Under normal operating conditions, the instrument laser is categorized as a Class I laser. When safety interlocks are disabled during certain servicing procedures, the laser can cause permanent eye damage, and, therefore, is classified under those conditions as a Class 3B laser.

The Applied Biosystems 3130/3130*xl* Genetic Analyzers have been tested to and comply with 21 CFR, 1040.10 and 1040.11, as applicable.

The Applied Biosystems 3130/3130*xl* Genetic Analyzers have been tested to and comply with standard EN60825-1, "Radiation Safety of Laser Products, Equipment Classification, Requirements, and User's Guide."

Safety and electromagnetic compatibility (EMC) standards

This section provides information on:

The instrument design and manufacture complies with the standards and requirements for safety and electromagnetic compatibility as noted in the following table:

Safety

Reference	Description
21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No.50, dated June 24, 2007, as applicable	U.S. FDA Health and Human Services (HHS) “Radiological health performance standards for laser products” and “Radiological health performance standards for specific purpose laser products”

EMC

Reference	Description
FCC Part 18 (47 CFR)	U.S. Standard “Industrial, Scientific, and Medical Equipment”

U.S. and Canadian Safety Standards

This instrument has been tested to and complies with standard UL 61010-2:2001, “Safety Requirements for Electrical Equipment for Laboratory Use, Part 1: General Requirements.”

This instrument has been tested to and complies with standard CSA C22.2 No. 61010-1, “Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements.”

This instrument has been tested to and complies with standard UL 61010-2-010, “Particular requirements for Laboratory Equipment for the Heating of Materials”.

This instrument has been tested to and complies with standard UL 61010-2-081, “Particular requirements for Automatic and Semi0-Automatic Laboratory Equipment for analysis and other purposes”.

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 61010-2-081:2003, “Particular requirements for Automatic and Semi0-Automatic Laboratory Equipment for analysis and other purposes”, and EN 60825:2002, “Radiation safety of laser products, equipment classification, requirements and user’s guide.”

EMC

This instrument meets European requirements for emission and immunity (EMC Directive 89/336/EEC). This instrument has been tested to and complies with standard EN 61326 (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

WARNING **GENERAL CHEMICAL HANDLING.** To minimize hazards, ensure laboratory personnel read and practice the general safety guidelines for chemical usage, storage, and waste provided below, and consult the relevant SDS for specific precautions and instructions:

- 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. To obtain SDSs, see the “Documentation and Support” section in this document.
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing).
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with adequate ventilation (for example, fume hood).
- Check regularly for chemical leaks or spills. If a leak or spill occurs, follow the manufacturer's cleanup procedures as recommended in the SDS.
- Handle chemical wastes in a fume hood.

- Ensure use of 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.)
- After emptying a waste container, seal it with the cap provided.
- Characterize (by analysis if necessary) the waste generated by the particular applications, reagents, and substrates used in your laboratory.
- Ensure that the 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.

WARNING **HAZARDOUS WASTE (from instruments).** Waste produced by the instrument is potentially hazardous. Follow the guidelines noted in the preceding General Chemical Handling warning.

WARNING **4L Reagent and Waste Bottle Safety.** Four-liter reagent and waste bottles can crack and leak. Each 4-liter bottle should be secured in a low-density polyethylene safety container with the cover fastened and the handles locked in the upright position.

Cleaning and decontamination

CAUTION **Cleaning and Decontamination.** Using a cleaning or decontamination method not specified by the manufacturer may result in damage to the equipment. For the protection of others, ensure the instrument is properly decontaminated prior to having the instrument serviced at your facility or before sending the instrument for repair, maintenance, trade-in, disposal, or termination of a loan. Decontamination forms may be requested from customer service.

Biological hazard safety

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:

In the U.S.:

- U.S. Department of Health and Human Services guidelines published in Biosafety in Microbiological and Biomedical Laboratories found at: **www.cdc.gov/biosafety**
- Occupational Safety and Health Standards, Bloodborne Pathogens (29 CFR§1910.1030), found at: **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**

In the EU:

- Check local guidelines and legislation on biohazard and biosafety precaution and refer to the best practices published in the World Health Organization (WHO) Laboratory Biosafety Manual, third edition, found at: **www.who.int/csr/resources/publications/biosafety/WHO_CDS_CSR_LYO_2004_11/en/**

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.

English	Francais
CAUTION Hazardous chemicals. Read the Safety Data Sheets (SDSs) before handling.	**ATTENTION** Produits chimiques dangeureux. Lire les fiches techniques de sûreté de matériels avant la manipulation des produits.
CAUTION Hazardous waste. Read the waste profile (if any) in the site preparation guide for this instrument before handling or disposal.	**ATTENTION** Déchets dangereux. Lire les renseignements sur les déchets avant de les manipuler ou de les éliminer.
CAUTION Hazardous waste. Refer to SDS(s) and local regulations for handling and disposal.	**ATTENTION** Déchets dangereux. Lire les fiches techniques de sûreté de matériels et la régulation locale associées à la manipulation et l'élimination des déchets.
WARNING Hot lamp.	**AVERTISSEMENT** Lampe brûlante.
WARNING Hot. Replace lamp with an Applied Biosystems lamp.	**AVERTISSEMENT** Composants brûlants. Remplacer la lampe par une lampe Applied Biosystems.
CAUTION Hot surface.	**ATTENTION** Surface brûlante.

English	Francais
DANGER High voltage.	**DANGER** Haute tension.
WARNING To reduce the chance of electrical shock, do not remove covers that require tool access. No user-serviceable parts are inside. Refer servicing to Applied Biosystems qualified service personnel.	**AVERTISSEMENT** Pour éviter les risques d'électrocution, ne pas retirer les capots dont l'ouverture nécessite l'utilisation d'outils. L'instrument ne contient aucune pièce réparable par l'utilisateur. Toute intervention doit être effectuée par le personnel de service qualifié de Applied Biosystems.
DANGER Class 3B laser radiation present when open and interlock defeated. Avoid direct exposure to laser beam.	**DANGER** Class 3B rayonnement laser en cas d'ouverture et d'une neutralisation des dispositifs de sécurité. Eviter toute exposition directe avec le faisceau.
DANGER Class 3B laser radiation when open. Avoid direct exposure to laser beam.	**DANGER** Class 3B rayonnement laser en cas d'ouverture. Eviter toute exposition directe avec le faisceau.
DANGER Class 2(II) laser radiation present when open and interlock defeated. Do not stare directly into the beam	**DANGER** de Class 2(II) rayonnement laser en cas d'ouverture et d'une neutralisation des dispositifs de securite. Eviter toute exposition directe avec le faisceau.
DANGER Class 2(II) laser radiation present when open. Do not stare directly into the beam.	**DANGER** de Class 2(II) rayonnement laser en cas d'ouverture. Eviter toute exposition directe avec le faisceau.
DANGER Class 2(II) LED when open and interlock defeated. Do not stare directly into the beam.	**DANGER** de Class 2(II) LED en cas d'ouverture et d'une neutralisation des dispositifs de securite. Eviter toute exposition directe avec le faisceau.
DANGER Class 2(II) LED when open. Do not stare directly into the beam.	**DANGER** de Class 2(II) LED en cas d'ouverture. Eviter toute exposition directe avec le faisceau.
CAUTION Moving parts.	**ATTENTION** Parties mobiles.

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.

Index

E

F

H

I

K

L

M

N

O

P

R

S

T

U

W

Y

Z

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