SeqStudio™ Genetic Analyzer

GETTING STARTED GUIDE

Create and run plate setups, monitor runs, and view results

for use with:
SeqStudio™ Data Collection Software v1.1.4
SeqStudio™ Genetic Analyzer Cartridge (Cat. No. A33671)
SeqStudio™ Genetic Analyzer Cartridge v2 (Cat. No. A41331)
SeqStudio™ Plate Manager
SeqStudio™ Remote Monitoring App

Thermo Fisher
S C I E N T I F I C

Manufacturer:
Life Technologies Holdings Pte Ltd |
Block 33 |
Marsiling Industrial Estate Road 3 |
#07-06, Singapore 739256

Products:
SeqStudio™ Genetic Analyzer
SeqStudio™ Data Collection Software
SeqStudio™ Plate Manager (desktop)
SeqStudio™ Genetic Analyzer Cartridge
SeqStudio™ Genetic Analyzer Cartridge v2

Manufacturer: Life Technologies
Corporation | 200 Oyster Point Blvd |
South San Francisco, CA 94080 |
USA

Products:
SeqStudio™ Remote Monitoring App

Manufacturer: Life Technologies
Corporation | 35 Wiggins Avenue |
Bedford, MA 01730

Products:
SeqStudio™ Genetic Analyzer Cathode Buffer Container

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Revision	Date	Description
B.0	9 May 2019	• Added expiration information for the SeqStudio™ Genetic Analyzer Cartridge v2. • Added information on Quality Values (QVs). • Updated the manufacturer of record. • Changed "Thermo Fisher Cloud" to "Connect cloud-based platform". • Added the Microsatellite Analysis Software to the list of secondary analysis software apps.
A.0	15 November 2017	New document for v1.1 Software. Replaces Quick Reference Pub. No. MAN0016144 and MAN0017087.

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1 Product information

Product description

The Applied Biosystems™ SeqStudio™ Genetic Analyzer with SeqStudio™ Data Collection Software is a fluorescent dye-labeled genetic analysis system using capillary electrophoresis technology. It enables both sequencing and fragment analysis applications without the need to switch polymer type or capillary array length.

You can use the data collection software on the instrument to create and run plate setups, monitor runs, and view results. You can also use the optional SeqStudio™ Plate Manager and Remote Monitoring App to perform some of these functions.

For complete information on using the instrument and software, see *SeqStudio™ Genetic Analyzer Instrument and Software User Guide* (Pub. No. MAN0016138).

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2 Prepare the samples and the instrument

Prepare the samples

Sample preparation guidelines

Item	Guidelines
Plates and tubes 	• Use MicroAmp™ Optical 96-Well Reaction Plate or MicroAmp™ Reaction Tubes with a tray and retainer set. **IMPORTANT!** Fast plates are not compatible with the SeqStudio™ Genetic Analyzer. Fast plates will damage the cartridge. • Use the appropriate septa for plates and tubes. • See *SeqStudio™ Genetic Analyzer Instrument and Software User Guide* for more information.

Item	Guidelines

Fragment analysis sample preparation
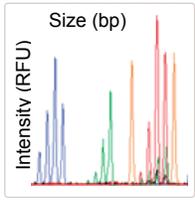 	
 Size (bp) / Intensity (RFU) graph
	• Prepare the samples as recommended by the kit for fragment analysis.
	 • Use a 10–20 μL sample volume.
	 • Ensure that Hi-Di™ Formamide is fresh.
	   – Hi-Di™ Formamide should not undergo more than two freeze-thaw cycles (one to aliquot and one for use).
	   – Use the same day after thawing.
	 • For more information, see *DNA Fragment Analysis by Capillary Electrophoresis User Guide* (Pub. No. 4474504).

Sequence analysis sample preparation
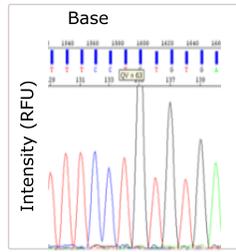 	
 Base / Intensity (RFU) graph
	• Prepare sequencing reactions according to kit instructions, and purify the extension products with ethanol precipitation, spin columns, or the BigDye XTerminator™ Purification Kit.
	   – If ethanol precipitation or spin columns are used, dry the samples in a vacuum centrifuge without heat or at low heat for 10–15 minutes or until dry.
	      Note: Do not over dry the samples.
	   – Resuspend in 10–20 μL of Hi-Di™ Formamide.
	 • Use a 65 μL or 130 μL sample volume for samples that are prepared with the BigDye XTerminator™ Purification Kit. See *BigDye XTerminator™ Purification Kit Protocol* (Pub. No. 4374408).
	   IMPORTANT! Use the appropriate run modules for samples prepared with BigDye XTerminator™ Purification Kit.
	 • Use a 10–20 μL sample volume for samples that are prepared with Hi-Di™ Formamide.
	 • Ensure that Hi-Di™ Formamide is fresh.
	   – Hi-Di™ Formamide should not undergo more than two freeze-thaw cycles (one to aliquot and one for use).
	   – Use the same day after thawing.
	 • Do not resuspend samples in water, which can decrease sample stability.
	 • For more information, see *DNA Sequencing by Capillary Electrophoresis Chemistry Guide Second Edition* (Pub. No. 4305080).

Plate layout and loading guidelines

- Samples are stable for 16–24 hours on the instrument.
- Load a maximum of 48 samples per plate if you use a long run module (Long Seq, Long Seq BDX, and Long Frag Analysis). The long fragment analysis run modules can take >24 hours to run an entire 96-well plate.
- Add samples to plates in columns. The default injection order is: A1–D1, E1–H1, A2–D2, E2–H2....A12–D12, E12–H12.
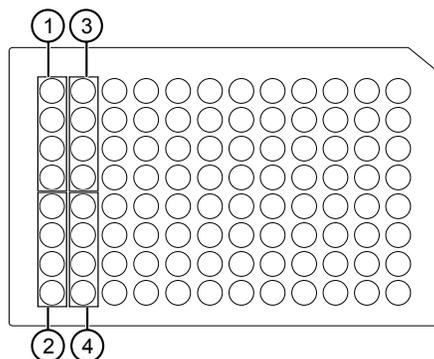
① Injection group 1, wells A1–D1
② Injection group 2, wells E1–H1
③ Injection group 3, wells A2–D2
④ Injection group 4, wells E2–H2

Prepare the instrument

Power on the instrument

IMPORTANT! Do not power on the instrument until it has been installed and set up by a Thermo Fisher Scientific representative.

Press the On/Off switch on the rear panel.

Check the consumables status

1. Touch ⚙ **Settings ▸ Consumable status**.

2. Ensure that:
   - Sufficient consumables are installed for the run.
   - Installed consumables have not exceeded their expiry date.

Display	Cartridge	Cathode buffer
NA	Not installed on the instrument.	Not installed on the instrument.
White	OK for use.	OK for use.
Yellow	OK for use, but: • It will exceed the manufacturer's expiry date within 2 weeks *or* • It will exceed the maximum number of days allowed on the instrument within 2 weeks[1]	OK for use, but: • It will exceed the manufacturer's expiry date within 2 days *or* • It will exceed the maximum number of days allowed on the instrument (14 days) within 2 days

Display	Cartridge	Cathode buffer
Red	Expired because either of the following conditions have occurred: • It has exceeded the manufacturer's expiry date *or* • It has exceeded the maximum number of days allowed on the instrument[1]	The cartridge is expired. • It has exceeded the manufacturer's expiry date *or* • It has been installed on the instrument for >14 days

[1] The maximum number of days allowed on the instrument is 120 days for the SeqStudio™ Genetic Analyzer Cartridge (Cat. No. A33671) and 180 days for the SeqStudio™ Genetic Analyzer Cartridge v2 (Cat. No. A41331). For more information, see *SeqStudio™ Genetic Analyzer Instrument and Software User Guide*.

3. Touch **Close**, then touch ⬅.

Load the CBC, the sample plate, and the cartridge

The **Eject plate** command is disabled for a few minutes after you insert a cartridge. If you are loading the CBC, sample plate, and cartridge at the same time, you can save time by loading the CBC and sample plate before you insert the cartridge.

For information on loading the individual components, see:

• "Prepare and load the plate or tubes" on page 13
• *SeqStudio™ Genetic Analyzer Instrument and Software User Guide*

In the home screen:

1. Touch ⏏, touch ▦ **Eject plate**, then open the instrument door when prompted.

2. Press the release button on the autosampler to open the lid, then remove the CBC.
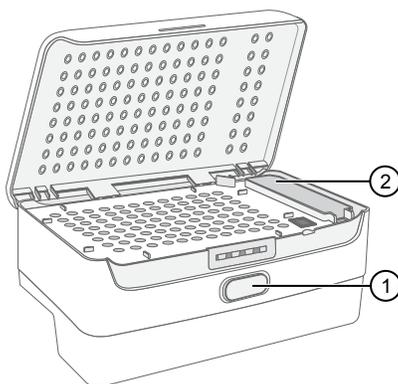
① Release button
② Location of CBC

3. Check the buffer fill level:
   a. Remove the CBC.

b. Ensure that the level of buffer is above the fill line.

   If the buffer is at or below the fill line, see *SeqStudio™ Genetic Analyzer Instrument and Software User Guide*.

   If the buffer is above the fill line, reinsert the CBC.

① Replace if buffer is at or below the fill line

① New CBC buffer level

4. Place the plate or tube assembly firmly in the autosampler.

5. Close the autosampler lid: Press down on the center of the lid or press down on both sides of the lid with equal pressure until the lid clicks shut.

6. Touch **Retract plate**, then close the instrument door.

7. Touch ⌷ **Eject cartridge**, then open the instrument door when prompted.

8. Hold the cartridge at the hand hold above the capillaries, then pull to remove it from the instrument.

9. Insert a new cartridge (see *SeqStudio™ Genetic Analyzer Instrument and Software User Guide*).

10. Close the instrument door.

Prepare and load the plate or tubes

Prepare the plate   On a clean and level surface:

1. Pipet the sample into the plate.

2. Place a septum onto the plate.
   a. Align the holes of the septa with the wells.

   b. Press gently until the septum is inserted into position in each well.

3. Centrifuge the plate assembly briefly to collect the contents at the bottom of each well.

   Centrifuge the plate assembly again if the contents are not at the bottom of the wells.
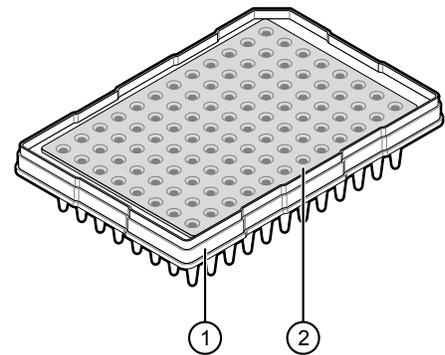
① Plate
② Septum

Load the plate onto the instrument immediately or keep the plate on ice and protected from light until it is loaded onto the instrument.

Prepare the tubes   On a clean and level surface:

1. Place the tubes in the MicroAmp™ 96-well tray, then place the tray retainer over the tubes.

2. Pipet the sample into the tubes.

3. Place a septum on the tubes.
    a. Align the holes of the septa with the tubes.

    b. Press gently until the septum are inserted into position in each tube.

4. Centrifuge the tube assembly briefly to collect the contents at the bottom of each tube.
   Centrifuge the tube assembly again if the contents are not at the bottom of the tubes.
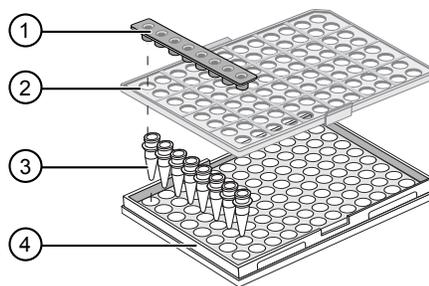
① Septum
② 96-well retainer
③ 8-tube strip
④ MicroAmp™ 96-well tray

Load the tube assembly onto the instrument immediately or keep the tubes on ice and protected from light until they are loaded onto the instrument.

Load the plate or the tube assembly   In the home screen:

1. Touch ⏏, touch ▦ **Eject plate**, then open the instrument door when prompted.

2. Press the release button on the autosampler to open the lid.

3. Place the plate or tube assembly firmly in the autosampler.

4. Check the buffer fill level:
    a. Remove the CBC.

    b. Ensure that the level of buffer is above the fill line.
       If the buffer is at or below the fill line, see *SeqStudio™ Genetic Analyzer Instrument and Software User Guide*.
       If the buffer is above the fill line, reinsert the CBC.

5. Place the plate or tube assembly firmly in the autosampler.
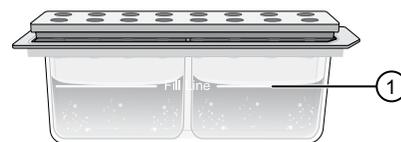
① Replace if buffer is at or below the fill line
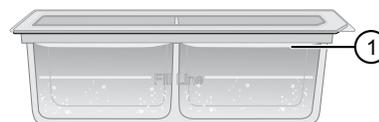
① New CBC buffer level

6. Close the autosampler lid: Press down on the center of the lid or press down on both sides of the lid with equal pressure until the lid clicks shut.

7. Touch **Retract plate**, then close the instrument door.

Unload the plate or the tube assembly

When the run is complete:

1. Touch ⏏, touch ⊞ **Eject plate**, then open the instrument door when prompted.

2. Press the release button on the autosampler to open the lid.

3. Remove the plate or tube assembly.

4. Close the autosampler lid: Press down on the center of the lid or press down on both sides of the lid with equal pressure until the lid clicks shut.

5. Touch **Retract plate**, then close the instrument door.

3 Set up a plate using default settings (Plate Manager)

Access the Plate Manager

- To access the Plate Manager from your Connect cloud-based platform account:

    a. Sign in to **thermofisher.com/ connect**.

    b. In the **My apps** list, select **SeqStudio™ Plate Manager**.

    If SeqStudio™ Plate Manager is not listed under **My apps**, scroll down in the **All apps** list.

- To access the Plate Manager from the desktop:

    a. Select **Start ▶ All Programs ▶ Applied Biosystems ▶ Plate Manager ▶ Plate Manager**.
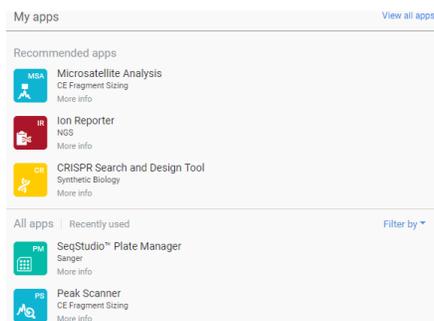
Create or open a plate setup PSM file

1. Click **PM** to display the home screen.

2. In the **Plate setup** screen, create or open a plate setup:

   If you are running the Plate Manager on the Connect cloud-based platform:

Click...	To...
New	Create a new plate setup or to create a plate setup from a template.
Open from cloud	Open a plate setup that you created in Plate Manager on your Connect cloud-based platform account.
Open from local drive	Open a plate setup that you created in Plate Manager on your computer (PSM file) or in another application (CSV file).

   If you are running the Plate Manager on the desktop:

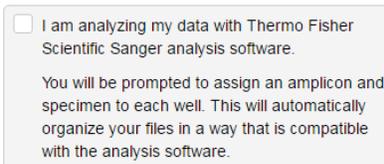| Click...	To...
New	Create a new plate setup or to create a plate setup from a template.
Open	Open a plate setup that you created in Plate Manager (PSM file) or in another application (CSV file).

Enter plate properties

In the **Properties** tab:

1. *(Optional)* Edit the **Plate name**, **Barcode**, or **Owner**.

2. Select an option in the **Plate setup security** field.
   - **Hidden**—Prevents other users from using or accessing the plate on the instrument. The last settings specified by the signed-in user are applied when a **Hidden** plate setup is opened or imported on the instrument.
   - **Shared**—Allows other users to access and edit the plate on the instrument. Analysis settings saved in the plate setup.

3. Select the **Application type**: **Sequencing, Fragment analysis**, or **Mixed plate (sequencing & fragment)**.

   A mixed plate allows you to specify fragment analysis and sequence analysis settings on the same plate.

4. *(Optional for Sequencing or Mixed plate)* Select the **I am analyzing my data with Sanger variant analysis software** checkbox.
   The amplicon and specimen fields are added to the **Plate** view, and the attributes are automatically added to the default file name conventions (see the software help for more information).

   ☐ I am analyzing my data with Thermo Fisher Scientific Sanger analysis software.

   You will be prompted to assign an amplicon and specimen to each well. This will automatically organize your files in a way that is compatible with the analysis software.

This feature is useful in secondary analysis software applications that organize files based on amplicon and specimen information (Connect cloud-based platform applications: Variant Analysis (VA) module, Next-generation Confirmation (NGC) module; desktop applications: SeqScape™ Software, Variant Reporter™ Software, Minor Variant Finder Software).

5. Click **Next**.

Assign wells: Sample and run information

1. In the **Plate** screen, click a well to select an injection group, or Shift+click to select multiple injection groups.
   Each set of 4 wells on the plate is referred to as an injection group.
   The default injection order is: A1-D1, E1-H1, A2-D2, E2-H2....A12-D12, E12-H12.

2. If you are creating a mixed plate, select the **Application type** for the selected injection groups.

3. *(Fragment analysis only)* Select the **Sample type** for each well: **Allelic ladder**, **Negative control**, **Positive control**, or **Sample**.

4. *(Fragment analysis only)* Select a size standard for the selected injection groups.

5. Select a **Dye set** for the selected injection groups.

6. Select a **Run module** for the selected injection groups.

7. Click **Next** and proceed to "Save a plate setup in the Plate Manager" on page 18.

Save a plate setup in the Plate Manager

After you assign wells to a plate setup:

1. In the **Save the plate setup** dialog box, modify any settings as needed.

2. Click **Save**.

   Note: The **Monitor my run button** is available only in the Connect cloud-based platform app.

If you are running the Plate Manager on the...	The plate setup is saved as a...
Connect cloud-based platform	Plate setup that you can open from the Connect cloud-based platform and run on the instrument.
Desktop	PSM file that you can open from a network drive or a USB and run on the instrument.

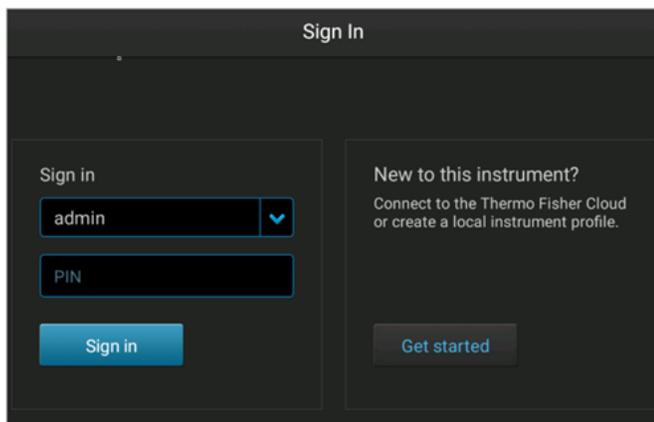# 4 Set up a plate using default settings (instrument)

Sign in

1. If another user is signed in, touch ⊚ in the home screen, then touch **Sign out**.

2. In the **Sign in** screen, touch **Sign In**, then select your instrument profile and enter your PIN.

(Optional) Set up for auto export of sample data files (AB1 and FSA)

By default, sample data files (AB1 and FSA) are saved to the instrument.

When you create a plate setup, you can also set the **Save location** to **Cloud**, **Network Drive**, and/or **USB**.
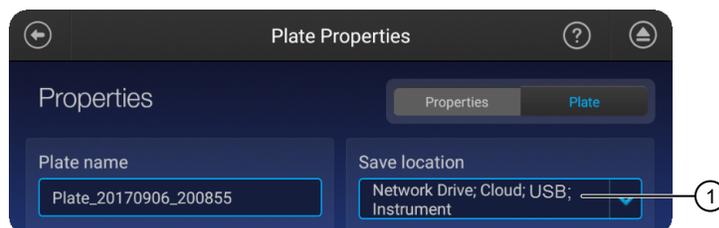
① Save location

When the plate is run, the instrument automatically exports the sample data files to the save locations.

Before you can select these save locations, set up the instrument:

- Appendix A, "Link the instrument to your Connect cloud-based platform account —detailed instructions"
- Connect to a network drive (see *SeqStudio™ Genetic Analyzer Instrument and Software User Guide*)
- Insert a USB into the USB port on the front of the instrument

Create or import a plate setup

In the home screen:

1. Touch **Set up run**.

2. Create, open, or import a plate setup:

To	Procedure
Create a new plate setup	1. Touch **Create new plate setup**. 2. See "Enter plate properties" on page 21.
Open an existing plate setup on the instrument	1. Touch 🖥 **My Instrument**. 2. Touch: • **My plates** folder to select hidden plates that you have created. • **Public** folder to select (1) shared plates that were created by any user or (2) any plates that were created by a Guest user.
Import a plate setup	1. Touch ☁ **Cloud**, ▭ **USB**, or ▤ **Network Drive**. 2. Select: • 📄 PSM file • 📄 CSV file

Export or delete a plate setup (PSM file)

1. Touch **Set up run**, then touch 🖥 **My instrument**.

2. Touch **Manage** at the bottom left of the screen.

3. Touch a plate, then touch **Export** or **Delete**.

4. If you touched:

   • **Export**, select a storage location, then touch **Export**.
   • **Delete**, then touch **Yes** to delete the plate setup.

Enter plate properties

In the **Plate properties** screen:

1. Touch the **Plate name** field, then enter the plate name.

2. Touch **Applications**, then select **Sequencing**, **Fragment analysis**, or **Mixed plate** (allows you to specify fragment analysis and sequence analysis settings on the same plate).

3. *(Optional)* Touch the **Barcode** field, then use a scanner to scan the barcode.

4. *(Optional)* Touch the **Owner** field, then enter the plate owner name.

5. *(Optional)* Touch **More options** to check the **Plate setup security**, **Analysis settings**, and **File name convention**.

6. If you want to save the plate to a location in addition to the instrument, touch **Save location**, then select a location for the run results.

   The plate setup is always saved to the instrument. In addition, you can save the plate to the Connect cloud-based platform, a network, or a USB, which will auto export the sample data files.

   IMPORTANT! To view analyzed data in the Remote Monitoring App on the Connect cloud-based platform, you must save the plate setup to the Connect cloud-based platform.

   Note: If you save a plate setup to the Connect cloud-based platform, a network, or a USB, then access the plate setup at a later time when the instrument is not linked to the Connect cloud-based platform, a network, or a USB, the save location is displayed with strikethrough text.

7. *(Optional for Sequencing or Mixed plate)* Touch the **I am analyzing my data with Sanger variant analysis software** checkbox.

   The amplicon and specimen fields are added to the **Plate** view, and the attributes are automatically added to

   I am analyzing my data with Sanger variant analysis software.

   Files will be configured compatible with Sanger variant analysis software. You will be prompted to assign an amplicon and specimen to each well.

   the default file name conventions (see the software help for more information).

   This feature is useful in secondary analysis software applications that organize files based on amplicon and specimen information (Connect cloud-based platform applications: Variant Analysis (VA) module, Next-generation Confirmation (NGC) module; desktop applications: SeqScape™ Software, Variant Reporter™ Software, Minor Variant Finder Software).

Assign wells: run module, size standard, and dye set

In the **Plate properties** screen:

1. At the top-right of the screen, touch **Plate**.

   Each set of 4 wells on the plate is referred to as an injection group.

   An injection group is identified by the first well in the set of 4 (for example, Injection Group A1 contains wells A1–D1).

   The default injection order is: A1-D1, E1-H1, A2-D2, E2-H2....A12-D12, E12-H12.

2. Select injection groups, then touch **Edit**.

   • Touch a well to select a single injection group.

   • Touch and drag to select multiple injection groups or the entire plate.

3. If you are creating a mixed plate, select the **Application type** for the wells.

4. Touch **Run modules**, then select a run module.

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Chapter 4 Set up a plate using default settings (instrument)
Assign wells: sample name, sample type, and custom fields

4

5. *(Fragment analysis only)* Touch **Size standard**, then select a size standard for the injection group.

6. Swipe up to display the rest of the screen.

7. Touch **Dye set**, then select a dye set for the injection group.

8. Touch **Done**.

Assign wells: sample name, sample type, and custom fields

In the **Edit plate** screen:

1. Touch **Sample name** to display the well attributes fields.

2. Touch a setting, then enter the definition for the selected wells:
   - *(Fragment analysis only)* **Sample type**—**Sample**, **Positive Control**, **Negative Control**, or **Allelic Ladder**.
   - **Custom fields**—Text fields to include additional sample attributes or identifiers that can be used by secondary analysis applications.
   - *(Sequencing only)* **Amplicon and Specimen**—Amplicon and Specimen names for Sanger Sequence analysis, if you selected the option in the **Plate Properties** screen.

3. Touch **Done** to close the screen then **Done** to close the **Edit Plate** screen.

4. Touch **Save** to save the plate to run at a later time, or touch **Start Run**.

Save and/or run a plate setup

After you assign wells, you can:
- Touch **Save** to save the plate setup to run or edit later. When you touch save, the **Set up run** screen is displayed.
- Load the plate in the instrument, then touch **Start run** to run the plate setup.

5 Start and monitor a run

Load the plate or the tube assembly

In the home screen:

1. Touch ⏏, touch ▦ **Eject plate**, then open the instrument door when prompted.

2. Press the release button on the autosampler to open the lid.

3. Place the plate or tube assembly firmly in the autosampler.

4. Check the buffer fill level:

    a. Remove the CBC.

    b. Ensure that the level of buffer is above the fill line.

       If the buffer is at or below the fill line, see *SeqStudio™ Genetic Analyzer Instrument and Software User Guide*.

       If the buffer is above the fill line, reinsert the CBC.

① Replace if buffer is at or below the fill line

5. Place the plate or tube assembly firmly in the autosampler.

① New CBC buffer level

6. Close the autosampler lid: Press down on the center of the lid or press down on both sides of the lid with equal pressure until the lid clicks shut.

7. Touch **Retract plate**, then close the instrument door.

Select a plate setup and start a run

After you load the plate in the instrument (see "Load the plate or the tube assembly" on page 14):

1. In the instrument home screen, touch **Setup run**.

2. Select the location of your plate setup, then select the plate setup.

3. Verify that settings are as needed.

4. Touch **Start run**.

When the run starts, the instrument automatically:

- Performs an optical alignment each time a cartridge is inserted.
- Performs an automatic spectral calibration adjustment (auto calibration) for each sample to correct for spectral overlap.

During a run, an administrator can lock the touchscreen to prevent other users from using the instrument. Only the user who started the run or an administrator can sign in to the instrument if the touchscreen is locked.

Proceed to:

- "Monitor a run from the instrument" on page 34

Start a run on the instrument

1. Sign in to the instrument.

2. In the home screen, touch **Set up run**, touch the location of a saved plate setup, then open a plate setup.

3. Load the plate in the instrument.

4. Touch **Start run**.
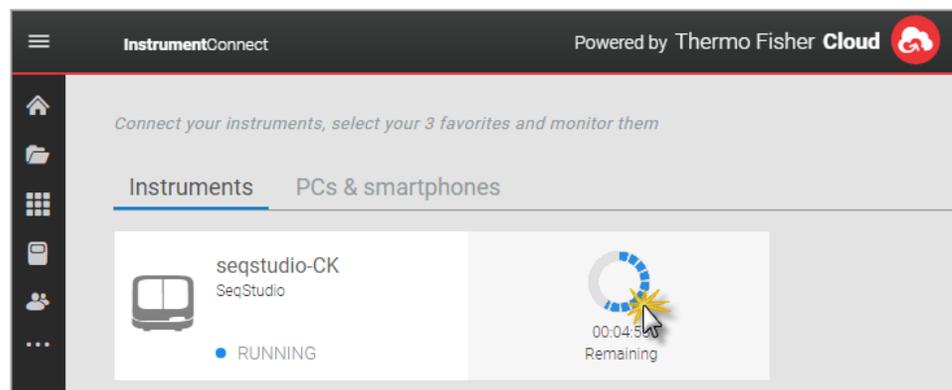
Monitor a run from the Connect cloud-based platform

Open the Remote Monitoring App from Instrument Connect App

A run is accessible from InstrumentConnect for 24 hours after the run is complete, or until another run is started.

1. Sign in to **thermofisher.com/connect**.

2. Click 🗗 to access InstrumentConnect.
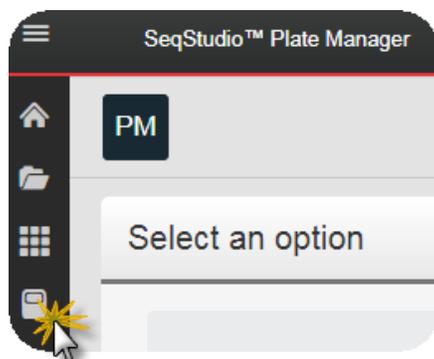
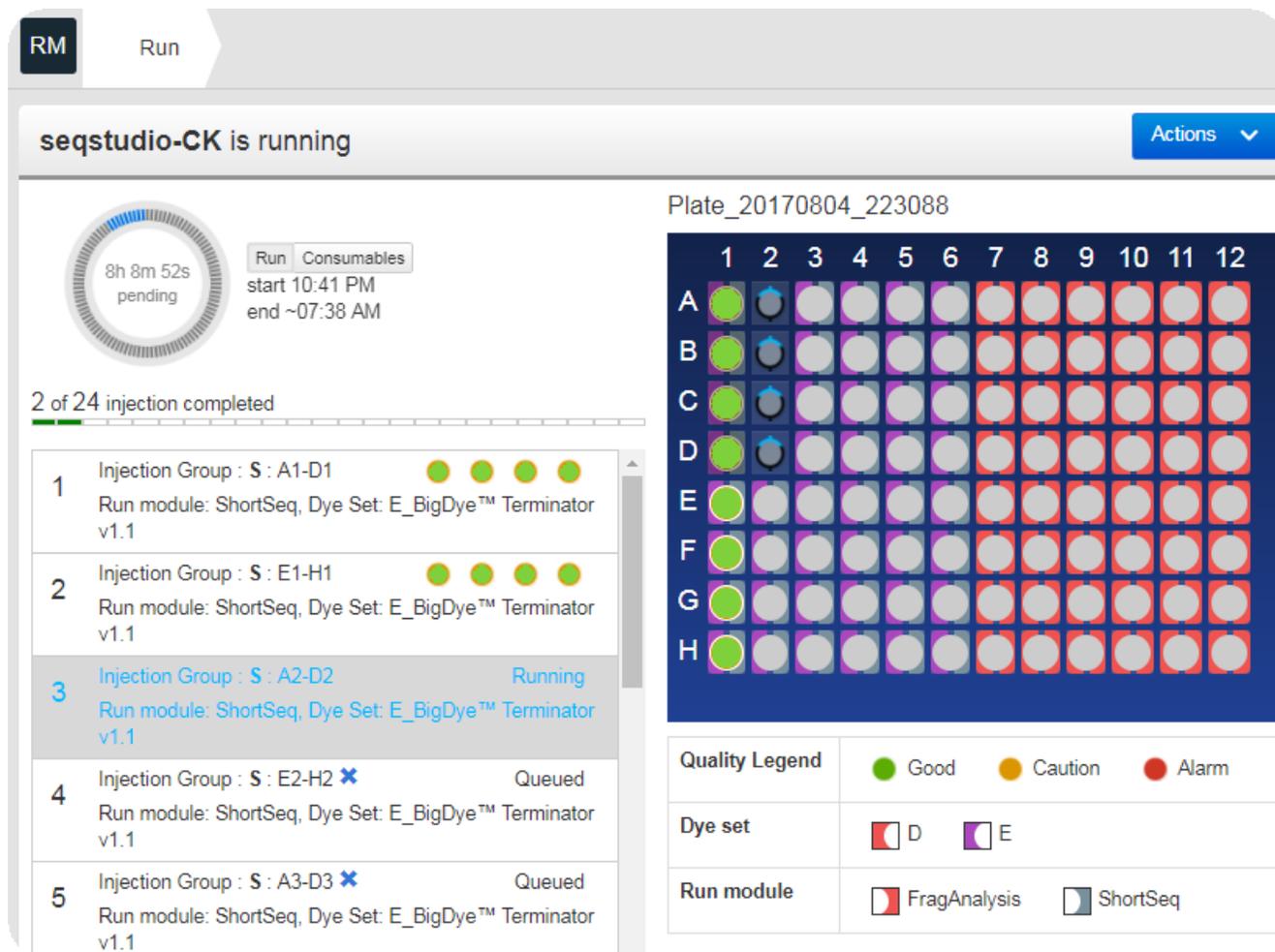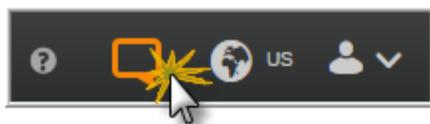3. Click the run status dial to display the Remote Monitoring App.

Figure 1 Remote Monitoring App

View notifications from the instrument on your Connect cloud-based platform account

1. In any screen in the Connect cloud-based platform, click 🖵.

2. Click a notification, then click **Dismiss** or **Dismiss all** to dismiss the notification.

Pause or cancel an injection in the Remote Monitoring App

Select:

- **Actions ▸ Pause plate** to pause the run after the currect injection is complete.
- **Actions ▸ Stop current injection** to immediately stop the injection.

View results in the Remote Monitoring App on the Connect cloud-based platform

1. Open the Remote Monitoring App (see "Open the Remote Monitoring App from Instrument Connect App" on page 26).

2. Click an injection group in the injection list or the plate view.

   The status dials are color-coded for quality alerts:

   - 🟢 —All QC tests passed.
   - 🟡 —At least 1 warning quality alert was triggered.
   - 🔴 —At least 1 failing quality alert was triggered.

   Note: The **Analyzed** tab is disabled if the **Save location** for the plate setup is not set to **Cloud** or if the injection group has not finished running.

3. In the **Quality alerts** screen, click the **Raw**, **EPT**, or **Analyzed** tab to view data.

4. As needed, select **Actions ▸ Re-inject group**, select the **Run module** and settings, then click **Inject**.

Remote Monitoring App raw trace
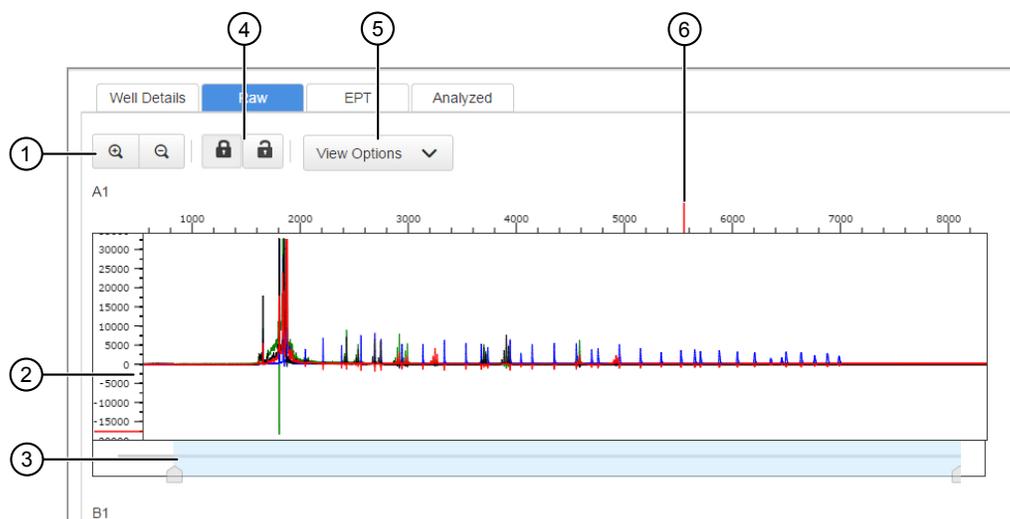
Figure 2 Fragment analysis raw trace

① Zoom in/out.

② Raw trace.

③ Thumbnail trace—Click-drag to view another region of the trace.

④ Lock/unlock trace zooming for all traces in the injection group.

⑤ View Options—Select the dye color to display; set vertical scaling.
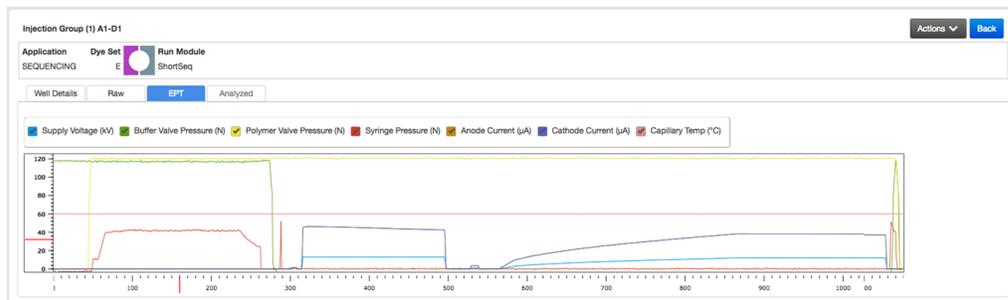
⑥ Cursor position indicator (red line).
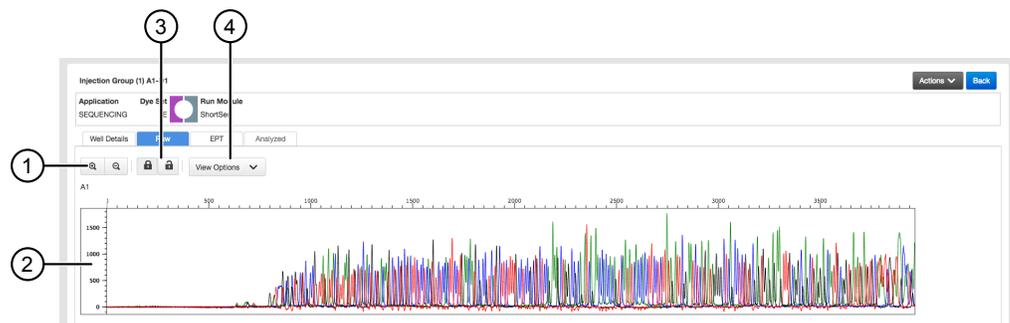
Figure 3 Sequence analysis raw trace

① Zoom in/out.

② Raw trace.

③ Lock/unlock trace zooming for all traces in the injection group.

④ View Options—Select the basecalls to display; set vertical scaling.

Remote Monitoring App EPT trace

The EPT view (ElectroPhoresis Telemetry) shows instrument data conditions (currents, temperatures, electrophoresis voltage) as a function of time.

Remote Monitoring App analyzed trace

Figure 4 Fragment analysis analyzed trace

① Lock/unlock trace zooming for all traces in the injection group.

② Zoom in/out.

③ Analyzed trace.

④ Thumbnail trace—Click-drag to view another region of the trace.

⑤ View Options—Select the dye colors to display; set vertical scaling.

⑥ Cursor position indicator (red vertical and horizontal tick marks outside trace).

⑦ Size standard curve (red line).
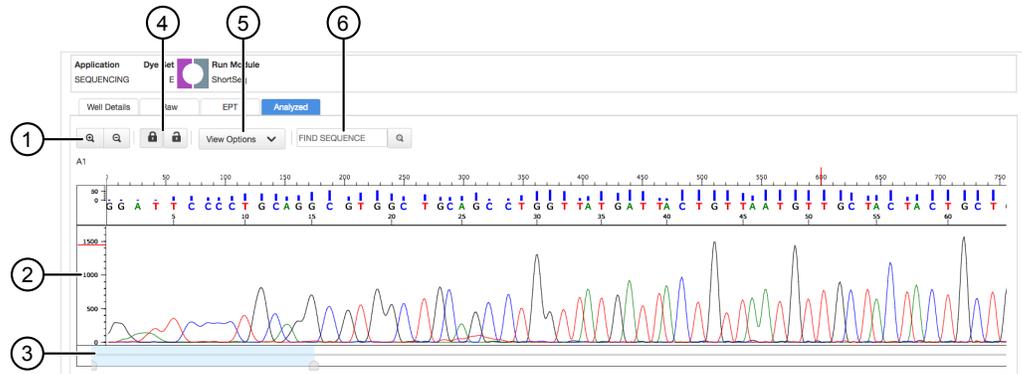
⑧ Actions—Select commands to pause and cancel injections.

Figure 5 Sequence analysis analyzed trace

① Zoom in/out.

② Analyzed trace.

③ Thumbnail trace—Click-drag to view another region of the trace.

④ Lock/unlock trace zooming for all traces in the injection group.

⑤ View Options—Select the basecalls to display; show/hide quality bars and values; set vertical scaling.

⑥ Search for a sequence.

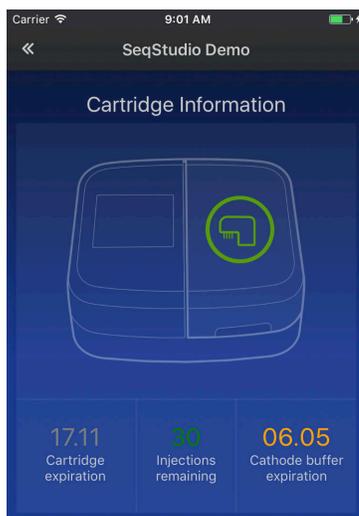# Monitor a run from a mobile device

Before you begin, see "Link the instrument from a mobile device" on page 47.
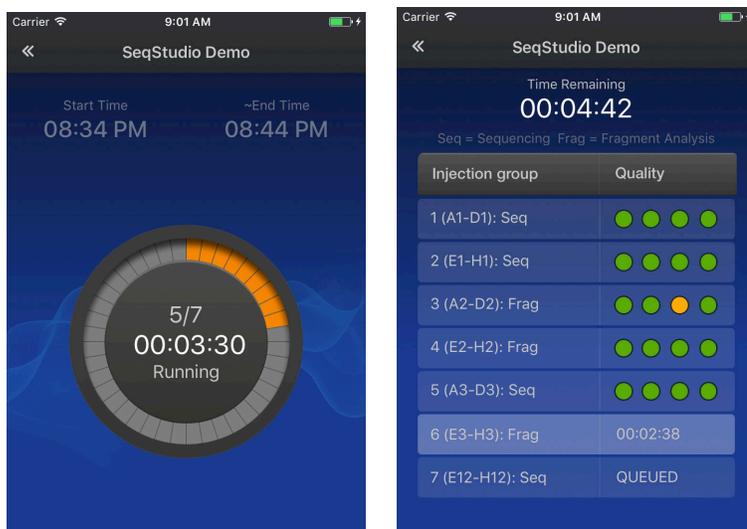
1. On your mobile device, launch InstrumentConnect.

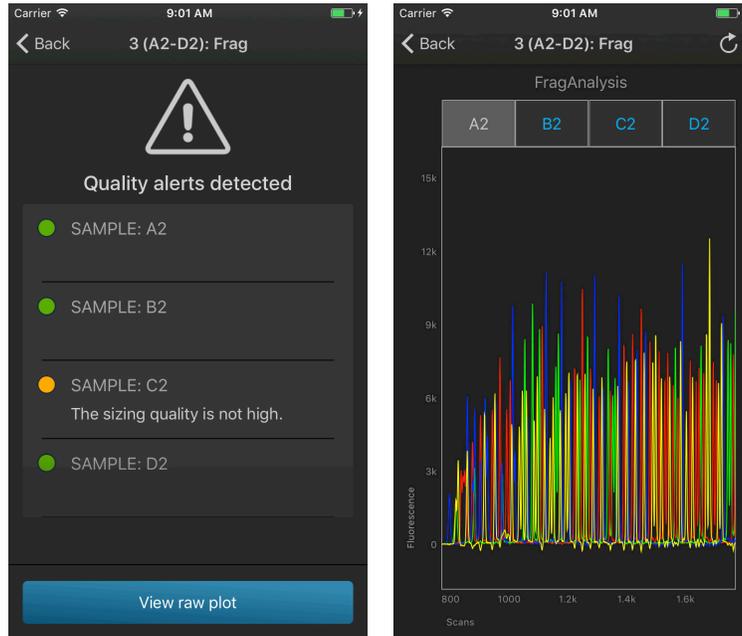2. Touch the instrument to monitor.
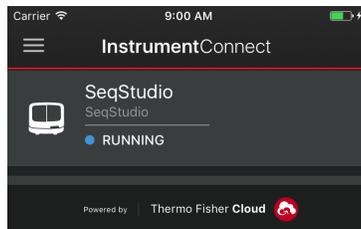
3. Swipe left to view consumable status.

4. Touch the status dial to view the injection list.

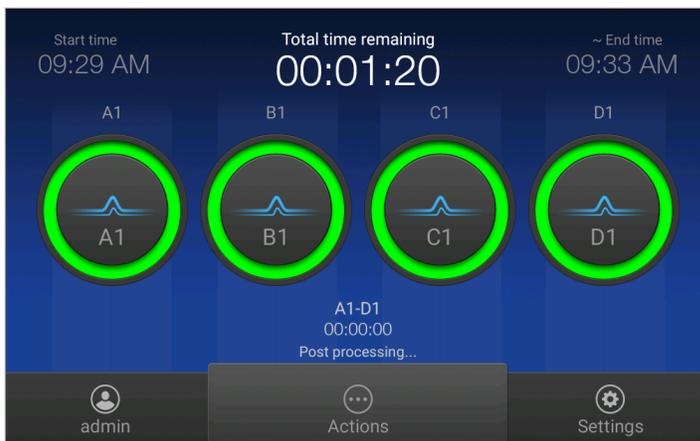5. Touch an injection group to display quality alerts, then touch **View raw plot** to view the data.

- Swipe left to view the entire trace.
- Pinch-zoom to expand the trace.

Monitor a run from the instrument

View the run status

In the home screen:

View the run time information and the status dial for each capillary.

The status dials are color-coded for quality alerts:

- 🟢 —All QC tests passed.
- 🟡 —At least 1 warning quality alert was triggered.
- 🔴 —At least 1 failing quality alert was triggered.

If an injection group is set to re-inject, the number of the current injection is displayed on the status dials.

View real-time results

During a run, in the home screen:

Touch one of the injection dials to display the trace for the selected capillary.

See "Fragment analysis trace" on page 39 or "Sequence analysis trace" on page 40 for information.

Pause a plate or cancel or stop injections

In the **home** screen:

1. Touch ⊙ **Actions**.

2. Manage the plate or injections:

Touch	To
View results	View the list of injections and status.
Edit plate	For injections that have not yet been run, edit **Sample Name**, **Run Module**, **Dye Set**, **Size Standard**, **Sample Type**, and custom fields.
Pause plate	Stop the run after the current injection is complete. Touch **Resume** to continue the run.
Stop current injection	Stop the current injection immediately. Touch **Resume** to continue the run.
Cancel remaining injections	Specify whether to cancel the run immediately or after the current injection is complete.
Injection options	Move an injection to the top of the injection list, edit run module information, and/or reinject samples.

View results for the current plate

When a run is complete, in the home screen:

1. Touch **View Results**.

2. Touch **List view**.
   Each injection group displays a QC color for each capillary:
   - 🟢 —All QC tests passed.
   - 🟡 —At least 1 warning quality alert was triggered.
   - 🔴 —At least 1 failing quality alert was triggered.

3. Touch an injection group.

4. View the results in the **Run Result Details** screen, or touch 📄 for well details.

5. Touch a sample file name.

6. Touch and drag the thumbnail view of the analyzed trace (below the trace) to scroll left or right.

7. *(Optional)* Adjust the graphical view (see "Adjust the trace display" on page 42).

8. Touch ❯ or ❮ to scroll to the raw data or **EPT Plot** (ElectroPhoresis Telemetry).

(Optional) View the injection list, change injection settings or order, or specify replicates and re-injections

In the **Plate properties** screen:

1. Touch **Injection options**.

2. Touch an injection group, then configure the injection list:

    *   Touch and drag an injection group to a new location in the injection list.
    *   Touch **Inject first**—Moves the selected injection group to the top of the injection list.
    *   Touch **Edit and re-inject**—Adds replicates or re-injections to the injection list. You can also modify **Run module**, **Injection time**, **Injection voltage**, **Run time**, or **Run voltage** for these injections.

        Note: Changes to **Injection time**, **Injection voltage**, **Run time**, or **Run voltage** are not saved to the plate setup and will be used during the current plate run only.

3. Touch **Done**.

View and analyze results

View results in the Remote Monitoring App on the Connect cloud-based platform

1. Open the Remote Monitoring App (see "Open the Remote Monitoring App from Instrument Connect App" on page 26).

2. Click an injection group in the injection list or the plate view.

    The status dials are color-coded for quality alerts:

    - 🟢 —All QC tests passed.
    - 🟡 —At least 1 warning quality alert was triggered.
    - 🔴 —At least 1 failing quality alert was triggered.

    Note: The **Analyzed** tab is disabled if the **Save location** for the plate setup is not set to **Cloud** or if the injection group has not finished running.

3. In the **Quality alerts** screen, click the **Raw**, **EPT**, or **Analyzed** tab to view data.

4. As needed, select **Actions ▸ Re-inject group**, select the **Run module** and settings, then click **Inject**.

View results on the instrument

View results for the current plate

When a run is complete, in the home screen:

1. Touch **View Results**.

2. Touch **List view**.
   Each injection group displays a QC color for each capillary:
   - 🟢 —All QC tests passed.
   - 🟡 —At least 1 warning quality alert was triggered.
   - 🔴 —At least 1 failing quality alert was triggered.

3. Touch an injection group.

4. View the results in the **Run Result Details** screen, or touch 📄 for well details.

5. Touch a sample file name.

6. Touch and drag the thumbnail view of the analyzed trace (below the trace) to scroll left or right.

7. *(Optional)* Adjust the graphical view (see "Adjust the trace display" on page 42).

8. Touch ❯ or ❮ to scroll to the raw data or **EPT Plot** (ElectroPhoresis Telemetry).

Fragment analysis trace
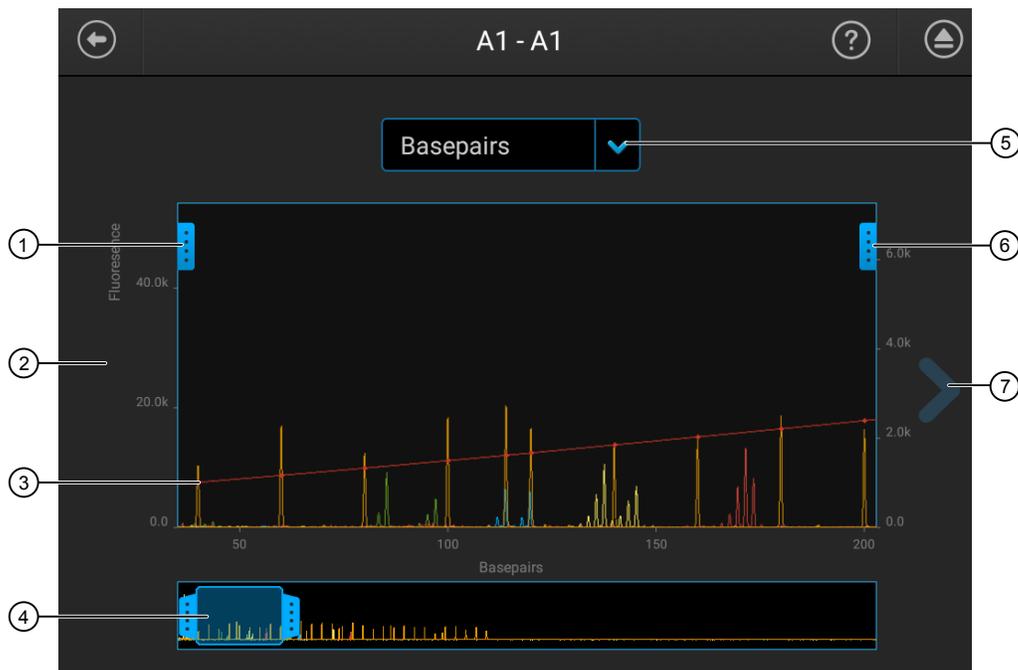
① Trace color hide/show—Touch to open, then touch a color to hide or show.

② Analyzed trace

③ Size standard curve (red line)

④ Thumbnail trace—Drag the center of the pane in the thumbnail trace to display another trace area in the top pane. Drag the right or left handle of the pane to zoom horizontally.

⑤ Basepair or scan display selection.

⑥ Zoom tools—Touch to open.

⑦ Next trace tool—Touch to view the raw trace or EPT for the well.

6

Sequence analysis trace
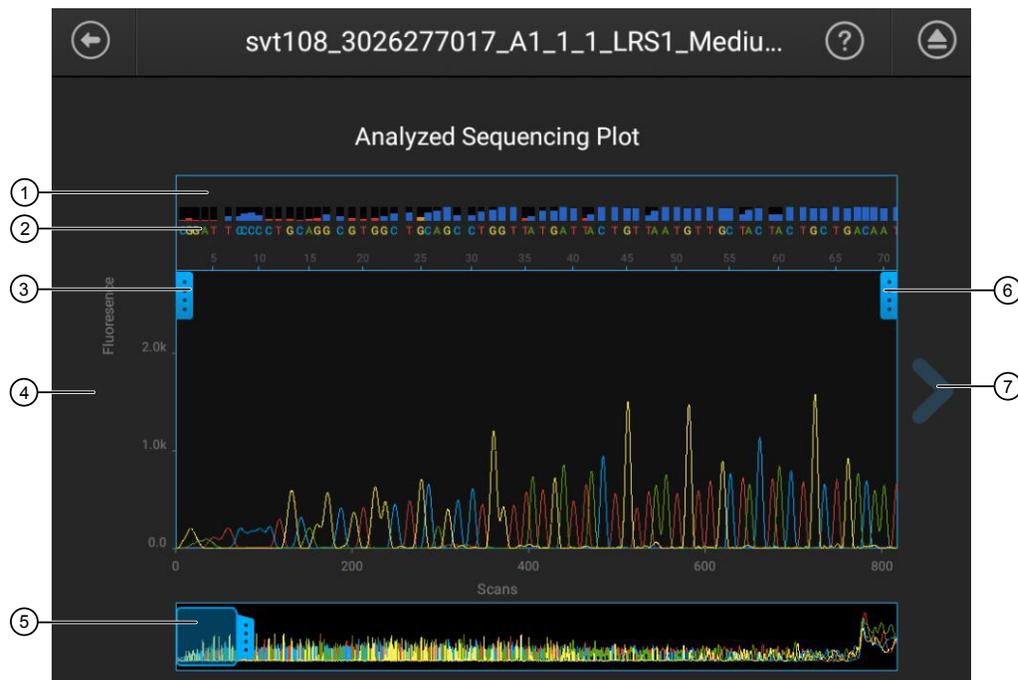
① Quality Value bars and values:

- ▮ Pure base with QV ≥20
- ▮ Pure base with QV 15–19
- ▮ Pure base with QV <15
- ▮ Mixed base

② Bases—Mixed basecalls are highlighted in red (if they exceed the **Mixed base threshold** specified in analysis settings; see *SeqStudio™ Genetic Analyzer Instrument and Software User Guide*).

③ Trace color hide/show—Touch to open, then touch a color to hide or show.

④ Analyzed trace

⑤ Thumbnail trace—Drag the center of the pane in the thumbnail trace to display another trace area in the top pane. Drag the right or left handle of the pane to zoom horizontally.

⑥ Zoom tools—Touch to open.

⑦ Next trace tool—Touch to view the raw trace or EPT for the well.

EPT plot

The EPT view (ElectroPhoresis Telemetry) shows instrument data conditions (currents, temperatures, electrophoresis voltage) as a function of time.


Touch ⁞ on the left border of the plot to display the legend.
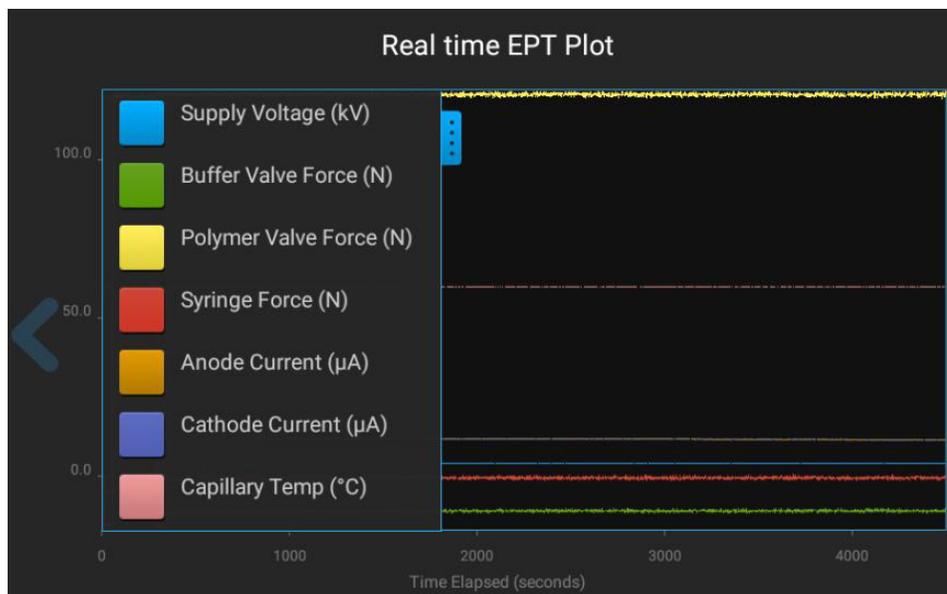
Adjust the trace display

See "View results for the current plate" on page 35 to access results.

- Drag one finger to pan to the left or right.

- Zoom in and out by pinching and expanding with two fingers.

- Touch ⁝ on the left border of the trace, then touch a dye to deselect.

- Touch ⁝ on the right border of the trace, then touch ⊕ **Zoom In**, ⊖ **Zoom Out**, or ⤡ **Fit to screen** to adjust the display.

- Drag the center of the pane in thumbnail view to scroll left or right.
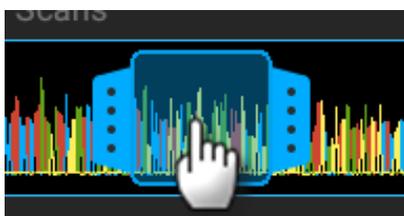
- Drag the right or left handle of the pane to zoom horizontally.
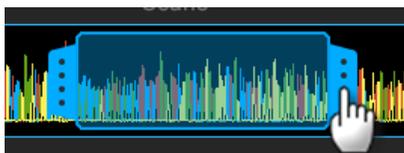
View results for a previously run plate (run history)

In the home screen:

1. Touch ⚙ **Settings** ▸ **Run history**.

2. Touch a plate name, then touch **View**.
   If you select more than one plate name, the **View** button is dimmed.

3. Touch a sample file name.

4. View the results in the **Run history** screen, or touch 🛈 to view well details.

5. Touch a sample file name, then touch **View**.
   If you select more than one sample file name, the **View** button is dimmed.

6. Touch and drag the thumbnail view of the analyzed trace (below the trace) to scroll left or right.

7. Touch ❯ or ❮ to scroll to the raw data or **EPT Plot**.

Edit injection parameters and re-inject samples

You can edit injection parameters and re-inject samples during a run or after a run is complete.

1. Access **Injection options**.

   - During a run—Touch ⊙ **Actions** ▸ **Edit plate**.
   - After a run—Touch **Results**.

2. Touch an injection group, then configure the injection list:

   - Touch and drag an injection group to a new location in the injection list.
   - Touch **Inject first**—Moves the selected injection group to the top of the injection list.
   - Touch **Edit and re-inject**—Adds replicates or re-injections to the injection list. You can also modify **Run module**, **Injection time**, **Injection voltage**, **Run time**, or **Run voltage** for these injections.

3. Touch **Done**.

   Note: The changes are not applied until you touch **Done**.

Export a report (QC report)

This function allows you to export a QC report for the current plate. To export a QC report for a previously run plate, export a run history (see "Export results from the instrument (sample data files and QC reports)" on page 43).

When a run is complete, in the home screen:

1. Touch **Results**.

2. Touch **Export report**.

3. Select a storage location.

4. Navigate to, then select a location, then touch **Export**.

Export results from the instrument (sample data files and QC reports)

In the home screen:

1. Touch ⊛ **Settings** ▸ **Run history**.

2. Select one or more plates from the **Run History** table.

3. Touch **Export**.

4. Select a storage location.

The following data is exported for the plate:
- Fragment analysis—FSA file for each sample.
- Sequencing—AB1 file for each sample.
- Plate QC report in CSV and PDF format.

Note: If you select a plate, select **View**, then select **Export**, only an FSA or AB1 file for each analyzed sample is exported.

Analyze data

1. Export results (see "Export results from the instrument (sample data files and QC reports)" on page 43) or use auto exported data.

2. Use an appropriate fragment analysis or sequencing application to analyze the data.

   Note: Data from the SeqStudio™ Genetic Analyzer may be labeled as "3200" in secondary analysis software.

Secondary analysis software

Secondary analysis software is available for desktop computers and on your Connect cloud-based platform account.

Visit **thermofisher.com/connect** for the latest available secondary analysis applications.

Note: Data from the SeqStudio™ Genetic Analyzer may be labeled as "3200" in secondary analysis software.

Secondary analysis apps on the Connect cloud-based platform

Analysis	App	Description
Sequencing	Quality Check (QC) module	• Automatically checks sequence trace quality. • Provides a results summary that is based on quality parameter settings. • Auto-flags lower-quality traces for further inspection.
	Variant Analysis (VA) module	• Finds variants in samples that are sequenced on Applied Biosystems™ genetic analyzers. • Reports variants at genomic coordinates. • Allows export of variant calls in standard Variant Call Format.
	Next-generation Confirmation (NGC) module	• Confirms next-generation sequencing (NGS) variants using CE technology. • Allows visualization of the variants that are detected by both NGS and CE platforms. • Allows export of confirmed variants in standard Variant Call Format.
Fragment analysis	Sizing Analysis Module Peak Scanner™ Software	Performs peak sizing.

Analysis	App	Description
Fragment analysis	Microsatellite Analysis Software MSA	Analyzes a mixture of DNA fragments, separated by size, on supported capillary electrophoresis systems.

Desktop secondary analysis software

IMPORTANT! Older versions of the desktop secondary analysis software cannot analyze data files generated by the SeqStudio™ Genetic Analyzer. Contact Support for information on obtaining the latest versions of software.

Analysis	Software	Minimum version required
Sequencing	Sequencing Analysis Software	6.2
	SeqScape™ Software	3.2
	Variant Reporter™ Software	2.2
	Minor Variant Finder Software	1.2
Fragment analysis	GeneMapper™ Software	5.1

A Link the instrument to your Connect cloud-based platform account— detailed instructions

Workflow: Set up the instrument for access to the Connect cloud-based platform

Register and obtain a Connect cloud-based platform account
(page 47)

▼

Link the instrument to your Connect cloud-based platform account in any of the following ways:

- Link the instrument from a mobile device
  (page 47)
- Link the instrument using a link code
  (page 49)
- Link the instrument using your Connect cloud-based platform account
  (page 52)

Appendix A Link the instrument to your Connect cloud-based platform account—detailed instructions
Register and obtain a Connect cloud-based platform account

A

Register and obtain a Connect cloud-based platform account

1. Go to **www.thermofisher.com**.

2. On the home page, select **Sign In ▶ Register**.
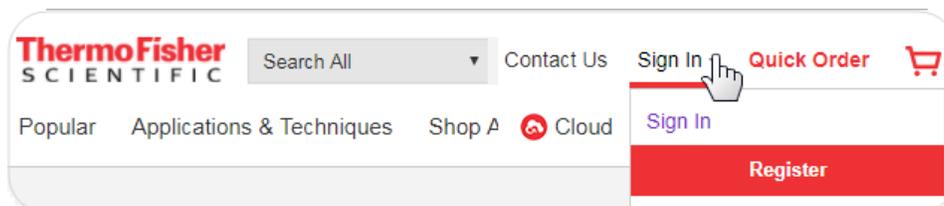
3. Fill in all information, then click **Create account**.
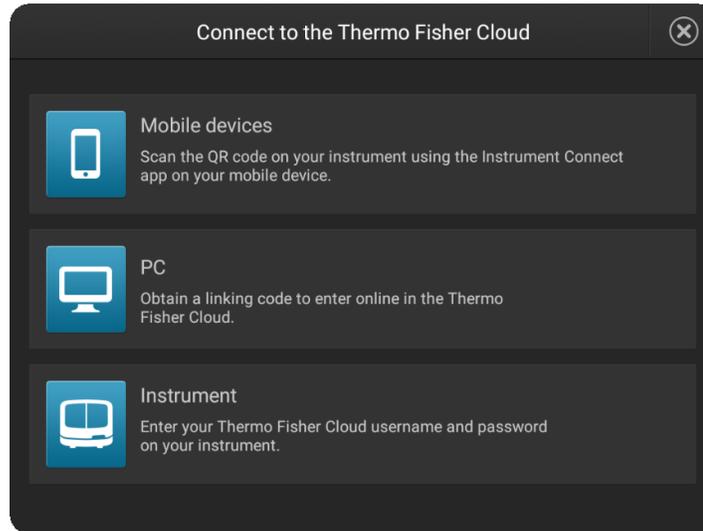
Link the instrument from a mobile device

**Create a Connect cloud-based platform PIN and generate the QR code on the instrument**

1. Sign in to **thermofisher.com/connect**.

2. Click 📱 to access InstrumentConnect.

3. If you have not previously set up a PIN, click **Update PIN**, then enter a PIN that you will use to sign in to the instrument.

4. From the instrument **Sign In** screen, navigate to the **Connect to the Thermo Fisher Cloud** screen:

Do you have a local instrument profile?	Description
Yes	1. Touch **Sign in**, then enter your PIN. 2. In the home screen, touch **Setup run**. 3. In the **Setup run** screen, touch **Cloud**.
No	Touch **Get started ▶ Connect**.

5. Touch **Mobile devices**.

The QR code is displayed.
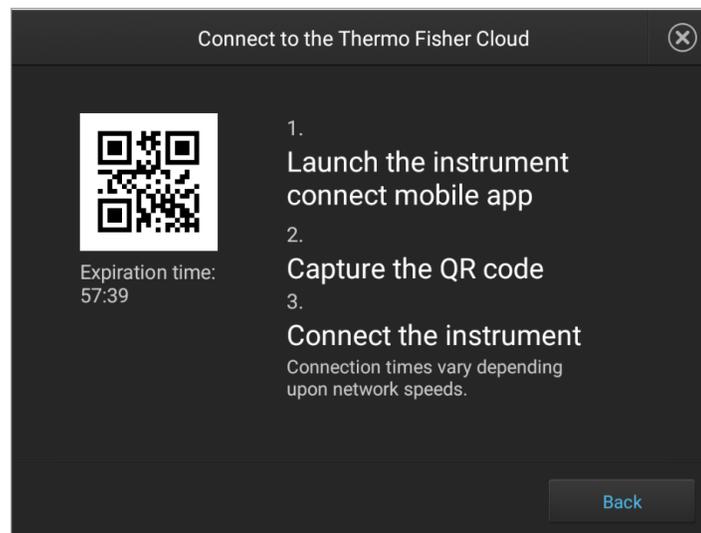
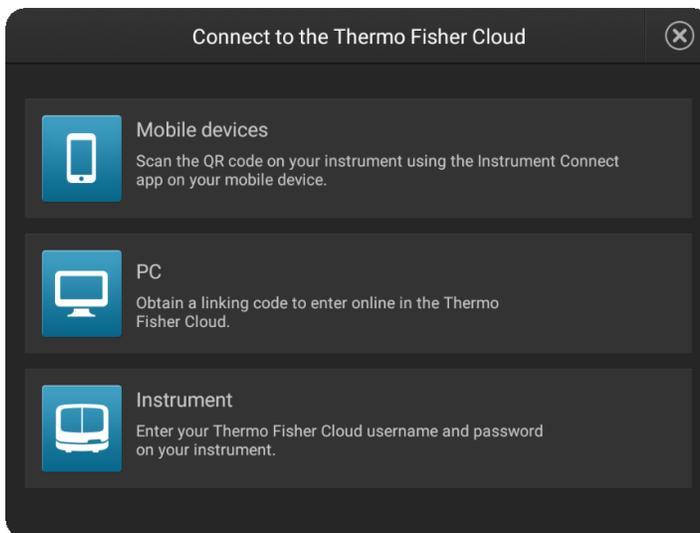**Register the instrument with the Instrument Connect App**

1. On your mobile device, download the InstrumentConnect from the Apple Store or from Google™ Play.

2. Launch, then sign in to the mobile app on your mobile device.

3. Register the instrument:

   a. Touch ☰ , then touch **Register Instrument**.

   b. Touch **QR code** on your mobile device.

   c. With your mobile device, scan the QR code displayed in the instrument touchscreen.

Appendix A Link the instrument to your Connect cloud-based platform account—detailed instructions
Link the instrument using a link code

A

Link the instrument using a link code

1. From the instrument **Sign In** screen, navigate to the **Connect to the Thermo Fisher Cloud** screen:

Do you have a local instrument profile?	Description
Yes	1. Touch **Sign in**, then enter your PIN. 2. In the home screen, touch **Setup run**. 3. In the **Setup run** screen, touch **Cloud**.
No	Touch **Get started ▸ Connect**.

2. Touch **PC**.

A unique link code is displayed.
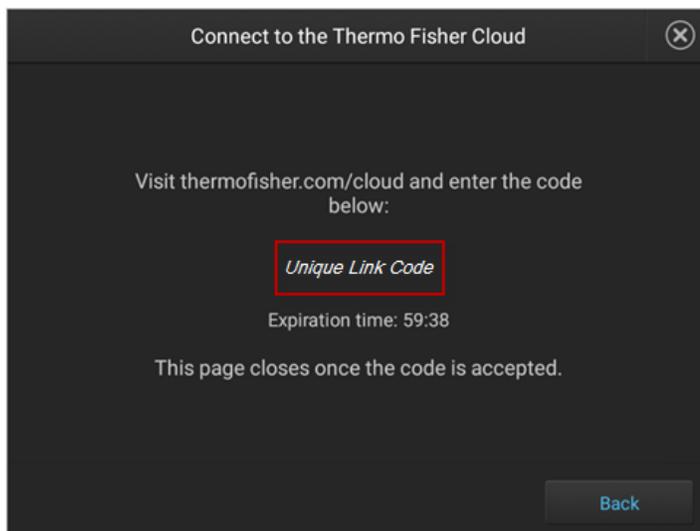
3. Sign into your Connect cloud-based platform account on a separate computer. Go to **thermofisher.com/connect**.

4. Click ⊟ , then click **Add an Instrument**.

5. Select **SeqStudio™**, then click **Next**.
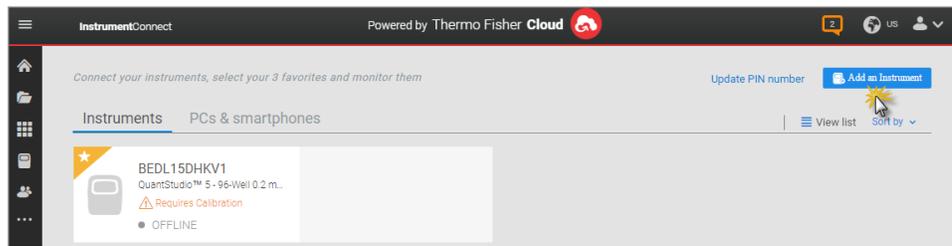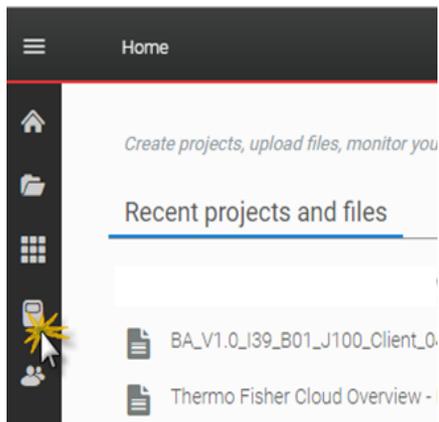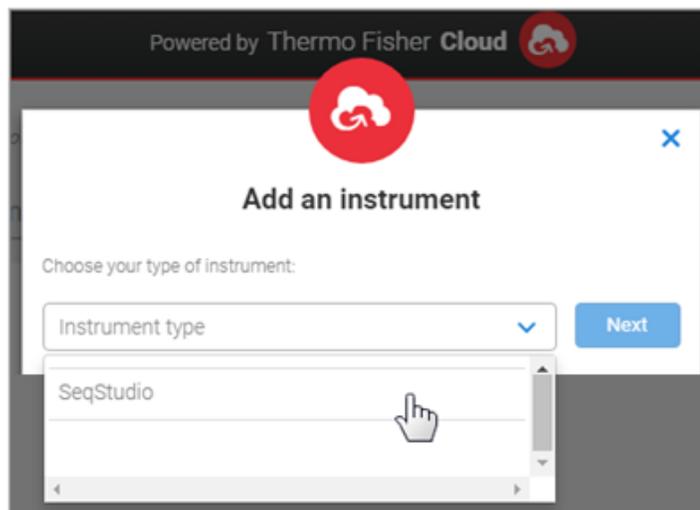
Appendix A Link the instrument to your Connect cloud-based platform account—detailed instructions
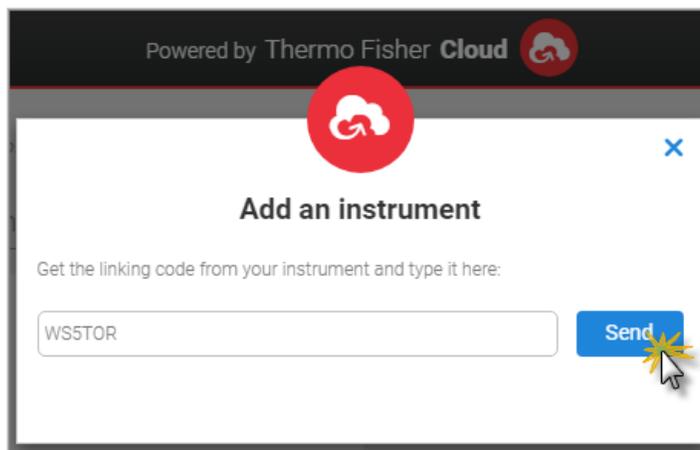*Link the instrument using a link code*

A

6. Enter the link code from the instrument touchscreen (from step 2), then click **Send**.

7. If you have not previously set up a PIN, enter a PIN to use when you sign in to an instrument, then click **Send**.
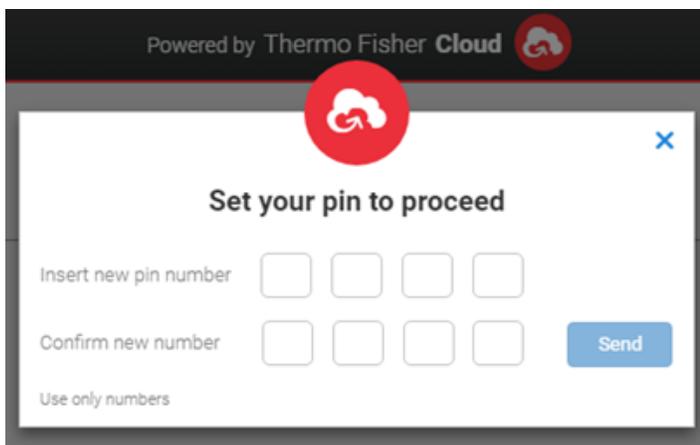
A start linking message is displayed.

A confirmation message is displayed on the instrument touchscreen when the instrument is linked and connected to your Connect cloud-based platform account.

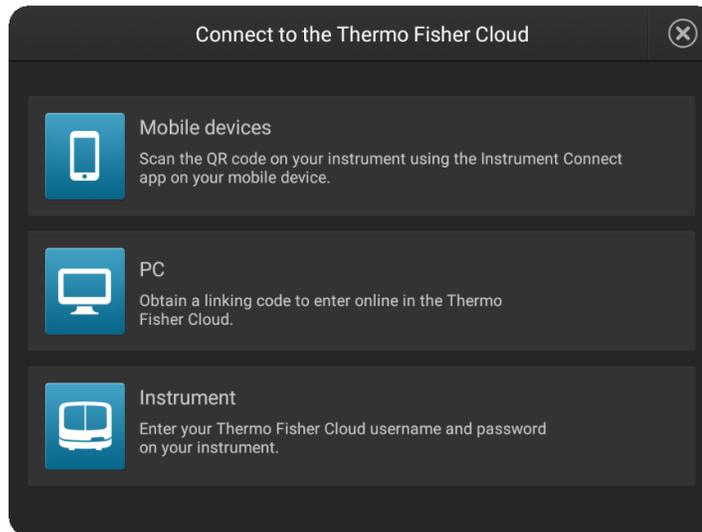The first time the instrument is linked, the software automatically:

- Creates a Connect cloud-based platform instrument profile with the First Name and Last Name from your Connect cloud-based platform account.
- Registers the instrument in the InstrumentConnect software.

Link the instrument using your Connect cloud-based platform account

1. From the instrument **Sign In** screen, navigate to the **Connect to the Thermo Fisher Cloud** screen:

Do you have a local instrument profile?	Description
Yes	1. Touch **Sign in**, then enter your PIN. 2. In the home screen, touch **Setup run**. 3. In the **Setup run** screen, touch **Cloud**.
No	Touch **Get started ▸ Connect**.

2. Touch **Instrument**.

　　　　　　　　　　　　　　SeqStudio™ Genetic Analyzer Instrument and Software Getting Started Guide

3. Enter your Connect cloud-based platform account username (email address) and password, then touch **Link account**.
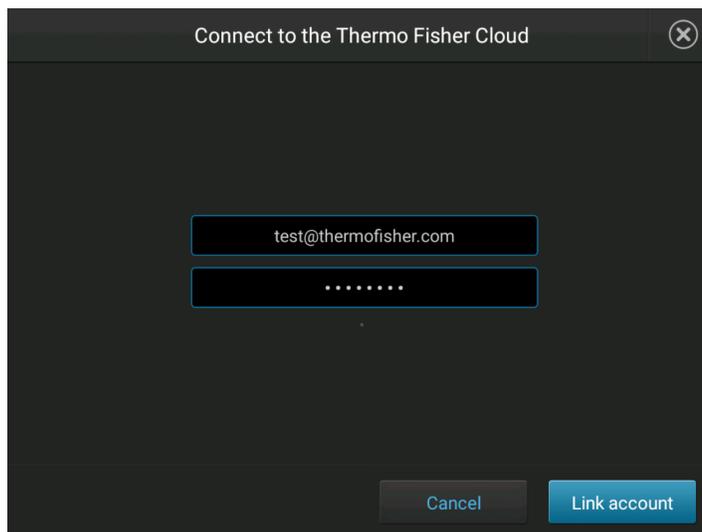
4. If you have not previously set up a PIN, enter a PIN to use when you sign in to an instrument, then touch **Done**.
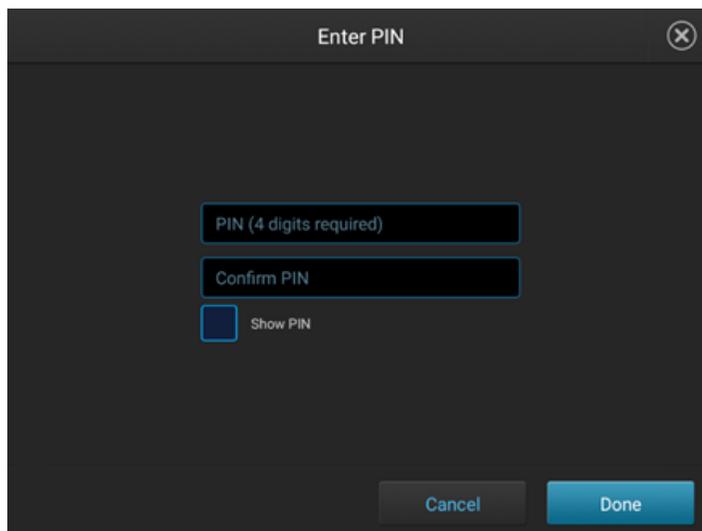
A confirmation message is displayed when the instrument is linked and connected to your Connect cloud-based platform account.

The first time the instrument is linked, the software automatically:

• Creates a Connect cloud-based platform instrument profile with the First Name and Last Name from your Connect cloud-based platform account.

• Registers the instrument in the InstrumentConnect software.

B Keyboard shortcuts for Plate Manager

Keyboard shortcuts for the sample table

Keys	Action
Navigation	
Arrow keys	Move to the cell above, below, to the right, or to the left of the current cell.
Tab	Move to the cell to the right of the current cell.
Shift+Tab	Move to the cell to the left of the current cell.
Home	Move to the first cell in the row.
End	Move to the last cell in the row.
Ctrl+Home	Move to the first cell in the column.
Ctrl+ End	Move to the last cell in the column.
Selection	
Ctrl+A	Select all.
Shift+Arrow keys	Extend the selection of the cell above, below, to the right, or to the left of the current cell.
Shift+Home	Select all cells in the row to the right including the current cell.
Shift+End	Select all cells in the row to the left including the current cell.
Ctrl+Shift+Home	Select all cells in the column to the top cell including the current cell.
Ctrl+ Shift+End	Select all cells in the column to the bottom cell including the current cell.
Editor	
Enter	Open and close the cell editor.
F2	Clear the cell contents and open the cell editor.
Esc	Cancel editing and close the cell editor.
Backspace	Delete.
Delete	Clear the cell contents.
Ctrl+C	Copy.

Keys	Action
Ctrl+X	Cut.
Ctrl+V	Paste.
Ctrl+Enter	Fill all selected cells with edited cell's value: Select a range of cells, then press **F2** to edit the first cell in the selection. Type a value, then press **Ctrl+Enter** to fill all selected cells with the value.
Ctrl+Z	Undo.
Ctrl+Y	Redo.

Documentation and support

Related documentation

Document	Pub. No.
SeqStudio™ Genetic Analyzer Instrument and Software User Guide	MAN0016138
SeqStudio™ Genetic Analyzer Instrument and Software Getting Started Guide	MAN0017464
DNA Fragment Analysis by Capillary Electrophoresis User Guide	4474504
DNA Sequencing by Capillary Electrophoresis Chemistry Guide Second Edition	4305080
Troubleshooting Sanger sequencing data	MAN0014435
SeqStudio™ Genetic Analyzer Site Preparation Guide	MAN0016143

Customer and technical support

Visit **thermofisher.com/support** for the latest service and support information.

- Worldwide contact telephone numbers
- Product support information
  - Product FAQs
  - Software, patches, and updates
  - Training for many applications and instruments
- Order and web support
- Product documentation
  - User guides, manuals, and protocols
  - Certificates of Analysis
  - Safety Data Sheets (SDSs; also known as MSDSs)

  Note: For SDSs for reagents and chemicals from other manufacturers, contact the manufacturer.

Limited product warranty

Life Technologies Corporation and/or its affiliate(s) warrant their products as set forth in the Life Technologies' General Terms and Conditions of Sale at **www.thermofisher.com/us/en/home/global/terms-and-conditions.html**. If you have any questions, please contact Life Technologies at **www.thermofisher.com/support**.