K&A Labs Oligonucleotide Synthesizer

Quick Start Guide

Software: KA Labs Version 0.0.16.6

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Step 1 — Verify Pressures

Most users leave the instrument pressurized between runs. Before starting, confirm both pressure circuits are within the correct operating ranges at the instrument regulators:

Circuit	Target Range
High Pressure (compressed air)	0.30–0.40 MPa
Low Pressure (argon)	0.04–0.08 MPa

If the instrument has been shut down since the last run, open gas supplies in the following order before proceeding:

1. High Pressure (compressor)
2. Low Pressure (argon)
3. Amidite and Modifier Valve (A) — fully open
4. Reagent valve (R) — fully open

> ⚠ **IMPORTANT** High pressure must be opened before low pressure. Ensure all reagent and amidite bottles are properly pressurized before proceeding. Improper pressure will result in poor delivery and failed synthesis.

Step 2 — Verify Reagents and Port Assignments

Navigate to **Setup/Utilities → Port Assignments** and confirm that the physical bottle configuration matches what is shown on screen.

Then navigate to **Setup/Utilities → Configuration** and confirm that the correct Port Assignment file is selected as active.

> ⚠ **IMPORTANT** Port Assignments must be updated any time a bottle has been moved or a line has been replumbed since the last run. The active Port Assignment file must be selected in the Configuration screen — saving a new file does not make it active automatically.

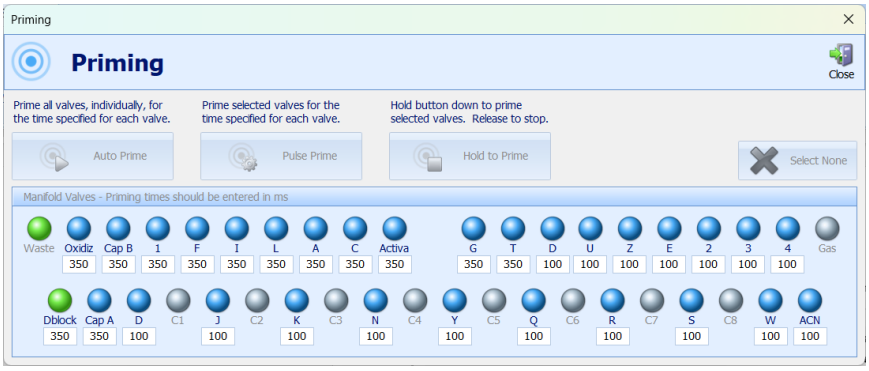
Running with an incorrect assignment will result in wrong reagent delivery and a failed synthesis.

Step 3 — Prime the Lines

NOTE: Priming is recommended before every run — especially if the instrument has been through a shutdown procedure since the last run. Priming before the next run ensures dead volume is cleared and the first column receives the correct reagent.

Navigate to **Synthesis → Priming**.

1. Enter a dispense time in milliseconds in the field below each line to be primed. **350 ms is recommended** for most lines. **200 ms is the bare minimum** for eliminating dead volume and should not be used as a routine value.
2. Click **Auto Prime** to fire all lines sequentially.
3. Visually confirm that liquid has reached the main block for each primed line before proceeding.



NOTE Mid-Synthesis Priming is recommended, confirm it is enabled in **Setup/Utilities → Configuration** before starting the run

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Step 4 — Load Sequences

Navigate to **Synthesis → Sequences**.

- Enter sequences manually, or import from a .xlsx or .csv file.
- Confirm the following fields for each sequence:

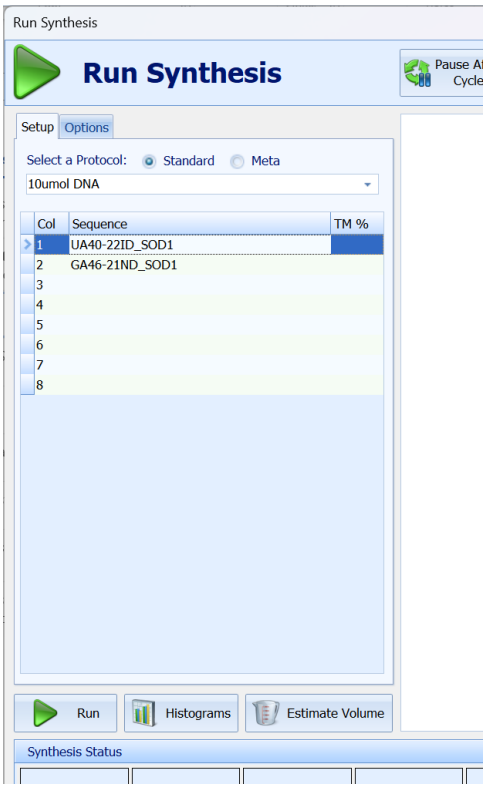
Field	Check
Name	Unique identifier entered
DMT Off	Selected if final DMT removal is required
Univ	Selected if using universal support
Pre / Post	Selected if Pre-Process or Post-Process protocol is required
Sequence 5'→3'	Correct sequence entered; multi-character bases bracketed e.g. [FAM]

NOTE Export a test sequence first to use as an import template before loading a large batch.

Step 5 — Set Up the Run

Navigate to **Synthesis → Run Synthesis**.

1. Assign each sequence to the appropriate column position in the run screen.
2. Select the desired protocol — **Standard** or **Meta**.

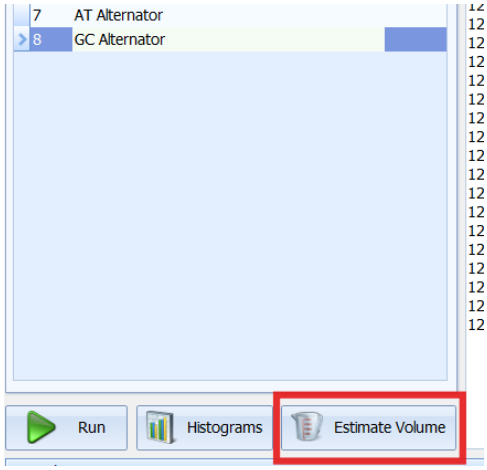


3. Set any additional run options as needed:

Option	Description
Start at Base X	Starts all columns at a specified base. Must be set before starting.
Pause Before Base X	Pauses before the selected base cycle. Can be set during a run.
Pause After Time	Pauses before the next cycle after a set time period (HH:mm). Can be set during a run.

Step 6 — Run Estimate Volume

Click **Estimate Volume** in the Run Synthesis screen.

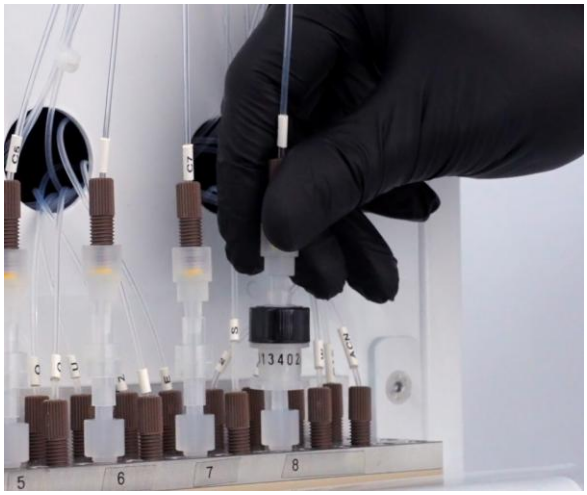


- Review the estimated consumption for each reagent and amidite line.
- Visually inspect each bottle to confirm sufficient volume is available.

⚠ **IMPORTANT** Estimate Volume requires calibrated flow rates to produce accurate results. If flow rates have not been checked recently, navigate to **Setup/Utilities → Flow Rates** to calibrate before running the estimate. Flow rates should be checked monthly.

Step 7 — Load Columns

Install synthesis columns into the instrument. Connect each column securely via luer-lock fittings.



NOTE Install bypass connectors in any unused column positions. This ensures misdirected reagent flows to waste rather than an open port. Replace any removed columns with bypass connectors during the run as well.

Step 8 — Start the Run

Click **Run** to begin synthesis.

Monitor the following during the run:

- System status in the software status panel
- Pressure stability on the instrument gauges
- Trityl histogram values (accessible via the Histograms button)
- Reagent and amidite levels in bottles

⚠ **CAUTION** Do not allow reagent or amidite bottles to run dry during a synthesis. Running dry can introduce air into the lines and compromise results.

If You Need to Pause

Option	Description
Pause After Cycle	Pauses at the end of the current complete cycle
Pause After Rep	Pauses at the end of the current section rep
Pause Immediately	Pauses at the current step

To refill a bottle during a run: 1. Click **Pause** and wait for the status to display “Pause.” 2. Refill the required bottle. 3. Return to the Priming screen and prime the affected line. 4. Click **Pause** again to resume.

Step 9 — Complete the Run

When synthesis finishes:

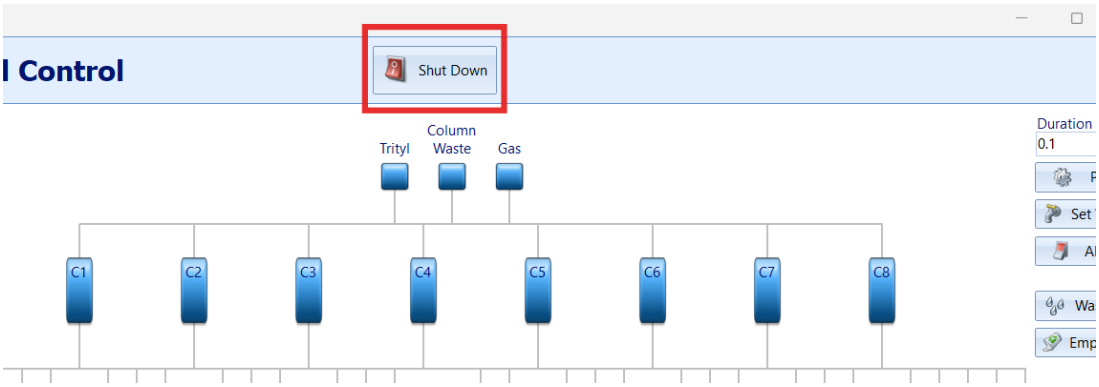
- Remove completed columns from the instrument.
- Replace removed columns with bypass connectors if other positions are still running.
- Proceed to post-processing. Refer to the K&A Labs User Manual — Section 7 for post-processing guidance.

> 💡 **NOTE** Some column positions may finish earlier than others. You may remove completed columns while the instrument continues running remaining positions.

Step 10 — Shutdown

Running the Shutdown Procedure after every synthesis is strongly recommended. FEP tubing is semi-permeable to moisture — returning reagents and amidites to their bottles after each run helps preserve amidite quality and keeps lines dry between runs.

1. Navigate to **Synthesis → Manual Control**.
2. Click **Shut Down**.



3. Click **Yes** to confirm.
4. Follow all on-screen prompts. Active valves will be highlighted in green as the software works through each step.
5. When prompted to perform a manual action — such as closing bottle pressure valves or loosening bottle caps — complete the action and click **OK** to continue.
6. Continue until the shutdown sequence is complete.

> ⚠ **WARNING** Never turn off the high-pressure supply while reagent or amidite bottles are still pressurized. Wait for the software prompt before depressurizing bottles.

> **NOTE** Do not close the software until the shutdown sequence has fully completed.

Quick Reference — Pause Options

Option	When to Use
Pause After Cycle	End of current cycle — safest pause point
Pause After Rep	End of current section rep
Pause Immediately	Urgent stop at current step
Resume	Restart after any pause
Cancel	Permanently cancel the synthesis

Quick Reference — Priming

Scenario	Recommended Action
Before every run	Auto Prime all lines at 350 ms
After a shutdown procedure	Auto Prime all lines — lines will be dry
After a bottle change during a run	Pulse Prime or Hold to Prime the affected line
After an idle period	Auto Prime all lines before starting
First column yield lower than others	Enable Mid-Synthesis Priming in Configuration

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Support

Contact	Details
Support Center	https://support.sierrabio.com
Email	support@sierrabio.com
Phone	+1-209-396-1969

For full operational guidance refer to the K&A Labs User Manual. For maintenance and servicing refer to the K&A Labs Service Manual.

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Daily Synthesis Checklist

For experienced users. For detailed guidance on any step refer to the pages above.

Before the Run

- ☐ Verify high pressure: 0.30–0.40 MPa at instrument regulator
- ☐ Verify low pressure: 0.04–0.08 MPa at instrument regulator
- ☐ Confirm Port Assignment is correct and active file is selected in Configuration
- ☐ Prime all lines — 350 ms recommended, 200 ms minimum
- ☐ Visually confirm liquid has reached the main block
- ☐ Load and verify sequences in the Sequences screen
- ☐ Assign sequences to columns in Run Synthesis screen
- ☐ Select protocol (Standard or Meta)
- ☐ Run Estimate Volume — confirm sufficient reagent in all bottles
- ☐ Load synthesis columns — bypass connectors in all unused positions

Starting and Monitoring

- ☐ Click Run
- ☐ Monitor pressure stability
- ☐ Monitor reagent levels — do not allow bottles to run dry
- ☐ Monitor trityl histogram values

After the Run

- ☐ Remove completed columns — replace with bypass connectors
- ☐ Proceed to post-processing
- ☐ Run Shutdown Procedure — Manual Control → Shut Down
- ☐ Follow all on-screen prompts to completion

⚠ **WARNING** Never turn off the high-pressure supply while reagent or amidite bottles are still pressurized. Wait for the software prompt before depressurizing bottles.

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