

Installation Guide – Thermo Scientific™ Vanquish™ Duo for Dual LC

Observe the safety information and precautionary statements, unpacking and installation instructions presented in the *Operating Manual* for the respective Thermo Scientific™ Vanquish™ modules.

This guide provides condensed information for installing a Thermo Scientific Vanquish Horizon Duo or Flex Duo UHPLC system for Dual LC.

Parts required

Table 1: Modules required for installation of Vanquish Horizon Duo or Flex Duo UHPLC system for Dual LC

Component	Vanquish Horizon Duo for Dual LC			Vanquish Flex Duo for Dual LC	
System: Base, Rack & Capillaries	<ul style="list-style-type: none"> 1x System Base Vanquish Duo for Dual LC (VF-S02-A-02) Optional: 2x Passive Pre-Heater (6732.0184) <u>Stack Stabilizer for stacks ≥ 5 modules</u> Ion Bench with stack mounting kit (6036.1720) or Stack Stabilizer Kit for benchtop installation (6036.1710) 				
Pumps	<ul style="list-style-type: none"> 2x Binary Pump H (VH-P10-A-02) or 1x Binary Pump H and 1x Quaternary Pump F 			<ul style="list-style-type: none"> 1x Dual Pump F (VF-P32-A-01) or 2x Binary Pump F (VF-P10-A-01) or 2x Quaternary Pump F (VF-P20-A) or 1x Binary Pump F and 1x Quaternary Pump F 	
Samplers	1x Dual Split Sampler HT (VH-A40-A-02)			1x Dual Split Sampler FT (VF-A40-A-02)	
Optional Sample Extension	Charger (VH-A90-A)				
Column Compartments	1x or 2x Column Compartment H (VH-C10-A-02) , for a 2 nd Compartment 1x Conversion Kit (6732.0007) is mandatory				
Any Combination of Two Detectors	Diode Array <ul style="list-style-type: none"> HL (VH-D10-A) FG (VF-D11-A-01) 	Variable Wavelength <ul style="list-style-type: none"> F (VF-D40-A) 	Fluorescence <ul style="list-style-type: none"> F (VF-D50-A) F Dual-PMT (VF-D51-A) 	Charged Aerosol <ul style="list-style-type: none"> H (VH-D20-A) F (VF-D20-A) 	ISQ EC (ISQEC-LC) on one channel
Flow Cells	Selection of wide range of flow cells per each optical detector			n.a.	

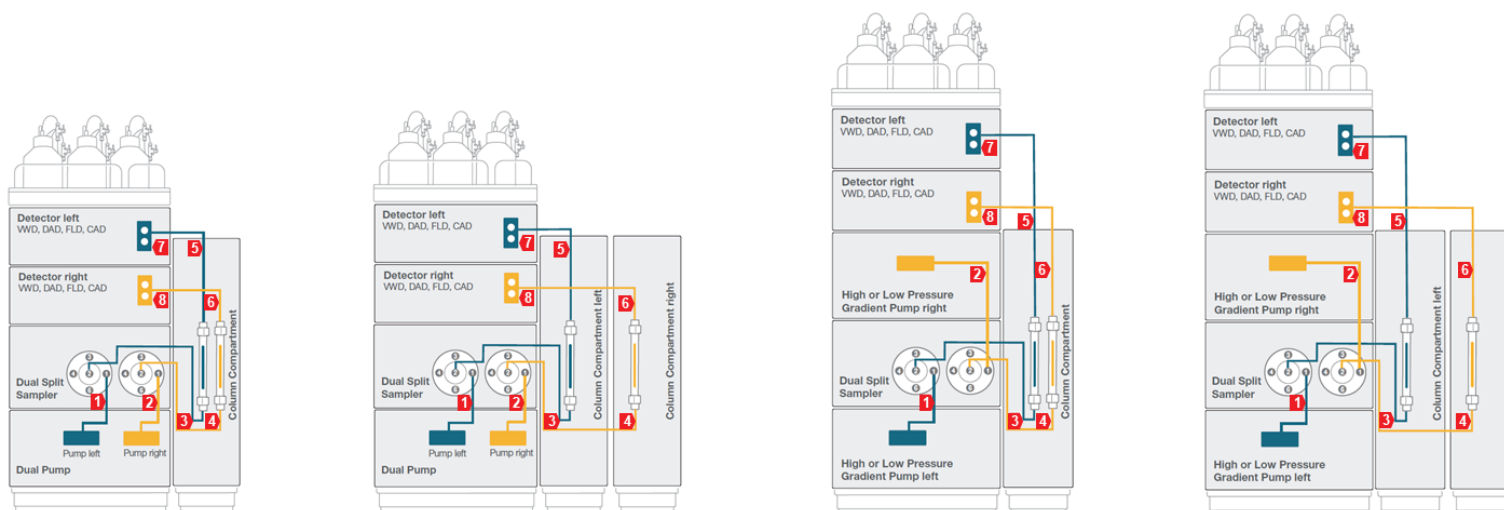


Figure 1: Flow Schemes Overview Vanquish Duo for Dual LC

Table 2: Required system tubing and items, compatible with any configuration from Table 1.

No.	Description	No.	Description
1	Viper Capillary, 0.10 x 550 mm, MP35N (6042.2360) ¹	6	Viper Capillary, 0.10 x 650 mm, MP35N (6042.2370) ¹ optional: Post Cooler 1µL, 0.1 x 590 mm, VH-C10 (6732.0520) ¹
2	Viper Capillary, 0.10 x 550 mm, MP35N (6042.2360) ¹	7	Waste fluidic ³
3	Active Pre-Heater, 0.1 x 610 mm, VH-C10 (6732.0150) ¹ optional: Passive Pre-Heater 0.1 x 680 mm, MP35N (6732.0184) ²	8	Waste fluidic ³
4	Active Pre-Heater, 0.1 x 610 mm, VH-C10 (6732.0150) ¹ optional: Passive Pre-Heater 0.1 x 680 mm, MP35N (6732.0184) ²		<i>Flow Schemes Vanquish Duo for Dual LC</i> (4820.3613): four different flow schemes are included in the delivery showing the stack and tubing for four different configuration options. <i>Flow Schemes</i> can be clipped into right sampler door ¹
5	Viper Capillary, 0.10 x 650 mm, MP35N (6042.2370) ¹ optional: Post Cooler 1µL, 0.1 x 590 mm, VH-C10 (6732.0520) ¹		Optional: Set color marker labels (blue and red) for capillaries, solvent lines and wash lines ¹

¹ Included in System Base Vanquish Duo for Dual LC (VF-S02-A-02), Re-ordering Workflow Kit, Vanquish Duo for Dual LC, P/N: 6036.2305, ² not shipped with system, to be ordered separately,

³ Included in respective detector ship kit

Hardware and Software Installation

1. Locate and unpack all required system components as shown in Table 1 and Table 2 and follow the instructions in the Vanquish System Operating Manual.
2. Identify your configuration out of the four *Flow Scheme* pictures and stack the modules accordingly. Some Vanquish configurations may require the stacking of more than four modules (e.g. Vanquish Duo setups with two separate pumps). This installation mandatorily requires an appropriate protection against tilting.

NOTICE: Thermo Fisher Scientific offers various technical solutions for tilting protection, e.g. Stack Stabilizer Kit for benchtop installation (6036.1710) or Ion Bench with Stack Mounting Kit (6036.1720). Make sure that an appropriate tilting protection is installed for a safe operation.

TIP: For installation instruction of the stack stabilizing follow the respective instructions delivered with the stack stabilizing options.

NOTICE: For installation of two Column Compartment H the Conversion Kit (6732.0007) needs to be installed on the left compartment.

3. Connect all power cords, USB and system interlink cables as described in the respective modules *Operating Manual*. Diode array detectors may need to be plugged to the PC individually.
4. Connect all system tubing and solvents
 - a. For solvent lines follow the *Vanquish Pumps Operating Manual*.
 - b. For rear seal tubing follow the *Vanquish Pumps and Sampler Operating Manual*.
 - c. For needle wash tubing follow the *Vanquish Sampler Operating Manual*.
 - d. For system capillaries install each capillary according to the numbering on the *Flow Scheme* belonging to your configuration and part of the delivered capillary kit. Instructions on how to install the passive pre-heater are outlined in the *Installation Note* of the passive pre-heater. For installing the capillaries correctly, please read the *Viper Installation and Operating Guide*.

TIP: The *Flow Scheme* of the installed system configuration can be clipped into the right sampler door.

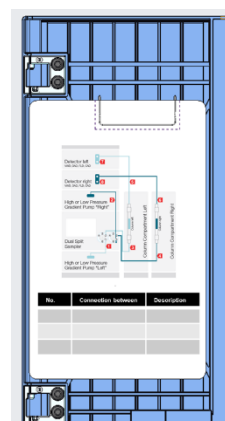


Figure 2: Right sampler door with flow scheme

- e. For waste fluidic follow the *Quick Installation Guide* delivered with the waste fluidic.
5. Optionally install tubing markers that are delivered with the system ship kit on the flow paths for optical distinction.
6. Install the columns.

TIP: If operational qualification of the hardware is required please follow the *Operating Instructions for Operational Qualification/Performance Qualification for HPLC Instruments*.

7. Switch on all modules in the system.
8. Install Thermo Scientific Chromeleon 7.2.8 (or higher) Chromatography Data System (CDS). Follow the instructions of section **Software Configuration** to configure and operate the Vanquish Duo for Dual LC system.

Software Configuration

1. Open the **Chromeleon Services Manager** and start the **Instrument Controller** (if not started automatically on system start).
2. Open the **Chromeleon Instrument Configuration Manager** and create two **Instruments**

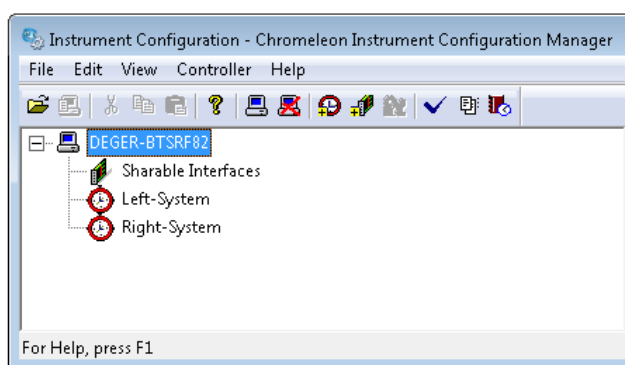


Figure 3: Instruments in Chromeleon

***TIP** The names used here (Left-System; Right-System) are examples. Feel free to choose your own.

3. Add one pump to each instrument
 - a. If a Dual Pump is present choose **HPLC: Vanquish** followed by **Vanquish Dual Pump**. Assign the left and right pump to the previously generated instruments on the **Devices** page. Ensure that the device names for the instrument devices are not identical (e.g., PumpLeft and PumpRight). The pump will be automatically added to the second instrument and shared between both instruments.

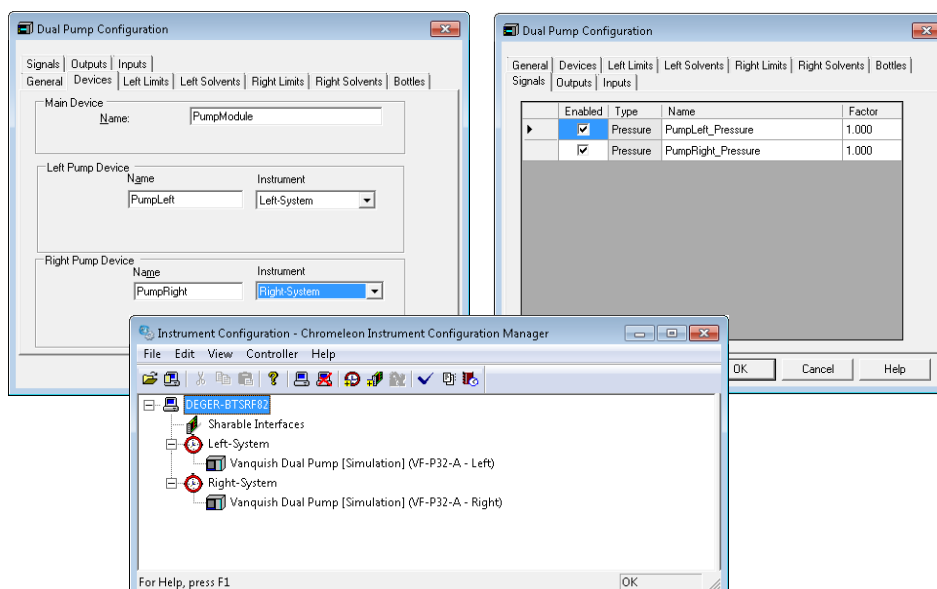


Figure 4: Dual Pump configuration

- b. If two separate pumps are present choose **HPLC: Vanquish** followed by the respective pump type. It is recommended to add a descriptive extension to the respective device names and signal names. This will show up on the module panels and simplifies distinction.

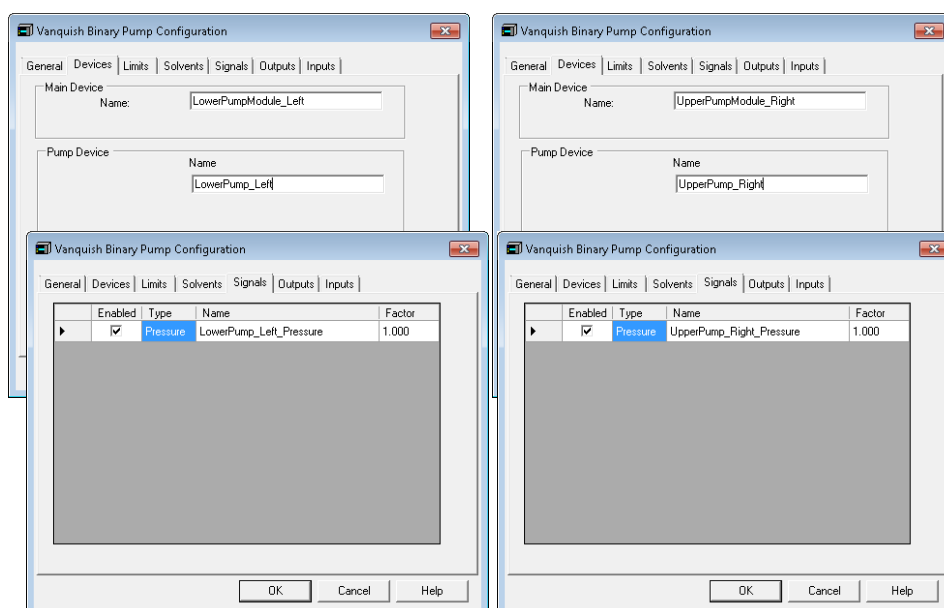


Figure 5: Configuration with two pumps

4. Add the Dual Sampler to one instrument. Choose **HPLC: Vanquish** followed by **Vanquish Autosampler**. Assign the left and right sampling unit to the previously generated instruments; assign the appropriate pump links if applicable (e.g., *VPUMP_L_STRK* for the **Left** and *VPUMP_R_STRK* for the **Right** sampling unit). The sampler will be automatically added to the second instrument and shared between both instruments. Add a Vanquish

Charger module if present in the configuration and follow the instructions in the *Vanquish Charger Installation Guide*.

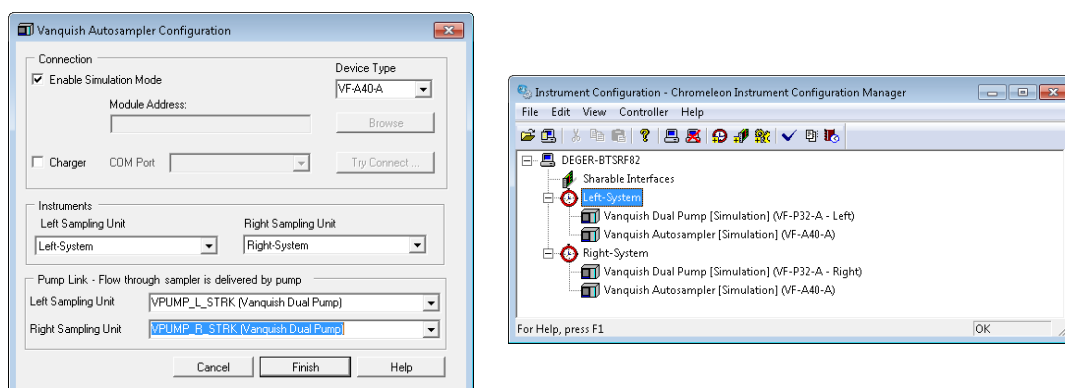


Figure 6: Dual Sampler configuration

5. Add the Column Compartment to the instruments.
 - a. If one column compartment is present choose **HPLC: Vanquish** followed by **Vanquish Column Compartment**. Assign the left and right pre-heater and column to the previously generated instruments. Ensure that the device names for the instrument devices are not identical. The column compartment will be automatically added to the second instrument and shared between both instruments.

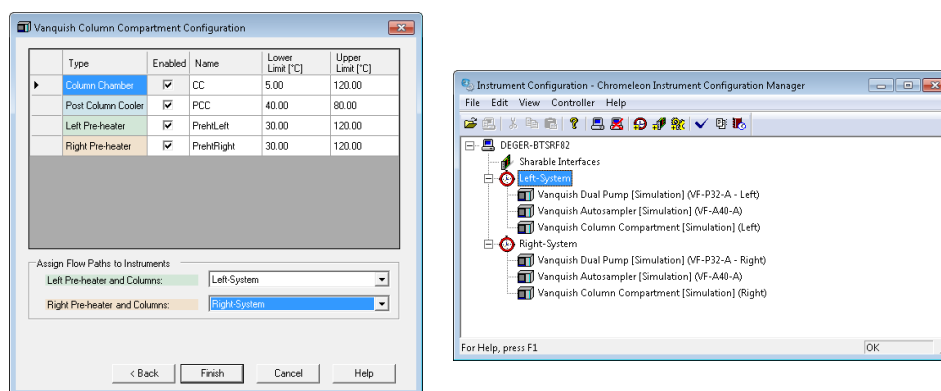


Figure 7: Configuration with shared Column Compartment

- b. If two or more column compartments are present add each column compartment to each instrument separately. Choose **HPLC: Vanquish** followed by **Vanquish Column Compartment**. It is recommended to add a descriptive extension to the respective device names and signal channels. This will show up the module panels and simplifies distinction. An example is shown for one instrument.

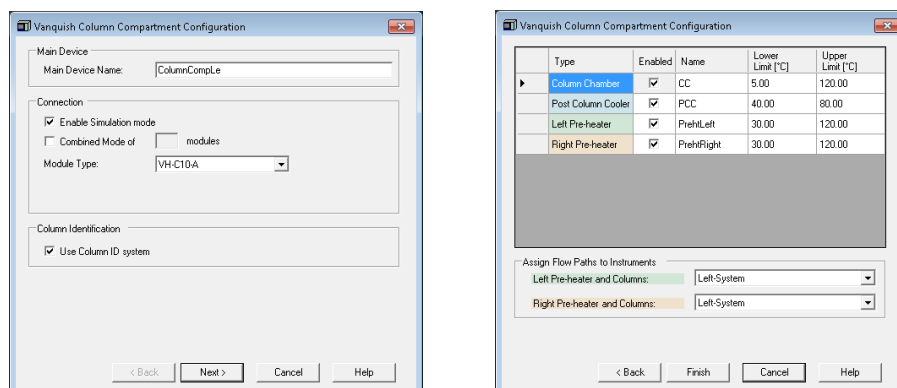


Figure 8: Configuration with two Column Compartments

- Add a detector to each instrument. Choose **HPLC: Vanquish** followed by the respective detector type. It is recommended to add a descriptive extension to the respective device names and signal channels. This will show up on the module panels and simplifies distinction.

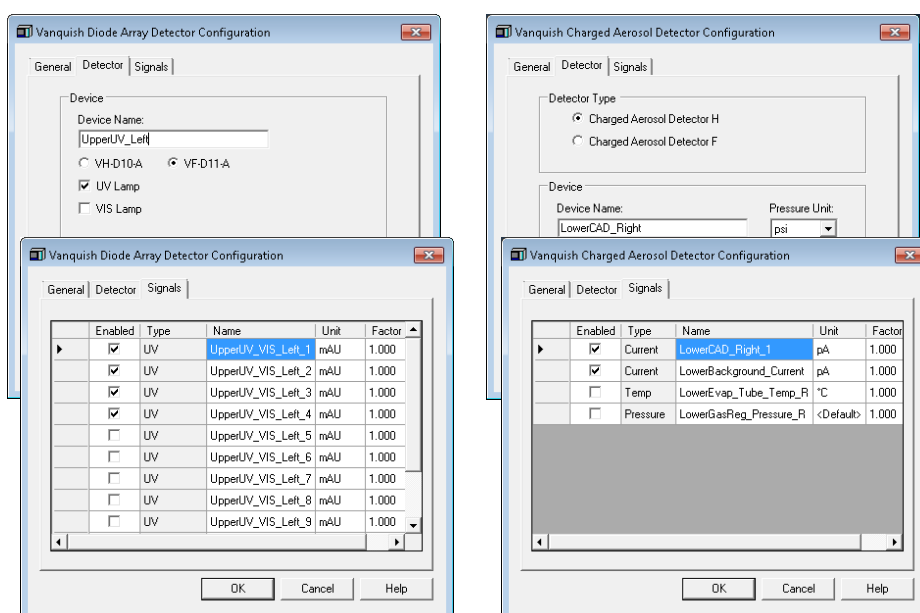


Figure 9: Configuration with two Detectors

- Save the configuration and launch **Chromeleon**.

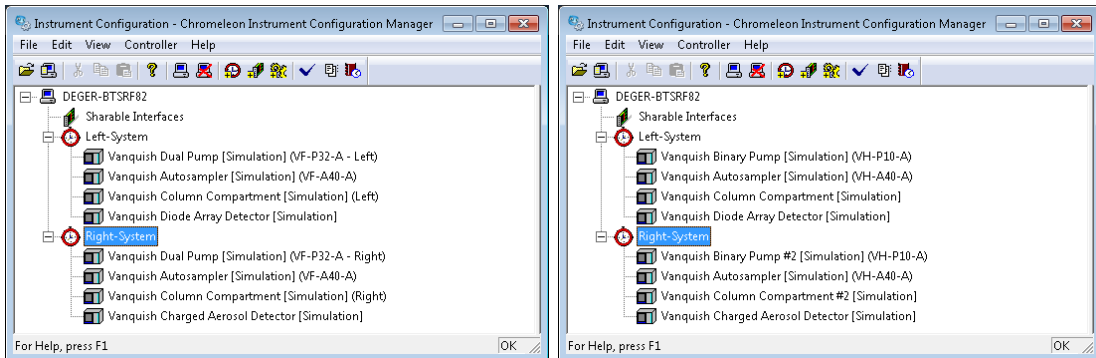


Figure 10: Final instrument configuration

8. Select one instrument and launch the **Fluidic Configuration** wizard.

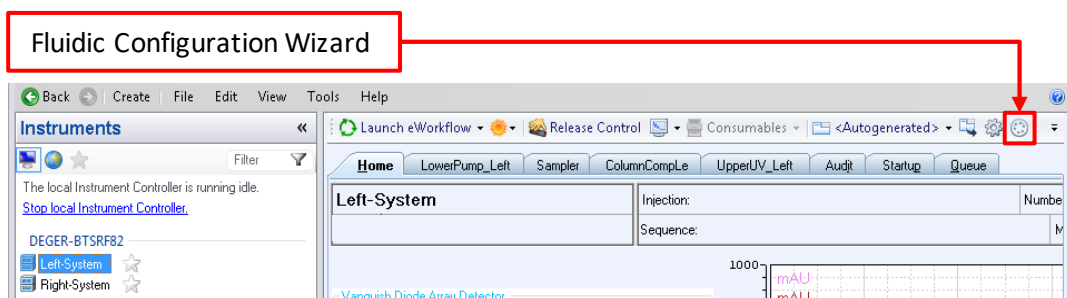


Figure 11: Fluidic configuration in Chromeleon

9. On the first wizard page select the installed capillary kit from the drop down list, here **Vanquish Dual LC**.

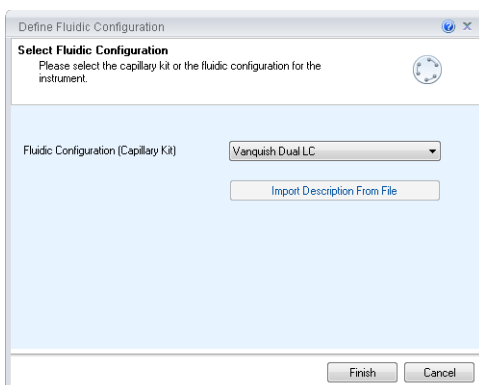


Figure 12: Workflow selection in Fluidic Configuration

TIP: The drop down list entries are automatically tailored to the previously created hardware configuration.

- a. If one column compartment is shared between the instruments, click **Finish**.

- b. If each instrument has one column compartment configured assign the respective active pre-heater and column used for operation. Click **Finish**.

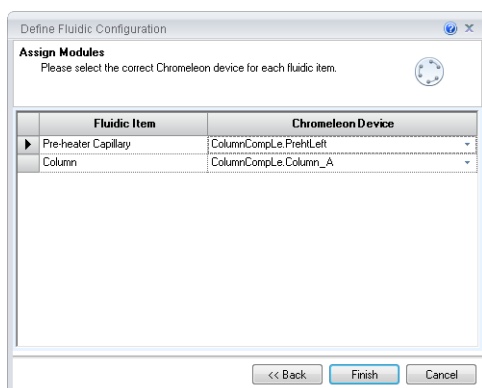


Figure 13: Assignment of column capillaries in two Column Compartments configuration

- c. Check the Audit Trail if the Fluidic Configuration was saved accordingly.

		Date	Time	Retention Time	Device	Message
1		2/15/2018	11:36:51 AM +01:00			The capillary kit / application 'Vanquish Dual LC' has been selected.

Figure 14: Audit trail message from fluidic configuration

10. Repeat step 9 for the other instrument.
11. Create an instrument method for each instrument by clicking **Instrument Method...** in the **Create** drop down menu. Select the instrument you want to write a method for, follow the wizard and save the method.
 - a. Repeat the steps for the other instrument.
 - b. Use the method translation tool. Please see separate section below.
12. Create a sequence for each instrument by clicking **Sequence...** in the **Create** drop down menu. The sequences can be started in parallel.

Method Translation Tool

The creation of an instrument method follows the standard procedures. In order to transfer an instrument method file between systems (e.g. from “right-system” to “left-system”) the method translation tool can be used to easily re-assign the method. The method translation tool will automatically translates all individual commands to the new instrument.

1. Assign the desired method to the other instrument and click **Start the Translation Tool**.

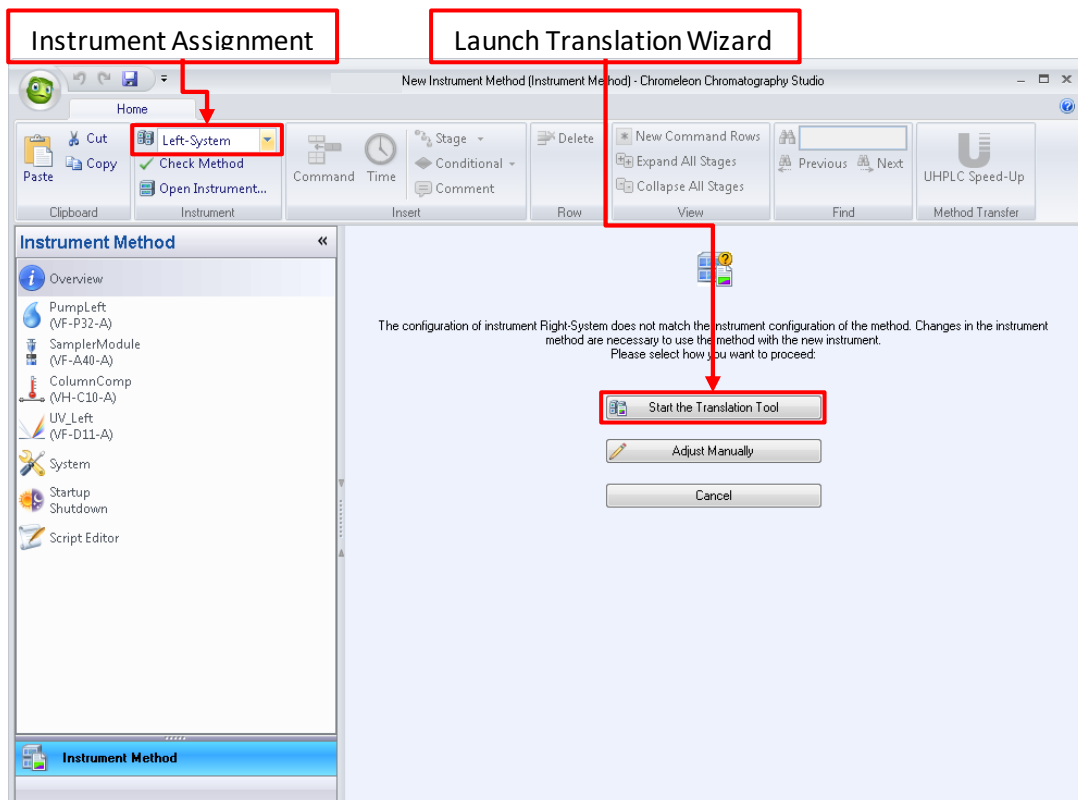


Figure 15: Instrument assignment in Method Editor

2. Assign the required devices for the cells highlighted in orange.

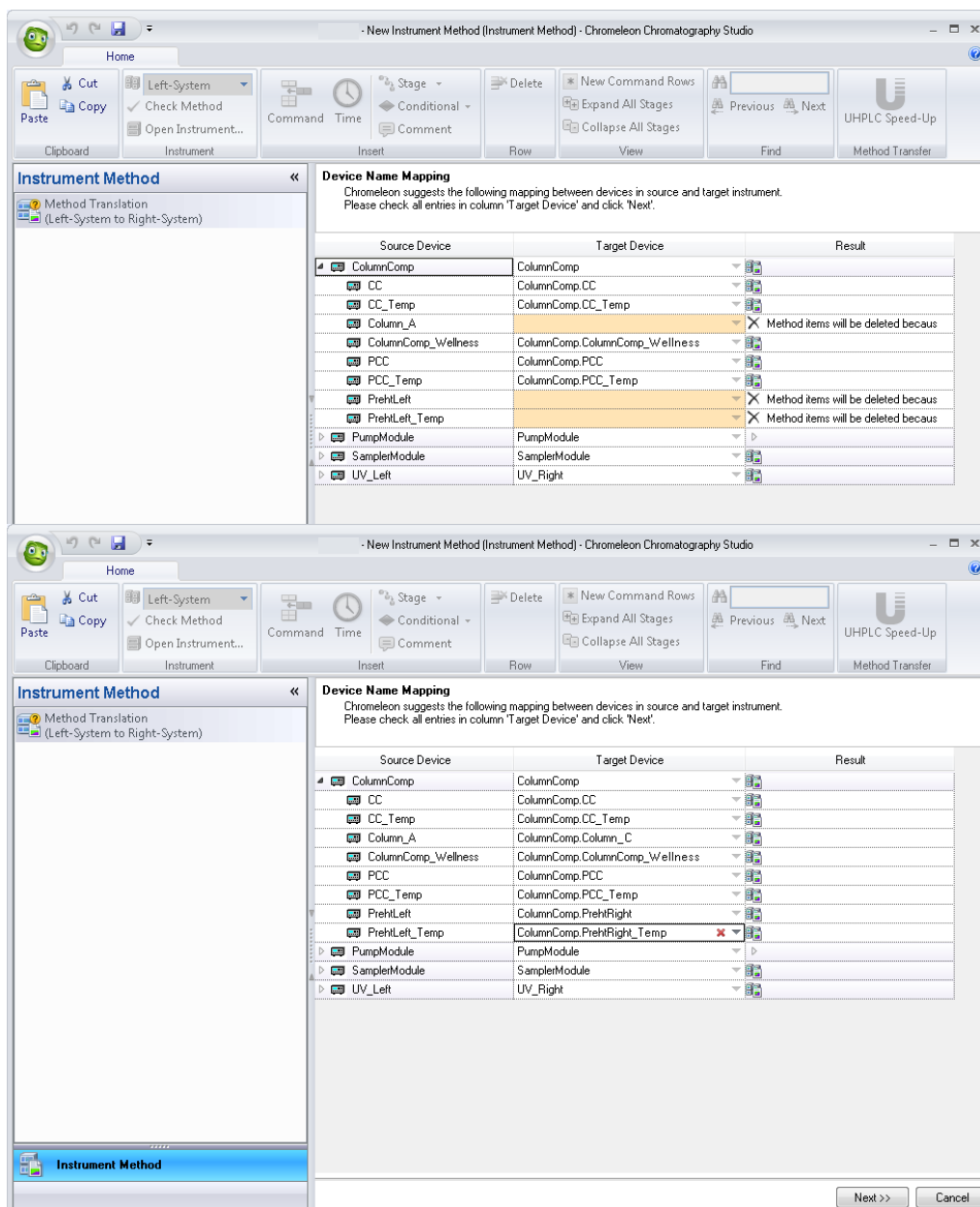


Figure 16: Device Mapping for method translation

3. A summary of the translated method is generated for review. Click **Finish** to complete the translation and save the method.

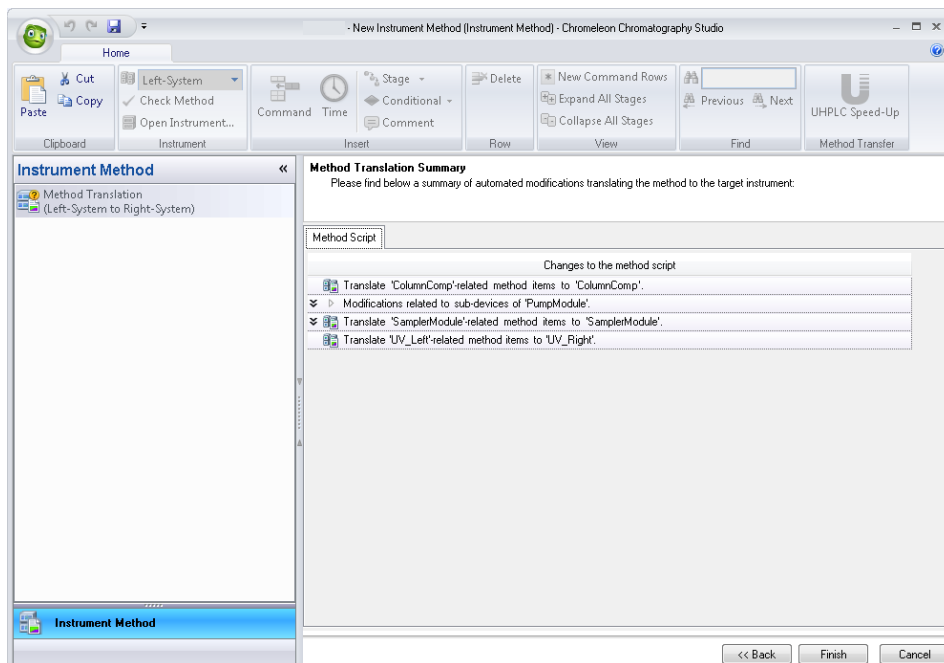


Figure 17: Summary page of Method Translation wizard