



Agilent Drivers for Thermo Chromeleon

## GC User Guide

# Notices

## Document Information

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### WARNING

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# 1

## Introduction and Scope

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### Terms and Abbreviations

**Table 1** Terms and abbreviations used in this document

Term	Description
Agilent Drivers Agilent Drivers for Chromeleon 7	Agilent Drivers for Thermo Scientific Chromeleon 7
Chromeleon	Thermo Scientific Chromeleon 7 Chromatography Data System (CDS)
Thermo Fisher	Thermo Fisher Scientific
DDK	Driver Development Kit (from Thermo Fisher Scientific)
ICF	Agilent Instrument Control Framework
CDS	Chromatography Data System

# Introduction

Agilent Technologies first released the Instrument Control Framework (ICF) in March 2010 as a shell for the Agilent Instrument Driver Packages. Since then, ICF packages are built into the Chromeleon CDS by Thermo Fisher Scientific. Using ICF, certain Chromeleon-specific features are not supported; for example, the method script and direct instrument control using ePanels are not available.

The Agilent Drivers have been developed to support these Chromeleon-specific driver features.

This document describes

- how to install the Agilent Drivers
- how to configure the instrument
- how to run injections
- the method handling (Agilent Method user interface/Chromeleon Script Editor)
- how to troubleshoot

## NOTE

Chromeleon is the acting Data System and hosts the integration of the Agilent Drivers.

The Agilent Drivers are a subcomponent controlling the communication to the Agilent Instrument. Chromeleon coordinates the communication and interaction with the Agilent Drivers.

Both companies are working closely together. For questions regarding the hardware, contact your local Agilent representative; for all other questions, contact Thermo Fisher.

---

## 2

# Compatibility and Requirements

Chromeleon CDS/Agilent Driver Compatibility 8

Software Components Required 9

Chromeleon Licenses 10

This chapter contains important information about compatibility and the requirements.

### NOTE

For a complete overview of hardware and software requirements, see the *Release Notes for Agilent Drivers for Thermo Scientific Chromeleon 7*.

## Chromeleon CDS/Agilent Driver Compatibility

To ensure the alignment of compatible components, Thermo Fisher provides the tested and certified Agilent Drivers on the Chromeleon disk in the following location:

X:\Chromeleon YZ\Packages\Agilent Chromeleon Driver

where X is the drive letter of the DVD drive and YZ is the Chromeleon version.

## Software Components Required

**NOTE**

Refer to “[Installation of the Agilent Drivers](#)” on page 13 for detailed information on the installation of the Agilent Drivers in combination with Chromeleon.

The Agilent Drivers comprises two major components:

- Agilent\_Drivers\_for\_Thermo\_Chromeleon.msi  
The Agilent Drivers installer is a single executable that includes
  - Agilent Drivers for Chromeleon 7
  - Agilent Instrument Control Framework
  - Agilent Instrument Control Framework - LC Driver
  - Agilent Instrument Control Framework - GC/HS Driver
  - Agilent Instrument Control Framework - ELSD Driver
- SetupSVT.exe
  - Agilent Software Verification Tool  
This separate executable installs the Agilent Software Verification Tool (SVT). The SVT executes the installation verification.

The main components for the Agilent Drivers and the SVT are visible in the Windows sections **Program and Features**.

## Chromeleon Licenses

The Agilent Drivers for Chromeleon will request a class 3 license for LC instruments and a class 2 license for GC instruments.

Depending on the version of Chromeleon in use, this might differ somewhat. Please contact your Thermo Scientific representative for the correct license if using those versions.

Any Chromeleon version up to and including 7.2.10 MUa and 7.3 will request a class 3 license for a GC where normally only a class 2 would be required.

Newer Chromeleon versions request the class 2 license as expected.

GCs configured in dual sequence mode will request only one license.

# 3

## Installation

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This chapter describes the steps required to install the Agilent Drivers with Chromeleon.

### NOTE

Ensure that the installation operator has full local Windows administrator privileges.

## Hardware Installation

Before you install the software, ensure that the hardware is correctly installed. Refer to the corresponding Agilent manuals for full details.

Hardware installation and operation manuals are available on <https://www.agilent.com/>.

## Installation of the Agilent Drivers

### NOTE

During the automatic installation of the Agilent Drivers using Chromeleon Installer, the Software Verification Tool (SVT) is installed automatically.

If you are installing the Agilent Drivers manually, the SVT must be installed before the Agilent Drivers are installed.

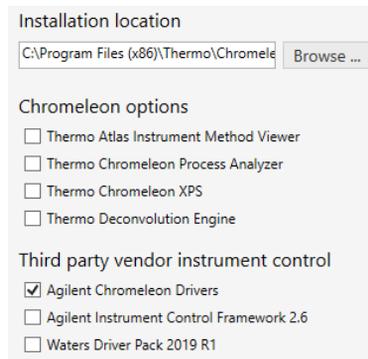
### NOTE

Install the same version of the Agilent Drivers on all PCs.

## Automatic Installation using the Chromeleon Installer

The Chromeleon Installer manages the installation of all required components, including the SVT.

Install the Agilent Drivers using the **Advanced Options** available during the Chromeleon installation. This is described in detail in the *Chromeleon Installation Guide*.



**Figure 1** Advanced Options in Chromeleon Installer

Mark the check boxes for the components that you want to install.

### NOTE

If you want to install the ICF drivers in addition, mark the **Agilent Instrument Control Framework** Version check box as well.

## Manual Installation

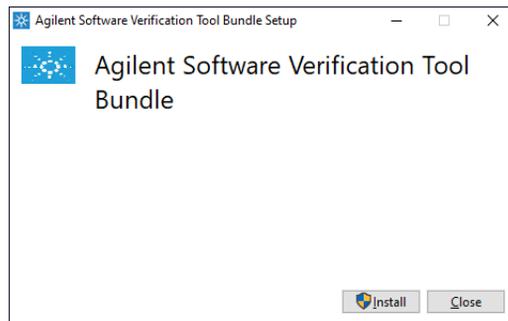
The files required for manual installation are located on the Chromeleon DVD in the folder X:\Chromeleon X.Y\Packages\Agilent Chromeleon Driver, where X is the drive letter of the DVD drive. You can also download the files from the Thermo Fisher support pages. For instructions, contact Thermo Fisher.

Before you install the Agilent Drivers, you must install the Software Verification tool, which is required for the installation of the Agilent Drivers.

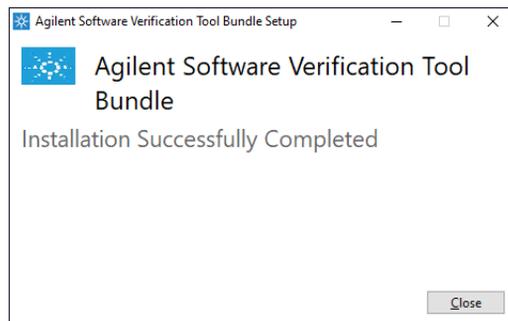
If you received the Agilent Drivers as a stand-alone installer you can follow the same steps described below.

### Manual Installation of the Software Verification Tool

- 1 Double-click SetupSVT.exe to start the installation of the Software Verification Tool.



- 2 After completion, click **Close** to close the installation wizard.



The Software Verification tool is now available in the Windows **Start** menu:  
**Start >Agilent Technologies >Software Verification Tool.**

#### Manual Installation of the Agilent Drivers

- 1 Double-click the file Agilent\_Drivers\_for\_Thermo\_Chromeleon.msi to start the installation of the Agilent Drivers.
- 2 On the upcoming setup screen, accept the license terms and continue with **Install**.

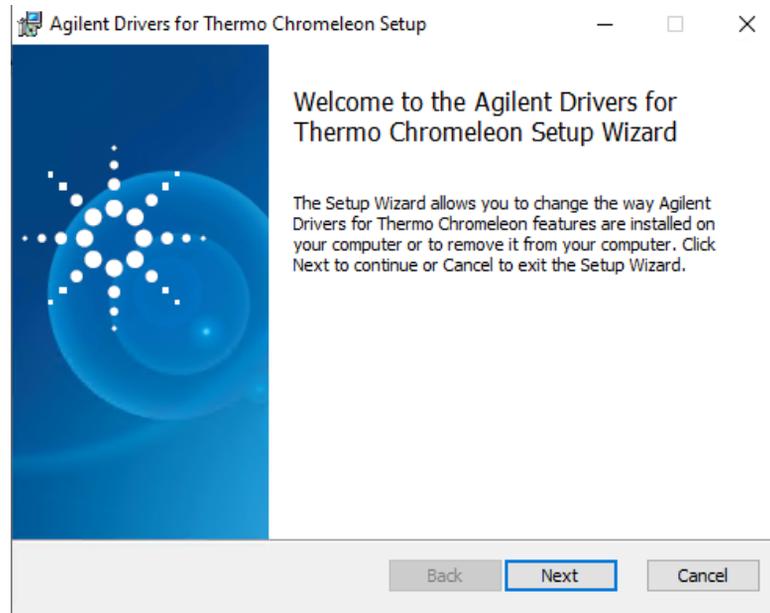


Figure 2 Accept license terms

- 3 Click **Yes** on the user account control to allow the installation of the Agilent Drivers.

- 4 To finalize the installation, click **Finish**.

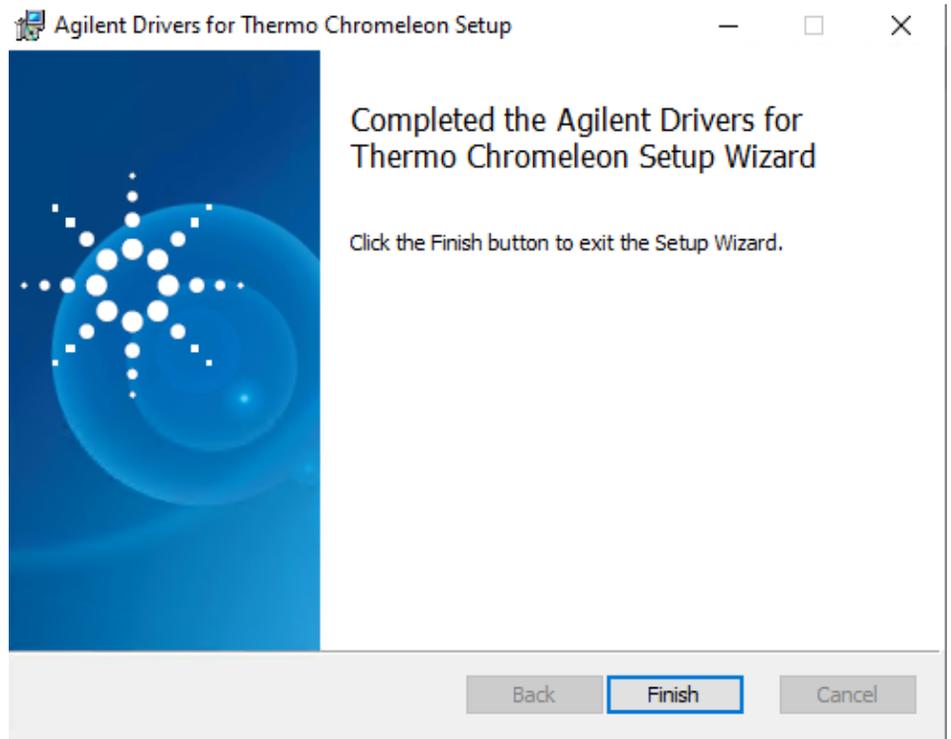


Figure 3 Finalize installation

The final location for the files for the default installation is C:\Program Files (x86)\Agilent Technologies\Agilent Drivers for Thermo Chromeleon (64 bit Windows).

# Software Verification

Agilent offers a Software Verification tool (SVT) to verify the correct installation of the software components.

- When the Chromeleon installation routine is used, the tool is installed along with the Agilent Drivers.
- When the Agilent Drivers are installed manually, the Software Verification tool needs to be installed manually, as it is not part of the Agilent Drivers.

In order to check the successful installation of the Agilent Drivers and its subcomponents, execute SVT.

### NOTE

The Chromeleon IQ also verifies the driver installation. You can use either tool.

- 1 Open **Start >Programs >Agilent Technologies** and select **Software Verification Tool**.
- 2 In the upcoming dialog box, select the required report type and the components of interest and click **Qualify**.

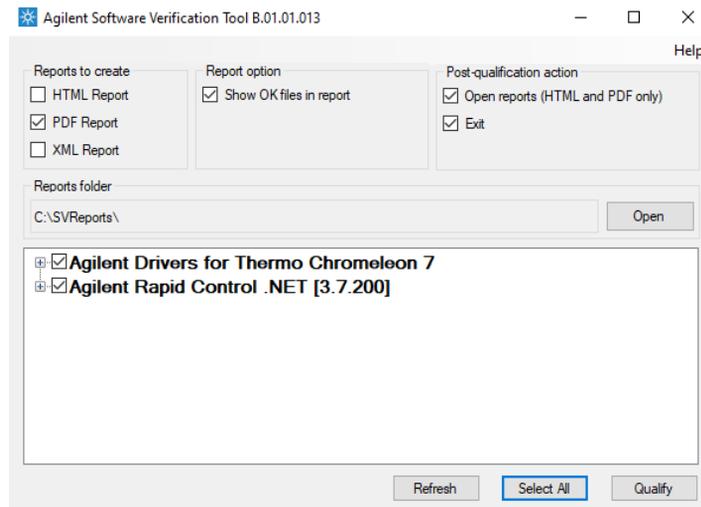


Figure 4 Software Verification Tool dialog box

The corresponding browser opens and shows the resulting files.

- 3 Close the SVT screen by clicking on the x in the upper right corner of the window.

Example Software Verification Report:

Software Verification Report					
<b>Date:</b>	Dienstag, 16. November 2021	<b>Time:</b>	11:22:23 [UTC +01:00:00]	<b>Host Name:</b>	3P-WIN10-R
<b>Windows User Name :</b>	locAdmin	<b>Base Revision Number:</b>	01.00.000	<b>Product Name :</b>	Agilent Drivers for Thermo Chromeleon 7
<b>Install Type:</b>	Agilent_Drivers_for_Thermo_Chromeleon	<b>Additional Packages:</b>	Details		
<b>Details</b>					
ID	Description				
10003	Agilent Drivers for Thermo Chromeleon 2.5.5				
10004	Agilent Instrument Control Framework 2.6.37				
10005	Agilent Instrument Control Framework - LC Drivers 2.19.205.0				
10015	Agilent Instrument Control Framework - ELSD Drivers Version A.01.07 [19]				
10028	Agilent Instrument Control Framework - GC-HS Drivers 3.6 [181]				

Figure 5 Example: extract of SVT report

#### NOTE

The Chromeleon IQ does not start the Agilent SVT. You need to execute the Agilent Software verification tool manually.

#### NOTE

Chromeleon IQ also reports the version number of the Agilent Instrument Control Framework (ICF) used by the ICF integration in Chromeleon.

## Unattended Installation of the Agilent Drivers and Agilent Software Verification Tool

It is possible to install the Agilent Software Verification Tool and the Agilent Drivers in silent mode by executing the following commands in the command console. Make sure to log on to the PC with a local Administrator account and administrative privileges. Start the command line with **Run as administrator**.

### NOTE

The Software Verification Tool must be installed before the Agilent Drivers are installed.

### NOTE

The installation can only run if the Temp folder exists beforehand. It is not created at runtime. Instead, the installation is aborted. Create folder C:\Temp.

- Silent installation of the Agilent Software Verification Tool:  

```
msiexec /i "<PathToMsi>\SFVTOOL.MSI" /passive
INSTALLDIR="C:\Program Files (x86)\Agilent Technologies\
IQTool" /L*v "C:\Temp\SFV.log" /quiet /qn
```
- Silent installation of the Agilent Drivers:  

```
msiexec /i "<PathToMsi>\
Agilent_Drivers_for_Thermo_Chromeleon.msi" /quiet /L*v
"C:\Temp\install.log"
```
- Silent uninstallation:  

```
msiexec /x "<PathToMsi>\
Agilent_Drivers_for_Thermo_Chromeleon.msi" /quiet /L*v
"C:\Temp\uninstall.log"
```
- Silent upgrade:  

```
msiexec /i "<PathToMsi>\
Agilent_Drivers_for_Thermo_Chromeleon.msi" /quiet /L*v
"C:\Temp\upgrade.log"
```

The generated log file can be used for troubleshooting. Be sure to generate a logfile: C:\Temp\install.log

### NOTE

The **Response File** section of the *Chromeleon Installation Guide* gives you further information on the unattended installation of Chromeleon.

## Unattended Execution of the Software Verification Tool

It is possible to run the Agilent Software Verification Tool (SVT) in silent mode by executing one of the following commands in the command console:

- `SFVTool.exe -silent -p:"Agilent Drivers for Thermo Chromeleon 7"`

The command runs the SVT silently with the command window hidden and saves the report in html format (default option) for the selected product(s). It does not open the report.

- `SFVTool.exe -qt -p:"Agilent Drivers for Thermo Chromeleon 7"`

The command runs SVT showing the progress in the command window, and saves the report in html format (default option) for the selected product(s).

- `SFVTool.exe -qt -p:"Agilent Drivers for Thermo Chromeleon 7" -html -pdf -open`

The command runs the SVT, showing the progress in the command window, saves the report in html format (default) and pdf for the selected product(s) and opens the reports.

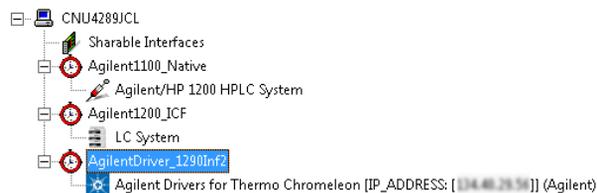
## Agilent Drivers Co-Execution with Other Drivers

Agilent Drivers co-execute with other driver solutions present on the same PC as long as the instrument stack is controlled purely by the Agilent Drivers.

Currently, it is possible to choose the kind of drivers per instrument, but not per module:

- *Agilent Technologies*  
developed by Agilent, integrated by Agilent using the Chromeleon DDK adapter and certified by Thermo Fisher Scientific.
- *Agilent*  
Agilent ICF Interface provided by Agilent and integrated into Chromeleon by Thermo Fisher Scientific.
- *Obsolete Agilent/HP*  
Native Drivers developed by Thermo Fisher Scientific/Dionex based on Agilent Control Code. These drivers are supported by Thermo Fisher only, and are limited to control of 1100/1200 Series modules. These drivers are on the installation medium for compatibility purposes and should not be used.

For the time being, all three kinds of driver are available for configuration of Agilent Instrumentation.



**Figure 6** Possible configurations

### NOTE

Only one driver instance of Agilent Drivers can be assigned to one instrument.

### NOTE

Mixed LC instrument stacks are only supported for Thermo Fisher Scientific Corona Veo and WPS-3000.

It is possible to install the Agilent Drivers as well as the ICF integration. In this case, both drivers are listed in **Windows Control Panel >Programs and Features**.

## Installation

### Agilent Drivers Co-Execution with Other Drivers

As the Agilent Drivers includes all components in a shell, and ICF comes with three packages, the **Programs and Features** list shows both parallel integrations as follows:

 Agilent Drivers for Thermo Chromeleon	Agilent Technologies	08.02.2019	279 MB	2.0.35
 Agilent Instrument Control Framework - GC/HS Drivers A.03.02	Agilent Technologies	07.09.2018	260 MB	3.2.103
 Agilent Instrument Control Framework - LC Drivers A.02.14	Agilent Technologies	07.09.2018	111 MB	2.14.115
 Agilent Instrument Control Framework A.02.04	Agilent Technologies	07.09.2018	49,4 MB	2.4.124

**Figure 7** Example of different kinds of drivers



## 4

# Configuring the Agilent Drivers in the Chromeleon Instrument Configuration

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This chapter gives you step-by-step instructions for configuring the Agilent Drivers in Chromeleon.

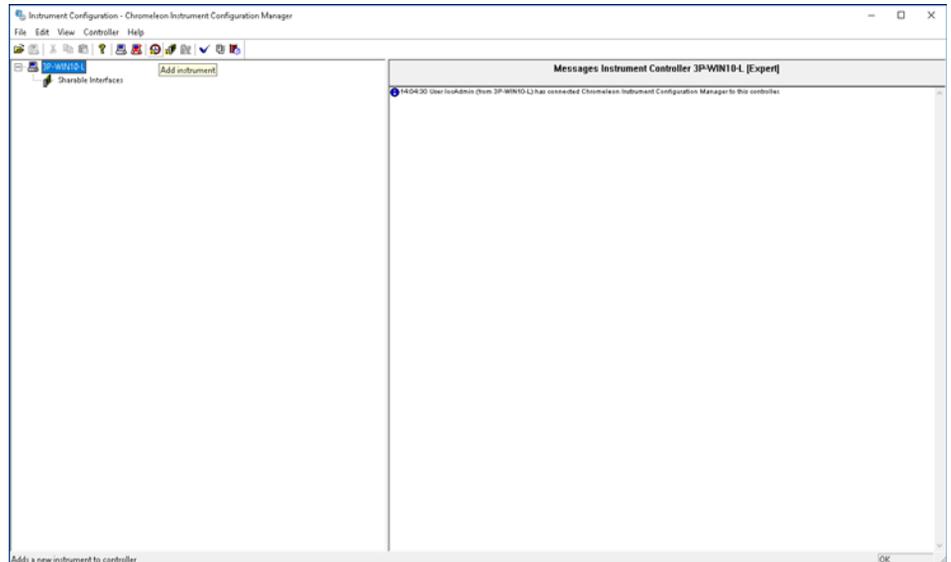
## Configure your Agilent GC

### NOTE

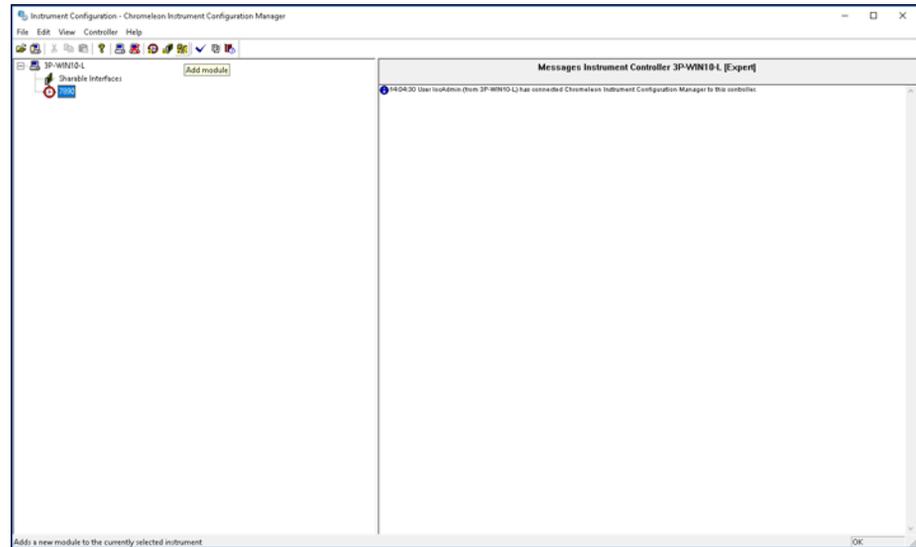
The configuration of a GC/HS system is a two-stage process. First configure the GC, then repeat the steps for the HS.

## Step 1: Configure your Agilent GC

- 1 Turn on the GC system.
- 2 In the **Chromeleon Services Manager**, ensure that the **Instrument Controller Service** is running.
- 3 Start the instrument configuration using the **Chromeleon Instrument Configuration Manager** application.
- 4 Right-click the instrument controller and select **Add Instrument**. Provide an instrument name.



- 5 Right-click the instrument and select **Add Module**.

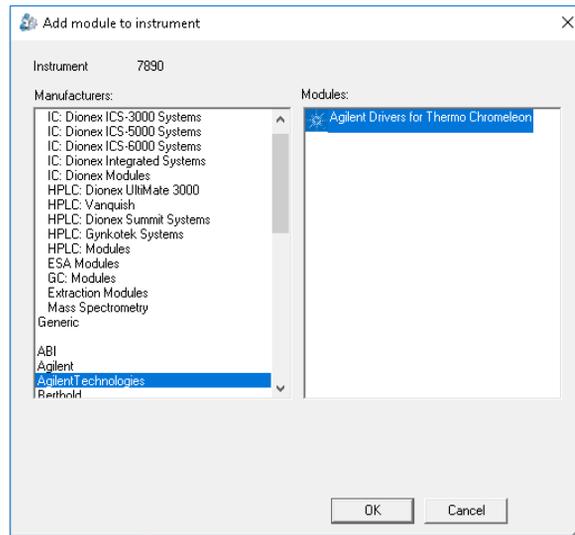


The **Manufacturers** list offers two Agilent integrations:

- **Agilent Technologies**
- **Agilent**

- 6 Select the **Agilent Technologies** option in the **Manufacturers** panel.

- 7 Select the **Agilent Drivers for Thermo Chromeleon** in the **Modules** panel and click **OK**.



The **Agilent Drivers – Instrument Configuration** dialog box opens, where you can configure the instrument.

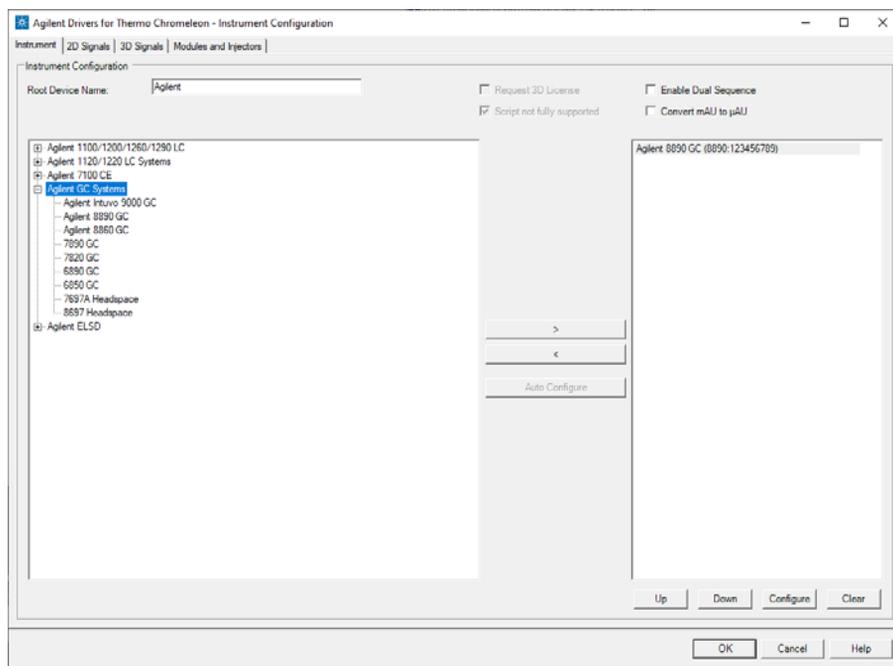
- 8 Provide the **Root Device Name**.

#### NOTE

The name is preset to Agilent. It can be changed but it cannot be left empty. The **Root Device Name** is the root for the Chromeleon command tree and, correspondingly, the naming in the method script. The name must conform to the Chromeleon naming restrictions.

## Configuring the Agilent Drivers in the Chromeleon Instrument Configuration

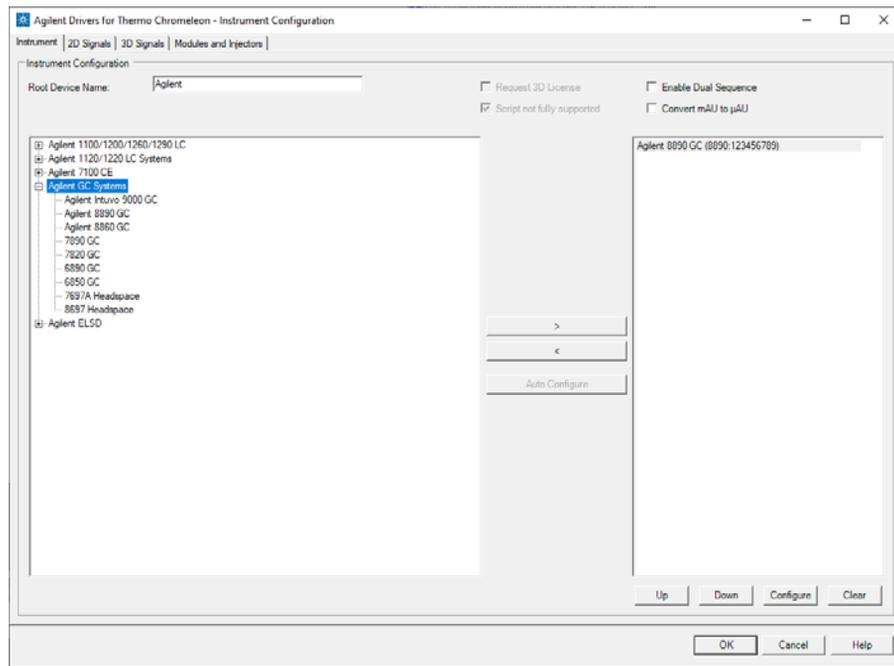
### Configure your Agilent GC



## Configuring the Agilent Drivers in the Chromeleon Instrument Configuration

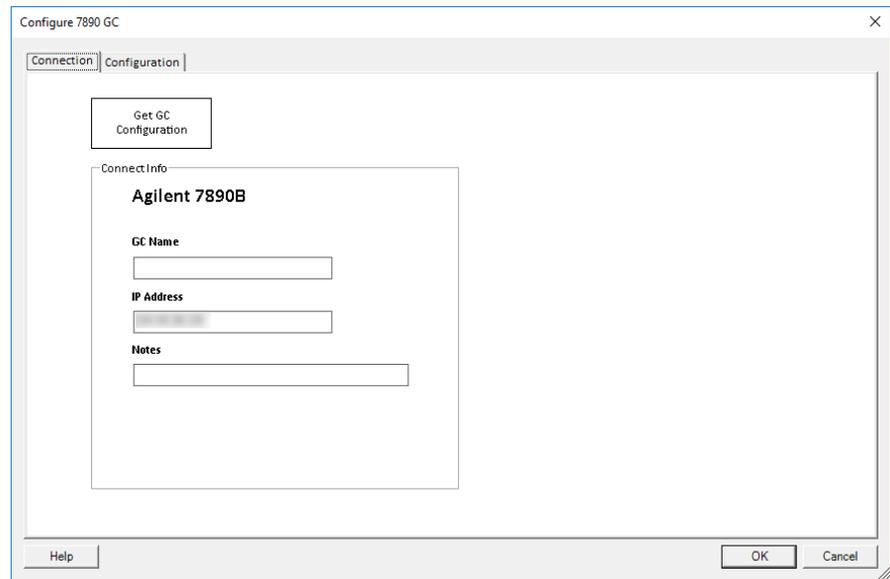
### Configure your Agilent GC

- 9 Select the GC model from the left panel and click the arrow to add it to the right panel.



- 10 Click **Configure**.

11 In the configuration window, enter the GC's IP address.



12 Click **Get GC Configuration**.

After a few seconds the GC configuration is downloaded from the GC.

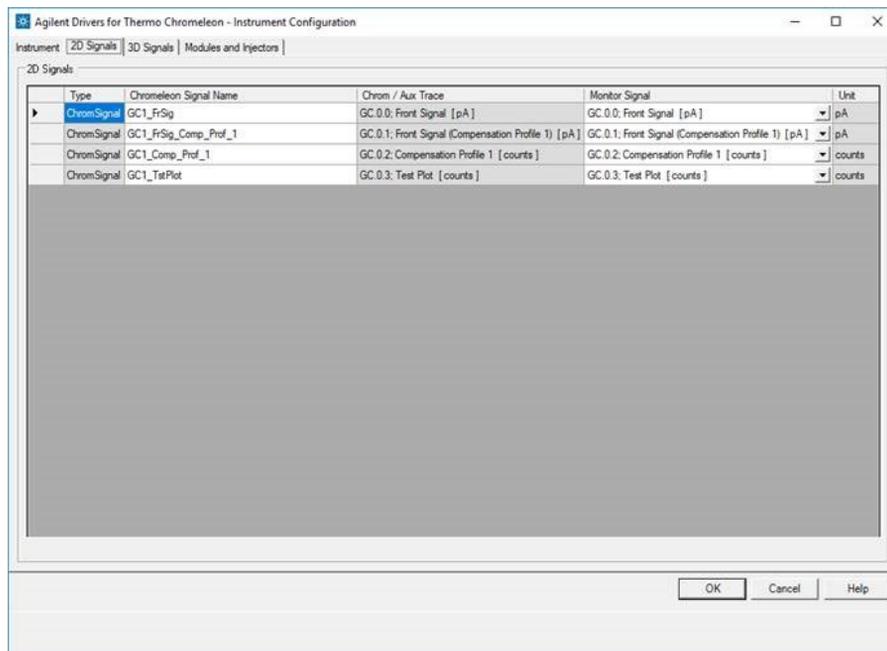
13 In the **Configuration** tab, select the keypad lock. Depending on your GC model one or more of the following options are available:

- **Keypad is locked during runs:** Disables the GC keypad during runs.
- **Keypad is locked while under software control:** Disables the GC keypad during live instrument sessions. This is the recommended setting.
- **Keypad is never locked:** Enables the GC keypad at all times.

[OPTIONAL] 14 For GCs with firmware version 2.4 or higher: Select the GC to activate (see GC driver Release Notes).

15 Verify the detected configuration and click **OK** to accept the configuration settings.

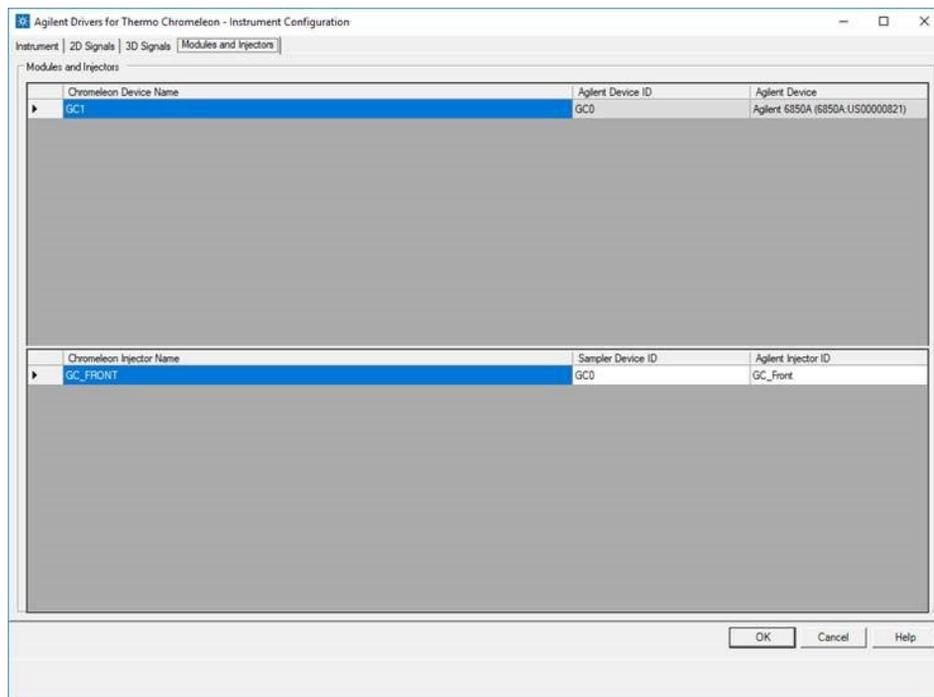
16 Check the **2D Signals** tab. Optionally, you can rename the signals here.



## Configuring the Agilent Drivers in the Chromeleon Instrument Configuration

### Configure your Agilent GC

- 17 Select the **Modules and Injectors** tab. The upper table lists all configured modules, while the lower table lists all configured injectors. New injection sources can be added manually. For details on adding injection sources, see “Handling Injector Changes” on page 41.



- 18 Click **OK**.

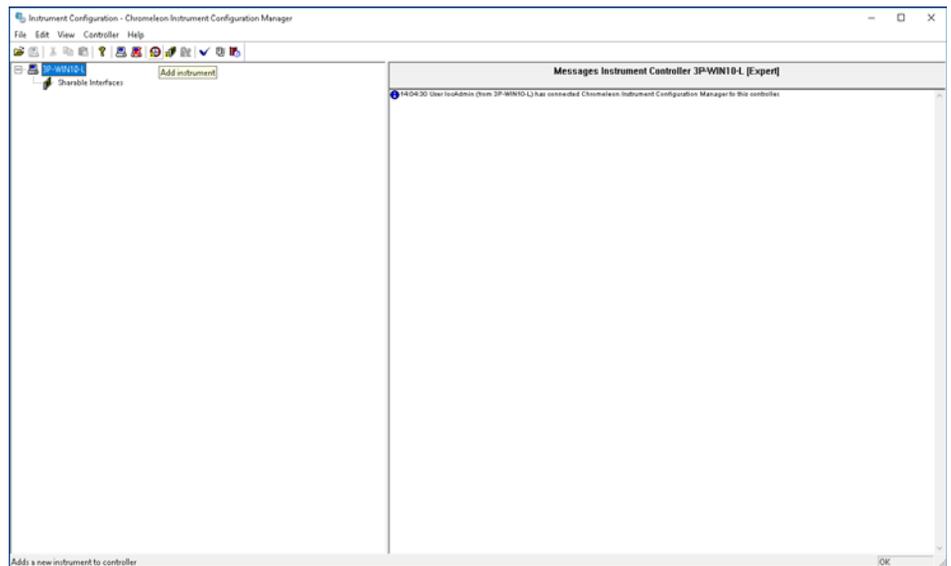
#### NOTE

A warning will be shown when saving a configuration of an instrument with more than one injector. This warning is to be expected and can be disregarded. No other warnings should be shown. The warning's text is:

Warning: More than one inject device installed for instrument

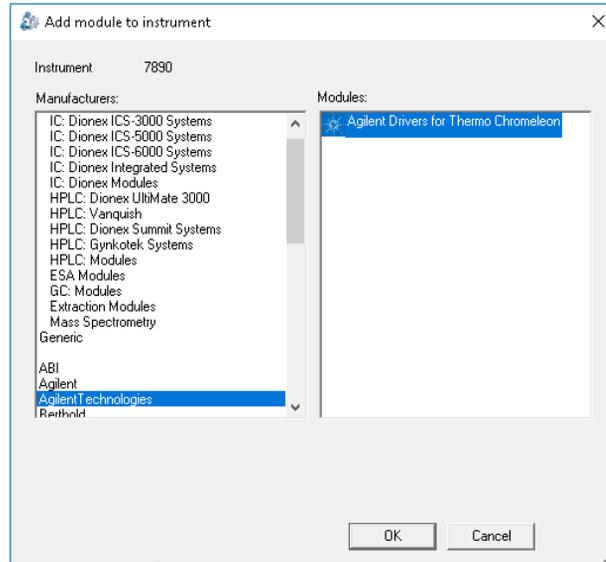
## Step 2: Configure your Agilent GC/HS

- 1 Turn on the GC system.
- 2 In the **Chromeleon Services Manager**, ensure that the **Instrument Controller Service** is running.
- 3 Start the instrument configuration using the **Chromeleon Instrument Configuration Manager** application.
- 4 Right-click the instrument controller and select **Add Instrument**. Provide an instrument name.



- 5 Select the **Agilent Technologies** option in the **Manufacturers** panel.

- 6 Select the **Agilent Drivers for Thermo Chromeleon** in the **Modules** panel and click **OK**.

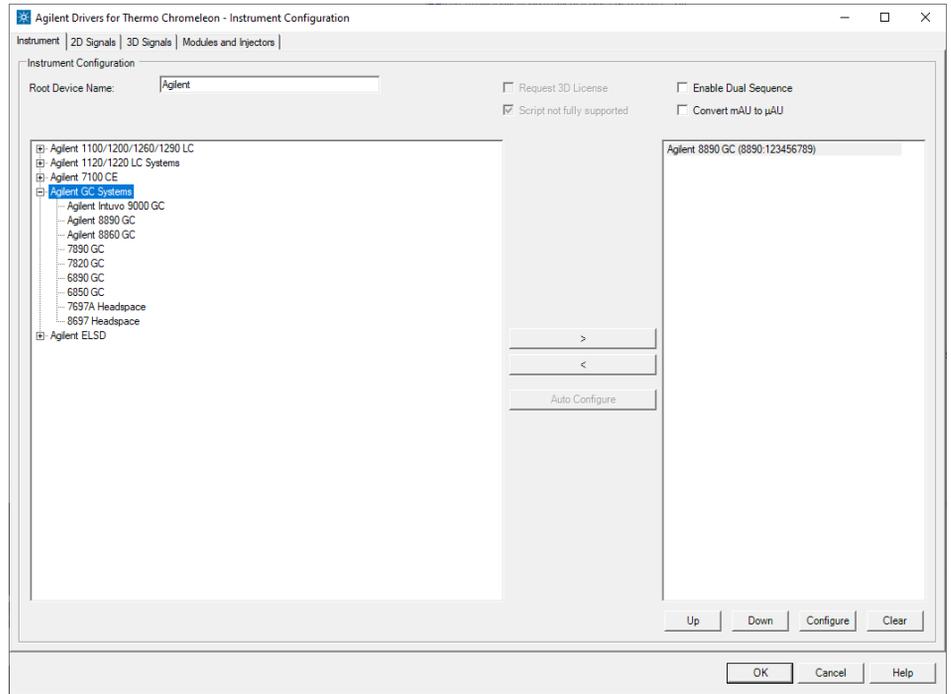


The **Agilent Drivers – Instrument Configuration** dialog box opens, where you can configure the instrument.

## Configuring the Agilent Drivers in the Chromeleon Instrument Configuration

### Configure your Agilent GC

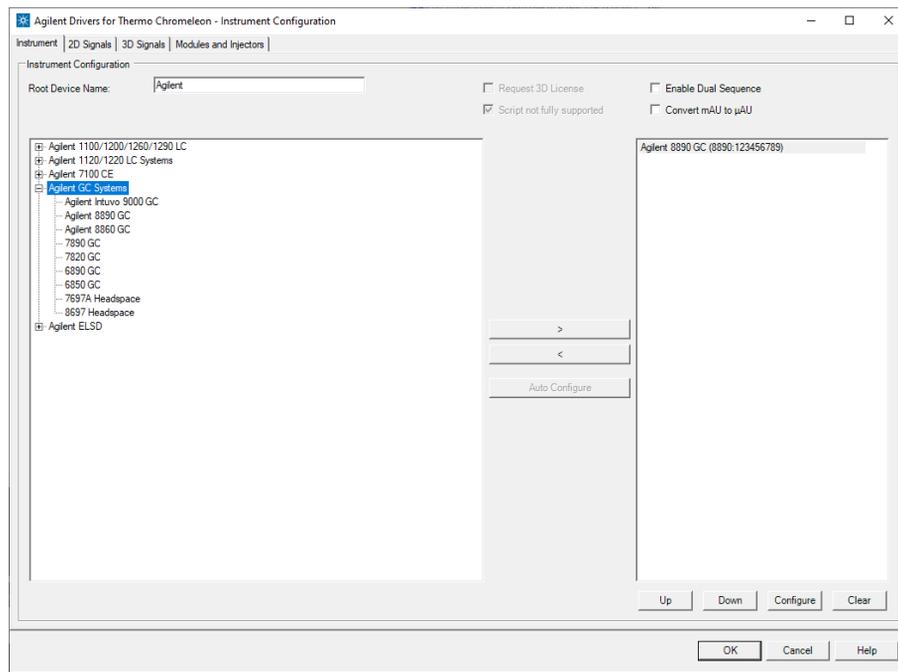
- 7 Provide the **Root Device Name**. The name is preset to Agilent. It can be changed but it cannot be left empty. The **Root Device Name** is the root for the Chromeleon command tree and, correspondingly, the naming in the method script. The name must conform to the Chromeleon naming restrictions.



## Configuring the Agilent Drivers in the Chromeleon Instrument Configuration

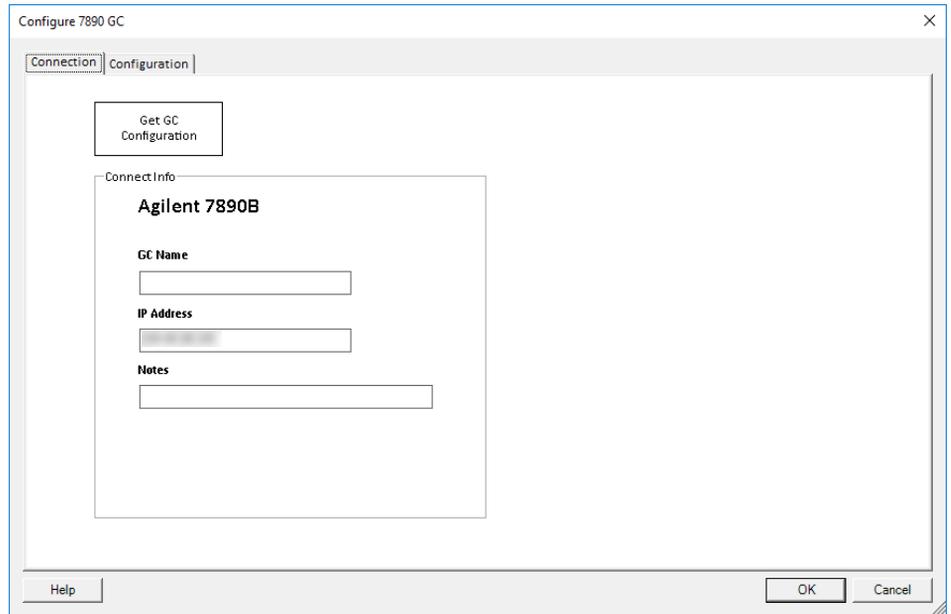
### Configure your Agilent GC

- 8 Select the GC model from the left panel and click the arrow to add it to the right panel.



- 9 Click **Configure**.

10 In the configuration window, enter the GC's IP address.



11 Click **Get GC Configuration**.

After a few seconds the GC configuration is downloaded from the GC.

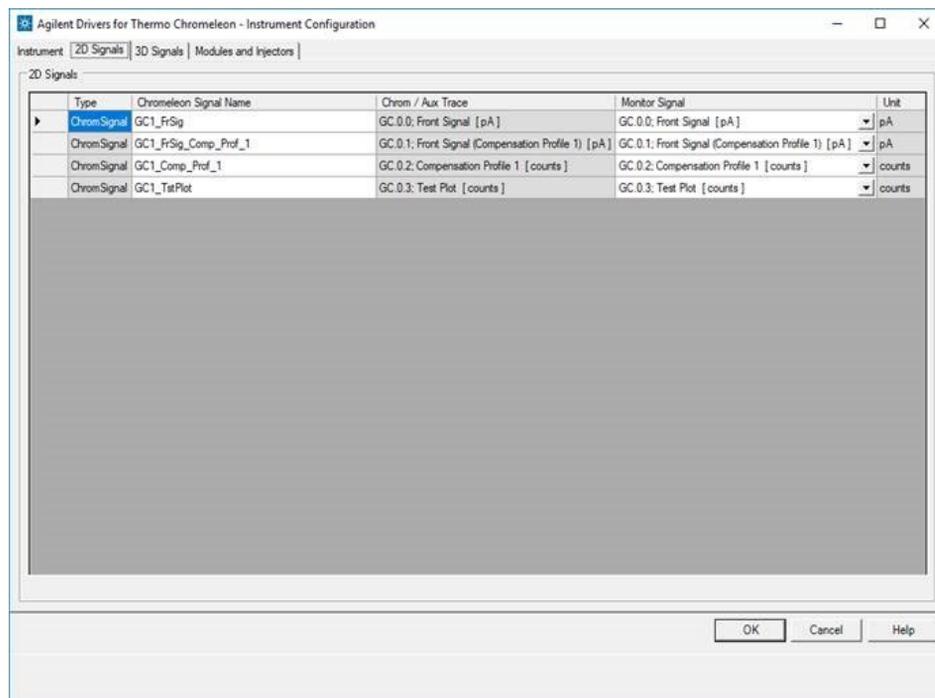
12 In the **Configuration** tab, select the keypad lock. Depending on your GC model one or more of the following options are available:

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- **Keypad is locked while under software control:** Disables the GC keypad during live instrument sessions. This is the recommended setting.
- **Keypad is never locked:** Enables the GC keypad at all times.

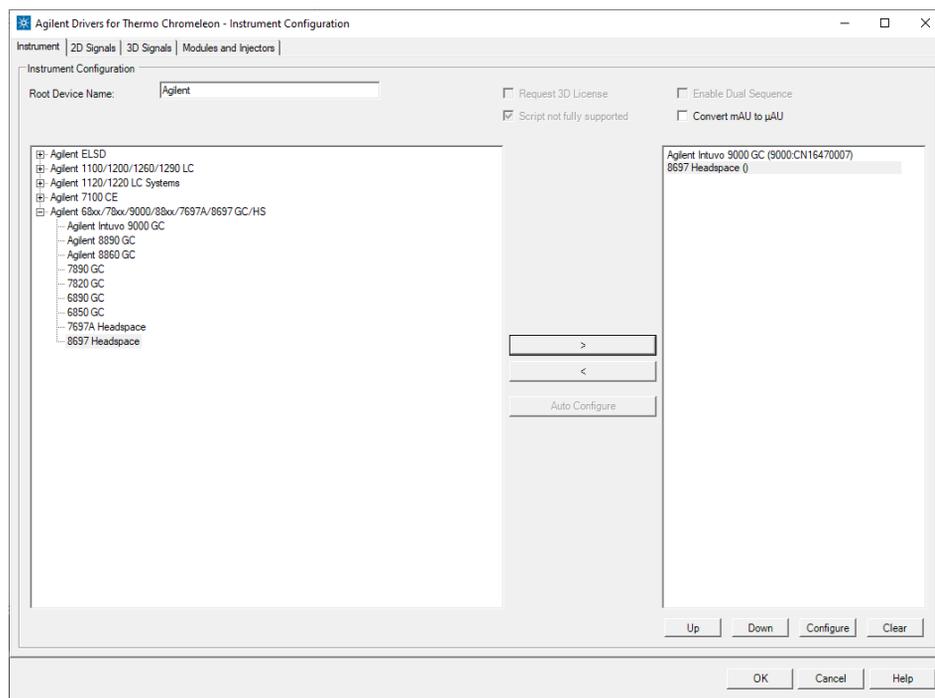
13 Click **OK**.

[OPTIONAL] 14 For GCs with firmware version 2.4 or higher: Select the GC to activate (see GC driver Release Notes).

15 Check the **2D Signals** tab. Optionally, you can rename the signals here.



- 16 Select the HS model from the left panel and click the arrow to add it to the right panel.



- 17 Click **Continue**.

## Configuring the Agilent Drivers in the Chromeleon Instrument Configuration

### Configure your Agilent GC

- 18 In the configure window, enter the HS's IP address. Optionally, adjust the settings in the **Configuration** and **Preferences** tabs. Click **OK**.

The screenshot shows a dialog box titled "Configure 7697 Headspace" with a close button (X) in the top right corner. The dialog has three tabs: "Connection", "Configuration", and "Preferences", with "Configuration" currently selected. The "Configuration" tab is divided into two main sections: "Connection Information" and "Version Information".

**Connection Information:**

- Agilent 7697A** (Instrument Name)
- Instrument Name:** [Text input field]
- IP Address or Hostname:** [Text input field]
- Notes:** [Text input field]

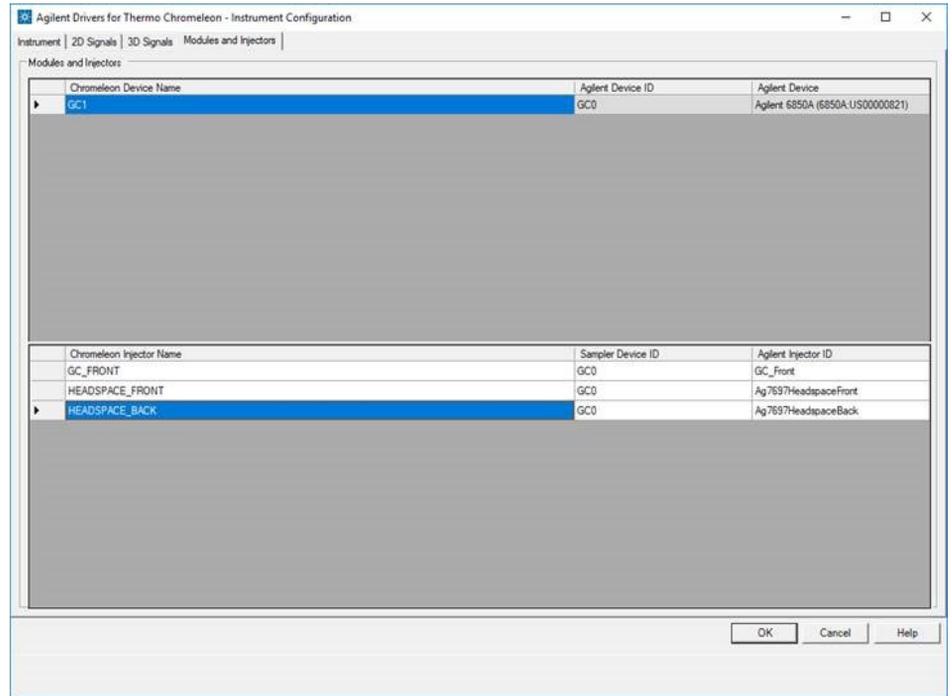
**Version Information:**

- Software Driver Version: B.01.07.3 [6823]

At the bottom of the dialog, there are three buttons: "Help", "OK", and "Cancel".

- 19 On the **Modules and Injectors** tab the individual modules and injectors can be verified and renamed. Also, new injection sources can be added manually. For

details on adding injection sources, see “Handling Injector Changes” on page 41.



20 Click **OK**.

#### NOTE

A warning will be shown when saving a configuration of an instrument with more than one injector. This warning is to be expected and can be disregarded. No other warnings should be shown. The warning's text is:

Warning: More than one inject device installed for instrument

## Handling Injector Changes

It is possible to add and remove injector devices during normal operation without the need to reconfigure the instrument. For this feature to work all injectors that are to be used must be part of the instrument configuration before they are physically connected to the instrument.

To prepare the Agilent Drivers to handle injector changes add all injectors you are planning to use during the initial configuration.

To manually add an injection source, follow these steps:

- 1 Right click in the lower table and select **Add Injector** from the context menu.
- 2 Fill in **Chromeleon Injector Name**, **Sampler Device ID**, and the **Agilent Injector ID**. The sampler Device ID must be one of the Device IDs in the upper table.

### NOTE

A warning will be shown when saving an instrument configuration with more than one injector for a single instrument. This warning is to be expected and can be disregarded. No other warnings should be shown. The warning's text is:

Warning: More than one inject device installed for instrument

Chromeleon Injector Name	Sampler Device ID	Agilent Injector ID
GC_FRONT	GC0	GC_Front
GC_BACK	GC0	GC_Back

Add Injector

Figure 8 Select Add Injector to add a new injection source to the configuration

Chromeleon Injector Name	Sampler Device ID	Agilent Injector ID
GC_FRONT	GC0	GC_Front
GC_BACK	GC0	GC_Back
INJECTORID	GC0	MyNewInjector

Figure 9 Manually fill in the table cells

Table 2 Mapping of injector device types to Agilent injector IDs

Injector Device Type	Agilent Injector ID
Front injector	GC_Front
Back injector	GC_Back
Headspace front injector	Ag7697HeadspaceFront
Headspace back injector	Ag7697HeadspaceBack
Sampling valve on position N	GC_ValveN

## Baseline Monitoring with a GC Instrument

- 1 In the status dashboard, click **Edit GC Method...** on the GC status tile.

The screenshot shows the 'Agilent 7890B' status dashboard. On the left, there are sections for 'GC ALS' and 'Front/Back Injectors'. The main area displays 'Front Inlet Flow Path' and 'Back Inlet Flow Path' with various parameters like pressure (psi), temperature (°C), and flow rate (mL/min). A 'Run 0.00 / 1.00 min' bar is at the bottom. On the right, there are buttons for 'Status Dashboard', 'Collect Support Info', and 'Help'.

- 2 Select the signals which will be acquired during baseline monitoring. Then click **Set Method**.

The screenshot shows the 'Edit GC Method' dialog box. The 'Signals' section is expanded, showing a table of signal sources. A red circle with the number '1' highlights the 'Signal Source' column. The 'Signal Event Table' is also visible. At the bottom, a red circle with the number '2' highlights the 'Set Method' button.

Signal Source	Data Rate / Min Peak Width	Zero	Save
#1: Diagnostics: Column: #1: Flow	50 Hz / 0.004 min	<input type="checkbox"/>	<input checked="" type="checkbox"/>
#2: Diagnostics: Column: #1: Pressure - Actual	50 Hz / 0.004 min	<input type="checkbox"/>	<input checked="" type="checkbox"/>
#3: Diagnostics: Intuvo: Column Connector 1: Actual	50 Hz / 0.004 min	<input type="checkbox"/>	<input checked="" type="checkbox"/>
#4: Diagnostics: Inlet (SS Inlet): Pressure: Actual	50 Hz / 0.004 min	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- 3 Click **Monitor Baseline** and select the same channels as in step 2. Click **OK**.

**NOTE**

It is possible to deselect all channels in the online method and start baseline monitoring. No signal will be acquired until the GC method is edited and a signal acquired. The signal will then start at retention time 0.0min.

For more info on Baseline Monitoring refer to the Chromeleon help.

# Create a Configuration Report

Chromeleon offers a summary report of the configured modules with the current configuration including the present module options. The configuration report lists absorbance unit signals according to the configuration settings as either mAU or  $\mu$ AU.

- 1 Select **Create Report** in the **Chromeleon Instrument Configuration Manager >Controller**.

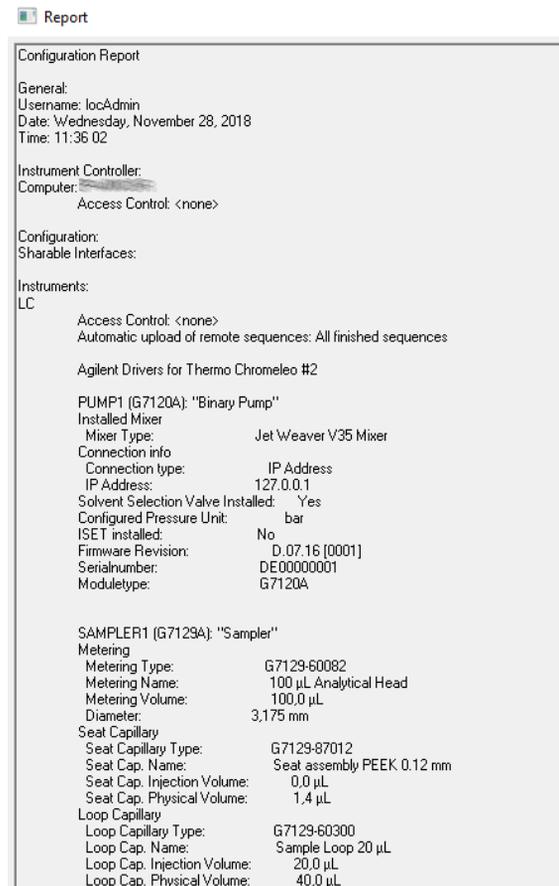


Figure 10 Chromeleon Configuration Report

### Device and Signal Names

The Chromeleon Instrument Configuration Editor offers access to the module names and signal names.

#### Agilent Device Name

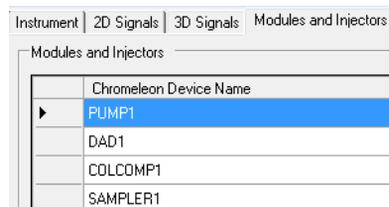
The Agilent **Device name** in the instrument tab is used on each graphical component of the module. These names have no naming restrictions.



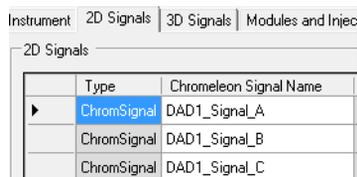
**Figure 11 Agilent Device Name**

#### Chromeleon Device and Signal Names

The Chromeleon device and signal names are subject to restrictions. If a restricted character is used, or a misconfiguration happens during manual interaction, a warning appears and the setting must be corrected before the dialog box can be closed.



**Figure 12 Chromeleon Device Name**



**Figure 13 Chromeleon Signal Name**

In the Script Editor, only the **Chromeleon Device Name** can be used. If required, you can adjust the Agilent **Device name** to match the **Chromeleon Device names**.

**NOTE**

Both names (Agilent **Device name** and **Chromeleon Device Name**) appear in the graphical user interface.

## Name appearance in the Chromeleon Console

The graphical Interface often shows both names in the following format:

### Agilent Device Name (Chromeleon Device Name)

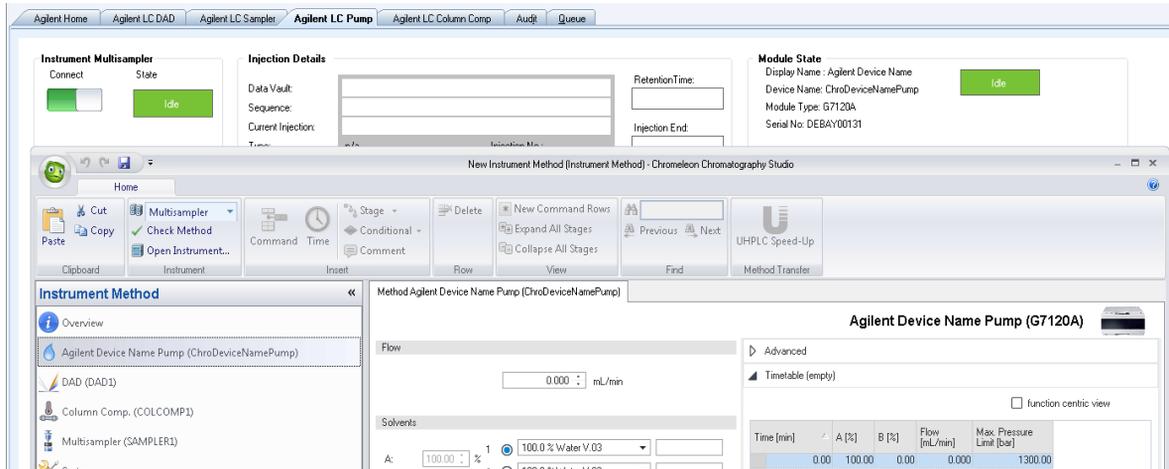


Figure 14 Naming in graphical components

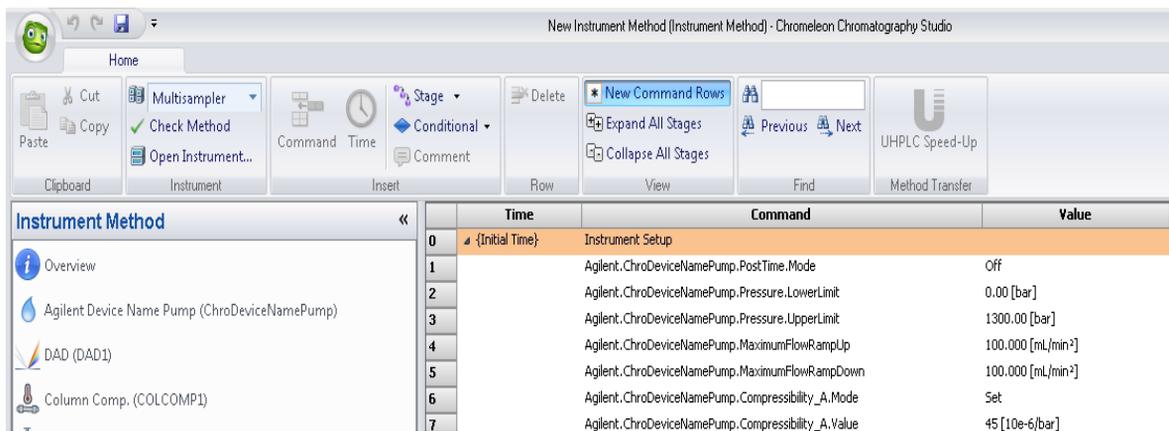


Figure 15 Naming in method script

# 5

## Getting Started

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This chapter gives you the necessary information to allow you to start working with the Agilent Drivers.

## Direct Control of the Instrument

### **Method Script and Command Tree**

The command tree is only available for LC instruments. GC/HS instruments offer a basic method script. It is not possible to set method parameters in the method script.

The command tree contains additional commands, such as actions that are performed but are not part of the method. However, not all of these additional commands are available for use.

For more information on the command tree, see the Chromeleon help.

## Setting Up an Instrument Method

### GC and Headspace Instrument Method

#### GC Instrument Method

Use the Chromeleon Instrument Method Wizard to generate an Instrument Method.

- 1 Start the Chromeleon Instrument Method Wizard.
- 2 The **Run Time** is automatically adjusted based on the instrument method settings and should not be changed manually.
- 3 Click **Next**.
- 4 Select the injector device from the list.
- 5 Adjust method parameters. The Chromeleon Instrument Method Wizard offers the GC method in one window. The method parameters are displayed on the right panel. The **Flow Path** and the **Run Time** calculated on the current parameter settings are displayed at the top. The panel on the left side allows switching between instrument method sections.
- 6 The injection volume is not set in the Injector section. Instead, set the injection volume in the Chromeleon sequence.
- 7 Click **Next**.
- 8 Enter a comment and description as required and click **Finish** to complete the wizard.
- 9 Run **Check Method** to ensure the method is valid.

#### GC HS Instrument Method

Use the Chromeleon Instrument Method Wizard to generate an Instrument Method.

- 1 Start the Chromeleon Instrument Method Wizard.
- 2 The **Run Time** is automatically adjusted based on the instrument method settings and should not be changed manually.
- 3 Click **Next**.
- 4 Select the injector device from the list.

- 5 Adjust GCHS method parameters. The method parameters are displayed on the right panel. The **Flow Path** and the **Run Time** calculated on the current parameter settings are displayed at the top. The panel on the left side allows switching between instrument method sections.
- 6 Click **Next**.
- 7 Enter a comment and description as required and click **Finish** to complete the wizard.
- 8 Run **Check Method** to ensure the method is valid.

## Additional Information about the Instrument Method

### Run Time/Stop Time

Chromeleon specifies the **Run Time** as a general part of the method, while the Agilent modules method windows offer a **Stoptime** and a **Posttime** per module. The module **Stoptime** has been disabled and the Chromeleon **Run Time** is automatically applied to all modules present in the method.

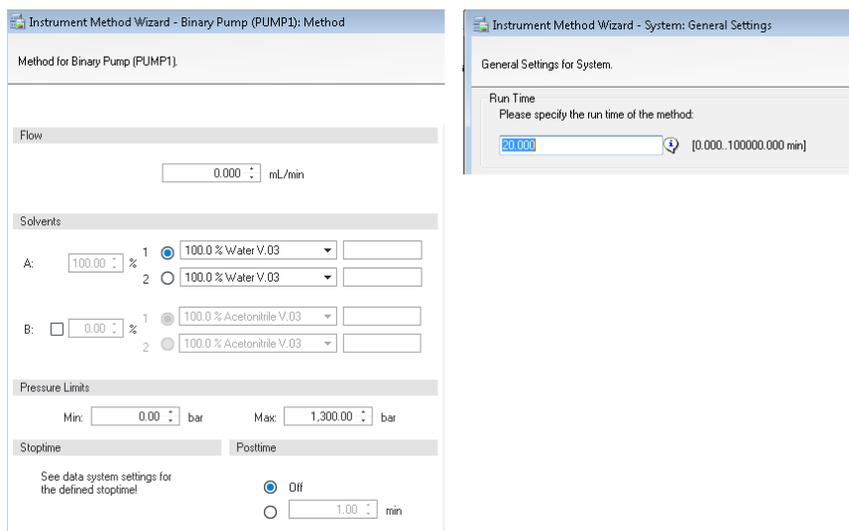


Figure 16 Agilent Module Stoptime (left) and Chromeleon Run Time (right)

### Automatic Extension of Run Time due to Timetable Setup

The specified **Run Time** in the general settings of a Chromeleon method is automatically extended in the following cases:

- if a module **Timetable** is specified to be longer than the **Run Time**;
- if the pump **Timetable** is automatically adjusted based on the automatic calculation of the solvent gradients due to special features such as ISET.

The adjusted **Run Time** can be seen in the overview of the instrument method and in the **Time** steps in the method script.

### Injection Volume Handling

Injection **Volume** and **Location** are defined in the sequence only; therefore, the samplers do not offer the injection volume as a parameter entry. It is possible to

## Getting Started

### Setting Up an Instrument Method

add **Volume** and **Location** manually in the method script as Inject Command parameters.

**Figure 17** Sampler method screen without injection volume

Chromleon offers the possibility to manually edit the method script and add a line to specify a method-specific volume and location. In the **Inject** stage, select the inject command line and specify the values for

- Position
- Volume

Using this manual method update, the method parameters overwrite the sequence parameters. The information on the parameters that are used is documented in the **Audit Trail**.

Line	Command
12	Agilent.SAMPLER1.HIPALS.Inject
13	Wait
	<a href="#">Click here to append a new command</a>
14	Start Run
15	Agilent.PUMP1.PUMP1_Pressure.AcqOn
16	Agilent.PUMP1.PUMP1_Flow.AcqOn
17	Agilent.PUMP1.PUMP1_Solvent_Ratio_A.AcqOn
18	Agilent.PUMP1.PUMP1_Solvent_Ratio_B.AcqOn
19	Agilent.PUMP1.PUMP1_Tuning_A.AcqOn
20	Agilent.PUMP1.PUMP1_Tuning_B.AcqOn
21	Agilent.DAD1.DAD1_Signal_A.AcqOn
22	Agilent.DAD1.DAD1_Signal_B.AcqOn
23	Agilent.DAD1.DAD1_Signal_C.AcqOn
24	Agilent.DAD1.DAD1_Signal_D.AcqOn

**Figure 18** Manual edit of the method script

## Graphical Instrument Method versus Instrument Method Script

The Agilent Drivers offer method parameters in a graphical user interface as well as in scripted format.

- The Agilent method user interface offers initial parameters on the left of the method screen, additional parameters and timetable parameters on the right.

Time [min]	A [%]	B [%]	Flow [mL/min]	Max. Pressure Limit [bar]
0.00	20.00	80.00	2,000	1300.00
0.40	40.00	60.00	.....	.....
0.60	60.00	40.00	.....	.....
0.80	80.00	20.00	.....	.....
1.00	90.00	10.00	.....	.....

Figure 19 Graphical method screen

## Getting Started

### Setting Up an Instrument Method

- In the **Chromeleon script editor**, all initial parameters (home values) are listed in the **Instrument Setup**, while the timetable values are listed in the **Run** stage at the time of execution.

0	Initial Time	Instrument Setup	
1		Agilent.DAD1.PostTime.Mode	Off
2		Agilent.DAD1.AnalogOutput_A.AnalogAttenuation	1000.00 [mAU]
3		Agilent.DAD1.AnalogOutput_A.AnalogOffset	5 [%]
4		Agilent.DAD1.Peakwidth	0.1000 [min]
5		Agilent.DAD1.Slitwidth	4 [nm]
6		Agilent.DAD1.UV_LampRequired	True
7		Agilent.DAD1.MarginForNegativeAbsorbance	100 [mAU]
8		Agilent.DAD1.Autobalance.Postrun	False
9		Agilent.DAD1.Autobalance.Prerun	True

Figure 20 Initial/Home values in Instrument Setup

0.000	Run	Duration =
	<a href="#">Click here to append a new command</a>	
0.400	Agilent.PUMP1.%B.Value	60.00 [%]
	<a href="#">Click here to append a new command</a>	
0.600	Agilent.PUMP1.%B.Value	40.00 [%]
	<a href="#">Click here to append a new command</a>	
0.800	Agilent.PUMP1.%B.Value	20.00 [%]
	<a href="#">Click here to append a new command</a>	
1.000	Agilent.PUMP1.%B.Value	10.00 [%]

Figure 21 Timetable values in the Run stage

## Getting Started

### Setting Up an Instrument Method

Commands in the Command Tree and Script Editor

The Command Tree and the Script Editor (available using the **Script Editor** link in the navigation pane) provide a structured list of the parameters of the method. The command includes the naming and section in which the parameter is present in the graphical method interface. The following naming convention for instrument parameters is used:

RootNode.Device.Feature.Parameter[\_Detail]

for example, Agilent.COLCOMP1.EnableAnalysis.MaximumDeviationLeft

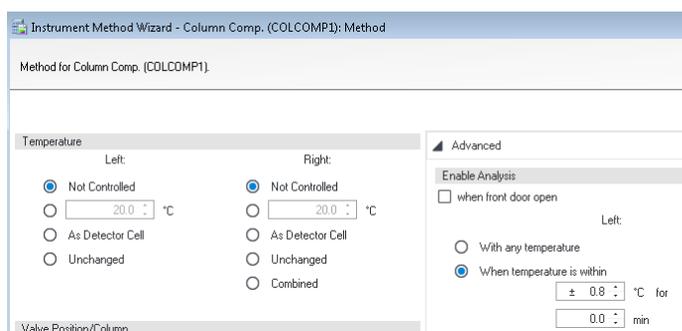


Figure 22 Graphical method screen – parameter

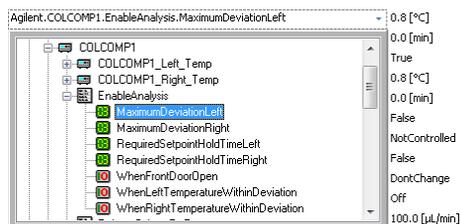


Figure 23 Method script – grouped parameters follow the graphical method screen

Timetable Entries

The initial/home values can be updated using timetable entries. In the Chromeleon script, it is possible to select a command to change a method parameter and, depending on the run stage (initial or run), the parameter is identified as either a home value (initial state) or a timetable value (run state). Therefore, the command name is the same; for example, **Flow** at initial time is the initial flow, **Flow** within the run stage is the corresponding timetable value at the specified time.

## Getting Started

### Setting Up an Instrument Method

	Time	Command	Value
101	0.000	Equilibration	Duration = 0.000 [min]
102		Agilent.PUMP1.Flow.Nominal	1.000 [mL/min]
103		Agilent.PUMP1.%B.Value	80.00 [%]
*		<a href="#">Click here to append a new command</a>	
New Time Step			
127	0.000	Run	Duration = 20.000 [min]
*		<a href="#">Click here to append a new command</a>	
128	0.400		
129		Agilent.PUMP1.%B.Value	60.00 [%]
*		<a href="#">Click here to append a new command</a>	
130	0.600		
131		Agilent.PUMP1.%B.Value	40.00 [%]
132		Agilent.PUMP1.Flow.Nominal	2.000 [mL/min]
*		<a href="#">Click here to append a new command</a>	
133	0.800		

**Figure 24 Method script: initial values (top) and timetable values (bottom)**

For certain parameters, it is possible that the initial and timetable values differ, so that the timetable may offer a different number of parameters. In this case, timetable values are notified with a TT (timetable). These commands cannot not be used outside the run stage, for example:

#### Home Value

- Temperature TCC
- Not controlled
  - Set
  - As detector cell
  - Unchanged
  - combined

#### Timetable Value

- Temperature TCC increase
- Not controlled
  - Set

	Time	Command	Value
0	{Initial Time}	Instrument Setup	
90		Agilent.COLCOMP1.TemperatureControlLeft.Mode	NotControlled
127	0.000	Run	Duration = 20.000 [min]
128		Agilent.COLCOMP1.TT.TemperatureControlModeLeft	Set
129		Agilent.COLCOMP1.TemperatureControlLeft.Nominal	22.0 [°C]
*		<a href="#">Click here to append a new command</a>	

**Figure 25 Method script – special timetable values**

#### NOTE

Changing the timetable (adding, removing or modifying) in the script is not supported and not recommended. Changes to the timetable must be made in the graphical method user interface in order to ensure a fully specified method (see “Special Information about the Command Tree, Instrument Method Commands and Method Script” on page 58).

# Special Information about the Command Tree, Instrument Method Commands and Method Script

Configuration change — impact on commands

Certain instrument configurations affect the instrument method by either adding or removing method parameters (for example, if the cooler option is present, it offers additional temperature method parameters). As the Chromeleon Command Tree is generated during the startup of the **Chromeleon Console**, structural changes require a correct configuration (using **Auto Configure**) and a restart of the **Chromeleon Console**.

Date	Time	Retention Time	Device	Message
3/30/2016	11:05:46 AM +02:00		Agilent	Driver has disconnected.
3/30/2016	11:05:46 AM +02:00		Agilent	Instrument configuration changed. The changes affect the instrument command structure required by Chromeleon. The instrument must be restarted with the new configuration.

## NOTE

When the instrument configuration is changed, be sure to reconfigure the module in the **Chromeleon Instrument Configuration Manager** and, perhaps, to restart the **Chromeleon Console**.

Command tree grouping

In general, the command tree/Instrument Method commands follow the structure of the graphical interface. However, different modules may place the

## Getting Started

### Setting Up an Instrument Method

same command at a different position in the graphical method interface, for example:

**Samplers** The **Sample Flush Out Factor** is present in **High Throughput** for all samplers, even though older samplers list this field in the **Auxiliary** or **Advanced** method parameters.

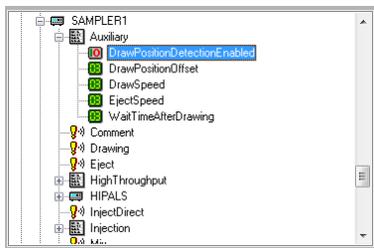


Figure 26 Example of parameter grouping

### Value Ranges for Commands

If a parameter value range (min./max.) depends on the configured options or a specific method setup, the script offers the maximum range, because the Agilent method interface uses built-in intelligence to determine these dependencies. Therefore, the graphical method interface may offer a smaller value range than is allowed in the scripted method range.

For example:

- G2258A Dual Loop Sampler fill loop with overfill factor

The graphic method screen restricts the overfill factor, while the method script, allows a maximum overfill of 100.

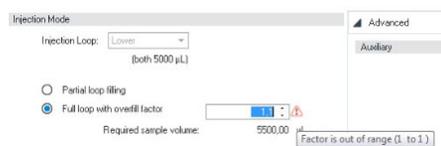


Figure 27 Restriction in graphical method interface

### Script grouping

In general, the script groups commands by the structure of their hierarchy in the graphical method user interface. This means, for example, that all method parameters for the Analog Output are listed one below the other in the script.

## Getting Started

### Setting Up an Instrument Method

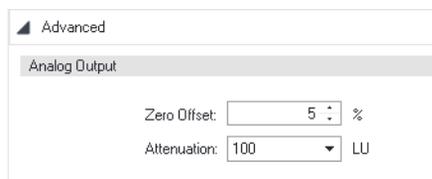


Figure 28 FLD Analog Output in the method user interface

```
Agilent.FLD1.AnalogOutput_A.AnalogAttenuation      100,000 [LU]
Agilent.FLD1.AnalogOutput_A.AnalogOffset          5 [%]
```

Figure 29 FLD Analog Output in the script

Please also note that if method is changed in the method user interface, all the commands of the changed module are moved to the end of the method script's instrument setup.

Very seldom, it may happen that the corresponding method parameters of a section are not listed one below the other; see, for example, the Multi-wavelength setting of the FLD:

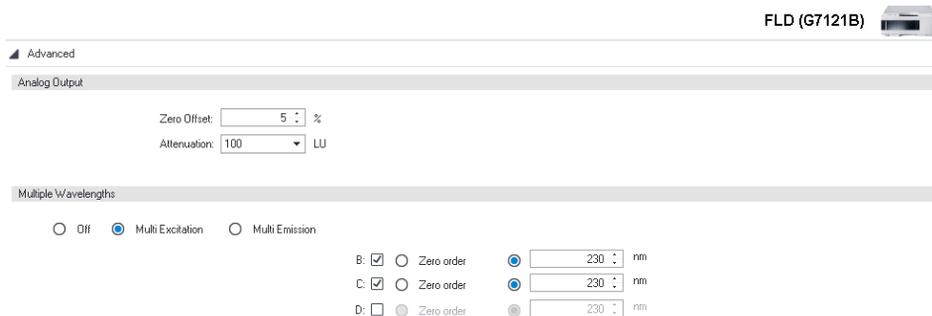


Figure 30 FLD Multiwavelength Setting in the method user interface

Agilent.FLD1.PostTime.Mode	Off
Agilent.FLD1.Detection.DetectionMode	Fluorescence
Agilent.FLD1.MultiWavelength.ScanMode	MultiExcitation
Agilent.FLD1.AnalogOutput_A.AnalogAttenuation	100,000 [LU]
Agilent.FLD1.AnalogOutput_A.AnalogOffset	5 [%]
Agilent.FLD1.Peakwidth	0,2000 [min]
Agilent.FLD1.Misc.SignalPolarity	Positive
Agilent.FLD1.Misc.BaselineBehavior	Append
Agilent.FLD1.Lamp.LampOnOnlyDuringRun	False
Agilent.FLD1.Lamp.LampRequired	True
Agilent.FLD1.Lamp.LampFlashRate	False
Agilent.FLD1.Lamp.LampEnergyReference	True
Agilent.FLD1.PmtGain	10
Agilent.FLD1.FLD1_Signal_A.Acquire	True
Agilent.FLD1.FLD1_Signal_A.Excitation_WavelengthMode	Set
Agilent.FLD1.FLD1_Signal_A.Excitation_Wavelength	230 [nm]
Agilent.FLD1.FLD1_Signal_A.Emission_WavelengthMode	Set
Agilent.FLD1.FLD1_Signal_A.Emission_Wavelength	460 [nm]
Agilent.FLD1.FLD1_Signal_B.Excitation_IsUsed	True
Agilent.FLD1.FLD1_Signal_B.Excitation_WavelengthMode	Set
Agilent.FLD1.FLD1_Signal_B.Excitation_Wavelength	230 [nm]
Agilent.FLD1.FLD1_Signal_C.Excitation_IsUsed	True
Agilent.FLD1.FLD1_Signal_C.Excitation_WavelengthMode	Set
Agilent.FLD1.FLD1_Signal_C.Excitation_Wavelength	230 [nm]
Agilent.FLD1.FLD1_Signal_D.Excitation_IsUsed	False

Figure 31 FLD Multiwavelength Setting in the script

## Backward Compatibility

### Method Migration

In case of a method migration, the method will be resolved to the new configuration. To keep the original method, save the method under a new name or abort.

### Changes to method script commands

Upgrading a method created with earlier Agilent Drivers versions may require manual intervention. After the first release, some commands and parameters were adjusted. If the following commands and parameters are used in your method scripts and these scripts will be used in Agilent Drivers 1.2 or 2.0, a manual update of these methods is necessary. Method script entries requiring intervention are shown on a red background in the method script editor.

#### G1390B UIB II command with two underscores

Prior to Agilent Drivers version 1.2 the acquisition on and off commands for Analog In unit are shown with two consecutive underscores in the command name. The command was changed to only contain one underscore, for example, Agilent.UIB1.UIB1\_Analog\_In\_AcqOn.

*Action item:* Instrument methods using the UIB acquisition commands for Analog In unit need to be updated to use the new command, for example, Agilent.UIB1.UIB1\_Analog\_In\_AcqOn.

#### Needle Wash and Valve Position Parameter

Prior to Agilent Drivers 1.2, the NeedleWash and solvent composition valve position commands contained the prefix 'me\_'. Starting with Agilent Driver 1.2, the prefix is dropped. For a sampler with the Multi Wash option installed, the method script contained the parameter me\_NeedleWash, for example, Agilent.Sampler1.MultiWash\_1.me\_NeedleWash. Starting with Agilent Drivers 1.2, the prefix is dropped and the corresponding command is, for example, Agilent.Sampler1.MultiWash\_1.NeedleWash

*Action item:* Update affected instrument methods to use the new command.

#### Run Diagnostic Data (Analytical Results)

Agilent Drivers 1.2 introduced Analytical Results, which offer enhanced system and run information, for example, column information, system start and stop conditions, RFID tag information, used needle in dual needle mode. Adding the **RunDiagnosticData** commands to the method script enables printing of the information to the audit trail.

Instrument methods for GCs (7890B, 8890, Intuvo 9000) created prior to version 2.3 of the Agilent Drivers for Thermo Chromeleon include two **Run Diagnostic Data** channels. Versions 2.3 and later of the Agilent Drivers for Thermo Chromeleon only use one **Run Diagnostic Data** channel to provide the same information. It is necessary to update the GC instrument methods manually to adjust for the change in the driver.

After opening the instrument method, the Chromeleon method translation tool starts automatically. Select **Adjust Manually** and open the method script. Delete the two command lines highlighted in red and save the method.

#### Solvent Compressibility

A method created with Agilent Drivers prior to version 1.2 raises method check warnings when opening with Agilent Drivers version 1.2 or 2.0. The warnings are specifically for G7112B 1260 Infinity II Binary Pump. The pump's method script

contains parameters for compressibility settings while at the same time **UseSolventTypes** is set to **True**. These settings are mutually exclusive.

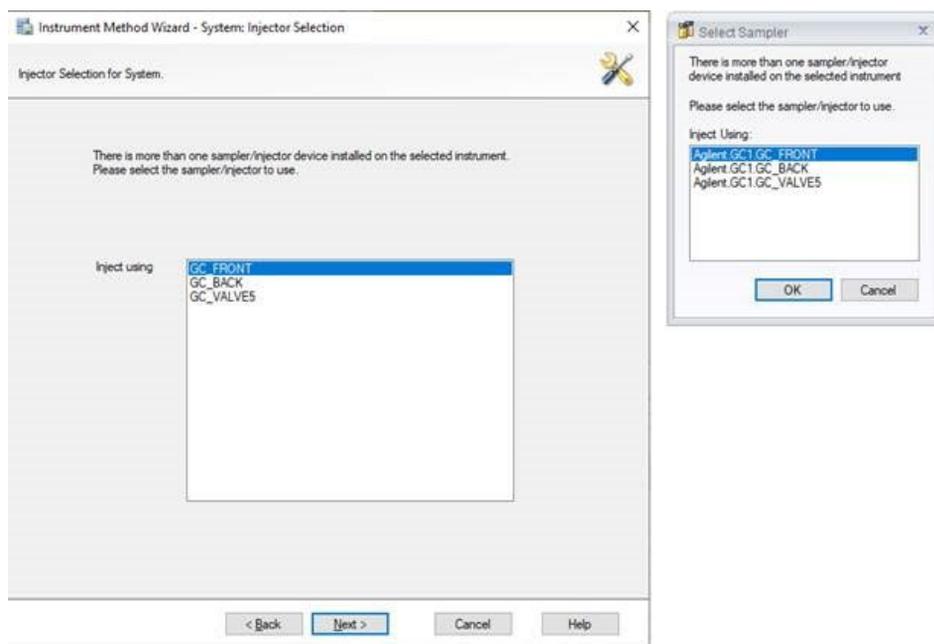
*Action item:* To use customized compressibility settings the parameter **UseSolventTypes** must be set to **False**.

If **Solvent Types** are to be used, **Solvent Types** must be set to **True**, and all compressibility parameters must be deleted from the method script. These changes can also be made in the graphical user interface.

## Running Injections

This chapter provides additional information on the execution of injections and sequences using the Agilent Drivers.

### GC Injector Selection



**Figure 32** Method and sequence injector selection windows

The GC injector must be selected during sequence and method creation. The sequence and method wizards provide windows for convenient selection, in case more than one injector is configured. Ensure that the used instrument method and sequence use the same injector and that the injector is installed on the instrument. A mismatch causes the ready check to fail and the mismatch must be resolved.

### Using ALS and HS in the Same Sequence

A sequence only containing headspace sampler injections is fully downloaded to the sampler upon sequence start. In this full sequence mode, the sampler uses the sequence information to optimize the workflow. Samples can be appended to

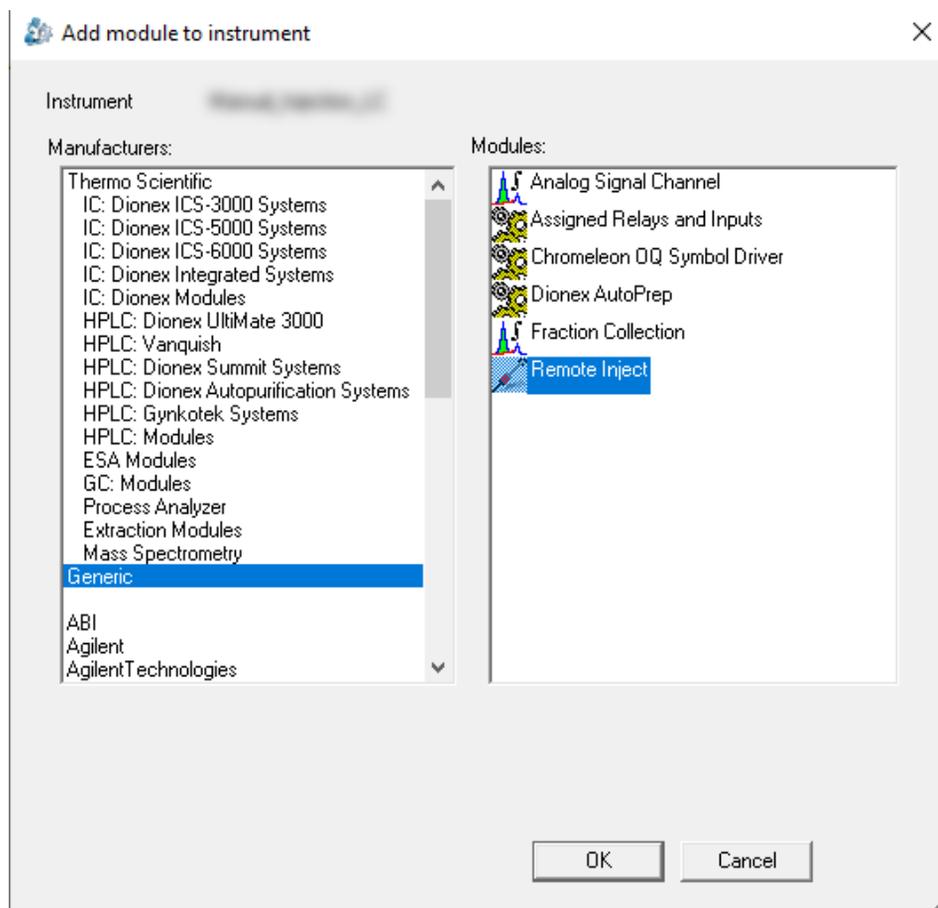
a sequence running in full sequence mode. These samples must use the headspace sampler as injection source. If a sample is appended or inserted using a different source, e.g., the ALS, then the sequence is aborted at the beginning of the next injection. Mixing HS and ALS injections in the same sequence requires that both injection types are added to the sequence before it is started. Such a sequence will not run in full sequence mode and the HS will work on each sample sequentially. A sequence not running in full sequence mode may be appended with injections of either sampler.

## Manual Injection on GC Instruments

### Configuration

- 1 Start the Chromeleon Instrument Controller Service.
- 2 Open the Chromeleon Instrument Configuration Manager.
- 3 Select the instrument to which the manual injection valve is connected.
- 4 Click **Add Module**.
- 5 Select **Generic** from the manufacturers list.

- 6 Select **Remote Inject** from the modules list.

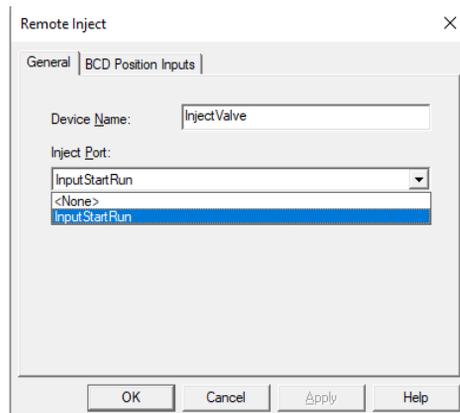


- 7 Click **OK**.

[OPTIONAL] 

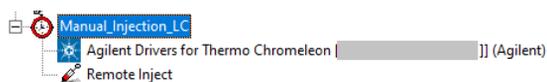
- 8 Enter a name for the remote injector.

- 9 From the **Inject Port** drop-down list select **InputStartRun**.



- 10 Click **OK**.

The **Remote Inject** driver is now added to the instrument configuration.



- 11 Save the instrument configuration.

## Using the Manual Injector

The manual injector is not controlled by the software, therefore it does not show up as its own tile in the status dashboard. Only modules that are controlled by the software are shown, for example ALS or HS sampler.

### Creating a Method

- 1 Open the Chromeleon console.
- 2 Start the Chromeleon instrument method wizard.
- [OPTIONAL] 3 Select the instrument used for manual injection and click **Next**.
- [OPTIONAL] 4 Select the remote injector from the list of injectors.
- 5 Set the desired method values.
- 6 Save the method.

### Running the Method

- 1 Create a sequence.
- 2 Select a method that uses the manual injection valve.

- 3 Start the sequence. The first instrument method in the sequence is downloaded to the GC.
- 4 Wait until the GC is ready for injection.
- 5 Insert the syringe needle into the injector port.
- 6 Inject the sample and press **Start Run** on the instrument.

## Barcode Reader Support

Agilent GC and HS instruments outfitted with a barcode reader can retrieve the barcode information from sample vials and check the code against a user-supplied value. If the information does not match, a user-defined action is executed.

These actions are available:

- **Skip:** The current sample is skipped and sequence execution proceeds with the next sample.
- **Inject:** The current sample is injected regardless of barcode mismatch.

The barcode reading feature is also available for dual simultaneous injections and overlapped injections. For dual simultaneous injections, you need to set up each sequence with the required variables.

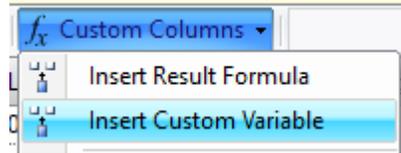
The expected barcodes can be supplied to the CDS either by manual input or using Thermo Fisher's Sample Manager.

For information on supported symbologies, see the operation manuals of the GC modules.

### Using the barcode reader for barcode confirmation

- 1 Prepare the samples and place the vials with the barcodes attached in the sample tray.
- 2 Open Chromeleon and create a new sequence.

- 3 In the injection list, create a custom column named "AgilentBarcode".
  - a Select **Custom Columns >Insert Custom Variable**.



The **Custom Variables Wizard** opens.

- b Fill out the required fields. Ensure to use the following parameters:
  - **Name:**AgilentBarcode
  - **Type:**Text

 A screenshot of the 'Custom Variables Wizard' dialog box. The title bar reads 'Custom Variables Wizard'. The main area is titled 'New Custom Variable' with the subtitle 'Create a new custom variable'. The fields are filled as follows:
 

- Context:** Injection (dropdown menu)
- Name:** AgilentBarcode (text input)
- Description:** Contains the expected barcodes (text input)
- Type:** Text (dropdown menu)
- Allow empty values (checkbox)
- Default:** (empty text input)
- Max. length:** 255 (spin box)

 At the bottom right, there are three buttons: '<< Back', 'Finish', and 'Cancel'.

Figure 33 Custom Variables Wizard

- c Deselect **Allow empty values**.
- d Enter a value for **Default**.

**NOTE**

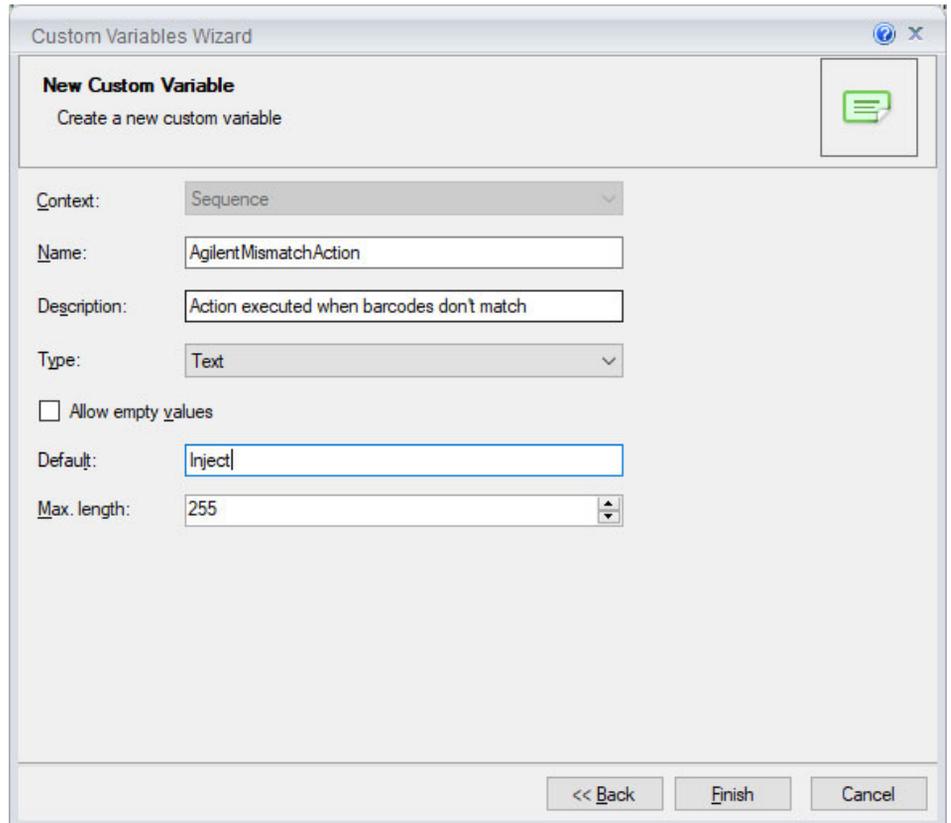
It is necessary to deselect **Allow empty values** and provide a default value, because leaving barcode cells blank is not supported. Every cell in the `AgilentBarcode` column must be populated with the expected barcode.

- 4 Fill the new custom column with the expected barcodes.
- 5 Create a custom sequence variable named "AgilentMismatchAction".
  - a In the **Custom Formulas** tab, click **Click here to add a new custom formula**.
  - b Fill out the required fields. Ensure to use the following parameters:
    - **Name:**AgilentMismatchAction
    - **Type:**Text
    - **Default:** Either `Inject` or `Skip`, depending on how you want mismatches to be handled.

**NOTE**

`Inject` and `Skip` are the available mismatch actions. The process works only with these exact terms. Ensure that there are not typos.

- c Deselect **Allow empty values**.
- d Click **Finish**.



The screenshot shows a dialog box titled "Custom Variables Wizard" with a close button in the top right corner. The main heading is "New Custom Variable" with the subtitle "Create a new custom variable" and a green help icon. The form contains the following fields and options:

- Context:** A dropdown menu set to "Sequence".
- Name:** A text input field containing "AgilentMismatchAction".
- Description:** A text input field containing "Action executed when barcodes don't match".
- Type:** A dropdown menu set to "Text".
- Allow empty values:** An unchecked checkbox.
- Default:** A text input field containing "Inject".
- Max. length:** A spinner box set to "255".

At the bottom of the dialog, there are three buttons: "<< Back", "Finish", and "Cancel".

Figure 34 New sequence variable

- 6 Save the sequence.

#### 7 Run the sequence.

#	GC1_FrSig	*AgilentBarcodes	Name	Type	Level	Position	Volume [µL]	Instrument Method
1	None	48941	1	Unknown		Vial:1	0.40	Basic Instrument Method
2	None	48942	1	Unknown		Vial:2	0.40	Basic Instrument Method
3	None	48943	3	Unknown		Vial:3	0.40	Basic Instrument Method

#	Name	Value	Description
1	AgilentMismatchAction	Inject	Action executed when barcodes don't match

Figure 35 Example of a sequence ready to run

### Dual simultaneous injections

To use the barcode reader when the GC is operated under dual simultaneous injection conditions, these requirements need to be met:

- Both sequences have the **AgilentBarcodes** and **AgilentMismatchAction variables** defined.
- Both sequences use the same **AgilentMismatchAction** setting.

If either of the requirements is not fulfilled, the sequences is executed sequentially, meaning only one sample is analyzed at a time.

### Audit trail and reporting

The actual barcode and the expected barcode are written to the audit trail. The audit trail also records which mismatch action, if any, was executed.

```

0.000      Waiting for inject response on GC_FRONT.
0.000      Barcode read for vial #101: actual: "98765432", expected: "98765432".
0.000      The barcode that was read matches.
0.000      GC0.GC_Front injected the sample with Id '98765432' from location Vial:101.
0.000      Got inject response.

```

Figure 36 Audit trail example of a confirmed barcode match

The expected barcode and the actual barcode are available as report variables. To add the expected barcode as a variable in a report template, use the formula `injection.customVar("AgilentBarcode")`. Likewise, the actual barcode can be reported using the formula `audit.Agilent.GC1.Barcode(chm.end_time,"backward")`.

#### NOTE

The delimiter for the parameters in the formula `audit.Agilent.GC1.Barcode(chm.end_time, "backward")` depend on the PCs regional settings. Some regional settings may require using different symbols as the delimiter, for example, a semi-colon.

Level	Inject Time	Status	Barcode (Agilent.GC1)	AgilentBarcode
	24/Feb/23 11:21:56	Finished	98765432	A
	24/Feb/23 11:25:08	Finished	98765433	B
	24/Feb/23 11:29:02	Finished	98765434	C

**Figure 37** Example of a report using the reporting formulas to print the actual and expected barcodes

### Troubleshooting barcode reader issues

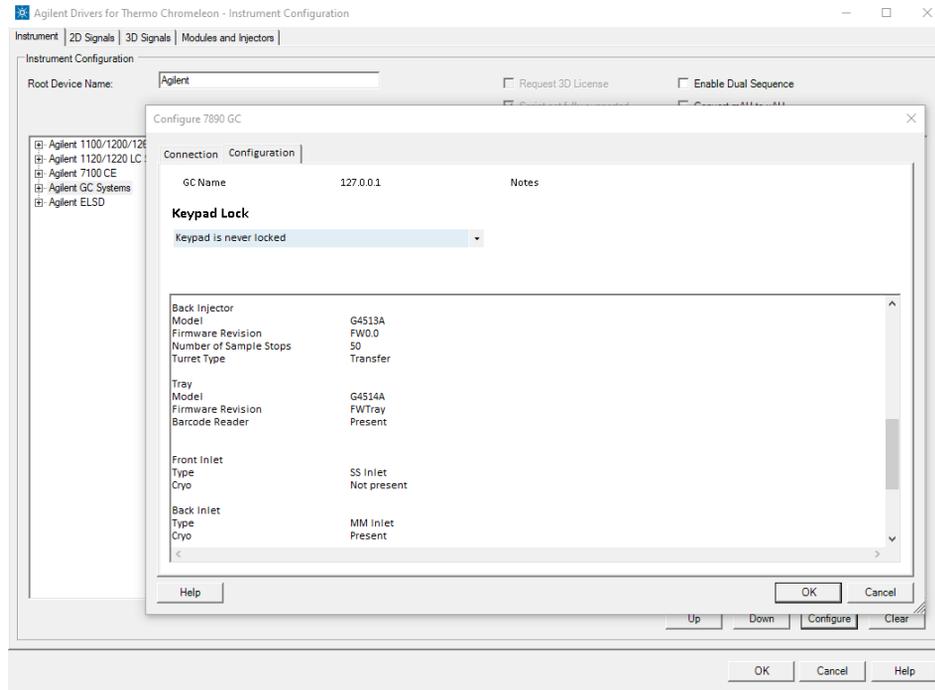
#### NOTE

The barcode is only available if the injection was performed. If the sample was skipped, the report does not display the barcode information.

If the barcode reader doesn't work, first check that the hardware is correctly installed. For installation instructions, see the hardware user guide.

Check that the vials are labeled with a barcode symbology supported by the GC or HS. The supported symbologies can be found in the instrument help.

Check the instrument configuration. Open the configuration dialog for the respective instrument and navigate to the configuration tab shown in [Figure 38](#) on page 74. Look for the line that says **Barcode Reader Present** as shown in [Figure 38](#) on page 74. If this line is not present, check the hardware setup and reconfigure the instrument.



**Figure 38** Instrument with barcode reader hardware installed

The custom variables created for each sequence must be spelled correctly. Always use "AgilentBarcode" as the name for the custom injection variable and "AgilentMismatchAction" as the name for the custom sequence variable.

If a sample barcode can't be read, the barcode reader returns the string **ERR**. In that case, check that the vial is properly labeled.

## GC System

### GC Online Method

The GC online method is accessible per the textual dashboard and provides means of making changes to the method on the instrument. To access the online method, right-click the textual dashboard and select **Edit GC Method...** while the GC is idle.

The online method editor provides access to the same parameters as the instrument method wizard but clicking **Set Method** sends the parameters directly to the GC without starting a run.

### GC Online Method Changes - Impact on Saved Instrument Methods

Some changes to the online method impact previously saved instrument methods. These changes affect the command structure of the GC driver and an appropriate message is written to the audit trail. The changes require a reconfiguration of the GC driver.

Device	Message
Agilent	Driver has disconnected.
Agilent	Instrument configuration changed. The changes effect the instrument command structure required by Chromeleon. The Instrument must be restarted with the new configuration.

**Figure 39** Audit trail messages after a configuration change with command structure change

Methods affected by these changes will automatically undergo method resolution once they are opened for editing. In the example below the pressure unit was changed from psi to bar. These inconsistencies must be resolved manually as described in ["Method Resolution"](#) on page 76.

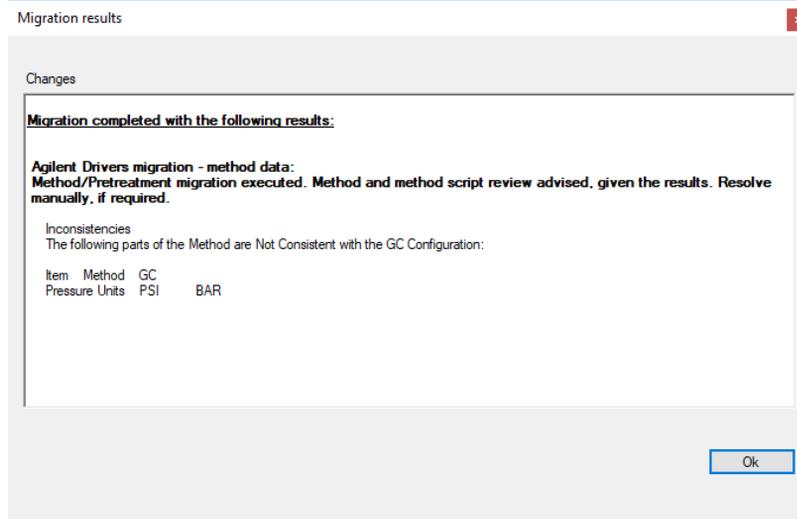


Figure 40 Migration results

## Method Resolution

When you load a method, the data system checks for hardware consistency (inlet types, detector types, and so forth). The Method Resolution Wizard launches when there is a hardware inconsistency between the GC and the method being loaded. The wizard displays a summary of the inconsistencies.

Choose one of the following options:

### NOTE

For Chromeleon users it is recommended to always use the **Start method resolution** option.

**Start method resolution**<sup>1</sup>: Select to continue with the Wizard, using the wizard to help you determine the correct flow path and resolve the inconsistencies. This works best when the loaded method uses a single, unbranched flow path (no flow splitting).

**Skip to editor for manual resolution**: Select to open a side-by-side presentation of the loaded and current GC method. Review all method parameters and adjust as needed. This choice works best for methods with complex flow paths, such as methods that split column flow.

<sup>1</sup> If the Wizard detects a complex flow path, this choice is disabled

**Skip method resolution and view the loaded method:** Select to make no changes. Skip to the **Method Report** step to browse the method settings. In this case, the method will not be modified and will not be loaded to the GC.

Select **Next** to continue.

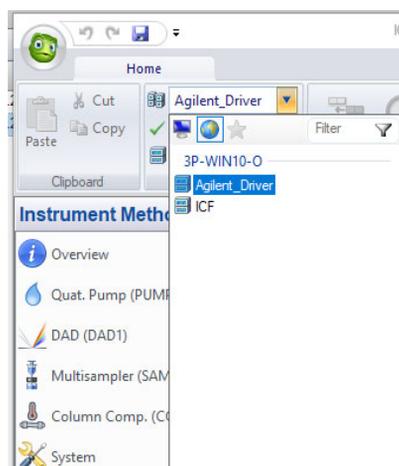
# Method Migration

## Migrating GC Methods

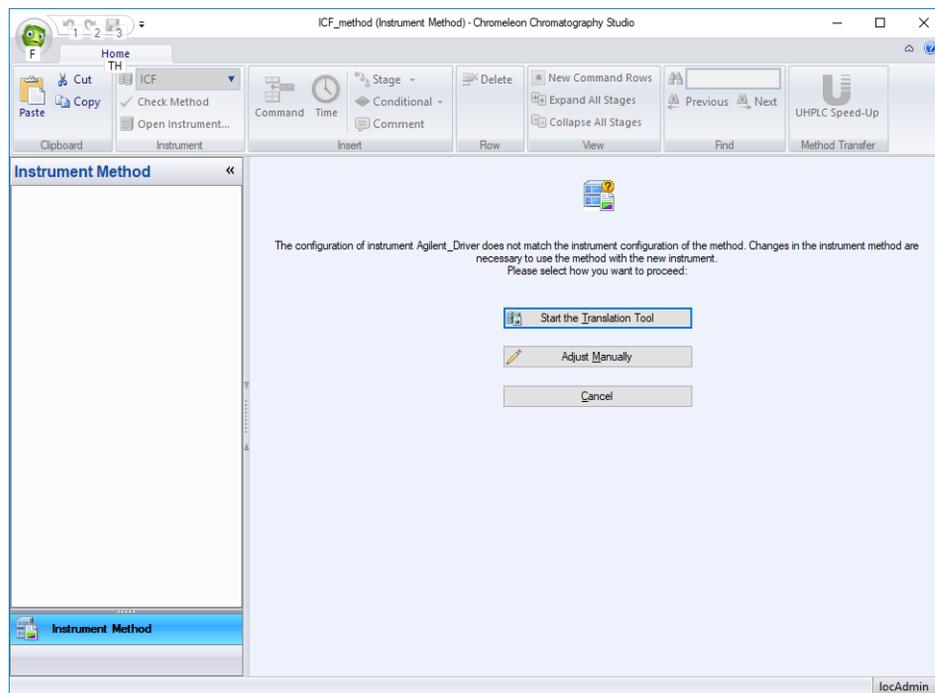
The method translation tool introduced to Chromeleon 7.2.8 by Thermo Scientific is currently not supported. To migrate anyway, you have to click **Adjust Manually** in the transfer tool.

### Native Methods

- 1 Open the method in the method editor and select the new instrument from the drop-down list.

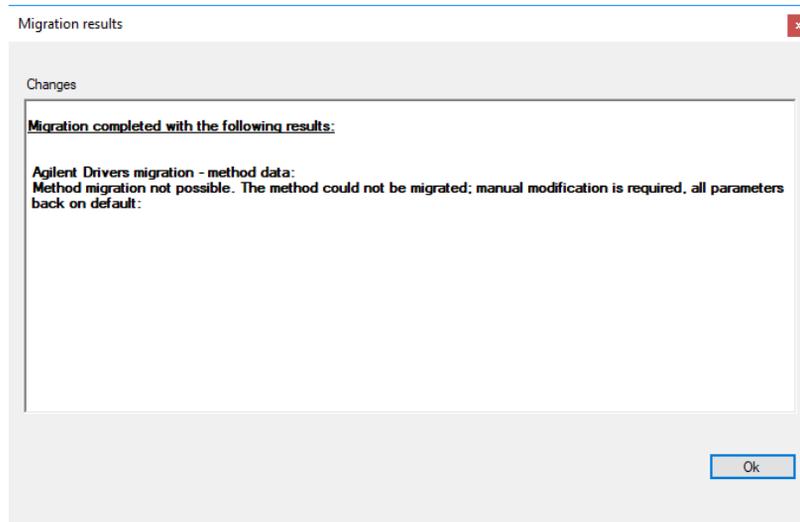


- 2 Select **Adjust Manually**. This starts an automatic method resolution.



After the automatic method resolution finishes a pop-up opens.

- 3 Close the pop-up.



- 4 Go to the **Script Editor** and delete all lines with a red background. These lines were migrated from the original method and are not automatically removed.
- 5 Save the migrated method.

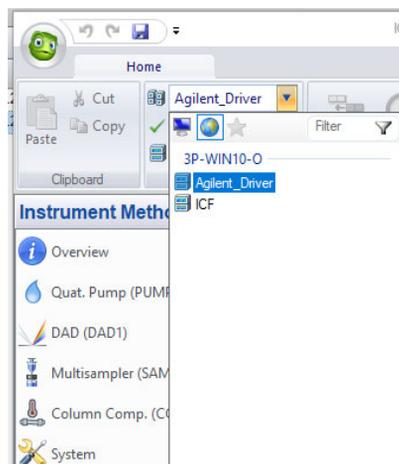
#### NOTE

Saving the migrated method under a new name will also restore the old method and start the migration tool again. This can safely be aborted.

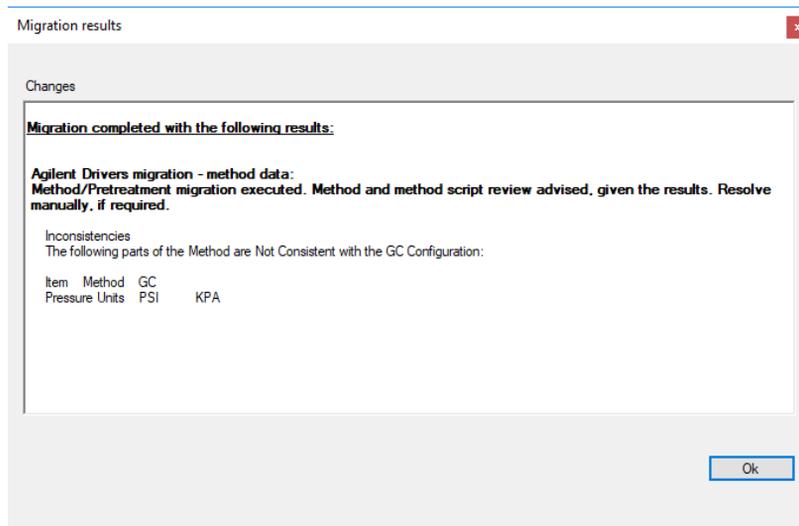
### Migrating to a Different Configuration

A method can be migrated from one instrument to another even when the configuration differs. The migration tool lists all differences in the configuration which then must be adjusted manually.

- 1 Open the method to migrate and select the new instrument from the drop-down list.



- 2 Make a note of all differences shown in the pop-up window and click **OK**. In the example below the old configuration is using psi as the pressure unit while the new configuration uses kPa.



- 3 Manually adjust the instrument method according to the differences noted in the previous step.
- 4 Save the method.

#### NOTE

Saving the migrated method under a new name will also restore the old method and start the migration tool again. This can safely be aborted.



## 6

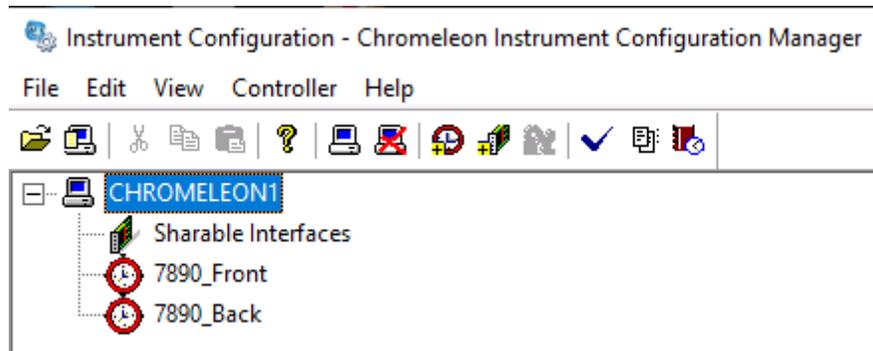
# Dual Simultaneous Injection

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OnlyFront and OnlyBack Settings	96

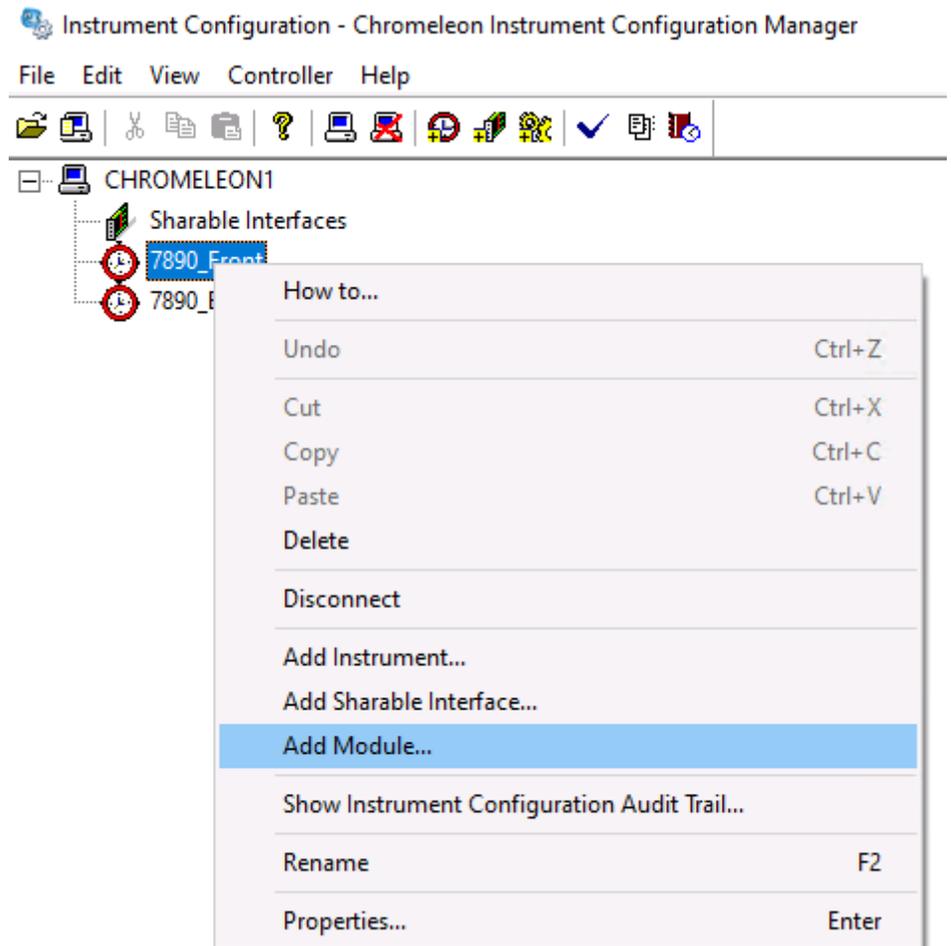
## Dual GC Configuration

To setup the driver for dual simultaneous injections two instruments are created in the instrument configuration manager. Then a single driver instance is added to one instrument. The driver instance will be automatically added to the second instrument. Only one driver instance can be added to an instrument. Adding a second driver instance to the same instrument is rejected by the driver.

- 1 Open the Chromeleon Instrument Configuration Manager.
- 2 Create two instruments representing the front and back instruments.

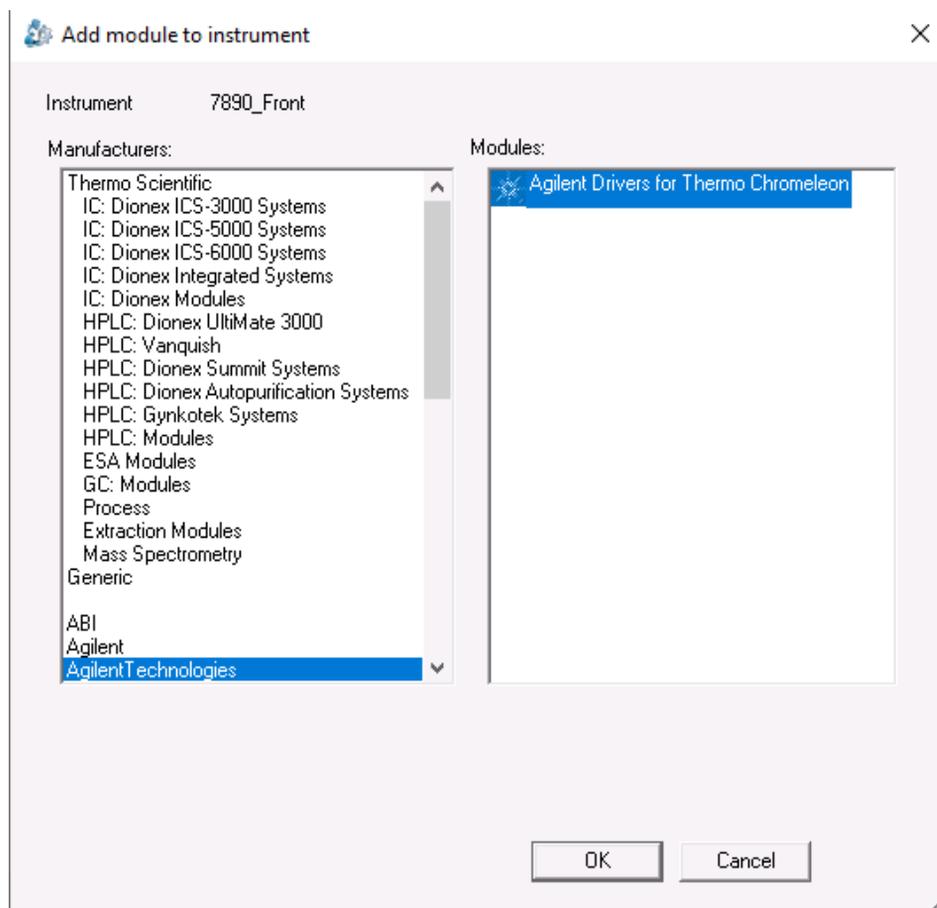


- 3 Right-click on the first instrument and select **Add Module...**



- 4 From the manufacturer list select **Agilent Technologies**.

- From the module list select **Agilent Drivers for Thermo Chromeleon**.

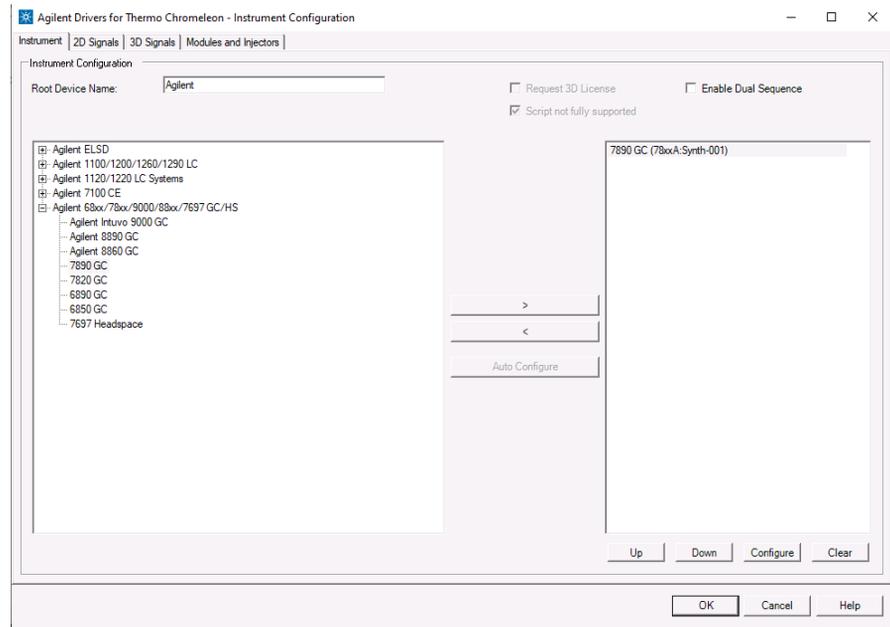


- Click **OK**.
- In the instrument configuration window select the appropriate instrument.

## Dual Simultaneous Injection

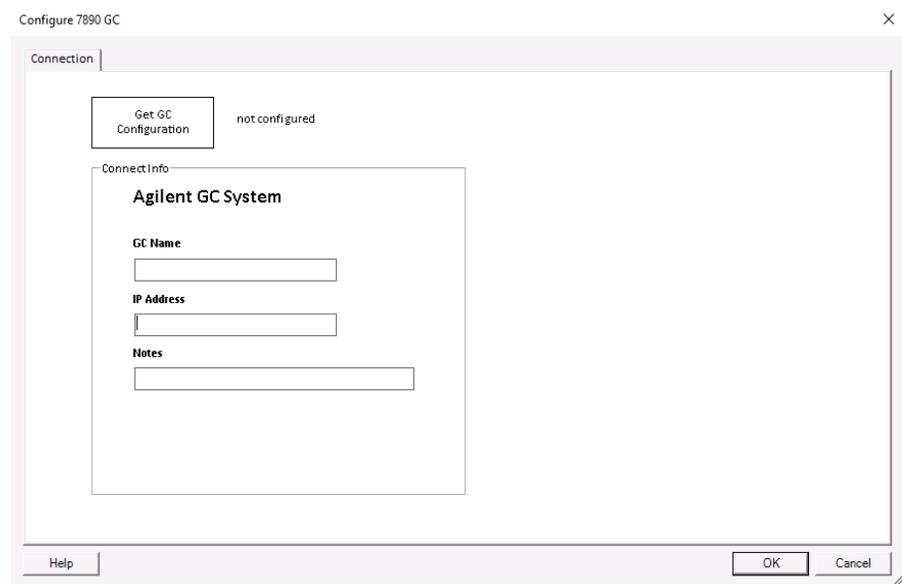
### Dual GC Configuration

- 8 Click the arrow button to add it to the list on the right-hand side.



- 9 Click **Configure**.

- 10 In the text box labeled **IP Address** enter the GC's IP.



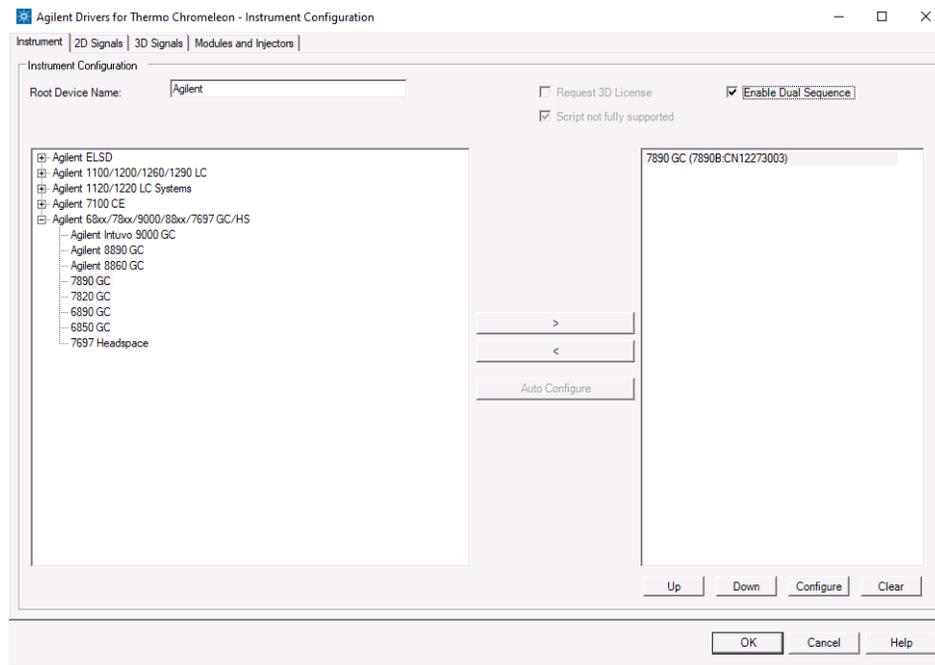
## Dual Simultaneous Injection

### Dual GC Configuration

11 Click **Get GC Configuration**.

12 After the GC configuration is loaded, click **OK**.

13 In the **Instrument Configuration** window select the **Enable Dual Sequence** check box.



#### NOTE

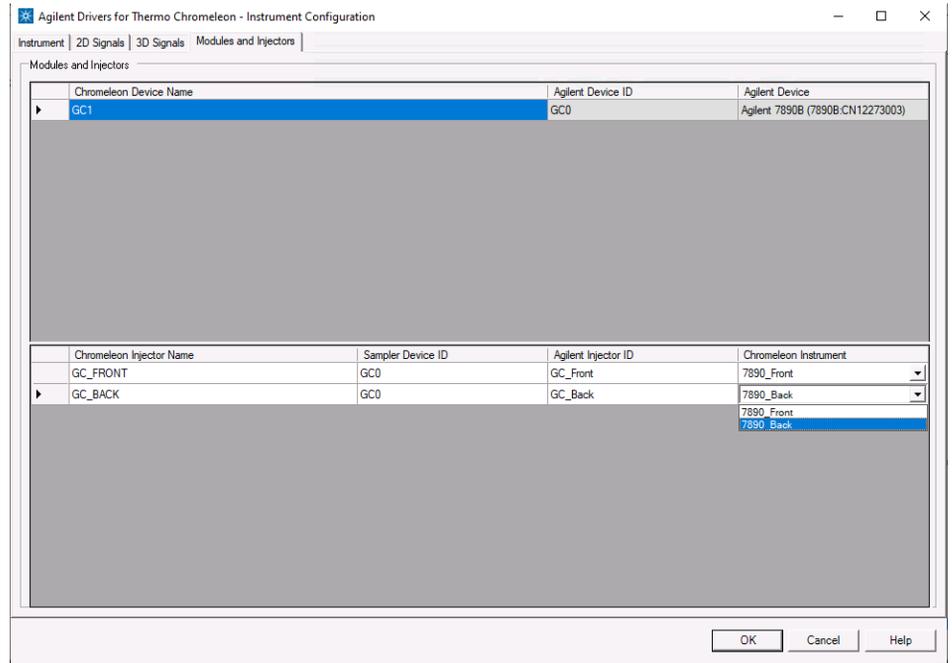
The **Enable Dual Sequence** check box is only active when a dual sequence-capable 6890GC, 7890GC or 8890GC is configured. Other models are not capable of running dual sequences.

14 Click the **Modules and Injectors** tab.

## Dual Simultaneous Injection

### Dual GC Configuration

- 15 In the lower table, assign the Chromeleon instruments to their respective injectors.



- 16 Click **OK**.

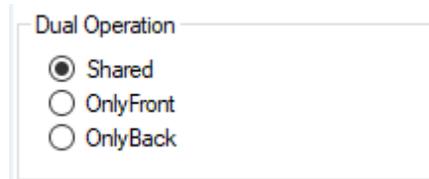
- 17 Save the configuration.

## Deleting a Shared Driver

A GC configured in dual sequence mode shares a driver instance between both instruments. Therefore, changes made to the configuration in either instrument configuration are reflected in the other instrument. However, deleting the driver instance from either instrument is possible and the Chromeleon Configuration Manager offers to move the configuration to the remaining instrument. Doing so disables the **Enable Dual Sequence** check box on the remaining instrument and assigns all injectors to the same instrument.

## The Agilent Home ePanel for Dual Sequence GCs

The Agilent Home ePanel for dual sequence GCs offers three radio buttons in the Dual Operation box as shown in [Figure 41](#) on page 90.



**Figure 41** Dual Operation radio buttons

The possible values are:

- **Shared:** Select this setting to run sequences simultaneously
- **OnlyFront:** Select this setting to run sequences on the front instrument only
- **OnlyBack:** Select this setting to run sequences on the back instrument only

# Creating Methods for Dual Simultaneous Injection

The instrument methods used in dual simultaneous injection mode must have the same setpoints. In case the instrument methods differ, the samples will run sequentially.

To ensure that the setpoints are identical, a method created for one instrument can be assigned to the second instrument and saved under a new name. Thereby eliminating the need to transfer the settings manually.

The method translation tool introduced to Chromeleon 7.2.8 by Thermo Scientific is currently not supported. To migrate anyway, you have to click **Adjust Manually** in the transfer tool.

Methods created for dual simultaneous injection include a script variable named **Sharable**. This variable value is set to **On** by default for use in dual simultaneous injections, but can be set to **Off** when the GC is used in OnlyFront or OnlyBack mode.

Creating methods for dual simultaneous injection:

#### NOTE

The script variable **Sharable** will always be set to **On** when a change in the method UI is made. Manually set the variable to **Off** if the method will be used in OnlyFront or OnlyBack mode.

- 1 In the Chromeleon Console select **Instrument Method...** from the **Create** menu.
- 2 If prompted, select the dual injection capable device from the instrument list, e.g., the front instrument.
- 3 Select the diagnostic channels to record, if any. The run time is set later via the oven program.
- 4 Click **Next**.
- 5 Enter all method parameters as required. The run time shown in the oven program settings is the run time used for this method.

#### NOTE

Always check all method settings.

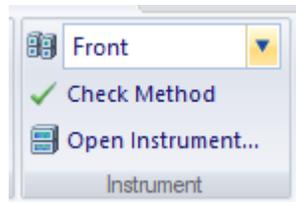
- 6 Select the signals section. Use the slider next to the signals table to assign signals to the front and back instrument. The letter F in the Dual column

means the signal is assigned to the front instrument, and a B means the signal is assigned to the back instrument.

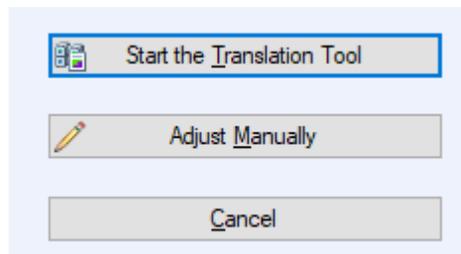
### NOTE

When creating a new method, the method script only list the signals assigned to the selected instrument. In the method UI all signals, for both instruments, should be set.

- 7 Click **Next**.
- 8 Save the instrument method and keep the method window open.
- 9 Change the assigned instrument in the menu bar. This workflow allows to transfer the method settings to the second instrument method. Alternatively, the second method could be created by repeating the above steps.

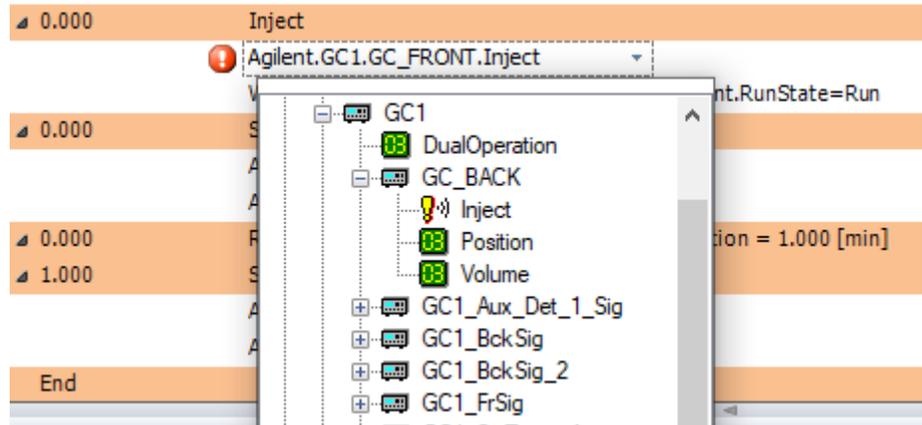


- 10 Select **Adjust Manually** from the method translation options.

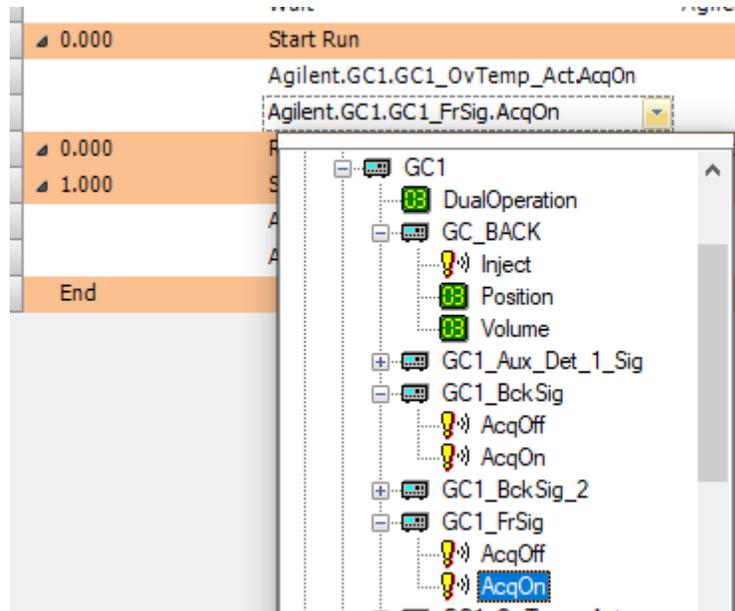


- 11 Select the **Script Editor**.

- 12 Click the inject command and adjust the command to the newly assigned instrument.



- 13 Click the **AcqOn** command in the **Start Run** stage and adjust the command to the newly assigned instrument.



14 Repeat step 13 for the **AcqOff** command.

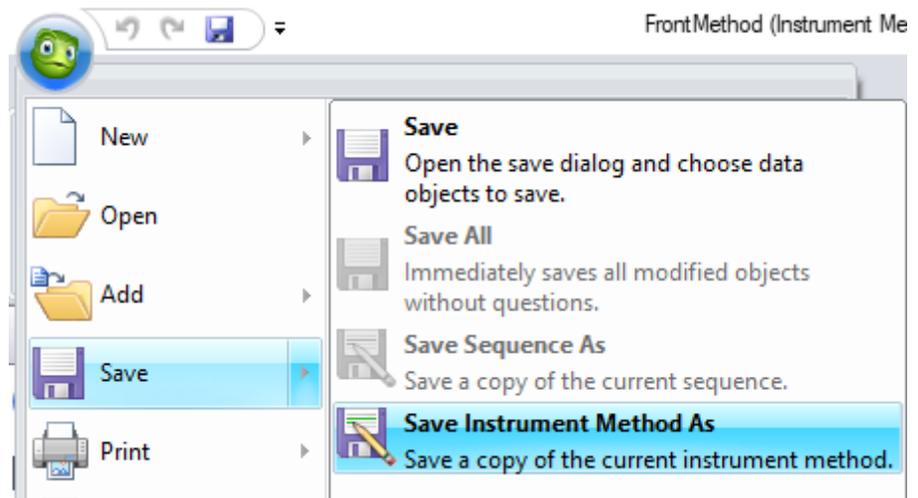


**Figure 42** A back detector signal assigned to the front instrument causing a Ready Check warning

## NOTE

A warning will be shown in the **Ready Check** results if the signal selection does not fit the instruments injector. In this case verify the signal selection in the method script.

15 Click the Chromeleon symbol in the upper left corner and select **Save Instrument Method as**.



16 Save the instrument method under a new name.

## Dual Simultaneous Injection Sequence

Sequences are created as described in “Manual Injection on GC Instruments” on page 65. Chromeleon handles the two sequences required for dual simultaneous injections separately. That means for each instrument a sequence is submitted. The results will then be stored in the respective sequence.

Running sequences simultaneously requires that the same instrument method settings be used for both samples. In case the instrument methods differ, the samples will run sequentially. The injection volume is not part of the instrument method. Hence it is possible to run sequences with the same instrument method setpoints but differing injection volumes.

In case the same vial position is used for injection in both sequences at the same time, the samples will be run sequentially. Dual simultaneous injection mode is resumed with the next sample, if possible.

### NOTE

For best utilization ensure that all samples can be run in dual simultaneous injection mode.

The screenshot shows a 'Ready Check' window with a status bar indicating 'Successful, however there are one or more warnings.' Below this is a table with three rows, each containing a yellow warning icon, a 'Source' column, a 'Device' column, and a detailed warning message.

	Source	Device	
⚠	Agilent.GC1	Agilent.GC1	Dual Operation: right sample #1 and left sample #1: shared settings don't match. The samples will run sequentially.
⚠	Agilent.GC1	Agilent.GC1	Dual Operation: right sample #2 and left sample #2: shared settings don't match. The samples will run sequentially.
⚠	Agilent.GC1	Agilent.GC1	Dual Operation: right sample #3 and left sample #3: shared settings don't match. The samples will run sequentially.

**Figure 43** Ready Check warning informing that three sample pairs will be run sequentially

The Agilent Drivers for Chromeleon check whether it is possible to run the sample pairs simultaneously during Ready Check. When a sample pair is found for which dual simultaneous injection is not possible, a warning as shown in Figure 43 on page 95 is displayed. In this case, check the instrument methods and sample positions to enable dual simultaneous injection. Alternatively, the warning can be disregarded, and the samples will run sequentially.

## OnlyFront and OnlyBack Settings

Selecting the OnlyFront or OnlyBack settings on the Agilent Home ePanel as shown in Figure 44 on page 96 temporarily disables the dual injection mode and sequences can be run on the front or back instrument respectively. Hence, a reconfiguration is not required if only one sequence will be run.



Figure 44 Dual Operation set to OnlyFront on the Agilent Home ePanel

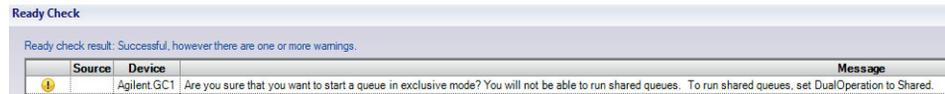


Figure 45 Ready Check warning in OnlyFront or OnlyBack mode

At the start of such a sequence, Chromeleon shows a **Ready Check** warning as shown in Figure 45 on page 96, informing that the current operation mode does not allow dual simultaneous injection. Disregard the warning to start the sequence or change the Dual Operation mode to **Shared** on the Agilent Home ePanel if dual simultaneous injection is desired.



# 7

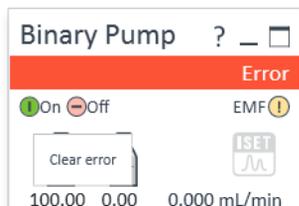
## Troubleshooting

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This chapter describes what to do when something goes wrong.

## Instrument Errors

In the case of an instrument error, the module tile reports an error by a red status field. The error message is revealed by hovering over the red status field, and gives you information about the error.



**Figure 46** Module in Error state

To clear an error on the instrument, click **On** in the corresponding module tile. The module becomes green if the error can be corrected by the system; if user interaction is required, the module remains red. Refer to the instrument manual to get help on how to resolve the error.

## Verify Correct Installation of Agilent Drivers

Run the Software Verification tool (SVT) to verify the correct installation of software components as outlined in section “[Software Verification](#)” on page 17. If the SVT reports missing file, reinstall the Agilent Drivers in

**Start >ControlPanel >Software and Features.**

## Information Required for Troubleshooting

Note the instrument configuration.

The screenshot displays the instrument's control interface. At the top, four modules are shown in an 'Idle' state: Multisampler (1.00 µL, 28 °C), Binary Pump (100.00, 0.00, 3.000 mL/min, 0.00 bar), Column Comp. (26.20 °C, 25.88 °C, Position 1), and DAD. Below this, a 'Module List' window is open, showing a table of installed modules.

Vendor	Name	Part Number	Serialnumber	Firmware Revision	Connection Info	Driver Version	Additional Information
Agilent	Binary Pump	G7120A	DEBAV00131	B.06.81 [0002]	[REDACTED]	A.02.14 Si 624	
Agilent	Multisampler	G7167B	DEBAQ00217	D.06.80 [0007]	[REDACTED]	A.02.14 Si 624	Cooler : 20448:DEBAT02417 Rev. 30
Agilent	Column Comp.	G7116B	DEBAZ00123	D.06.80 [0007]	[REDACTED]	A.02.14 Si 624	Slave Firmware: C.06.80 [0001]
Agilent	DAD	G7117B	DEBAW00140	D.06.80 [0006]	[REDACTED]	A.02.14 Si 624	Access Point

Buttons for 'Close' and 'Print' are located at the bottom right of the Module List window.

Figure 47 Detailed module information

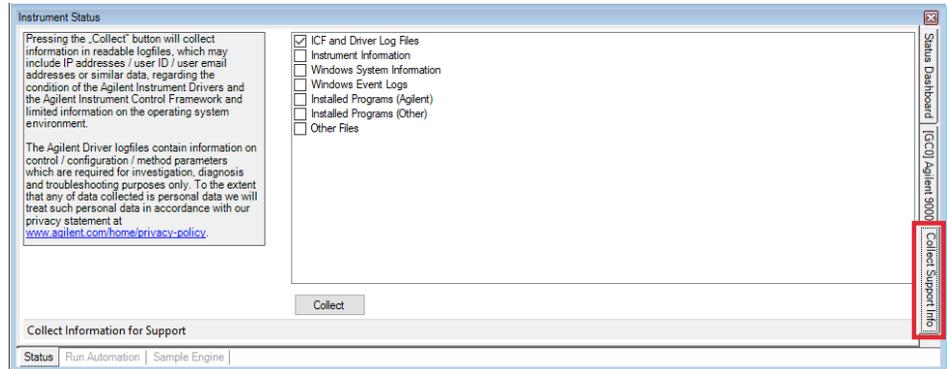
# Collect the Agilent Instrument Driver Log Files

## Collect the Support Information

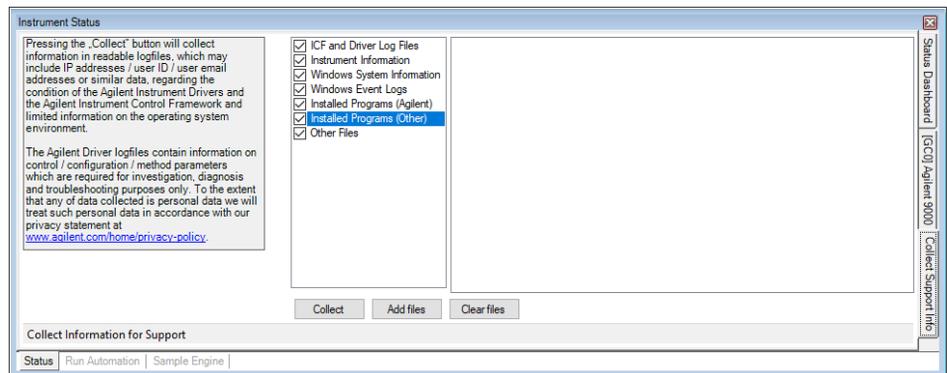
### NOTE

You must have administrative rights to collect the support information.

- 1 On the right-hand side of the dashboard select the **Collect Support Info** tab.



- 2 Select the desired check boxes.



- 3 Click **Collect**.
- 4 Select file name and location. Click **Save**.  
A zip file is created in the designated folder.

## Types of Information

### ICF Log Files

Log files created by ICF which underlies the Agilent Drivers. These are always required.

### Instrument Information

Collects configuration and status information on the Agilent instruments.

### Windows System Information

Collects basic operating system information.

### Windows Event Logs

Collects the Windows Application and System logs.

### Installed Programs (Agilent)

List of installed Agilent software.

### Installed Programs (Other)

List of all installed software, but Agilent Software.

### Other Files

Use this to add all files deemed useful. For example, an exported Chromeleon sequence.

## 8 Known Limitations

This chapter lists the known limitations of the current revision of the Agilent Drivers.

Only one CDS running the Agilent Drivers is supported

You can use only one CDS or other application using Agilent Drivers per computer. A different PC is required if you want to use another CDS with the Agilent Drivers.

Retention Time Locking is not supported

The RTL feature is not available in Chromeleon.

Blend Assist is not supported

Agilent Drivers do not support the Blend Assist functionality.

Diagnostic Functions are not supported

Agilent Drivers do not provide the functionality to access EMF counters or perform diagnostic/maintenance operations on the individual modules. Therefore, Chromeleon cannot offer any functionality for diagnostics. The Agilent Lab Advisor software is required to perform software diagnostic operations.

### NOTE

Modules equipped with firmware revision A.xx.xx are not able to communicate with Chromeleon and the Lab Advisor simultaneously.

Limited support for mixed module configurations

Mixing of third party modules with Agilent LCs has only been tested for Thermo Fisher WPS and Corona Veo modules. Mixing with other modules is not supported. GC instruments do not support mixing with modules from third party vendors.

Intuvo 9000 GC maintenance functions not available inside CDS

Agilent Drivers do not provide access to GC maintenance functions. Therefore, Chromeleon cannot offer any functionality for diagnostics. Maintenance functions are accessible via the instrument front panel.

### Headspace sequence size limitation

Restrict sequences using the 7697A headspace sampler to 111 lines or less. Restrict Sequences using the 8697 headspace sampler to 48 lines or less. Longer sequences or sequences with many extractions per line may result in high CPU usage of the Chromeleon Console.

In case the following warning is written to the audit trail:

```
"Client response for 'Get Status Xml' could not be returned because limit of 1MB is exceeded"
```

the number of extractions or sequence lines should be reduced.

### Other Limitations

- Only one injector is allowed per LC instrument.
- Missing vials are handled slightly differently from Thermo Fisher Scientific instruments. Either the method continues to run without injection (for the current method run time) or the running queue is aborted immediately. The behavior can be controlled via the setting **Ignore Missing Vessel** available from the Agilent status window in the ePanel. Select **Control...** from the sampler's context menu to access this setting.
- Visual display of the rack layout is not available for Agilent LC systems. The tray position of the Agilent LC shows a list of positions but no valid tray geometry, as this is not characterized by the Agilent Drivers.
- Data from *ad-hoc runs* (started via the handheld controller) are not collected.
- Agilent LC instruments use built-in emergency methods; therefore, emergency instrument methods in the Chromeleon queue cannot be used. Instead, these methods must be specified using the context menu in the Agilent instrument status window. Refer to the Chromeleon help or Agilent Instrument Drivers help for details.
- The commands **Hold**, **Continue**, **StopFlow** and **Message** are not available with the Agilent Drivers. These commands are treated differently, depending on the LC instrument stack:
  - If a sampler is part of the instrument, Wait/Hold/Continue/StopFlow commands in the **Run** stage are rejected by the ready check
  - If no sampler is part of the instrument, Wait/Hold/Continue/StopFlow commands in the **Run** stage are not rejected by the ready check
- The command **TurnON** is not available in the method script. It is available as a command, for example, for ePanels.
- The **Monitor Baseline** control, which Chromeleon offers for Data Acquisition functions, but is not supported. Chromeleon offers **Monitor Baseline** to allow

you to manually save the online signal in an idle state or after a manual injection. As Agilent modules offer a monitor signal (outside a run) and Chromatogram signals (inside a run) that are not delivered with the same frequency, Agilent does not support this feature for manual injections to generate analytical results.

- The configuration editor offers the setup of the column plumbing as well as a table for column information (for example, description, product number etc.) for the G7116A/B Multi-Column Compartment and for the Valve-Thermostat-Cluster (VTC). The column plumbing is correctly displayed and used in the methods. The module is working in the expected setup.

The column information cannot be presented for selection in the G7116A/B graphical method interface and Valve-Thermostat-Cluster (VTC). As the column information is not offered in the GUI, the option **enforce column** cannot be selected.

The pump's *Pressure Unit Configuration* options allow you to select between bar (default), psi, and MPa as pressure unit. This setting is then used in the graphical user interface. However, the script always uses bar as its pressure units, regardless of configuration settings.

- Use only a Windows zoom level of 100.
- Fraction collection modules and fraction collection clusters are not supported.
- Only LAN-based and RS232-communicating modules are supported. Modules connected using GPIB are not supported.
- The configuration of two samplers in one instrument stack is not supported.
- Changing the pressure unit requires a reconfiguration of the GC. It is not possible to mix pressure units, e.g. configuring the GC to use kPa and run a method that uses psi.
- 1000 Hz data rate for 7890 GC is not supported.
- Blank run evaluation is not supported.

## In This Book

This manual contains information for the installation and use of the Agilent Drivers for Chromeleon 7.

The manual describes the following:

- how to install the Agilent Drivers
- how to configure the instrument
- how to run injections
- how to troubleshoot

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