

Agilent 1200 Series Rapid Resolution LC system controlled by Chromeleon – Supported modules and tasks

Technical Note



Abstract

The Dionex Chromeleon[®] 6.80 control software with service pack 3 and driver update 2c is able to fully support an Agilent 1200 Series Rapid Resolution LC (RRLC) system, except for some special functions. After installing the Chromeleon software and respective drivers, the Agilent 1200 Series RRLC system:

- Can be easily installed and configured.
- Supports all important module parameters.
- Evaluates raw data, including three-dimensional (3D) and two-dimensional (2D) data and spectra from Agilent ultraviolet (UV) detectors.
- Maintenance and diagnostics are supported by the Agilent Lab Monitor & Diagnostic software.
- Can be quickly accessed using the Agilent 1200 Series instant pilot handheld controller.
- Executes some basic diagnostic/maintenance tasks from within Chromeleon.



Equipment

- Agilent 1200 Series Rapid Resolution LC
- system • Dionex Chromeleon software

Introduction

During the past five years, HPLC users have increasingly demanded to control their HPLC equipment with the same instrument control and data evaluation software that is currently used in the laboratory. This helps to reduce training effort, reduces costs of software licenses, minimizes information technology (IT) efforts, and ensures comparability of results. Therefore, it is becoming mandatory that suppliers of chromatography data systems be able to control instrumentation from other vendors.

This Technical Note describes how and to what extent Agilent 1100 Series, Agilent 1200 Series, and Agilent 1200 Series RRLC systems are controlled by Dionex Chromeleon software. The combination of the Agilent 1200 Series RRLC with Dionex Chromeleon software for instrument control and data evaluation, is used to illustrate how to configure and run such a combination.

Extent of Chromeleon support for Agilent LCs

Supported Agilent LC modules

Dionex Chromeleon 6.80 control with service pack 3 supports the Agilent LC modules that are shown in table 1. Diagnostics are also supported, except for the pump diagnostics, such as pressure and leak tests.

Tested firmware

The following Agilent firmware was tested with Chromeleon: B.01xx or A.06xx of Agilent 1200 Series LC and Agilent 1200 Series RRLC modules. Emulation mode for the

Agilent 1100 Series Modules G1310A isocratic pump G1311A quaternary pump G1312A binary pump G1313A autosampler (includes G1313A-60004 extension for extra vials only) G1314A variable wavelength detector (VWD) G1315A diode array detector (DAD) G1315B diode array detector G1316A thermostatted column compartment G1321A fluorescence detector G1322A vacuum degasser (compatible, not controllable) G1329A standard autosampler G1367B well-plate autosampler G1330A autosampler heater/cooler G1330B autosampler heater/cooler G1354A quaternary pump with decasser G1362A refractive index detector G1365A multiple wavelength detector (MWD) G1365B multiple wavelength detector G1379A micro vacuum degasser (compatible, not controllable) G1323B handheld controller All internal valves All external valves

Agilent 1200 Series Modules

G1310A isocratic pump G1311A quaternary pump G1312B binary pump SL See G1329

G1314B VWD G1314C VWD SL G1315C diode array detector SL (DAD SL) G1315D diode array detector G1316B thermostatted column compartment SL G1321A fluorescence detector G1322B vacuum degasser (compatible, not controllable) G1329A standard autosampler G1329B standard autosampler SL G1367C high performance autosampler SL G1330B autosampler heater/cooler G1354A quaternary pump with decasser G1362A refractive index detector G1365C multiple wavelength detector SL (MWD SL) G1365D multiple wavelength detector G1379B micro vacuum degasser (compatible, not controllable) G4208A instant pilot handheld controller 6-port valves only External valves (from next service pack in Spring 2008)

Table 1

Supported Agilent LC modules, with SL models highlighted.

Agilent 1200 Series SL modules is no longer needed.

Agilent LC configurations that are not supported

- Second pump for automated column regeneration
- Built-in 10-port valves
- Purge kit (G1373A)
- Injector programming
- Overlapped injections
- Fraction collection system
- Early Maintenance Feedback (EMF) and related functionality
- Radio frequency identification (RFID) tags: lamp and detector cell tags
- Column tag
- DAD recovery card

- Support of more than five signals for acquisition on a DAD or MWD
- Creation of additional compressibility curves by the user (workaround is to load a new calibration curve from an Agilent 1200 Series controller and set compressibility parameter in Chromeleon to *UserDefined*)
- Sample capacity extension module (G2257A)

Support of maintenance and diagnostic features

Third-party instrument control software typically does not provide all diagnostic and maintenance features, such as those that are available from Agilent ChemStation soft-

ware. But there is a solution that is able to fulfill these tasks. The Agilent Lab Monitor & Diagnostic software is an independent software that runs on a separate personal computer (PC) and provides Early Maintenance Feedback (EMF) and all diagnostic features. It runs completely independently from the control software of the instrument and can be used with Chromeleon or other data systems. Starting at the end of 2008, each Agilent 1200 Series RRLC pump module will be delivered with a basic version of the Agilent Lab Monitor & Diagnostic software, which can be upgraded to the advanced version by buying a license.

Agilent 1200 Series instant pilot handheld controller

The Agilent 1200 Series instant pilot (G4208A) allows quick access to any Agilent 1200 Series RRLC system. Chromatographic parameters, hardware addresses, instrument status, and error messages can be checked. This controller is also a powerful tool whenever there is a need to quickly change setpoints, for example, when the control software is down and the pump must be switched off immediately.

There may be problems when connecting the Agilent 1200 Series instant pilot to an Agilent 1100/1200 Series instrument when it is controlled by third-party software, because this software may generate an error upon detecting an unknown module in the configuration. Therefore, the Agilent instant pilot (G4208A) can be made invisible to other controllers. To activate this setting in the Agilent 1200 Series instant pilot, open the *Configure – Controller* screen. Scroll to 3^{rd} Party Software and switch to ON. The setting works as follows:

- Backward compatible OFF visible to other controllers (default)
- Backward compatible ON invisible to other controllers

Installation and configuration

System requirements

An Agilent LC system can be connected to Chromeleon using a workstation or a networked workstation. The LC instrument can be connected via a local area network (LAN) or General Purpose Interface Bus (GPIB); see figure 1. If LAN is used, the LC needs an Internet Protocol (IP) address. The IP address can be obtained via Bootstrap Protocol (BOOTP) or by using a fixed IP address, which can be entered via the Agilent 1200 Series instant pilot controller.

To install instrument control software, see also the Dionex product release notes for Chromeleon 6.80, driver update 2c.

Configuration

The configuration of the Agilent 1200 Series LC starts in the *Server Configuration* screen shown in figure 1.

The *Scan CAN* button shown in figure 1 enables the software to automatically recognize all the connected Agilent 1200 Series modules. The *Server Configuration* screen has tabs (shown in the dialog box in figure 1) that allow a user to configure the LC modules. For example, the





autosampler configuration is shown in figure 2.

Also, if the appropriate detectors are connected, the number of UV-DAD or fluorescence signals are defined here (figure 3).

Additional options like valves are selected in another screen (figure 4).

550 VIDA (53/2011 VIDE)	TP 1200 TPLC System	
WADEZ3 WADEZ3 Sharable Devices C1200 VC1200 HP 1200 HPLC System	General Components Options Solvents Rack and Syringe Signals Error Levels Rack and Syringe Types 100 Vial Rack Image: Plates 100 Vial Rack External 20 Vial Rack Image: Plates Left Tray Right Tray Front Plate 15 Vials 15 Vials "54VialPlate" 900 µl 900 µl "54VialPlate" Syringe 100 µl 900 µl Seat Capillary 1.2 µl 2.3 µl 400 µl 1400 µl 5000 µl 6000 µl	- - - - - - - - - - - - - - - - - - -

Figure 2

Agilent 1200 Series RRLC autosampler configuration screen.



Figure 3

Detector configuration screen.



Figure 4

Configuration screen for valves.

The number of solvents that are available is determined as shown in figure 5.

After setting up all the needed configuration parameters, the Agilent 1200 Series RRLC is ready to be used for analyzing samples.

Setting instrument parameters with Chromeleon for the Agilent 1200 Series RRLC modules

Typically, nearly all LC functions of the Agilent 1100 Series and Agilent 1200 Series are supported by Chromeleon.

Example: Setting parameters for the Agilent 1200 Series RRLC binary pump

For the pump, all needed parameters can be set in the pump's setup screen (figures 6 and 7). In figure 6, the compressibility for the solvents is defined. If a user needs a solvent for which a new calibration curve must be measured, the new curve can be loaded to the pump main board via the Agilent 1200 Series instant pilot. The correct setting in the Chromeleon software for the pump compressibility is UserDefined. Further, the flow and gradient stroke settings are set up in the appropriate screens (for example, figure 7).

All other modules are supported using similar dialog boxes; additional examples are shown in Appendix A.

Example: analyzing a sample

The following application example uses a typical workflow:

- Setting up the instrument
- Running a sample
- Finding the data
- Quick look at results in Chromeleon



Figure 5

Pump configuration screen.



Figure 6

Setting pump parameters.



Figure 7 Setting a gradient. The chromatographic parameters for the individual modules are specified under *Program* (figure 8). The *Program Wizard* displays the abovementioned setup screens for the modules, where the chromatographic parameters can be set. The settings are saved as an instrument method, with a name such as *isocratic.pgm*.

After saving an appropriate program (instrument method), a sequence can be created. A *Sequence Wizard* guides the user through all necessary screens. The setup starts by determining which instrument should be used (figure 9).

The dialog goes on with defining sample and calibration runs (figure 10).



Figure 8

Example file structure for instrument method files and sequences.

Timebase:	E B My Computer
LC1200	
Computer:	
WADEZ3	
Protocol:	
My Computer	
Enter connection information manually or pick a timebase from the list at right.	

Figure 9

Start of Sequence Wizard: selecting the instrument.

l ise template	→ Import	Sequence Preview	Rack Preview	
		Name	Pos.	Vol.
Template for Samp	le Name:	👩 iso21	1	1.0
iso2#r	▼ ▶	iso22	1	1.0
Number of Vials: Injections per Vial: Start Position:	1 [1x] 3 [199] 1 ÷ [1BF9]	(g) 1so23	1	1.0
Injection Volume:	1.00 [0.00100.00 μ]			
njection Volume:	1.00 [0.00100.00 μ]			

Figure 10 Defining sample and calibration runs.

After saving the sequence, the runs can be started and after completion, the data can be reviewed and a report can be created (figure 11).

Conclusion

The Agilent 1200 Series RRLC system can be controlled by Dionex Chromeleon 6.80 with service pack 3 and driver update 2c. All needed chromatographic parameters can be entered, to ensure that optimum performance is obtained. Some specific features, like injector programming and Early Maintenance Feedback (EMF), are not supported, but the list of non-supported modules and features is decreasing. The maintenance and diagnostic features of the Agilent 1200 Series RRLC system are supported by the Agilent Lab Monitor & Diagnostic software, which operates completely independently from the LC control software on a separate PC. Overall, the combination of the Agilent 1200 Series RRLC system with Chromeleon as control software can be recommended as an alternative.

Appendix A

Figures 12, 13, and 14 show additional setup screens for more Agilent 1200 Series RRLC modules.



Figure 11

Report from a sequence run.

rogram Wizard: Samı	oler Options	
🔽 Use Temperature Co		
Temperature:	1	
Draw Speed:	100	[101000 μl/min]
Dispense Speed:	100	[101000 μl/min]
Sample Height:	0.1	[-10.050.0 mm]
Flush Factor:	5.0	[0.120.0]
Equilibration Time:	2.0	[0.0100.0 s]
Wash Time:	5.0	[0.0100.0 s]
Wash Vial:	Flush	FlushBF9]
Wash Repeat:	1	[15]
Delay Volume Reduc	tion	
	Į.	< Back Next > Cancel Help

Figure 12

Agilent 1200 Series high performance autosampler setup screen.

nitial	I parameters and da	ata acquisition t	imes:			
llo.	Channel name	Acq0n[min	AcqOff[min]	Wavel.[nm]	Bandw.[nm]	RefWavel.[nm]
1	UV_VIS_1	0.000	5.000	254	10	360
2	UV_VIS_2	0.000	5.000	254	16	360
3	VV_VIS_3	0.000	5.000	210	8	360
4	UV_VIS_4	0.000	5.000	230	16	360
5	UV_VIS_5	0.000	5.000	280	16	360
6	SDFIELD	0.000	5.000			
<						
DM	fin. Wavelength:	210 [19)950 nm]	SlitWidth	4 💌	[116 nm]
DM	fax. Wavelength:	400 [19	0950 nm]	Peak Width:	0.0100 -	[0.00000.8500
DB	unchwidth:	2.0 [1.0	100.0 nm]			

Figure 13 DAD setup screen.

umn Compartment <u>M</u> ode: Separ	ate	
Column Compartment	ate Compartment	
nperature:	Temperature:	
Cell - [-5.00100.00 °C]	▼ [-5.00100.00 °C]	
rimal Difference (Delta):	Maximal Difference (Delta):	
0.00 [0.00100.00 °C]	[0.00100.00 °C]	
ver Limit	Lower Limit	
-5.00 [-5.00100.00 °C]	[-5.00100.00 °C]	
er Limit	Upper Limit	
100.00 [-5.00100.00 °C]	[-5.00100.00 °C]	



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