Clarity (Lite)

4.0 vs 3.0

ENG

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Contents

1 Preamble	1
2 Clarity	2
2.1 System configuration	2
2.1.1 Available Control Modules	2
2.2 Instrument window	3
2.2.1 Single Analysis	
2.2.2 Method Setup	4
2.3 Chromatogram window	4
2.3.1 Improvements in the Integration Algorithm	6
2.4 Calibration	9
2.5 Data Acquisition	10
2.6 Sequence window	11
2.7 Report Setup and printing	13
2.8 Various improvements in Clarity	14
3 DHA Extension	15
4 Colibrick	16
5 Control Modules	17
5.1 Agilent ICF	17
5.2 Uni Ruby	19
5.3 New and improved control modules	21
6 Clarity2Go	23

To facilitate the orientation in the **4.0 vs 3.0** manual and **Clarity** chromatography station, different fonts are used throughout the manual. Meanings of these fonts are:

Instrument (blue text) marks the name of the window, to which the text refers.

Open File (italics) describes the commands and names of fields in **Clarity**, parameters that can be entered into them or a window or dialog name (when you already are in the topic describing the window).

WORK1 (capitals) indicates the name of the file and/or directory.

ACTIVE (capital italics) marks the state of the station or its part.

The bold text is sometimes also used for important parts of the text and the name of the **Clarity** station. Moreover, there are text sections written in format other than normal text. These sections are formatted as follows:

Note:Notifies the reader of possibly interesting information.Caution:Warns the user of possibly dangerous or very important
information.

Marks the problem statement or trouble question.

Description:Presents any closer information on the problem, describes its causes etc.Solution:Marks the response to the question, presents a procedure how to remove it.

1 Preamble

This document will guide you through the news and improvements in the **Clarity** Chromatography Station version **4.0**. Main news includes:

- DHA extension for detailed hydrocarbon analysis according to ASTM D6730.
- USB A/D converter **Colibrick**.
- Agilent ICF for controlling the Agilent HPLC instruments.
- Grace Alltech 3300 ELSD detector.
- UNI Ruby for controlling your instruments using the customized scripts.

2 Clarity

2.1 System configuration

• New instrument type CE-PDA is available.

2.1.1 Available Control Modules

• Indication of available, but not installed modules was added. By doubleclicking on the dialog you can display additional information, for example prerequisites or how to install the module.



Fig 1: Information dialog when a module is not installed.

2.2 Instrument window

 New project could be created from the Login dialog by selecting the <New project> command verse.

Login Dialog
Enter User Name:
Administrator
Select Project:
<new project=""></new>
All Possible Instruments
OK Cancel Help

Fig 2: Login dialog and the option to create a new project

- Increased width of the Instrument window to fit the width of the menu in Clarity localized versions.
- User Options dialog, option *Warn before running already measured sequence* is now active in the default desktop.

2.2.1 Single Analysis

• It is possible to enter a subdirectory in the chromatogram file name.

If the directory path is relative, the chromatogram will be created in the subdirectory of the DATA folder (or CALIB in case it is a standard) of the respective project.

Single Analysis - (Te	st)		×						
Analysis									
Sample <u>I</u> D	Wine								
Sample	Sample								
Amount	0	ISTD Amount	0						
Dilution	1	Inj. ⊻olume [mL]	0,1						
Calibration Standard Method									
Level: 1 v Comments									
Control									
Send method Run Stop Abort Snapshot									
Chromatogram Eile Name (Wine Sample_1)									
Year %Y\%q %	Year %Y\%q %Q_%n								
Enable File Ov	Enable File Overwrite Counter 1 Data Recovery								
	ОК	Cancel	Help						

Fig 3: Single Analysis dialog and an example of subdirectory in the chromatogram file name

2.2.2 Method Setup

- New button *Load Method* **Constant**. Implemented for **Agilent ICF** control, should read the method from all connected devices. Note, many of them do not support this feature, thus no effect in such cases.
- LC Gradient tab Full version

Graph is displayed including the region before start.

Event table

New event *READY* invoked after sending method when all HW reports *READY*.

2.3 Chromatogram window

Perform PostRun...

New command in the lower part of the *File* menu allows you to display the **PostRun Setting** dialog also from the **Chromatogram** window. Compared to the **PostRun Setting** dialog displayed from the **Instrument** window, it enables you to perform the postrun actions for example after adjusting some parameters in the chromatogram and also *Sign* the chromatogram file.

PostRun Setting (From Chromatogram Window)			
Open Calibration Window			
Print Results To PDF			
Export Data			
Export Chromatogram in <u>A</u> IA Format			
Export Chromatogram in TXT Format			
Export Chromatogram in E <u>Z</u> Chrom Ascii Format			
Export Chromatogram in Multidetector Format			
Program to Run Only with Export			
Parameters			
⊘ Sign			
Perform OK Cancel Help			

Fig 4: Perform PostRun dialog

Grey Out Inactive Signals

New option in the *Signals* tab in the Graph Properties dialog enables you to gray out inactive signals in *OVERLAY*.

Graph Properties							? ×
Graph Axes Appearance Time Axis Signal	Axis Signals	Auxiliary	Signals	Gradient			
Use User Options	C:\Clarity\DEM	02\Data`	Wine_Sa	mple - UV	detector		•
Set Initial Colors			Offset &	Scale			
Grey Out Inactive Signals	Show						
Scale Y Mode	Show Labe	els	X Offset		0,000000	[min.]	
Preserve Signal Ratios			X Scale		1		
Scale to All Signals	Line <u>W</u> idth		Y Offset		0	М	
Scale to Active Signal		1	V Carla		1		
Scale Signals Separately			1 SCale				
Scale Maximum to:	Color			Oric	inal		
Maximum value 🗸	00001			20	pr run		
Scale Minimum to:							
·			ОК	Car	ncel	<u>A</u> pply	Help

Fig 5: Gray Out Inactive Signals in the Graph Properties dialog



Fig 6: Example of applying the Gray Out Inactive Signals function

Retention indices in the Chromatogram Result table

Retention indices are now calculated based on the data from calibration, previously all the peaks had to be identified in the chromatogram.

2.3.1 Improvements in the Integration Algorithm

• We improved the Integration Algorithm. It supports new features like filters, baseline crossing, etc.

Chromatograms measured in the **Clarity 4.0** are automatically integrated using this new version. If you open a chromatogram measured in **Clarity 3.0** and **older**, it will be automatically reintegrated by the new version and the chromatogram will be saved automatically.

It is possible to open the chromatogram using the older integration algorithm, if you select an older Method in the Open Chromatogram dialog:

Open Chromatogram - C:\Clarity\DEMO_DHA\Data							
Look In: 🔒 Data		→ ← 💼	E: E: % E: []	l 💼 🖻			
Name 🛆	Size	Туре	Created	Last Change			
ASTM6730_107.PRM	15315 kB	PRM Chromato	10.4.2012 18:12	10.4.2012 18:12			
ASTM6730_112.PRM	7860 kB	PRM Chromato	10.4.2012 18:13	10.4.2012 18:13			
ASTM6730_455.PRM	1804 kB	PRM Chromato	10.4.2012 18:13	10.4.2012 18:13			
M_PARAFFINS_FOR_ASTM673.	963 kB	PRM Chromato	10.4.2012 18:15	10.4.2012 18:15			
File Name ASTM6730_112.	PRM	Sig	gnals:	ОК			
			Detector A	Cancel			
Chromatogram fil	es (*.prm)	•		Calicer			
Method 10.4.2012 18:13	12 Recent (Lin	ked Calibrat 🔻		Overlay Mode			
10.4.2012 18:13:	12 Recent (Lin	ked Calibration)	~	larity			
Analyst: 10.4.2012 18:13:	12, IA: 3.0 or	older Recent (S	tor 1	000 mV / 10 Hz			
5.7.2011 17:39:4 5.7.2011 17:37:5	14, IA: 3.0 or ol i6. IA: 3.0 or ol	der (Stored Cal/No der (Stored Cal		105 00 min			
Sample: 14.6.2011 11:29:	12, IA: 3.0 or	older (Stored Ca		125,00 mm.			
Current State: 28.10.2010 8:54:	16, IA: 3.0 or	older ^{/AL}	Jata: N				
GLP Mode 27.10.2010 18:49	9:17, 1A: 5.0 OF	older ":	N	10			
ى دانلىدانىلىلى ا	ի տես է	and the		1 1			
LEAN AND AND AND AND AND AND AND AND AND A	ar nan ar an	بانتقاقه بتبالا الشائ	ا المالية ال				
1							

Fig 7: Open chromatogram using the integration algorithm from Clarity 3.0 and older

Major features of the improved Integration Algorithm

• New filters available

Moving Average and Savitzky-Golay

Value *n* corresponds to the number of points used by (2n+1). Valid range 1-500.

Note artefacts are created on extremely narrow, high peaks. **Moving Average** tends to skew them and **Savitzky-Golay** tends to create oscillations at base. Use the menu commands *Chromatogram* -*Integration* - *Moving Average Filter* or *Savitzky-Golay Filter*.

Spike Filter

New function will remove narrow (electronic) spikes, parameter corresponds to number of points within the spike, range *1-100*. Accessible using the menu *Chromatogram - Integration - Spike Filter*. This function could be blocked in *GLP Options* dialog.



Filters are now applied by time interval

The last entry in the integration table overrides previous filter operations on the set interval.

Baseline operations are applied on peaks with peak apex within the interval

Previously the entire peak had to be included.

Allow crossing of baseline with chromatogram

New function allows positioning of peak start/end to position, where the baseline crosses the chromatogram. Baseline is drawn till the actual *Start/End*, but only the area around peak apex to the first intersection of baseline with chromatogram is counted. Use the menu command *Chromatogram - Baseline - Allow Crossing*.

Spike Removal

New function which will replace spike (peak) in selected interval by estimated baseline curve. Could be blocked in *GLP* options. Use the menu command *Chromatogram - Baseline - Allow Spike Removal*. This function could be blocked in *GLP Options* dialog.



Fig 9: Example of removing of a spike

- The option Filter (Chromatogram window, Edit menu) has been omitted It intended to hide redundant lines in the integration table.
- FFT filter OFF

This option was omitted.

2.4 Calibration

• Calibration file size has been reduced by compression.

As a side effect it leads to incompatibility of calibration files stored/created in this version with previous **Clarity** versions.

2.5 Data Acquisition

• New option Set Axes Ranges in the Data Acquisition window (View menu) to set ranges for detector and auxiliary signals.

From To Range Smin. 1 min. 1000 5 1000 5 From To Range 1000 mFU U 1000 mFU 1000 mFU 10 mFU U 1000 mFU 1000 mFU 10 mFU U 1000 mFU U 100 mFU
Smin. 1 min. 1000 5 1000 5 From To Range 100 mFU V 1000 mFU
Fixed Floating From To Range U 1000 mFU 10 mFU
Fixed Floating From To Range U 1000 mFU 10 mFU
Fixed Floating From To Range U 1000 mFU 10 mFU
Fixed Floating From To Range U 1000 mFU 10 mFU
Fixed Floating From To Range U 1000 mFU 10 mFU
From To Range U 1000 mFU 10 mFU
U 1000 mFU 10 mFU
U 1000 mFU 10 mFU U 1000 mFU 10 mFU
U 1000 mFU 10 mFU
1000 mELL 10 mELL
1000 mV 10 mV
1000 mV 10 mV
From To Auto
in 2 mL/min
20 MPa
F

Fig 10: Se Axes Ranges dialog



Fig 11: Example of the Acquisition window after setting some axes ranges

2.6 Sequence window

Supported samplers allow user to enter the vial position interactively. Available for example in the **Agilent ICF** or **Spark Alias** control modules.



Fig 12: Selecting a vial interactively in the Sequence window

• When a path is specified within a file name (in **Sequence**, it must be relative to default project directories), nonexistent directory will be created. The path was ignored previously in such case.



Fig 13: Example of creating subfolders in the Sequence

2.7 Report Setup and printing

• Chromatogram - Print range - Both

New option *Both* in the **Report Setup** dialog, *Chromatogram* tab and *Print Range* box will print the entire chromatogram and the selected detail as two graphs (sharing the same settings).



Fig 14: Example of printing both detail and the whole chromatogram

• Print Icon on toolbars now prints directly

The printer selection dialog is no longer displayed. Not implemented in the Audit Trail window.

2.8 Various improvements in Clarity

- The Clarity station look now follows the Windows 7/Vista/XP.
- Improved functionality in tables right click on a row or column header selects the corresponding row. Right click on the left upper corner cell selects the entire table.
- **Clarity** can be run with a new *resume_seq* parameter for resuming running sequence and the *run_seq* command line parameter was corrected.
- Support for **Bar Code readers**: new variable %*f* in the filename and other fields that will be replaced with the reader input.
- Option to prolong/renew expired Trial mode in RkNDUSB HW keys.
- Windows 2000 are no longer supported in Clarity version 4.0 and higher. Older versions are still available for downloads.
- Spanish and German localizations of the chromatography station.



Fig 15: Clarity Instrument in Spanish and German

3 DHA Extension

 New DHA extension (Detailed Hydrocarbon Analysis) for PIONA analyses - p/n A33.

Prepared according to **ASTM6730** norm for determination of individual components in spark ignition engine fuels. Detailed manual is accessible in the **Clarity Main Help - Extensions** or online at www.dataapex.com.



Fig 16: DHA Extension in the Chromatogram window

4 Colibrick

 The new USB A/D converter with parameters corresponding to the successful PCI INT9 product line.

It is available with 1, 2 or 4 channels. For more information, download the manual at www.dataapex.com or see the **Clarity Main Help**.



Fig 17: Colibrick

5 Control Modules

5.1 Agilent ICF

• ICF (Instrument Control Framework) for Agilent 1100/1200/1290/1260 and 1120/1220 HPLC systems, ready for testing.

🖳 ICF Setup		
Instrument type:	Agilent 1100/1200/1260/1290 LC	•
Iso: Pump Bin, Pump Coust, Pump Low Row Pump Column Comp. Sampler Low Row Sampler HP Sampler Low Row HP Sampler DAD MWD WD WD RID FLD Valve Low Row Valve Low Row Valve Column Comp. Cluster Column Comp. Cluster	E Auto Confi	Iso. Pump (G1310A) Sampler (G1313A) MWD (G1356A) Bin. Pump (G1312A)
Allow starting of device	s from Clarity (Sampler always starts th	Up Configure Down e run) OK Cancel Help

Fig 18: Setup dialog of the Agilent ICF

elect Detector			MWD: Sign	ial A	•	Enabled					
									MWD (G13	65A)	
Signals							Advanced				1
		14/2010	Dend	D-(D-4		Analog Output				
	Signal	length	width	Wavelength	Bandwid	ce th	C	Dutput 1:	0	Dutput 2:	
Signal A		250 🔷	4 🔿	360 🚔	100 🚔	nm	Zero Offset:	5 🌩 %	Zero Offset:	5 ≑	%
Signal B		254 🚔	4	360 🚔	100 🚔	nm	Attenuation:	1000 💌 mAU	Attenuation:	1000 👻	mAL
Signal C		210 🚔	4	360 🚔	100 🖨	nm					1
Signal D		230 🚔	4	360 🚔	100 🚔	nm	Margin for neg	ative Absorbance	Slit		
Signal E		280 📩	4	360 🛋	100 🛓	nm		100 🚔 mAU	4	▼ nm	
Peakwidth							Autobalance		Lamps on req	uired for acquisi	tion
	>0,10 mi	n (2,0 s re	sponse time) (2,5 Hz)	•		V Prerun		🔽 UV Lan	np	
					()		Postrur	1	📃 Vis Lar	np	
Stoptime -			P	osttime							
As	'ump/Injec	tor		• 0 11	# 00 Å	a .					
0		io 🔤 mir	ו	0	1,00 🕎	min					
							Timetable				
Event Table	AS M	leasuremen	nt Acquisiti	on Integration	n Calcula	tion Advance	ed				

Fig 19: Configuration of the Agilent detector using ICF in the Method Setup dialog

Clarity use the **ICF** libraries developed by **Agilent**. This allows users to control large variety of instruments from this company in standardized user environment which is slightly different than the rest of the **Clarity** Chromatography Station. Pressing the F1 key in each of the module's window displays the **Agilent Help** which will help you with controlling the instrument from **Clarity**.

5.2 Uni Ruby Vellversion



• UNI RUBY control module could be used to create simplified drivers for pumps, detectors, valves, column ovens, fraction collectors and autosamplers. It is helpful in cases when developing a SDK driver is difficult or time-consuming, because writing an UNI RUBY script doesn't requires so high skills in programming. Examples, programmers documentation and support are available for external developers on request.

UNI RUBY scripts replaces the **LC-UNI** pump control for selected pump models. Additionally, this control enables features not supported by the LC-UNI pump like auxiliary signals and use the pump as auxiliary.

Most of the scripts are supported directly from Available Control Modules dialog. For some additional examples you have to add them as **UNI Ruby** module located in *Thermostats* section, and load the respective **RUBY** script from the UTILS\UNI_DRIVERS folder.

For testing are available scripts controlling intruments:

- Laballiance, Flom and Omniseparo M350 pumps.
- Vici Valco, Rheodyne and Upchurch valves.

∍ Fi	oxy - Device Monitor		
Eil	e Co <u>n</u> trol <u>V</u> iew <u>W</u> indow <u>H</u> elp	▋ ≦ ≦ ■ ◘ 0 ◎ 7 7 0 0	
Z V	D	Not Ready: No loaded method	
		Start Trigger	
Foxy FC Not Ready (Method has not been sent)			
	Property	Value	
1	Current Position	· ·	
		Next	
2			
2		Collect / Waste	
2 3 4	Position To Go	Collect / Waste	
2 3 4 5	Position To Go	Collect / Waste 1 Go To Position	

Fig 20: Device Monitor with the fraction collector

- General Purpose Fraction Collector replacing the LC UNI.
- Gilson FC 203B (204) and Teledyne ISCO Foxy R1/R2 fraction collectors.

• **Bar Code Reader**: Enables **Clarity** to read the barcode from vials and automatically paste it to the *Sample ID* or *Chromatogram Name* using a variable.

😳 Ir	nstrument 1 - Device Monitor		x
Eil	e Co <u>n</u> trol <u>V</u> iew <u>W</u> indow <u>H</u> elp 📐	1 4 5 5 6 0 8 9 7 7 6 0	
🔳 D	ataApex DEMO	Running	0
🗹 V	ial Bar Code Reader	Running	0
	Property	Value	
1	Vial	Set Vial ID for vial 1	
2	Vial ID	BarCodeValue 1	
3	Set Vial ID	Set Vial ID	
For H	- Help, press F1		

Fig 21: Barcode reader in the Device Monitor

- Support for Gilson pump interface (GSIOC).
- Kontron 360/560 autosampler.

5.3 New and improved control modules

Agilent 68x0

Agilent **G2880A** and **6850 ALS** supported within the 68x0 GC control driver. A new option to set up carrier gas from configuration.

Cetac AS 800 autosampler

Testing stage.

CTC PAL

New version of control libraries (ICC-CE) 1.6.0.5. Support for 5µl and 1.2µl syringes.

DANI

Updated drivers for **DANI Master GC** (version 1.4.4.0) and **Master DHS** (version 1.0.1.0).

Ecom

Added Flash12 DAD detector and updated other drivers.

Gilson pump control no more uses GSIOC the server

Thus is functioning on Windows 7 and Vista. Development stage.

Grace Alltech 3300 ELSD detector

Testing stage.

HTA HT3x0A autosampler

Testing stage.

Knauer

Optimas released as Ready. New detectors **10D** / **UVD2.1** and **Conductivity Monitor 2900**.

Driver for all Knauer Instruments updated to version 3.0.7.3055.

Konik Laevitas 800 HPLC pump

Released.

Mettler-Toledo Excellence ballances

Control module for EA Extension has been released.

PG Instruments HPLC module

Testing stage.

Sedere ELSD model 90LT

Testing stage.

Shimadzu AOC20i

Support for three solvents for wash.

Spark SPH 1240 pumps

Testing stage.

Vici Valco

New **Universal Actuator** now supported. For testing - actuator has to be configured by commands *LG2* and *IFM0* before connection.

Virtual digital input output loop

Option to specify number of devices. When more devices are specified, they could be used on multiple instruments to synchronize them, but the *Delay* command in the Method Setup will not be supported.

YL Instruments

New driver for YL6500 GC and YL6100 GC updated to version 4.0.0.1.

6 Clarity2Go

• Clarity Chromatography Station allows you to watch the status of the Instruments over the Internet on your iPhone or Android phones.

In the **Clarity** window - *System* menu you can click the *Clarity2Go* command to display the **Clarity2Go** Configuration dialog and securely connect the chromatography station and its **Instruments** to the **clarity2go.dataapex.com** server.

In the **Apple Store** or **Android Play** the **Clarity2Go** application is available which enables you to watch the current state of **Clarity Instruments** after entering the security password.

Clarity2Go Configuration	×
Web Server Address:	
http://clarity2go.dataapex.com/	
Instrument 1	
Instrument 2	
Instrument 3	
Instrument 4	
OK Cancel	Apply Help

Fig 22: Clarity2Go Configuration dialog