DataApex
Clarity™
CHROMATOGRAPHY SOFTWARE

CTC PAL3 SYSTEM

Clarity Control Module   ENG

Contents

To facilitate the orientation in the **CTC PAL3 System** manual and **Clarity** chromatography station, different fonts are used throughout the manual. Meanings of these fonts are:

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.

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

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

[Chromatogram](#) (blue underlined) marks clickable links referring to related chapters.

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

Note: Notifies the reader of relevant information.

Caution: Warns the user of possibly dangerous or very important information.

▌ **Marks the problem statement or trouble question.**

Description: Presents more detailed information on the problem, describes its causes, etc.

Solution: Marks the response to the question, presents a procedure how to remove it.

1 CTC PAL3 System

This manual describes the use of the **PAL RTC**, **PAL LSI** and **PAL RSI** autosamplers with the **Clarity** software ver. **8.0 and later**. **Clarity** comes with ICF version **A.02.04 Revised**.

Fig. 1: CTC PAL3 System

The control module enables direct control of the instrument over Local Area Network (LAN). Direct control means that the autosampler can be completely controlled from the Clarity environment. The Instrument method controlling the analysis conditions will be saved in the measured chromatograms.

2 Requirements

2.1 Software requirements

Clarity (p/n C50) installation with **AS control** module (p/n A26).

Agilent ICF and **CTC PAL3 System** require **Microsoft .NET version 4.8** or higher for correct installation and operation. This version is already installed on majority of PCs. Nonetheless you will be notified during the installation if your PC is missing any version of **Microsoft .NET** - then follow the instructions there. For complete list of .NET requirements, see the .NET Framework System Requirements on Microsoft web page.

Supported operating systems:

- **Windows 10 (64 bit)**
- **Windows 11 (64 bit)**

Note: Before installing **Clarity**, it is recommended that your **Windows** is updated to the latest version.

2.2 Hardware requirements

- Version of firmware must be compatible with the **Agilent ICF** installed with **Clarity**.
- LAN interface installed on PC is required.

2.3 Limitations

- Help is not fully functional in all windows.
- Demo mode is not supported.
- Injection overlapping for headspace sampler is not implemented yet.

3 Installation procedure

CTC PAL3 System is not part of the **Clarity** *Typical* installation. To install it, select the *Full* installation or *Custom* installation with ICF option selected.
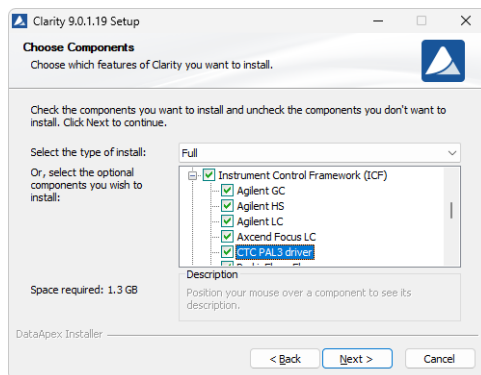

Fig. 2: Full installation of Clarity

3.1 Installing Correct Version of Agilent ICF

Clarity expects a specific version of Agilent ICF. Because other programs may also be using Agilent ICF, it is possible they've installed a different version than is supported by Clarity. In that case in the installation you will be prompted to reinstall it in order to install correct version. Going forward with this step is crucial for correct functionality of Clarity and Agilent ICF.

This situation may also occur during Clarity update when the new version contains updated ICF version.

Note: This reinstallation of Agilent ICF may cause that other programs using it, may not function properly.
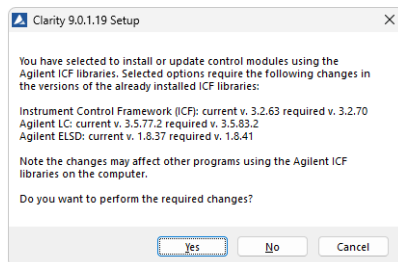

Fig. 3: Installing correct version of Agilent ICF

3.2 Network connections

The instruments supported by **Agilent ICF** has to be connected to a site network by LAN. It is recommended to attach the hardware directly to the PC avoiding hubs, switches etc. When using a switch or a hub, multiple hardware can be connected to one PC. Always contact your local LAN administrator who can make the appropriate settings.

Caution: **Cross LAN** cable is primarily used for the direct connection of the instrument and the PC. This cable can also be used for the connection of the device to the switch or network socket, but with older switches, the **straight LAN** cable might be necessary.

LAN Settings
PC: LAN card, TCP/IP protocol.

Both PC and supported CTC hardware should be configured on the same IP range.

Tab. 1: Recommended IP settings:

	CTC Hardware	LAN card
IP	192.168.111.235	192.168.0.1
Port	64000	- - -
Subnet Mask	255.255.255.0	255.255.255.0
Default Gateway	192.168.0.1	192.168.0.1
Accept From IP	0.0.0.0	- - -
Accept From Subnet Mask	0.0.0.0	- - -

Firewall
Ensure that the firewall does not block communication from the **CTC** hardware.

Internet connection
Be aware that many Internet connections are provided using the LAN card. If this is the case a separate LAN card must be configured for each Internet and connected **CTC** hardware.
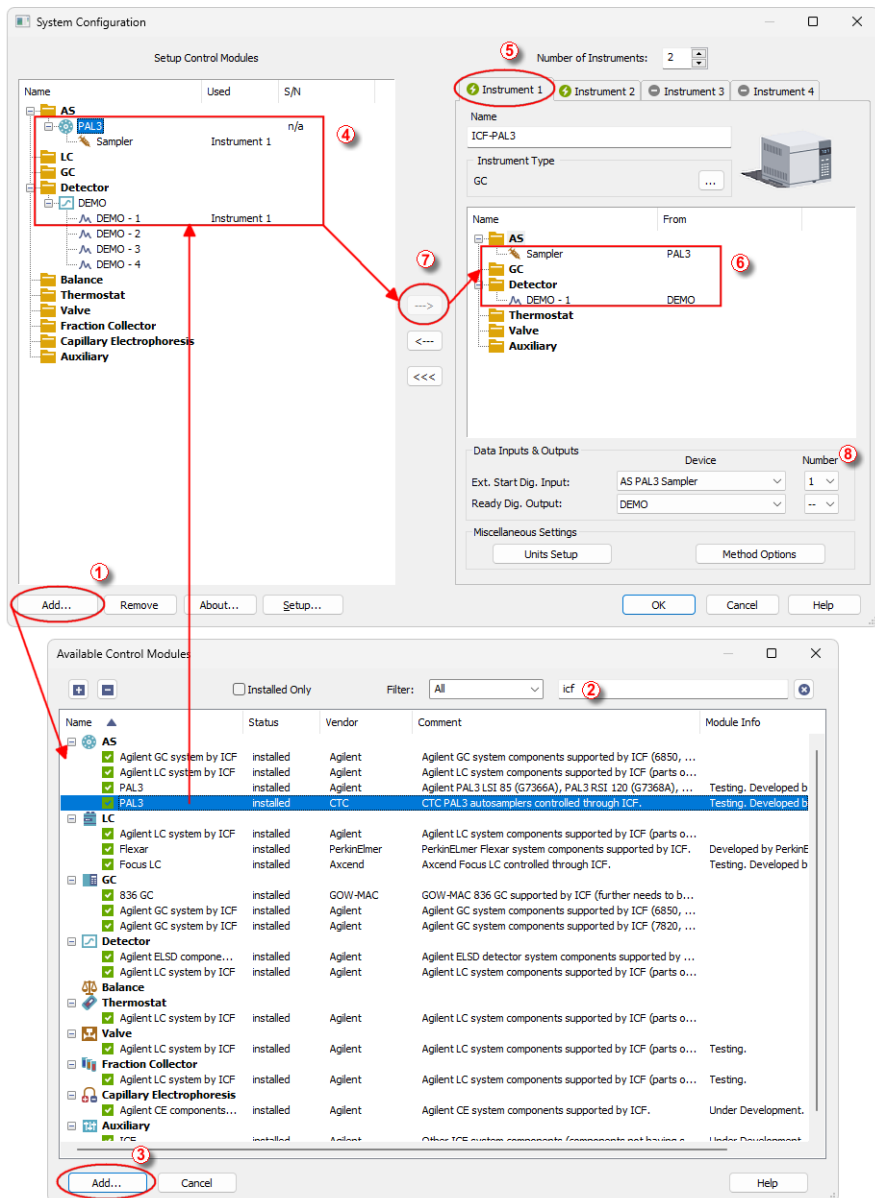
3.3 Clarity Configuration

Fig. 4: System Configuration

Caution: Before you start **Clarity**, ensure there is not any other application active and controlling the instruments.

- Start the **Clarity** station by clicking on the ◢ icon on the desktop.
- Invoke the *System Configuration* dialog accessible from the *Clarity* window using the *System - Configuration...* command.
- Press the *Add* button ① (See **Fig. 4** on pg. **5**.) to invoke the *Available Control Modules* dialog.
- You can specify the searching filter ② to simplify the finding of the driver.
- Select the **PAL3** item and press the *Add* ③ button.
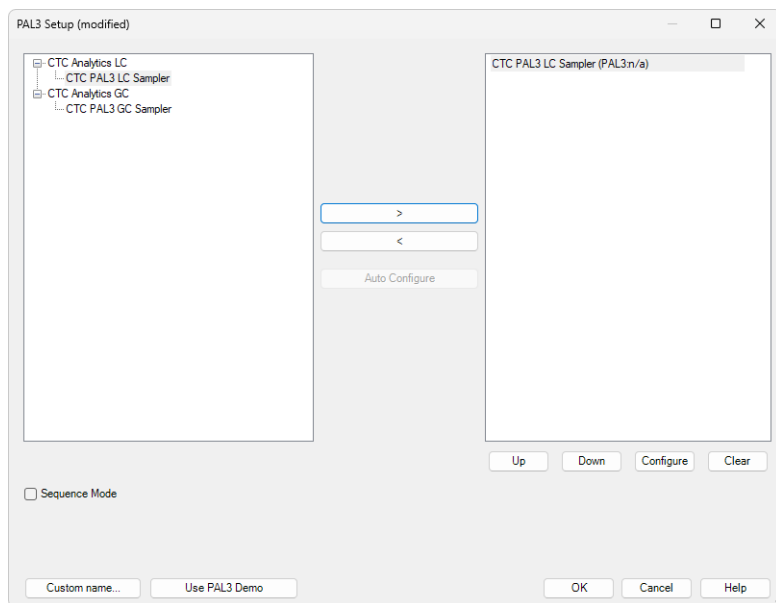
The PAL3 Setup dialog will appear.

Fig. 5: PAL3 Setup

Note: Press the *F1* key to display the **CTC PAL3 System** help with detailed description of the dialog.

- Click on the *Auto Configure* button in the *PAL3 Setup* dialog and the *Automatic configuration parameters* dialog is displayed for entering the connection parameters.

Note: *Auto Configure* button is active only when CTC Analytics LC or CTC Analytics GC item is selected.

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Note: The *Sequence Mode* option can optimize timing for maximum of 50 measurements. In case there are more measurements in sequence the optimization of sequence will be splitted into groups containing maximum 50 measurements.

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Note: CTC PAL3 GC Sampler should be used to run GC PAL3 Scripts. CTC PAL3 LC Sampler should be used to run LC PAL3 Scripts.

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Note: The *Custom name...* button can be used to alter the name of the module. This change propagates to the module name in the *Setup Control Modules* ④ and in the *Data Inputs & Outputs* ⑧ sections of the *System Configuration* dialog. Default name is used when the field is left empty.
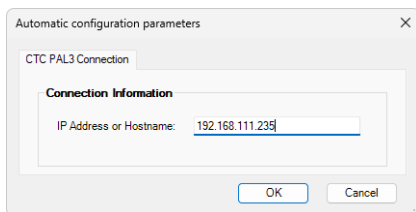
Fig. 6: Automatic configuration parameters dialog

- Fill in the *IP address* or *Hostname* and click *OK* button.

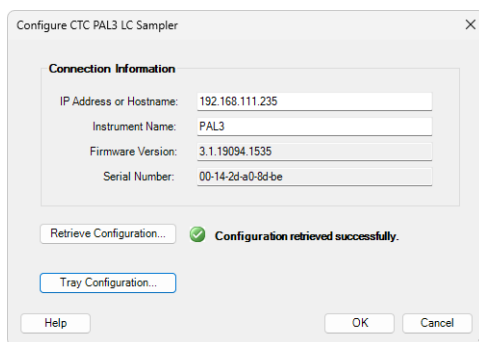For manual configuration click on *Configure* button. Sampler's Configure dialog will appear.

*Fig. 7: Automatic configuration parameters dialog*

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Note: The user has to fill the serial number manually. The serial number is not stored in the PAL firmware.

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Note: Configuration can be retrieve using the Retrieve Configuration button. If the device is offline the answer is:*Retreive configuration failed. No response from Server....* If the device is already used by other user the answer is: *Retreive configuration failed. The role is already taken.*

- Fill in required parameters and click *OK* button.
- Then click *OK* button in the lower part of the *PAL3 Setup* dialog.

The **CTC PAL3 System** will appear in the *Setup Control Modules* list ④ of the *System Configuration* dialog.

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Caution: When the *PAL3 Setup* dialog is open for extended time, communication between **Clarity** and the AS may be lost, in such case an error message will be displayed. After accepting the error message it is necessary to set the configuration from very beginning, starting with clicking the *Add* button ① (See **Fig. 4** on pg. **5**.) in the *System Configuration* dialog.

- Drag and drop the **PAL3** icon from the *Setup Control Modules* list ④ on the left side of the *System Configuration* dialog to the desired *Instrument* ⑤ tab on the right side ⑥ (or use the ⟶ button ⑦ to do so).

- Set the *Ext. Start Dig. Input* ⑧ to *"1"* - 1▾ ⑧ for ICF Sampler to assure correctly synchronized start of the analysis with the **PAL3** sampler's injection.

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Caution: If you change the configuration of the **CTC PAL3 System** (for example remove and add another instruments), the communication parameters like *IP address* will be lost and it is necessary to set them again.

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Note: The configuration dialog of the **CTC PAL3 System** can be displayed any time by double-clicking on its icon or using the *Setup* button.

3.4 Installation Qualification of Agilent ICF

Agilent ICF is an external program developed by Agilent and for that reason it must be validated using their utility. If you have installed Clarity with Agilent ICF, **the IQ is valid only if successful validation of ICF is attached**.

The validation of ICF can be performed directly from the *IQ Report.*

Caution: If Clarity expects ICF installation then **IQ** also. And if for some reason the ICF installation is not found, the *Installation Qualification Test* is automatically *FAILED*. To resolve this situation, it is necessary to re-install **Agilent ICF** during Clarity installation.

Fig. 8: IQ Report with ICF installation present

Click the link *"here"* ① , after that it is necessary to click *Run* in two pop-up windows. *Agilent Software Verification Tool* window will open. Select what report file type should be generated and define post-qualification actions. Click *Qualify* ② to run the IQ. The HTML reports are opened in the default browser if the *Open reports* option was enabled. Installed drivers and their versions are listed at the end of the report.
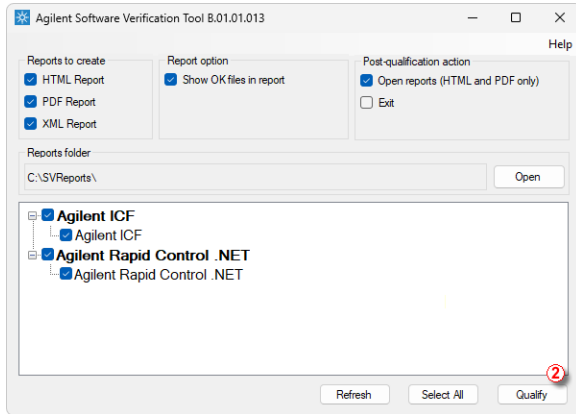
Fig. 9: Agilent Software Verification Tool

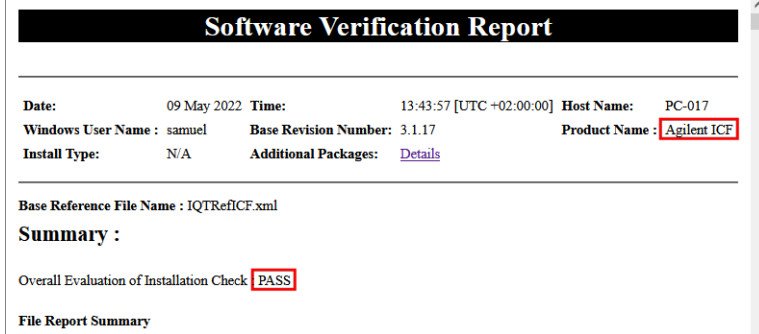Address field of the generated report displays the location of the actual report.

Fig. 10: ICF Report - PASS

4 Using CTC PAL3 System

There are multiple places for setting the parameters of the **CTC PAL3 System** in the **Clarity**:

- the Device Monitor
- the Method Setup

Caution: Before opening the *Instrument* window with configured **ICF** devices, ensure there is not any other PC connected to AS. Otherwise there will be raised an error during the connection.

4.1 Device Monitor

Before using CTC PAL3 System, corresponding scripts must be loaded from the *Device Monitor* window using the Script Manager. The *Device Monitor* window can be invoked by the *Monitor - Device Monitor* command from the *Instrument* window or using the **Device Monitor** 🔵 icon. Then Script Manager can be invoked from **Device Monitor** by holding right mouse button over PAL3 schema for 2-3s.
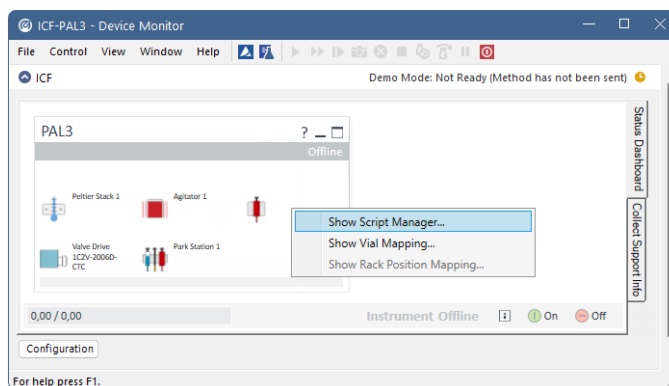

Fig. 11: Device Monitor

Use *Import Scripts* button and select the available scripts from Clarity\Bin\HW_DRIVERS\CTC_PAL3_Scripts.
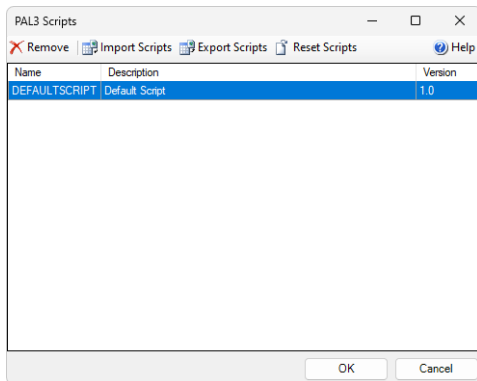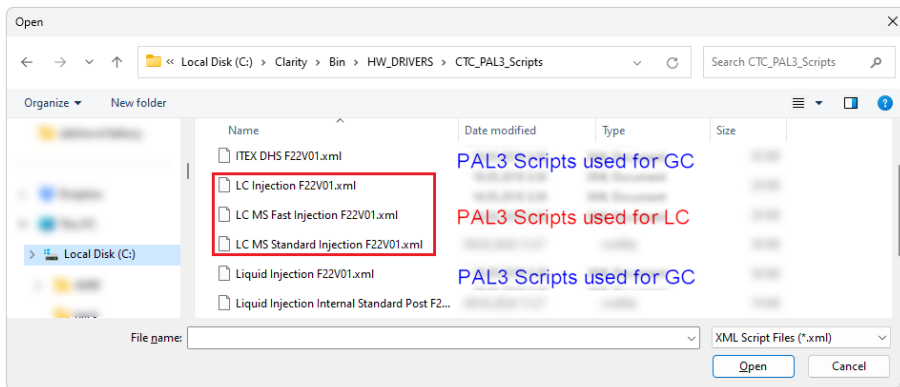
Fig. 12: Script Manager
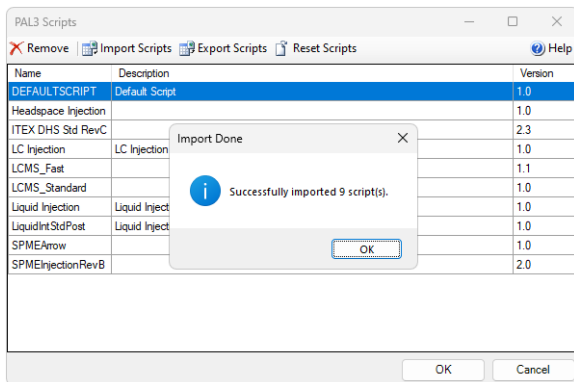

Fig. 13: Script selection

Fig. 14: Import confirmation

Button *Configuration* on the bottom part of autosampler section in the *Device Monitor* allows to enter and modify configuration of autosampler directly from the *Device Monitor*. This feature is intended for quick updating of configuration when trays or other tool of the autosampler are changed. Modifications of configuration may cause that method might need an adaptation before its use in analysis. The *Configuration* feature is not accessible during running analysis or running *Sequence*.
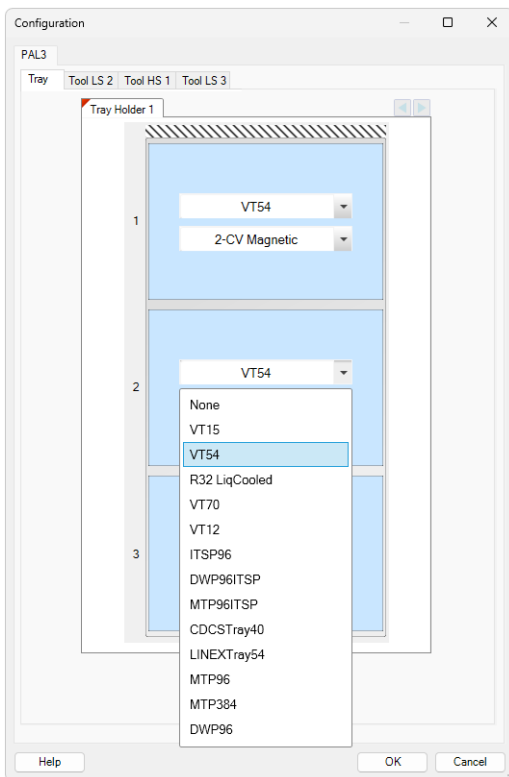

Fig. 15: Configuration from Device Monitor

4.2 Method Setup

In **AS tab** you can select appropriate Method Script ① and then set all the parameters for AS control ② .
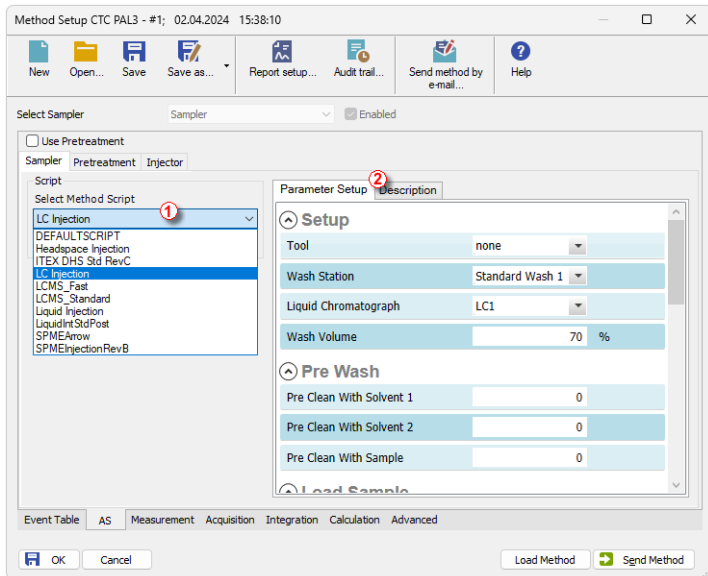
Fig. 16: Method Setup - Parameter Setup

Description tab is mainly informational.

Pretreatment tab is not supported.

Injector tab is not editable, it displays the injector selected by the script.
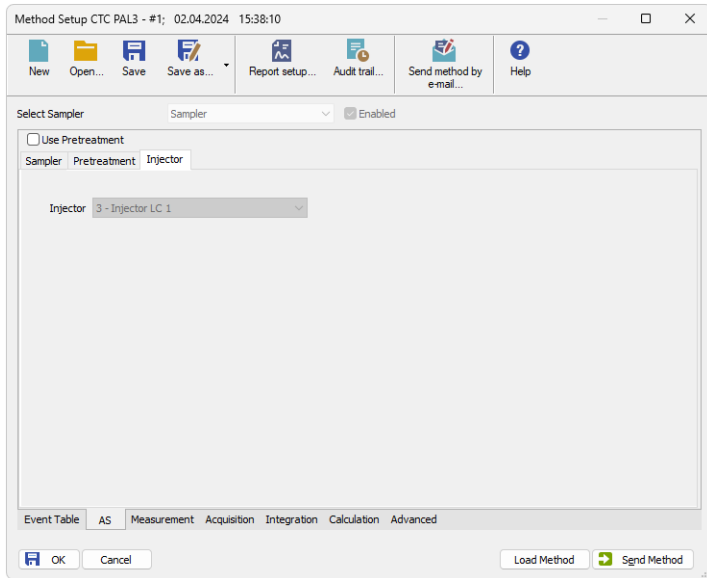
Fig. 17: Method Setup - Injector

4.3 Method Setup - Advanced

The *Method Setup - Advanced* tab serves for setting the usage of auxiliary signals of the **CTC PAL3 System** autosampler.
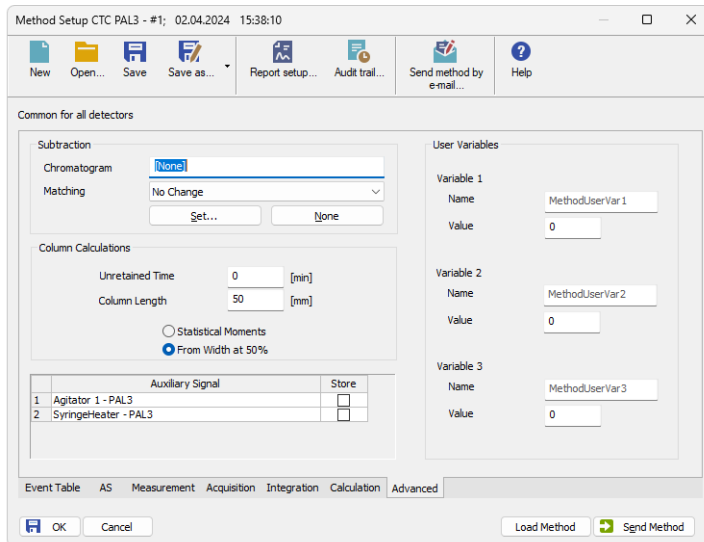

Fig. 18: Method Setup - Advanced

The list of available auxiliary signals is shown in the table in the lower part of the dialog. By checking the checkbox in the *Store* column for the particular row, the given auxiliary signal will be stored into the measured chromatogram.

Note: LC Injection valve auxiliary signal serves for service purposes only, under standard conditions it gives no data.

5 Troubleshooting

When the remedy for some problem cannot be discovered easily, the recording of communication between **Clarity** and **CTC PAL3 System** control module can significantly help the **DataApex** support to discover the cause of the problem. The recording can be found in the **Clarity** installation directory (C:\CLARITY\CFG\DEBUG_LOGS\PGMLOG by default). Older communication log files are removed and replaced by newer ones, therefore, it is necessary to copy out the communication log which was collected during the problem occurrence soon after it happened.

In case you cannot establish communication with Agilent ICF controlled instruments, please review the following issues:

### Check the network connection using the Ping command
The problem in communication between **Clarity** and Agilent instruments may be caused by wrong network configuration, firewall preventing the connection, etc. Run the command line in Windows (for example by pressing the **Windows key** together with the **R** key, in the displayed *Run* window type *cmd* and press *Enter*).

In the command line type ping <ip-adress-of-instrument> or <hostname> and press *Enter*. The *IP Adress* (*hostname*) is the same you entered in the ICF;Setup dialog.

5.1 Specific Problems

▌ **Clarity can't be run and it displays "Agilent ICF is not installed correctly." message.**

Cause: The cause of the problem is that the Agilent ICF has a different version than expected by Clarity. It can typically happen when other software also using Agilent ICF decides to reinstall it. Thus next time Clarity expects different version than is installed.
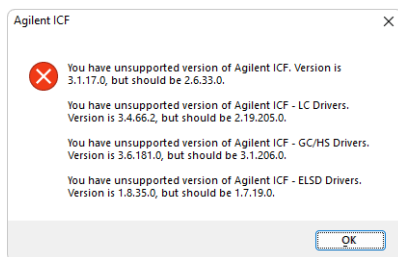
Solution: The Solution is to reinstall Agilent ICF during Clarity installation. Follow steps described in the chapter **"Installation procedure"** on pg. **3**.

▌ **Analysis can't be run in headspace mode and Clarity displays "Voltage of PWMOut is not set to 34V" message.**

Cause: In the Headspace mode, the settings of the PWMOut are expected to be set to 34V through the controller in order to be able to switch the valve. Default value after installation is 0V (for non-headspace samplers) in order not to power the valve which does not have to be present.

Solution: The Solution is to switch the PAL3 using the controller through *Setup - PAL Modules - I/O Interfaces - PWMOut - Output Voltage* to 34V. Please note that in order to be able to set the value, the user must be switched to the "Extended User" access level (done by simultaneously pressing both buttons on the controller).

▌**Incubating time in headspace mode is longer than expected.**

Cause: Analysis Time in Method in Headspace mode is shorter than the time of the entire analysis cycle (run time, cooling and equilibration).

Solution: The Solution is to prolong Analysis Time in Method in Headspace mode to cover the entire analysis cycle.