DataApex
Clarity™
CHROMATOGRAPHY SOFTWARE

R-BIOPHARM RIDACREST

Clarity Control Module ENG

Code/Rev.: M210/100A
Date: 2025-05-12

DataApex Ltd.
Petrzilkova 2583/13
158 00 Prague 5
Czech Republic

Phone: +420 251 013 400
clarity@dataapex.com
www.dataapex.com

Author: DM

Contents

To facilitate the orientation in the **R-Biopharm RIDACREST** 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 R-Biopharm RIDACREST Control module

This manual describes the setting of the **R- Biopharm RIDACREST** sample preparation system, composing of **Spark HPD** (High Pressure Dispenser), **Spark ACE** (Automatic Cartridge Exchanger) and **Spark Alias**. The control module enables direct control of the instrument over serial line. Further modules will be added to the driver in future versions.

Fig. 1: R-Biopharm RIDACREST

Direct control means that the system can be completely controlled from the **Clarity** environment, including in-module synchronization. Instrument method controlling the sample preparation conditions will be saved in the measured chromatograms.

Note: It is recommended to check the user manual of the instrument for its operating principles and restrictions.

2 Requirements

- **Clarity** Installation with AS Control module (p/n A26).
- Serial straight DB9F-DB9M communication cable (p/n SK02).

Note: Cables are not part of **Clarity** Control Module. It is strongly recommended to order required cables together with the Control Module.

- Free serial COM port in the computer.

Note: Modern computers usually have only one (if any) serial (COM) port installed. To use more devices requiring the port, the **MultiCOM** adapter (p/n MC01) is available.

- Optionally, Digital Input Device (p/n DID01) adapter for external start. For more details see the chapter **Installation Procedure** on pg. **3**.
- Minimum firmware version in the **Spark HPD**: **1.24**.
- Minimum firmware version in the **Spark ACE**: **1.52**.
- Minimum firmware version in the **Spark Alias**: **1.26**.

3 Installation Procedure

3.1 Hardware - Wiring

Commands for the **R-Biopharm RIDACREST** system are communicated with **Clarity** through the serial straight DB9F-DB9M cable (p/n SK02). Typical serial cable wiring is described in the picture:

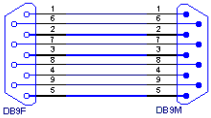

Fig. 2: Serial straight DB9F - DB9M cable

3.1.1 Connections of the R-Biopharm RIDACREST and rest of the chromatographic system

It is necessary to use additional starting cable from the part of the **R-Biopharm RIDACREST** system which will decide on the analysis start - typically **Spark ACE**. The cable should be connected from an output of the given device to either the A/D converter input, input of some other directly controlled instrument capable of starting the analysis (typically directly controlled detectors) or to an optional Digital Input Device (p/n DID01) adapter. Such device connected should be set in the *System Configuration* dialog as a source of the External Start Digital Input.

3.2 R-Biopharm RIDACREST setup - communication

The **R-Biopharm RIDACREST** can be controlled from **Clarity** via serial (RS232) communication. The first module is connected to the PC, rest of the modules are daisy-chained by further communication cables.

In addition, the *ID* of all parts of the **R-Biopharm RIDACREST** system must be the same that will be later set in **Clarity**. The ID is set on the back sides of the particular parts of the **R-Biopharm RIDACREST** system by turning the mini-dials. No two devices may use the same ID.

3.2.1 Digital Inputs and outputs

The digital inputs and outputs of the **R-Biopharm RIDACREST** are present on back panels of the instruments. Each instrument has it's own mapping of the digital inputs and outputs, which may serve for sending and receiving external signals to other devices which are not part of the **R-Biopharm RIDACREST** system (parts of the **R-Biopharm RIDACREST** system may be synchronized internally). These outputs may be used when other instrumentation needs to be acknowledged of the analysis start etc. by wire. The mapping of the pins on the connectors is as follows:

Tab. 1: Spark HPD I/O connector pins mapping

Pin	Function
1	Auxiliary Output 1 - Normally Open
2	Auxiliary Output 1 - Common
3	Auxiliary Output 2 - Normally Closed
4	GND
5	Input 2
6	Auxiliary Output 1 - Normally Closed
7	Auxiliary Output 2 - Normally Open
8	Auxiliary Output 2 - Common
9	Input 1

Tab. 2: Spark ACE external output connector pins mapping

Pin	Function
1	Auxiliary Output 1 - Normally Open (1)
2	Auxiliary Output 1 - Common (1)
3	Auxiliary Output 1 - Normally Closed (1)
4	Auxiliary Output 3 - Normally Open
5	Auxiliary Output 3 - Common
6	Auxiliary Output 3 - Normally Closed
7	Auxiliary Output 1 - Normally Open (2)
8	Auxiliary Output 1 - Common (2)
9	Auxiliary Output 1 - Normally Closed (2)
10	Auxiliary Output 2 - Normally Open
11	Auxiliary Output 2 - Common
12	Auxiliary Output 2 - Normally Closed
13	Auxiliary Output 4 - Normally Open
14	Auxiliary Output 4 - Common
15	Auxiliary Output 4 - Normally Closed

Note: Output 1 is a dual pole change over relay and outputs 2, 3 and 4 are single pole change over relays.

Tab. 3: Spark ACE external input connector pins mapping

Pin	Function
1	Input 1
2	Input 2
3	Input 3
4	Input 4
5, 6, 7, 8, 9	GND

Tab. 4: Spark Alias I/O connector pins mapping

Pin	Function
1	Output - Common
2	Output - Normally Open
3	Input 1
4	Input 2
5, 7, 8, 9	GND
6	Output - Normally Closed

3.3 Clarity Configuration

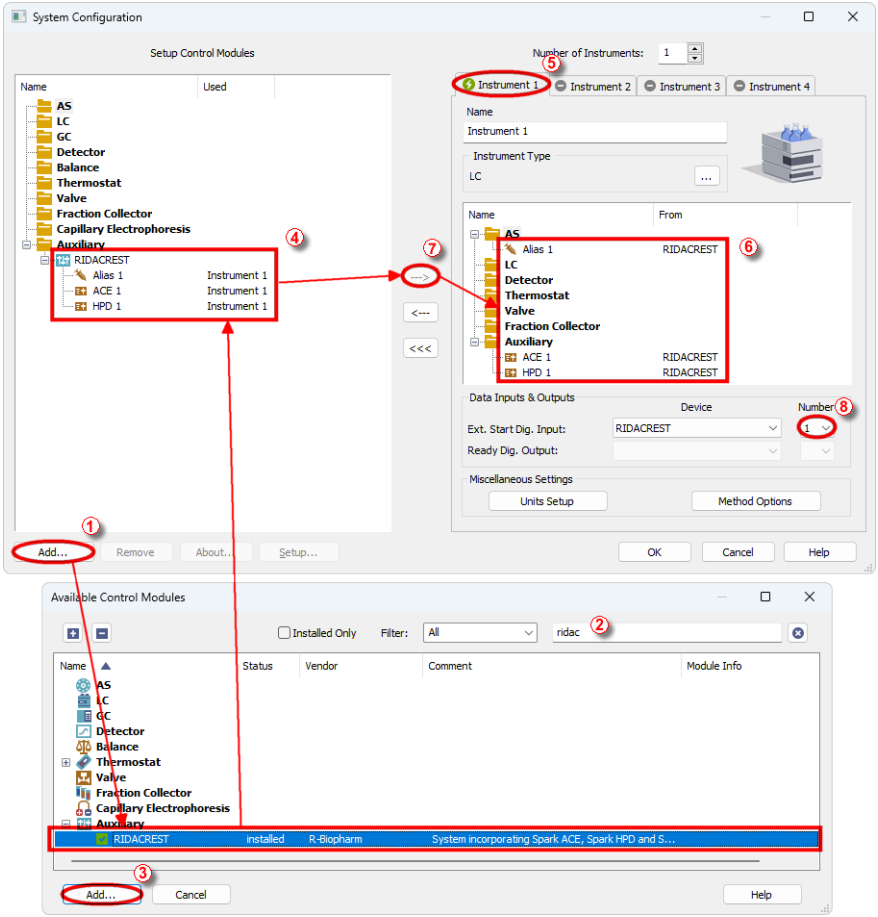

Fig. 3: System Configuration

- 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 **3.3** on pg. **6**.) to invoke the *Available Control Modules* dialog.
- You can specify the searching filter ② to simplify the finding of the driver.
- Select the **R-Biopharm RIDACREST** auxiliary device and press the *Add* ③ button.

The RIDACREST Setup dialog will appear.

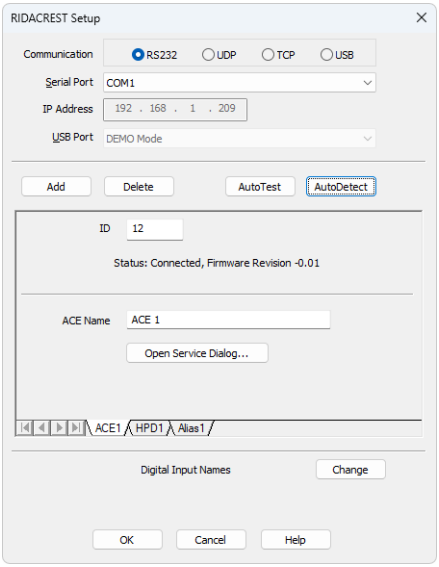

Fig. 4: Spark HPD Setup

Select the correct type of the *Communication* and fill in the appropriate *Serial Port*, *IP Address* or *USB Port* field, then press the *AutoDetect* button. If the communication is correct, the dialog pane in the lower part of the dialog will populate with tabs, one tab for each device connected using the same port. *Connected* inscription along with the firmware version and serial number of each **R-Biopharm RIDACREST** device will be displayed on each tab row. The *ID* will match the device identifier set previously on the back side of the instruments, as was described in the chapter "R- Biopharm RIDACREST setup - communication " and should not be changed. Press the OK button to close the RIDACREST Setup dialog.

Note: The RIDACREST Setup dialog is more closely described in the chapter **"RIDACREST Setup"** on pg. **25**.

The **R-Biopharm RIDACREST** item will appear in the *Setup Control Modules* list of the *System Configuration* dialog.

- Drag and drop the **R-Biopharm RIDACREST** icon from the *Setup Control Modules* ④ list 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* and *Ready Dig. Output* numbers ⑧ for your acquisition card according to the wires being used for synchronization. If you wish to synchronize the **Clarity** start with the **R-Biopharm RIDACREST** system over serial line, you can set the **R-Biopharm RIDACREST** in the *Ext. Start Dig. Input* drop-down menu, using the *1* as a input *Number*. In such case it is

necessary to change the behavior on the *Method Setup - Measurement* tab later from *Down* to *Up*.

4 Using the control module

New Method Setup - Aux. Devices tab appears in the *Method Setup* dialog, enabling the setting of the **R-Biopharm RIDACREST** system control method.

4.1 Method Setup - Aux. Devices

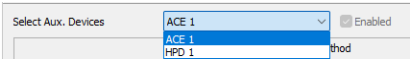

Fig. 5: Method Setup - Aux. Devices

Method Setup - Aux. Devices tab is common for all **Spark ACE** and **Spark HPD** instruments present in the **R-Biopharm RIDACREST** system. To check or modify the program for a particular device, use the *Select Aux. Devices* drop-down menu on the upper part of the dialog.

4.1.1 Method Setup - Aux. Devices - ACE - Time Program

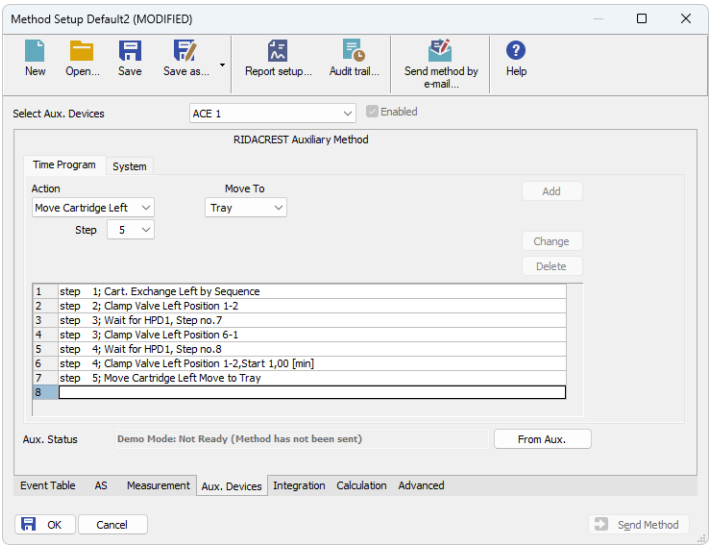

Fig. 6: Method Setup - Aux. Devices - Time Program dialog for ACE

Tab for setting the **Spark ACE** program. The user can add particular items into the program table by using the *Action* select box and pressing the *Add* button, or change already existing row in the table by selecting it, modifying the operation and pressing the *Change* button.

Each row has a *Step* number attached to it. The cartridge that will be used for the *Cart. Exchange Left* or *Cart. Exchange Right* action is defined in the *Left Clamp* or *Right Clamp* column, respectively, of the **Clarity** Sequence table. For the description of all possible actions please see the manual for the **Spark ACE** device produced by **Spark Holland** company.

The items that can be selected for the particular row in a **Time Program Table** are following:

Wait for HPD/Alias

Actual command used for synchronization with other parts of the **R-Biopharm RIDACREST** system. Set the device to wait to and the step number of the device's program to wait to. The performing of the **Spark ACE** user program is paused until the selected device reaches the beginning of the defined step.

Wait for

Sets the **Spark ACE** to wait for specified event - *Load*, *Inject*, *Exchange Completed*, *Valve Switched* or change of the defined *Input 1* to *Input 4* state (*HIGH* or *LOW*). If multiple conditions are specified, the **Spark ACE** will wait for all of the conditions to be true.

Delay Time
Defines the time (in minutes) for which the **Spark ACE** will wait before proceeding to the next step (or to other parts of the same step).

Move Cartridge Left/Right
Moves the cartridge currently clamped in the left/right clamp either back to tray or to the other clamp.

Cart. Exchange Left/Right
Puts the cartridge from the tray to the left/right clamp. The exact cartridge to be used can be defined in several ways by using the command options. The dropdown allows to set the cartridge to be used either *Absolute* (where a cartridge can be graphically selected from the tray) or by *Sequence*, which means the particular cartridge is defined in the Sequence table, *Left Clamp* or *Right Clamp* column. An optional *Offset* can be set for the *Sequence* position, either positive or negative, which allows to use cartridge as defined in the Sequence table but offset by set number in cartridge succession *A1 - A2 - A3 - .. - A12 - B1 - B2 - .. - G12* (where positive offset selects the cartridge further in order and negative vice versa). Default option is *Sequence* with no *Offset*.

ISS Valve 1..4
Switches the installed ISS valve into the *1-2* or *6-1* position. You can define the time delay to do so using the *Start Time* checkbox and field.

Clamp Valve Left/Right
Switches the particular clamp valve into the *1-2* or *6-1* position. You can define the time delay to do so using the *Start Time* checkbox and field.

Aux 1..4
Switches the given Auxiliary output to defined state (*HIGH* or *LOW*). You can define the time delay to do so using the *Start Time* checkbox and field, and/or set the auxiliary signal level switch as a pulse with defined length using the *Pulse Time* checkbox and field.

End Time
Defines time delay (in minutes) after the command on the same step is performed before the program of the **Spark ACE** continues to the next step of it's program.

Time Stamp 1..2
Invokes the specified time stamp for the **Spark ACE** at defined time of the given step.

Inject Marker
Serves for starting **Clarity** analysis. The only parameter is the step on which the *Inject Marker* should be triggered. The setting on the *Method Setup - Measurement* tab should be switched from *Down* to *Up*.

4.1.2 Method Setup - Aux. Devices - ACE - System

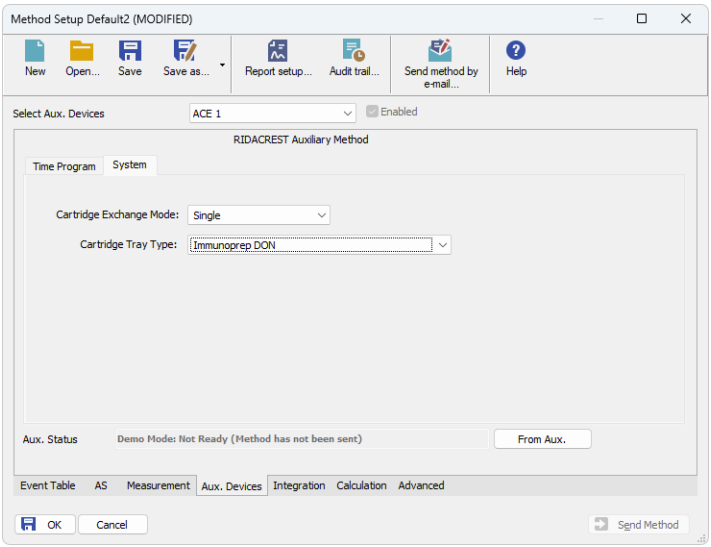

Fig. 7: Method Setup - Aux. Devices - System dialog for ACE

The *Method Setup - Aux. Devices - System* tab for **Spark ACE** serves for setting the operation mode of the **Spark ACE** device.

Cartridge Exchange Mode

Defines the usage mode of the **Spark ACE**. The options are *Single*, *Concurrent*, *Independent* and *Parallel*.

Cartridge Tray Type

Defines the cartridge tray type. The options are *None*, *Non-RBR*, *Immunoprep Aflatoxin*, *Immunoprep Ochratoxin*, *Immunoprep DON*, *Immunoprep Zearalenone*, *Immunoprep Aflatoxin M1*, *Immunoprep Fumonisin*, *Immunoprep T-2 and HT-2* and *Immunoprep Vitamin B12*.

Caution: Default Cartridge Tray Type for new method is *None*. When this combo-box option is left unchanged, you would not be able to start the sequence. Once changed and saved, the Cartridge Tray Type is locked and cannot be changed anymore by any means. If the Cartridge Tray Type does not correspond to actual tray type, you also would not be able to start the sequence.

4.1.3 Method Setup - Aux. Devices - HPD - Time Program

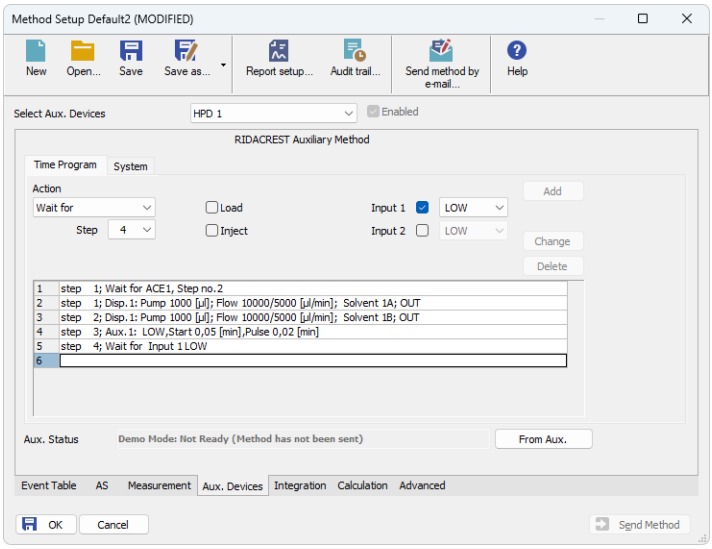

Fig. 8: Method Setup - Aux. Devices - Time Program dialog for HPD

Tab for setting the **Spark HPD** program. The user can add particular items into the program table by using the *Action* select box and pressing the *Add* button, or change already existing row in the table by selecting it, modifying the operation and pressing the *Change* button.

Each row has a *Step* number attached to it. Multiple rows can use the same step number, but only one action in the step may be one from *Aspirate*, *Dispense* or *Pump* actions. For the description of all possible actions please see the manual for the **Spark HPD** device produced by **R-Biopharm** company.

The items that can be selected for the particular row in a **Time Program Table** are following:

Wait for ACE/HPD/Alias

Actual command used for synchronization with other parts of the **R-Biopharm RIDACREST** system. Set the device to wait to and the step number of the device's program to wait to. The performing of the **Spark HPD** user program is paused until the selected device reaches the beginning of the defined step.

Wait for

Sets the **Spark HPD** to wait for specified event - *Load*, *Inject* or change of the defined *Input 1* or *Input 2* state (*HIGH* or *LOW*). If multiple conditions are specified, the **Spark HPD** will wait for all of the conditions to be true.

Delay Time

Defines the time (in minutes) for which the **Spark HPD** will wait before proceeding to the next step (or to other parts of the same step).

Disp. 1(2): Syringe Valve

Switches the syringe valve of the first (second) dispenser to one of the six available positions.

Disp. 1(2): Aspirate

Aspirates the defined *Volume* of the *Solvent* into the syringe of the first (second) dispenser using the defined *Aspiration Flow* speed. In case the **Spark HPD** supports mixing, using the *Mix* checkbox will limit the aspiration flow, but will allow option to select from 2 solvents defining the composition of the mixture using the *%* field (the value is the percentage of the *Solv. B*). Maximum *Volume* to be aspirated is limited by the remaining volume of the syringe (*2 ml*) - if there is something already aspirated in the syringe, the upper limit will be lower.

Disp. 1(2): Dispense

Dispenses the defined *Volume* of the solvent from the syringe using the defined *Dispense Flow* speed. The port to which the dispense action is performed is defined in the *Dispense to* field. Maximum *Volume* to be dispensed is limited by the volume of the liquid loaded into the syringe.

Disp. 1(2): Pump

Performs both the *Aspirate* and *Dispense* action (see above) performed in one step, with the same options available. Maximum *Volume* to be pumped this way is *999.999 ml*, which when over *2.000 ml* will be carried out as multiple aspirations and dispensions.

Aux 1..2

Switches the given Auxiliary output to defined state (*HIGH* or *LOW*). You can define the time delay to do so using the *Start Time* checkbox and field, and/or set the auxiliary signal level switch as a pulse with defined length using the *Pulse Time* checkbox and field.

End Time

Defines time delay (in minutes) after the command on the same step is performed before the program of the **Spark HPD** continues to the next step of it's program.

Note: Some operations, such as *Aspirate* or *Dispense*, are defined as "Actions". For the purpose of the *End Time* command the beginning of the time interval set is calculated from the end of the operation being performed. Other operations, such as *Pump*, are defined as "Events". The *End Time* interval command in such case starts at the exact time such operation begins. **Clarity** adds artificial *End Time* interval to such commands so that the synchronization between the devices works correctly.

Time Stamp 1..2

Invokes the specified time stamp for the **Spark HPD** at defined time of the given step.

Inject Marker

Serves for starting **Clarity** analysis. The only parameter is the step on which the *Inject Marker* should be triggered. The setting on the *Method Setup - Measurement* tab should be switched from *Down* to *Up*.

4.1.4 Method Setup - Aux. Devices - HPD - System

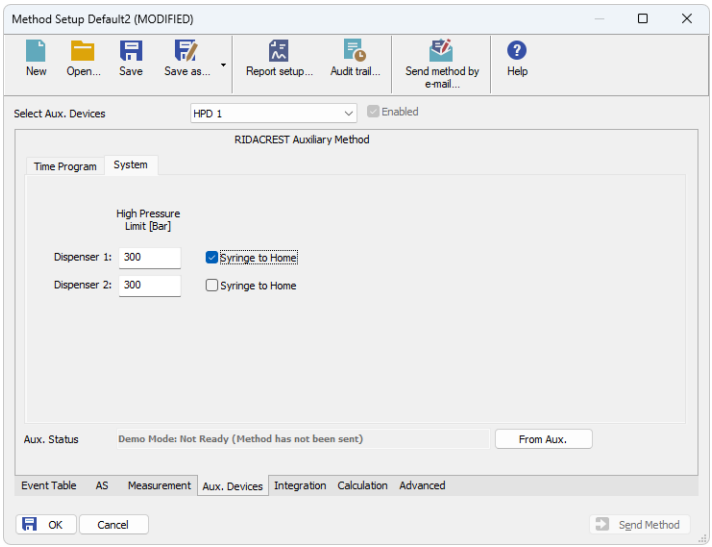

Fig. 9: Method Setup - Aux. Devices - System dialog for HPD

High Pressure Limit [Bar]

Sets the upper pressure limit for the **Spark HPD** dispensed. In case the device has two dispensers, each can have separate settings for the pressure limit.

Syringe to Home

When checked, this option forces the syringe to be pushed to the upper position before the run is started.

4.2 Method Setup - AS

The *Method Setup - AS* tab consists of six sub-tabs assigned for the various parts of the **Spark Alias** autosampler method, from which only the User Program tab is usable for the synchronization with the **Spark ACE** and **Spark HPD** devices in the **R-Biopharm RIDACREST** system. Additional buttons allow to display the Hardware Configuration dialog of the **Spark Alias** autosampler or to read the instrument method from the **Spark Alias** autosampler. The method is sent to the autosampler every time the *Send Method* or *OK* button is pressed. Other actions in different windows may also cause the sending of the instrument method to the controlled devices including the **Spark Alias** autosampler - most notable cases being pressing the *Send Method* button in the *Single Run* dialog or starting a new injection from the *Sequence* window (each injection is preceded with sending the instrument method).

To read the **Spark Alias** method from the autosampler it is necessary to use the *From AS* button available from all sub-tabs of the *Method Setup - AS* dialog. If the injection method is already established in the sampler, it is advisable to download it to **Clarity** using the *From AS* button and save it as a **Clarity** method.

4.2.1 User Program

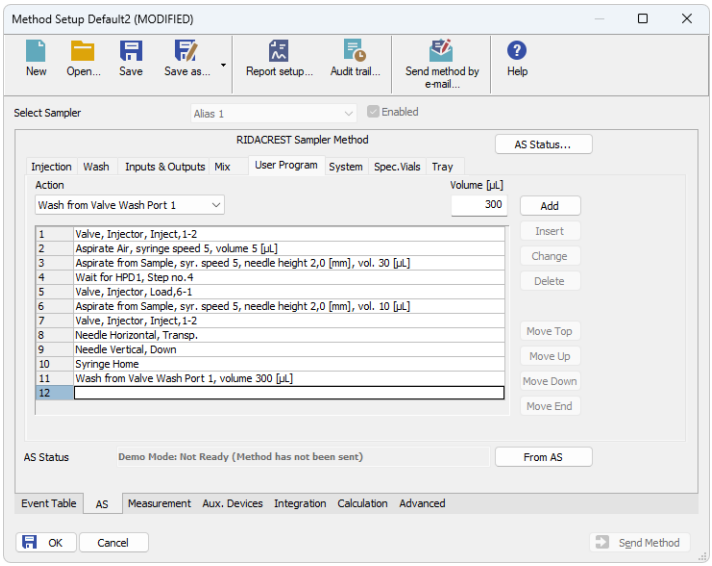

Fig. 10: Method Setup - AS - User Program

The table on the *Method Setup - AS - User Program* tab enables to set all parts of the **Spark Alias** sampler (as part of the **R-Biopharm RIDACREST** system) method in one place, which means that no parameters on *Injection*, *Wash*, *Inputs & Outputs* and *Mix* tabs will be necessary. *User Program* tab thus substitutes all tabs mentioned above and checking the *Use User Program* checkbox on *Method Setup - AS - Injection* tab will disable all other checkboxes there. Several operations are possible with vials defined on the Method Setup - AS - Spec. Vials tab. The table fields are context-based, that is their content change according to the action defined in the first column on the actual row.

Note: As of **Clarity** version 5.0.3, the synchronization of **Spark Alias** autosampler as a part of the **R-Biopharm RIDACREST** system can only be performed using the **Spark Alias** User Program.

Note: When any special vials (Reagent, Destination, Transport) should be used in the User Program method, check that there are these vials defined on the Method Setup - AS - Spec. Vials tab. If they are not defined, the default values will be used, which may invalidate given sample or other sample's analysis data.

A new row is added (or actual row is modified) using the *Action* drop-down list. When an action is selected, other parameters of the action emerge and can be modified. Using the *Add* or *Insert* button the action can be added as a new row into the table, either to the end of the list (*Add* button) or above the selected row (*Insert* button). The

existing row can be changed by selecting it, changing the necessary parameters and pressing the *Change* button. A row can be deleted using the *Delete* button.

When the row is selected, it can be moved up and down through the list by using the *Move Top*, *Move Up*, *Move Down* and *Move End* buttons.

Note: Up to 239 lines can be programmed in the **User Program Table**.

The items that can be selected for the particular row in a **User Program Table** are following:

Wait for ACE/Wait for HPD

Actual command used for synchronization with other parts of the **R-Biopharm RIDACREST** system. Set the device to wait to and the step number of the device's program to wait to. The performing of the **Spark Alias** user program is paused until the selected device reaches the beginning of the defined step.

Wait

Causes the sampler to wait for the specified time interval. The desired interval is entered into the *Time [min.]* field in minutes.

Repeat

Repeats the last one or more rows for the specified number of times. The *Times* field is used to set the number of repeats, the *Steps* field sets the number of **User Program Table** rows to be repeated.

Aspirate

Draws air or solution from sample, destination, specified reagent vial or defined Wash port. For selected aspiration sources, the speed of the aspiration move can be changed in the *Syringe Speed* field, while the height of the needle tip above the vial bottom is governed by the value entered into the *Needle Height [mm]* field. The volume being aspirated is defined by the *Volume [µl]* field, which can be done either absolutely or relatively (in % of the injection volume as set in the **Sequence Table**) by checking the *By Sequence* checkbox.

Dispense

Empties a given volume from the syringe into the specified vial or waste port. The height of the needle tip above the bottom of the vial tray and the speed of emptying is set in the *Needle Height* and *Syringe Speed* fields, respectively. The meaning of these fields is the same as in the *Aspirate* command, dispensing into the Waste port doesn't need to specify the *Needle Height* and *Syringe Speed* parameters. The volume being dispensed is defined by the *Volume [µl]* field, which can be done either absolutely or relatively (in % of the injection volume as set in the **Sequence Table**) by checking the *By Sequence* checkbox.

Wash

Performs the standard wash operation from the specified port - **Wash Port 1**, **Wash Port 2**, **Syringe Valve Needle Port** or **Syringe Valve Waste Port**. Specify the volume of the wash solvent in the *Volume [µl]* field.

Note: Program a *Dispense to Waste* action prior to washing to prevent the cross-contamination from the buffer solution.

Needle Vertical

Plunges the needle to the actual position (vial, port) or withdraws it to the home position, according to the value set in the *Position* field. The depth to which the needle will be plunged is 2.0 mm above tray bottom by default and cannot be changed.

Needle Vertical Absolute

Plunges the needle to the depth specified in the *Position [mm]* field. The value of 0.00 mm is meaning the Home position (syringe is raised), the lowest position to which the needle can be plunged is 50.00 mm. Smallest step is 0.17 mm from the current position.

Needle Horizontal

Moves the needle over the position defined in the *Position* field. Available positions are *Home* (Waste) port, *Wash* port and *Transport* liquid port (if available).

Needle Horizontal Absolute

Moves the needle over the position defined in the *Position [mm]* field. The value of 0.00 mm is meaning the Home position (Waste port), the furthest position to which the needle can be moved is 180.00 mm. Smallest step is 0.05 mm from the current position.

Syringe Valve

Switches the syringe valve to one of its positions: *Needle*, *Waste*, wash *Port 1* or wash *Port 2*.

Syringe Load

Forces the syringe to load the given *Volume [µl]* using the set *Syringe Speed*.

Syringe Unload

Forces the syringe to unload the given *Volume [µl]* using the set *Syringe Speed*.

Syringe Home

Forces the syringe to perform the home operation (the syringe will dispense itself into the last programmed position and will re-initialize).

Tray

Moves the tray to the position defined in the *Position* field.

Tray Absolute

Moves the tray to front or back, as defined in the *Position [mm]* field. The movement is defined by the distance from the home position (0.00 mm), where only moves differentiating by at least 0.05 mm from the current position will be performed.

Valve

Switches the injector valve or optional ISS-A valve to the desired position. The desired valve is set in the *Select* field, while the position is specified in the *Position* column. To be able to program ISS-A valve it is necessary to have it installed.

Compressor

Switches the compressor to put the air pressure on the sample *On* or *Off*, according to the *State* field. The compressor stays switched on until it is switched off (in some later step).

Wait for Input

Allows to set the input whose signal will temporarily override the Freeze function. In **User Program**, this is necessary to start the measurement in the *Sequence Mode* synchronized via the Freeze wiring. The input from which the signal is awaited is defined in the *Select* field, while the desired state unblocking the Freeze condition is defined in the *State* field. Only available when the *Use Input 1 as* or *Use Input 2 as* field on the *Method Setup - AS - Inputs & Outputs* is set to the *Freeze input*.

Auxiliary 1

Switches the state of the auxiliary output *On* or *Off*, according to the *State* field. Only available when the *Use Relay Output as* field on the *Method Setup - AS - Inputs & Outputs* is set to the *Auxiliary*.

Output 1

Switches the output of the **Spark Alias** autosampler *On* or *Off*, depending on the value set in the *State* field.

SSV

Defines the optional SSV valve position in the range *1-6* specified in the *Position* field. To be able to program SSV valve it is necessary to have it installed.

Marker

Sets the marker type in the *Select* field. The options are *Inject Marker* and *Inj. Marker Status* - the difference is that the *Inj. Marker Status* works without the *Use Relay Output as* field on the *Method Setup - AS - Inputs & Outputs* tab set to the *Inject Marker* state, thus allowing the use of *Auxiliary* program. The real state of the relay is not changed this way.

Caution: When setting the **User Program**, *Marker* has to be used to signal the injection. This operation is performed automatically in the Injection program, but has to be performed manually in the **User Program** as the user has full control of the injection valve settings. Also the setting on the *Method Setup - Measurement* tab should be switched from *Down* to *Up*.

Add - old version

Performs the sequence of steps involving aspiration from the vial (or port) defined in the *From* field and dispension into the vial defined in the *To* field. The volume that should be transported this way is defined in the *Volume [µl]* field.

Mix - old version

Mixes the liquid in the Destination vial by aspiring and dispensing the volume defined in the *Volume [µl]* field. The number of aspirations and dispensions is defined in the *Times* field.

Wait - old version

Causes the sampler to wait for the specified time interval. The desired interval is entered into the *Time [min.]* field in minutes.

Note: The "old version" items are available due to the compatibility with the methods created before the firmware upgrade - formerly the **Spark Alias** autosampler was only able to process the "old version" actions.

4.2.2 Spec. Vials

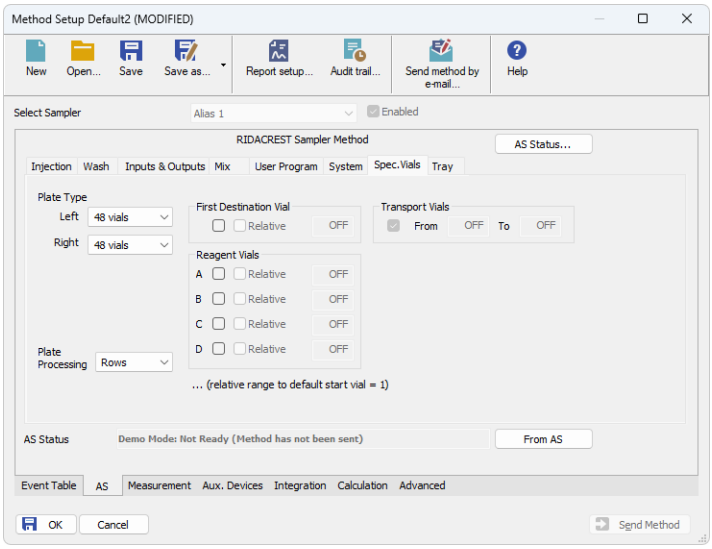

Fig. 11: Method Setup - AS - Spec. Vials

Governs the types of trays (or well-plates) used and allocation of special purpose vials (destination, transport and reagent vials) to particular vial well positions.

Plate Type

Defines the plate type inserted into the *Left* and *Right* tray position. The plate types may differ between positions, but if the *84+3* tray is used, it fills both positions. The visualization of the trays is displayed on the Method Setup - AS - Tray tab.

Plate Processing

Defines the numbering of vials (or wells) in the selected trays. The vials will be either counted in *Rows* or in *Columns*. For the 84+3 tray type only the *Rows* option is available. Actual numbers of particular vials (wells) are displayed on the Method Setup - AS - Tray tab.

First Destination Vial

Defines the position of destination vial(s) used in the *Mix* method and *User Program*. The most common usage of the destination vials is with the *Relative* checkbox checked, as it gives each vial in the sequence it's own destination vial.

Note: When using destination vials and mix method in general, do not use more than one injection per vial.

Reagent Vials

Defines the position of Reagent vial(s) used in the *Mix* method and *User Program*. Up to four different Reagent vials are available, each of them can have a fixed position or *Relative* position given to the sample vial. If the *84+3* tray is used, only two reagent

vials can be programmed and they can only be mapped to the large volume vials (85-87).

Transport Vials

Defines the position of vials containing the transport liquid (used with *µl Pick up* injection mode and together with the *84+3* plate type). The algorithm defining from which vial will the transport liquid be actually aspired is stored in the **Spark Alias** sampler. If the transport vials are used, they must form an uninterrupted row beginning in the well number defined in the first field and ending by the vial defined in the second field.

4.2.3 Tray

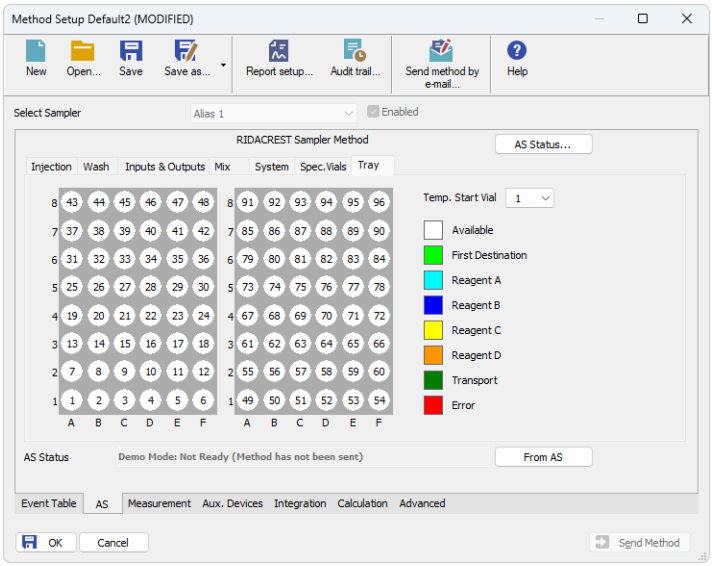

Fig. 12: Method Setup - AS - Tray

Displays the visualization of the **Spark Alias** autosampler tray(s), along with the mapping of the vials as performed on the Method Setup - AS - Spec. Vials tab.

Temp. Start Vial

Allows to set the temporary position of the first sample vial that will be used in the measurement to assess the positions of other special vials. The position of this temporary starting vial will be reset whenever the ***Method Setup*** dialog is closed.

4.3 Hardware Configuration

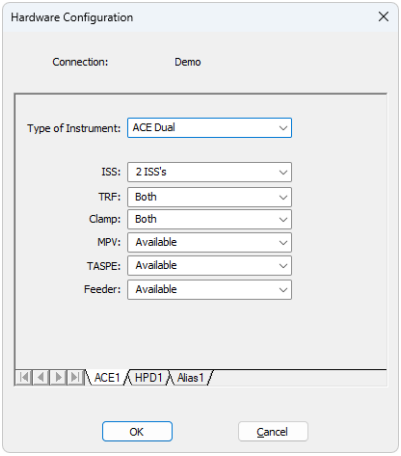

Fig. 13: Hardware Configuration

The *Aux Status* button in the Device Monitor displays the *Hardware Configuration* dialog. In the full version, this dialog displays automatically detected communication parameters and the presence of optional parts of the **R-Biopharm RIDACREST** system.

In the demo version the presence of the particular options can be set to demonstrate the possibilities of the system with selected configuration.

4.4 RIDACREST Setup

RIDACREST Setup dialog (accessible through the ***System Configuration*** dialog) allows to manually set the parameters needed for the communication with the **R-Biopharm RIDACREST** system, to see its autodetected status and firmware versions and to set further options.

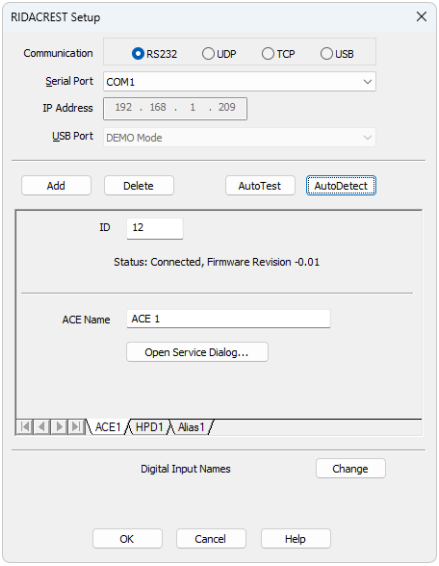

Fig. 14: RIDACREST Setup

Communication

Sets the type of the communication for the **R-Biopharm RIDACREST** autosampler. The possible options are *RS232*, *LAN* or *USB*. The particular devices in the same **R-Biopharm RIDACREST** system have to be daisy-chained, which may not be possible on different modes of communication then *RS232* as the communication boards may then miss the connector for connection to the other devices.

Serial Port

In case of serial (RS232) communication sets the COM Port used for the communication between the **R-Biopharm RIDACREST** system and **Clarity**.

IP Address

In case of LAN communication sets the IP address of the **R-Biopharm RIDACREST** system connected to the computer via network.

USB Port

In case of the USB communication sets the particular USB port used to communicate with the **R-Biopharm RIDACREST** system.

Add

Invokes a new *Add New Module* dialog to select the device to manually add into the system.

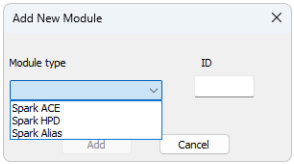

Fig. 15: Add New Module dialog

In case the device is added manually, it is necessary to ensure that the *ID* of the device is the same as set on the back panel of the device using the small dial before the *Add* button is pressed.

Delete

Invokes the *Remove Module* dialog to select the device which should be removed from the **R-Biopharm RIDACREST** system.

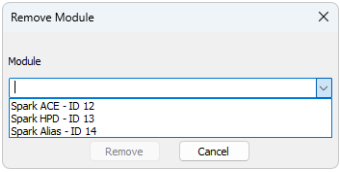

Fig. 16: Remove Module dialog

AutoTest

Tests the connection to the devices currently added using the set *ID*s from their particular tabs. If the communication attempt is successful, the *Connected* statement along with firmware version is displayed in the *Status* row of the device.

AutoDetect

Performs the autodetection using the communication port selected. Browses through all available *ID*s and checks whether the device is present on that *ID* or not.

Note: The *AutoDetect* action may take up to a minute depending on the communication speed. If you are sure the device is connected and switched on and still it is not autodetected on a first try, use the *AutoDetect* button for the second time.

Digital Input Names

This feature is not implemented yet in the **Clarity** version 5.0.2, but will be added later.

Digital Output Names

This feature is not implemented yet in the **Clarity** version 5.0.2, but will be added later.

Spark ACE

ID

Displays the device identifier of the **Spark ACE** device.

ACE Name

Allows to set the custom name of the **Spark ACE** device, which will be then displayed in the *Device Monitor* window, in the reports and on other places in **Clarity**.

Open Service Dialog...

Opens *ACE Service dialog* where *Check Cartridge Usage before Sequence Start* option can be checked/unchecked.

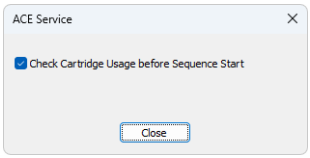

Fig. 17: ACE service

Note: Access to *ACE Service dialog* is protected by password. Thus, it is not accessible for common users.

Check Cartridge Usage before Sequence Start

While checked, performs the readout of the cartridge usage during the sequence check. For some special cartridge types, if any cartridge in the sequence would be used more than 15 times (it's readout of the usage would be *Max* for at least one analysis), the check of the sequence will fail, preventing running of the sequence. For standard cartridges, the cartridge usage will just be marked in the sample's audit trail.

Spark HPD

ID

Displays the device identifier of the **Spark HPD** device.

HPD Name

Allows to set the custom name of the **Spark HPD** device, which will be then displayed in the *Device Monitor* window, in the reports and on other places in **Clarity**.

Dispense to Port 4

Allows to use the port 4 as a port to which the **Spark HPD** will dispense during the *Pump* and *Dispense* actions.

Spark Alias

ID

Displays the device identifier of the **Spark Alias** device.

Alias Name

Allows to set the custom name of the **Spark Alias** device, which will be then displayed in the *Device Monitor* window, in the reports and on other places in **Clarity**.

Check Door

Sets whether the check for the opened autosampler cover door will be performed or not for the autosampler to operate. If possible, it is recommended to leave this option checked to avoid injury from the fast-moving **Spark Alias** compartments.

Enable Alphanumeric Vial Names

Sets whether the vial positions on the **Spark Alias** vial tray or well plate will be referenced from the **Clarity** *Sequence* window using the alphanumeric positioning (rows and columns, one using alphabet, second using numbers) or strictly using the numbers.

4.5 Device Monitor

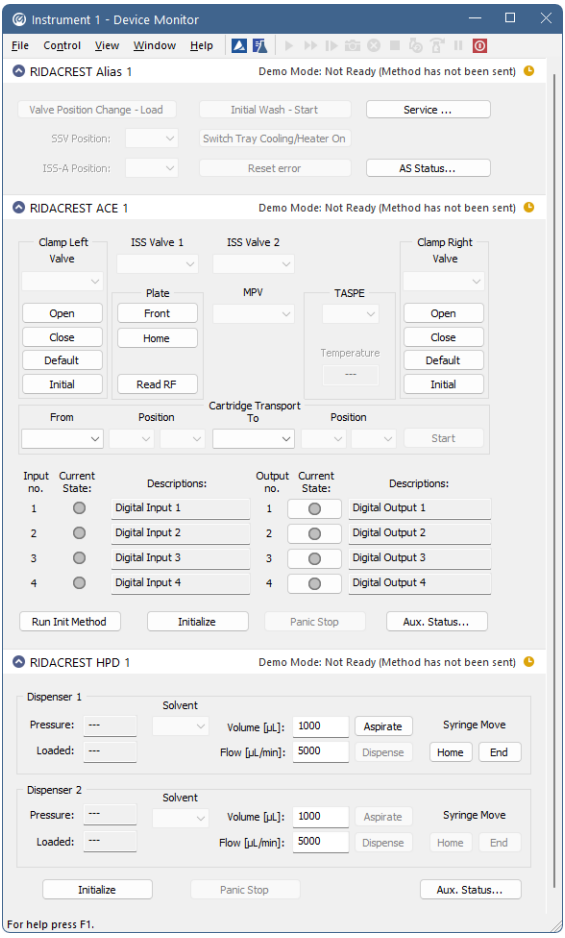

Fig. 18: R-Biopharm RIDACREST Device Monitor

The Device Monitor window for the **R-Biopharm RIDACREST** system enables to monitor the actual state of the particular parts of the **R-Biopharm RIDACREST** system and directly control selected actions. The status of each part of the system is indicated in the top right corner of the particular monitor pane.

Spark Alias device monitor

Valve Position change - Load/Inject

Changes the position of the valve from *LOAD* to *INJECT* position or the other way around. This only works when the autosampler is not working.

SSV Position
This drop-down menu shows and allows to switch the status of the optional SSV valve, if it is installed in the **Spark Alias** autosampler. This only works when the autosampler is not working.

Initial Wash - Start
When invoked, performs the Initial Wash operation to rinse all tubing.

Switch Tray Cooling/Heater On/Off
Switches the tray cooling and/or heater on or off. Sending a method will reset the cooler/heater to the state defined in the method.

Reset Error
When invoked, resets the Error state that occurred on the sampler.

Service
Displays the Service dialog for controlling the **Spark Alias** using other service commands.

AS Status
Opens the Hardware Configuration dialog described in the chapter **"Hardware Configuration "** on pg. **24**.

Spark ACE device monitor

Clamp Left/Right
This section (one for each clamp installed on **Spark ACE**) can be used outside of the analysis for direct actions with that particular clamp. The user can switch the clamp *Valve*, *Open* or *Close* the clamp or set it to *Default* or *Initial* position.

ISS Valve 1/2
Allows to switch the solvent selection valve installed.

Plate
This section allows to manually move the cartridge plates to the *Front* or *Home* position or to read the actual usage of particular cartridges using the *Read RF* button, which opens the Plates Info dialog.

Cartridge Transport
This section allows for manual moves of the cartridges from clamps or set positions in the plates to clamps or other positions of the plates. After filling the starting and final position, press the *Start* button to perform the transfer.

Run Init Method
Performs an initialization method - the method which the **Spark ACE** performs after it is switched on. The method takes several seconds to complete.

Initialize
Performs an initialization action, which may be used to recover the **Spark ACE** from an error.

Panic Stop
Immediately ends any operation **Spark ACE** device is currently doing and resets it.

Aux. Status

Opens the Hardware Configuration dialog described in the chapter **"Hardware Configuration "** on pg. **24**.

Spark HPD device monitor

Dispenser 1/2

This section (one for each dispenser installed on **Spark HPD**) can be used outside of the analysis for direct actions with that particular dispenser. Allows to monitor the actual pressure in the given dispenser and the amount of liquid loaded in the syringe, flush the dispenser using the solvent set in the *Solvent* field, set *Volume* and *Flow*, as well as to move the syringe to the *Home* or *End* position.

Initialize

Performs an initialization action, which may be used to recover the **Spark HPD** from an error.

Panic Stop

Immediately ends any operation **Spark HPD** device is currently doing and resets it.

Aux. Status

Opens the Hardware Configuration dialog described in the chapter **"Hardware Configuration "** on pg. **24**.

4.5.1 Service

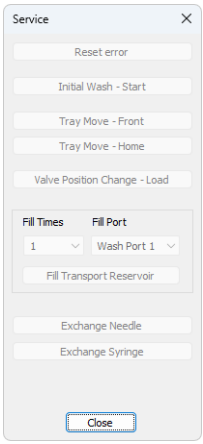

Fig. 19: Service dialog of the Spark Alias

This dialog is designed for controlling the **Spark Alias** using service commands.

Reset Error
When invoked, resets the Error state that occurred on the sampler.

Initial Wash - Start
When invoked, performs the Initial Wash operation to rinse all tubing.

Tray Move Front
Moves the tray from the home position (further from the door) to the front.

Tray Move Home
Moves the tray from the front position (near the door) back to the home position.

Valve Position change - Load/Inject
Changes the position of the valve from Load to Inject position or the other way around

Fill Transport Reservoir
By setting the required *Fill Times* and *Fill Port* it is possible to fill up the transport reservoir.

Exchange Needle
Allows to exchange the sampling needle. Follow the instructions on screen to perform the exchange.

Exchange Syringe
Allows to exchange the syringe. Follow the instructions on screen to perform the exchange.

4.5.2 Plates Info

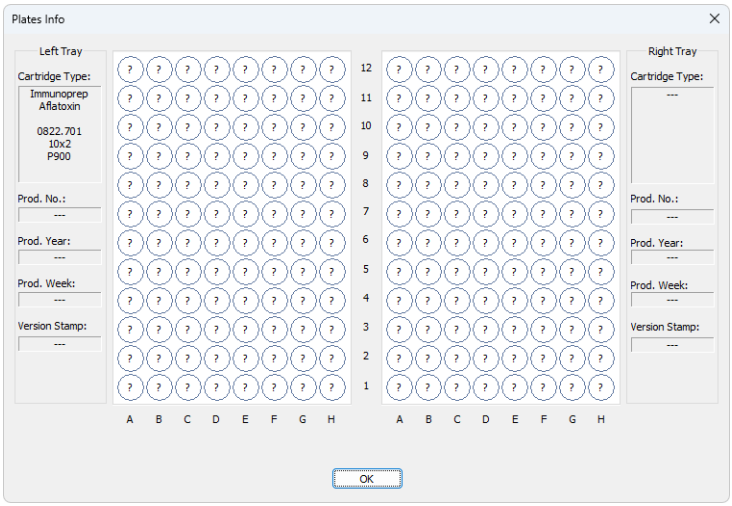

Fig. 20: Plates Info dialog

This dialog, when invoked using the *Read RF* button of the **Spark ACE** device monitor, is designed for checking the usage of particular cartridges of the **Spark ACE** part of the **R-Biopharm RIDACREST** system. It can be also invoked by clicking on the small arrow icon in the *Left Clamp*/*Right Clamp* column of the Sequence window, in which case it is used for an interactive selection of the cartridge to be used on the particular **Sequence Table** row. The dialog displays the information on *Cartridge Type*, tray information and the usage of the cartridges. *max* inscription means the cartridge was already used maximum number of times as is recommended, which is usually *15* or more times. The actual cartridge that was used for the measurement can be found out by checking the measured chromatogram in the Chromatogram window on the *Measurement Conditions - GLP Info* tab.

When invoked from the Sequence window, the actual readout of the cartridge usage is performed by using the *Read RF* button. The cartridge positions become interactive, the actual position clicked on is indicated in the status field. By pressing the *OK* button, the alphanumerical position of selected cartridge is transferred into the **Sequence Table** cell.

4.6 Sequence

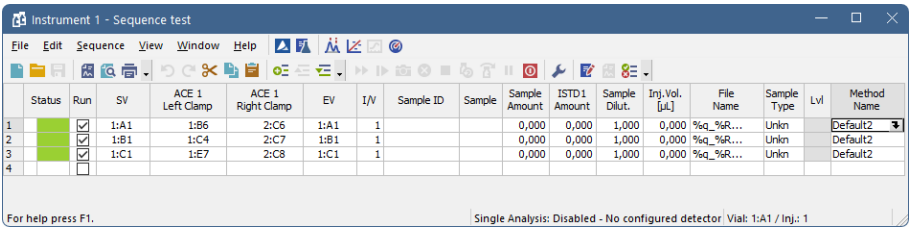

Fig. 21: Sequence

The *Sequence* window, when used together with the **R-Biopharm RIDACREST** system which contains the **Spark ACE** module, contains two additional columns - *Left Clamp* and *Right Clamp* columns. These are used for selecting the cartridge to be used on the given **Sequence Table** row for *Cart. Exchange Left* and *Cart. Exchange Right* commands, respectively, as set on the Method Setup - Aux. Devices - Time Program tab for **Spark ACE**.

In case the usage of the number of the cartridge used for given analysis is necessary, it is possible to use the cartridge number of a cartridge used in the *ACE Right Clamp* to *Sample ID*, *Sample* or *File Name* columns using the *%f* variable in the file name. Using *%f* variable expands to the cartridge identification after the analysis is finished in the format "Tray_Cartridge", for example "Left_H1".

5 Report Setup

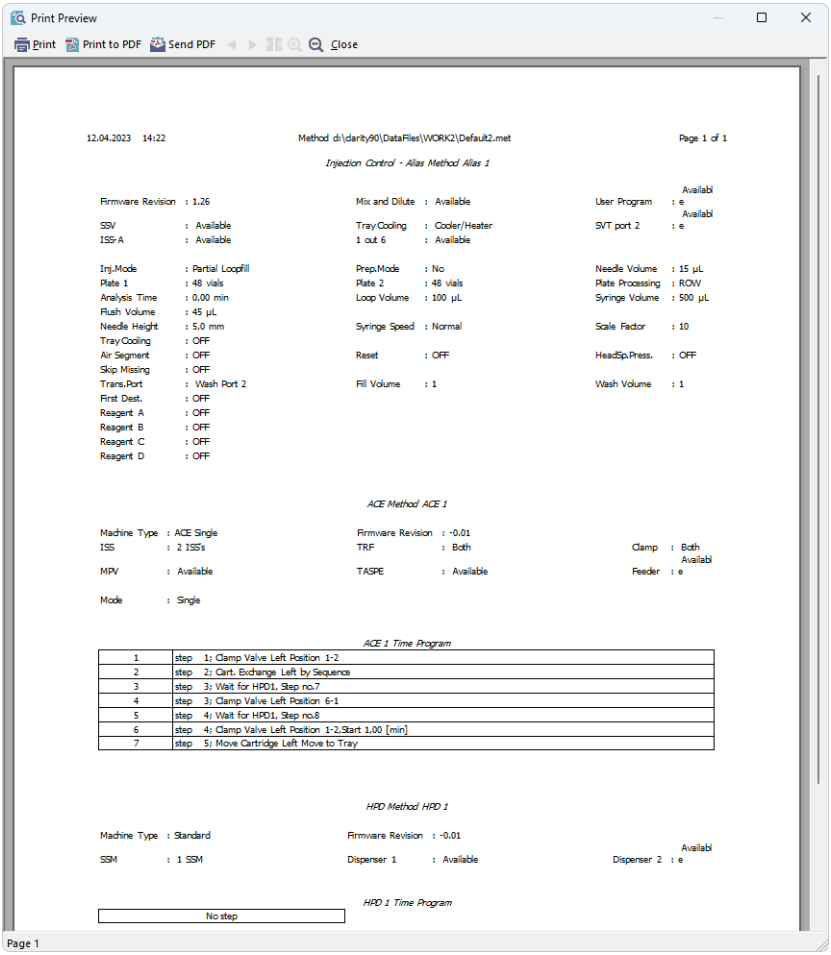

Fig. 22: R-Biopharm RIDACREST report preview

All settings in the method for **R-Biopharm RIDACREST** system, as well as the information on the system itself autodetected from the devices and the information set in the R-Biopharm RIDACREST Setup dialog, are reported as a part of the data displayed by the use of *Instrument Control* checkbox of the ***Report Setup - Method*** dialog.

6 Troubleshooting

When the remedy for some problem cannot be discovered easily, the recording of communication between **Clarity** and the controlled device can significantly help the **DataApex** support to discover the cause of the problem.

The recording can be enabled by adding or amending the COMMDRV.INI file in the **Clarity** installation directory (C:\CLARITY\CFG by default). The file can be edited in any text editor (e.g. Notepad). Following section should be edited or added:

```
[COM1]
echo=on
textmode=on
filename=RIDACREST_%D.txt
reset=off
```

Note: Instead of COM1 type the correct port used to communicate with the **R-Biopharm RIDACREST** system. This information is displayed when the *Aux. Status* button in the Device Monitor window is invoked or in the RIDACREST Setup dialog.

Note: *%D* (or *%d*) in the filename parameter means that the log will be created separately for each day. The *reset=off* parameter disables deleting the content of the log each time the station is started during the same day.

The created *.TXT files will greatly help in diagnosis of unrecognized errors and problems in communication. Note that the file size may be quite significant, so in case the error occurs on a regular basis, it might be better to set the Reset=on, start **Clarity**, invoke the error, close **Clarity** and send the diagnostics file (the file will be once more reset during the next start of **Clarity**).