Data**Apex**

Clarity™

CHROMATOGRAPHY SOFTWARE

SPARK MARATHON

Clarity Control Module   ENG

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Contents

To facilitate the orientation in the **Spark Marathon** 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 Spark Holland Marathon control module

This manual describes the setting of the **Marathon Basic, Marathon Basic Plus,** and **Marathon XT** autosamplers produced by the **Spark Holland** company. The control module enables direct control of the instrument over serial line.

Fig. 1: Spark Holland Marathon

Direct control means that the autosampler can be completely controlled from the **Clarity** environment. 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 autosampler for its operating principles and restrictions.

2 Requirements

- **Clarity** Installation with AS Control module (p/n A26).
- Free serial COM port in the PC

Note: Modern computers usually have only 1 (if any) serial (COM) port installed. To use more devices requiring the port, the **MultiCOM** adapter (p/n MC01) is available.

- Serial cross DB9F-DB25M cable (p/n SK03).

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

3 Installation Procedure

3.1 Hardware - wiring

Commands for the autosampler are communicated with **Clarity** through the Serial cross DB9F-DB25M (p/n SK03) cable.

Note: Typical connections of a set with Autosampler can be found in the **Getting Started** manual (chapter **Device Setup and Wiring**).

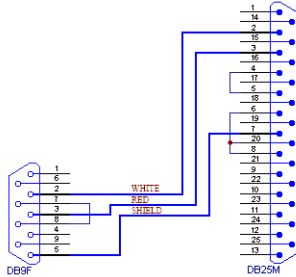Typical serial cables used are shown in the picture:

Fig. 2: Serial cross DB9F - DB25M cable

3.2 Spark Marathon setup - Communication

The **Spark Marathon** autosampler has to be set in the *SERIAL MODE* in order to function correctly with its **Clarity Control module**. In addition, the *ID* of the **Spark Marathon** autosampler must be the same that will be later set in **Clarity**. To set the autosampler to the *SERIAL MODE* and find out or change the autosampler *ID*, perform the following steps:

- Press the F key on the **Spark Marathon** autosampler keyboard, and then the 4 key to enter the *SERIAL MODE*.
- Press the Prog/End button to set the device identifier ID.

3.2.1 Connections

- For the start synchronization with LC the *Start* output must be connected with **Clarity Starting cable IN**.
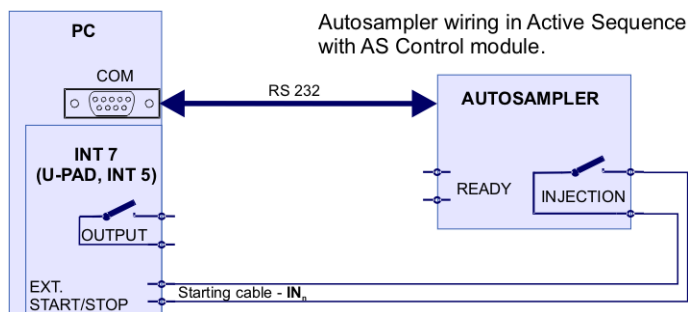

Fig. 3: Wiring of an autosampler with AS Control module

- Do not connect the digital output cable **OUTnR**.
- The starting cable **INn** must be connected.

. . . .
Note: **Clarity** standard cable (along with further details on wiring) is described in the **Clarity Getting Started** manual.

- The **Spark Marathon** autosampler accessories include the **Start marker** cable (15 pin Sub D connector to 2 free leads). Connect the leads on this cable to leads on the **Clarity Starting cable INx** cable extension.
- Consult the user manual for **Spark Marathon** autosamplers for details about wiring and connectors on the device.
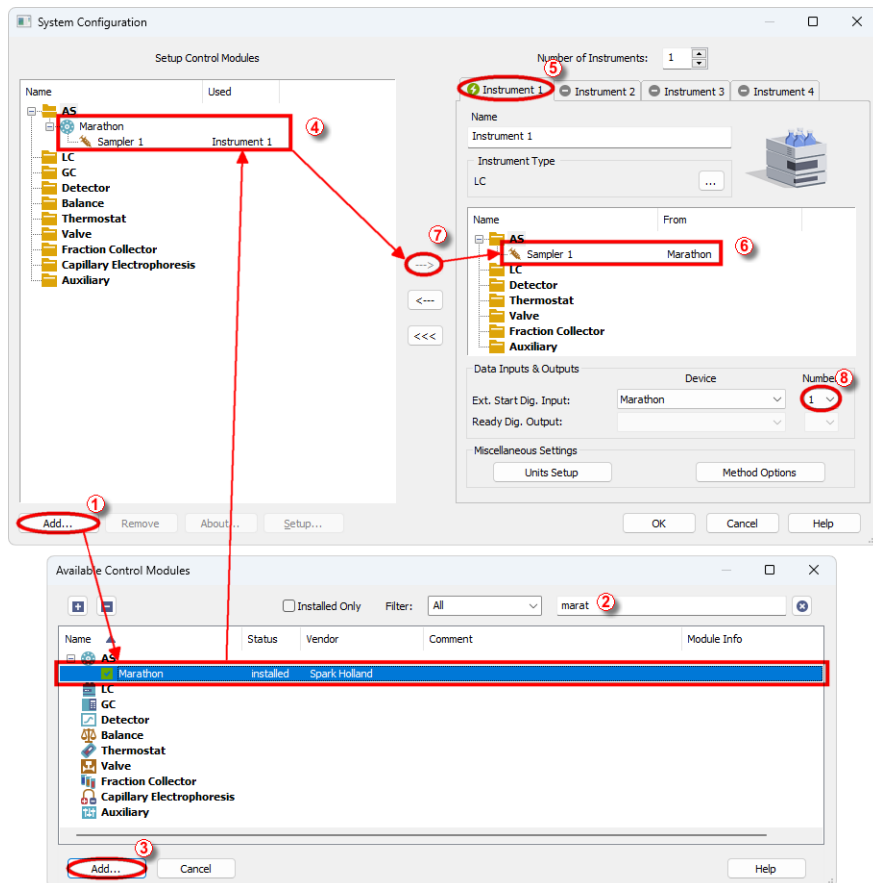
3.3 Clarity Configuration

Fig. 4: 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 **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 **Marathon** sampler and press the *Add* ③ button.

The Spark Marathon Setup dialog will appear.

Fig. 5: Spark Marathon Setup

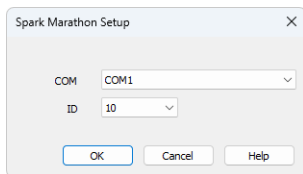- Fill in the *COM* and *ID* fields and press the *OK* button. The *ID* must match the device identifier set previously in the autosampler setup, as described in the chapter **"Spark Marathon setup - Communication"** on pg. **4**.

Note: The Spark Marathon Setup dialog is more closely described in the chapter **"Spark Marathon Setup"** on pg. **11**.

The **Marathon** autosampler item will appear in the *Setup Control Modules* list of the *System Configuration* dialog.

- Drag and drop the **Marathon** 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** with the autosampler, you can set the **Marathon** in the *Ext. Start Dig. Input* drop-down menu.

4 Using the control module

New *Method Setup - AS* tab appears in the *Method Setup* dialog, enabling the setting of the **Spark Marathon** autosampler control method.
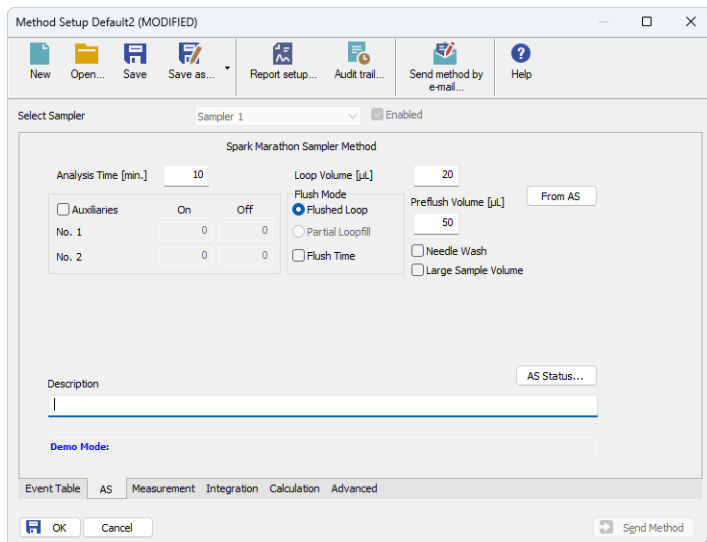
4.1 Method Setup - AS

Fig. 6: Method Setup - AS

The *Method Setup - AS* tab defines the properties of the **Spark Marathon** autosampler instrument method. The fields available in the dialog may vary according to the autosampler model connected and installed options.

Analysis Time [min.]
Sets the time after which the autosampler will start to inject next sample.

Note: As each injection is sent from **Clarity Sequence Table** by separate command, the *Analysis Time* field is not used and injections are controlled by **Clarity** when the sampler is operated by **Clarity**. The field is nonetheless active to provide compatibility with eventual manual control of the AS.

Loop Volume [μl]
Defines the value of the loop volume used for the injection (in μl). If the installed loop volume is different, the injection reproducibility may be impaired. Possible values range between *0* and *999* μl.

Auxiliaries
Sets the operation with two external contacts of the **Spark Marathon** autosampler. Each auxiliary external contact has its own row, on which can be once switched on and once switched off based on the time set in minutes. Available values for the

time in these fields are *0 - 99* min. For the pin organization on the **Spark Marathon** autosampler connector please see the **Spark Marathon** user manual.

Flush Mode
Allows to set the injection mode by selecting one of the possibilities. Note that the available options differ according to the sub-type of the autosampler. The options are:

> *fFlushed Loop* - in this mode, the full sample loop will be transferred to the column.
>
> *Partial Loopfill* - in this mode, only a part of the sample loop with the volume defined on the particular row of the **Sequence Table** will be transferred into the column.

> #### Flush Time
> When this field is checked, the loop is filled based on time by the overpressure instead by the dispenser pump. The injection volume in sequence then corresponds to time in seconds for partiall loopfill.

Preflush Volume [µl]
Defines the volume of the sample used to wash the needle and tubes before the injection valve is set to the load position. Possible values range between *50* and *999* µl in the *Partial Loopfill* mode and between *30* and *999* µl in the *Flushed Loop* mode.

Needle Wash
Defines whether the needle wash will be performed. The wash is performed after each injection, the flushing solvent will be taken from one of the wash vials (vials number 93 - 96). The option is disabled when the *Large Sample Volume* option is used.

Note: Fill all four vials and place them to the appropriate positions as the wash is taken alternately from them.

Large Sample Volume
Defines the type of the sample tray used with the Spark Marathon autosampler. When the standard tray (for 96x1,5ml vials is used, this option should be unchecked, as opposed to the usage of the 48x5 ml tray.

Tray Cooling On
When checked, the optional sample tray cooling is switched on. The cooling is set to the temperature of 4 °C.

Oven Temperature [°C]
Allows to enable the oven temperature function and set the temperature for the oven (in the range *0 - 90* °C, the instrument can only control temperatures at least *5 °C* above ambient temperature or more). The **Spark Marathon** autosampler will wait with the injection until the set temperature *± 2 °C* is reached. This option is grayed-out if the **Spark marathon** sampler doesn't have the function built-in.

2 Oven Temperature [°C]

Allows to set the oven temperature that will be used during the defined part of the analysis. Available temperature range is *0 - 90* °C, the time in which this temperature will be used as the desired one is set in the *Time Start* and *Time Stop* fields. Times entered here must be in the range *0 - 99* min.

Description

Allows to enter the custom description of the instrument method. This field is purely informational.

Additional buttons allow to display the Hardware Configuration dialog of the **Spark Marathon** autosampler or to read the instrument method from the **Spark Marathon** 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 Marathon** 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 Marathon** 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.
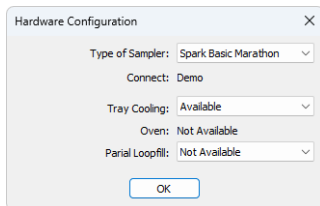
4.2 Hardware Configuration

Fig. 7: Hardware Configuration

The *AS Status* button in the [Method Setup - AS] displays the *Hardware Configuration* dialog. In the full version, this dialog displays autosampler model, automatically detected communication parameters and the presence of *Tray Cooling*, *Oven* and *Partial Loopfill* options installed.

In the demo version the presence of the *Tray Cooling*, *Oven* and *Partial Loopfill* can be set to demonstrate the possibilities of the sampler with selected configuration.

Type of Sampler
Control module will automatically detect the **Spark Marathon** autosampler.

Connect
Shows the communication parameters in the format: [COMX, <baud rate>, <parity>,<data bits>,<stop bits>] or, in the demonstration regimes, [Demo] or [Offline].

Tray Cooling
Shows whether the **Spark Marathon** sampler is equipped with the tray cooling option.

Oven
Shows whether the **Spark Marathon** sampler is equipped with the oven option.

Partial Loopfill
Shows whether the **Spark Marathon** sampler is equipped with the partial loopfill option.

4.3 Spark Marathon Setup

The *Spark Marathon Setup* dialog (accessible through the *System Configuration* dialog) allows to manually set the parameters needed for the communication with the **Spark Marathon** autosampler.
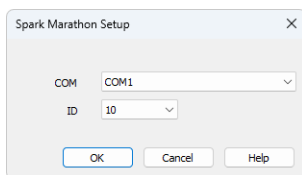

Fig. 8: Spark Marathon Setup

COM
Sets the COM Port used for the communication between the sampler and **Clarity**.

ID
Sets the device identifier of the **Spark Marathon** autosampler. The number listed here must be the same as the one set in the sampler. For more details see the chapter **Spark Marathon setup - Communication** on pg. **4**.

5 Report Setup

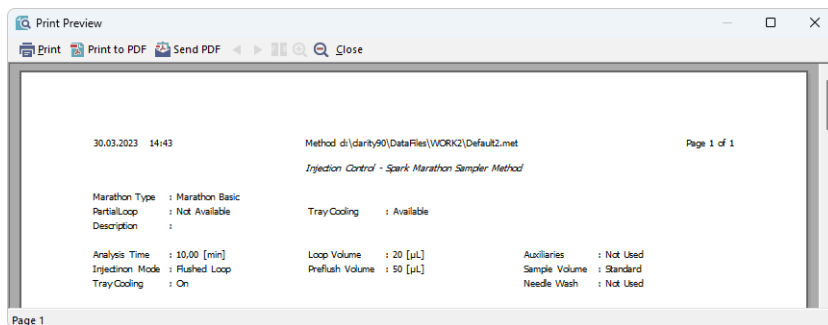*Fig. 9: Spark Marathon report preview*

All autosampler-specific settings (that means the data from all sub-tabs of the Method Setup - AS tab) are reported as a part of the data displayed by the use of *Injection 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 autosampler 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=SparkMarathon_%D.txt
reset=off
```

Note: Instead of COM1 type the correct serial port used to communicate with the **Spark Marathon** autosampler. This port number is displayed when the *AS Status* button in the Method Setup - AS dialog is invoked or in the Spark Marathon 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.

6.1 Specific Problems

▌**An error message "Cannot establish communication with …" appears when opening Clarity Instrument.**

Solution: Check the power cable (**Spark Marathon** sampler must be switched on), communication cable and communication settings (the autosampler must be in Serial mode, i.e. the "Serial mode" inscription must be shown on the Autosampler display). If it is not, switch it on.

▌**An error message "AS Error" appears during the Clarity operation.**

Solution: The communication has been interrupted. Check the communication cable as it is most probably disconnected. This message may also occasionally appear after aborting the *ACTIVE* Sequence.

▌**Injection volume set in the *Sequence* window is not accepted.**

Solution: Either you are using the *Flushed Loop* option and the injection volume doesn't the one of the installed injection loop, or you are trying to enter the volume that is greater than the half of the installed *Loop Volume* in the *Partial Loopfill* injection mode.

▌**The Spark Marathon autosampler does not start with the injection.**

Solution: Check the Freeze input active settings in the I/O configuration of the **Spark Marathon** autosampler. When set to *HIGH*, the injection will not start until the respective input is closed. For more details on how to check the I/O configuration see the **Spark Marathon** manual.