DataApex
Clarity™
CHROMATOGRAPHY SOFTWARE

SHODEX RI-501

Clarity Control Module ENG

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Contents

To facilitate the orientation in the **Shodex RI-501** 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 Shodex RI-501 Control Module

This manual describes the setting of the **Shodex RI-501**, **RI-502** and **RI-504** detector. The control module enables direct control of the instrument over Local Area Network (LAN).

Fig. 1: ***Shodex RI-501*** *detector*

Direct control means that the detector can be completely controlled from the **Clarity** environment. The Instrument method controlling the analysis conditions will be saved in the measured chromatograms.

The control is performed via the **UNI Ruby** control module and the **Shodex RI-501** script.

2 Requirements

- **Clarity** Installation with LC Control (p/n A24) or GC Control module (p/n A23).
- LAN card in the PC.
- LAN cross cable (p/n SK08).

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

3 Installation Procedure

3.1 Shodex RI-501 detector communication

The **Shodex RI-501** is controlled by LAN communication. It uses a standard cross LAN cable (p/n SK08).

No special settings have to be made on the **Shodex RI-501** detector, only the correct IP address of the instrument (set in the PARAMETERS SETTING section, IP ADDRESS item - press ▶ after detector start-up, then ▲ button four times). A default IP address of the **Shodex RI-501** detector is 192.168.1.2 which is suitable only in case the detector is connected directly to computer using separate network.

It is recommended to attach the detector directly to the PC avoiding hubs, switches etc. Contact your local LAN administrator who can make the appropriate settings. In case your network uses firewall for protection, make sure that connection is not blocked.

Caution: **Cross LAN** cable is primarily used for the direct connection of the chromatograph 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 instead.

Caution: The Shodex RI-501 detector cannot be used to start the analysis in Clarity, so in case there is another device not directly controlled that should decide on the analysis start (e.g. an autosampler), another way of getting the start signal into Clarity will be needed (e.g. Colibrick A/D converter (p/n U3x)) or an optional Digital Input Device (p/n DID01) adapter).

3.2 Clarity Configuration

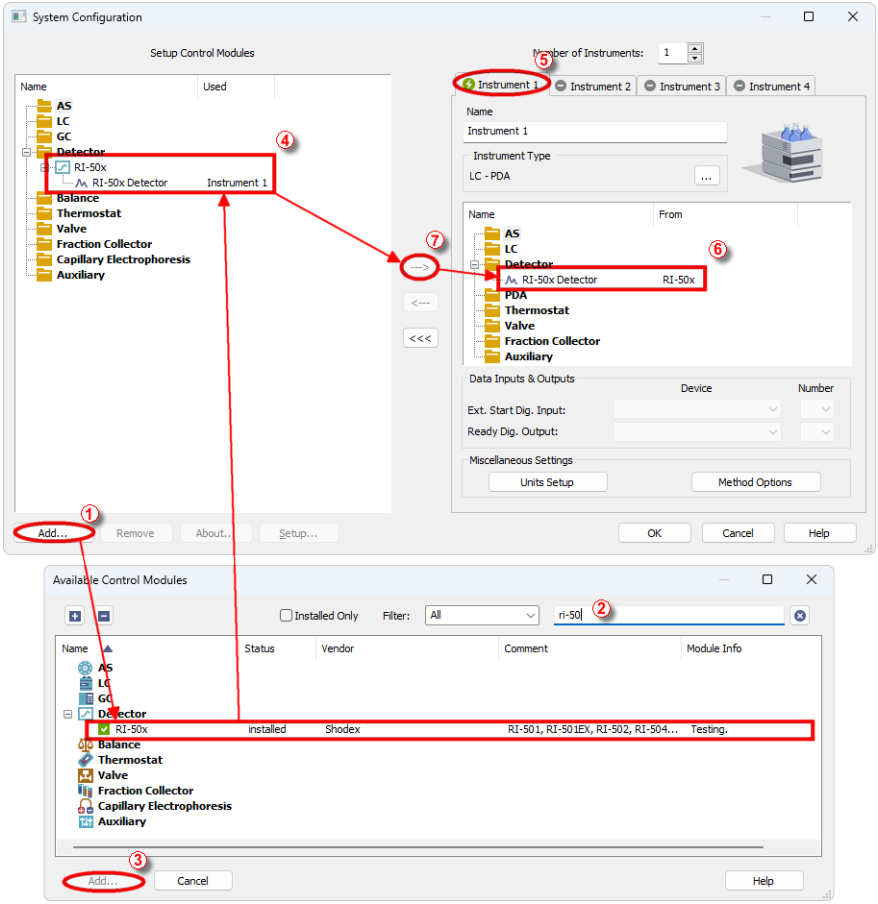

Fig. 2: How to Add Shodex RI-501 module

- 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 on **Fig. 2** on pg. **4**.) to invoke the *Available Control Modules* dialog.
- You can specify the search filter ② to simplify the finding of the driver.

- Select the correct item and press the *Add* (③ on **Fig. 2** on pg. **4**.) button. Each device with already created UNI profile should have its own item named accordingly in the *Available Control Modules* dialog.
- The *DataApex UNI Setup* dialog will appear.

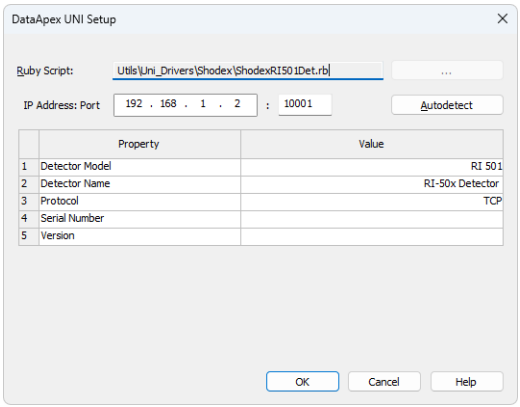

Fig. 3: DataApex UNI Setup

- Click on the *AutoDetect* button to establish communication with the device.
- You may fill in the custom *Detector Name*.

Note: The *DataApex UNI Setup* dialog is described in detail in the chapter **"DataApex UNI Setup"** on pg. **12**.

- The **RI-50x** item will appear in the *Setup Control Modules* list of the *System Configuration* dialog ④ .
- Drag the appropriate item from the *Setup Control Modules* list on the left side to the desired *Instrument* tab ⑤ on the right side ⑥ , or click on the ---> button ⑦ .

4 Using the control module

After adding and setting up the detector a new Acquisition tab will appear in the *Method Setup* dialog. A new **Shodex RI-501** detector section enabling the monitoring of the current detector state will be also created in the *Device Monitor* window.

Caution: For the detector to function properly, it is necessary to have Sleep or Standby mode disabled in the computer that is connected to the device.

4.1 Method Setup - Acquisition

The *Method Setup - Acquisition* tab serves for setting the common parameters of the **Shodex RI-501** detector. If more than one detector is available, it is possible to select between them by using the *Select Detector* combobox on the top of the dialog.

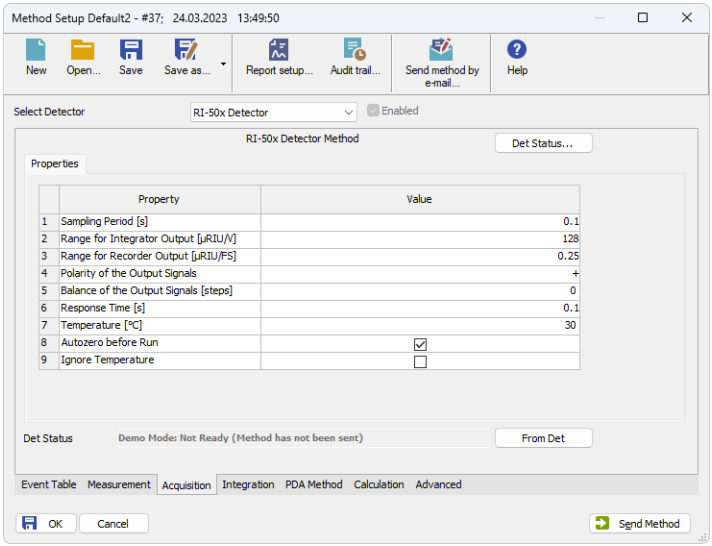

Fig. 4: Method Setup - Acquisition

Sampling Period [s]

Defines the frequency of data being gathered in the detector. The frequency of the data being sent to **Clarity** from the detector is defined by *Response Time* parameter. Valid values for the **Shodex RI-501** detector range from *0.1* to *2.0* s.

Range for Integrator Output [µRIU/V]

Sets the output range for the Integrator Output analog output, as well as digital signal sent to **Clarity**. The available range is dependent on the *Detector Model* as set in the *DataApex UNI Setup* dialog.

Range for Recorder Output [µRIU/FS]

Sets the output range for the Recorder Output analog output, as well as digital signal sent to **Clarity**.

Polarity of the Output Signals

Determines the polarity of the output signal.

Balance of the Output Signals [steps]

Defines the value to which the signal level will be reset when *Autozero* function is used.

Response Time [s]
Sets the frequency of the data being sent to **Clarity** from the detector. Setting this parameter to other value than *Sampling Period* means that the detector will filter the data and only send averaged values to **Clarity**.

Temperature [°C]
Defines the working temperature of the **Shodex RI-501** detector.

Autozero before Run
Sets whether the detector should be autozeroed at the beginning of the analysis run.

Ignore Temperature
Allows to start the detector run even when the detector is Temperature Unstable. The Startup Sequence still can't be started from Device Monitor (which is the limitation of the detector firmware).

From Det
Loads the detector control parameters from the detector to **Clarity**.

Det Status
When invoked, opens theHardware Configuration dialog showing the information regarding the connected detector.

4.2 Method Setup - Advanced

The *Method Setup - Advanced* tab serves for setting the usage of auxiliary signals of the **Shodex RI-501** detector.

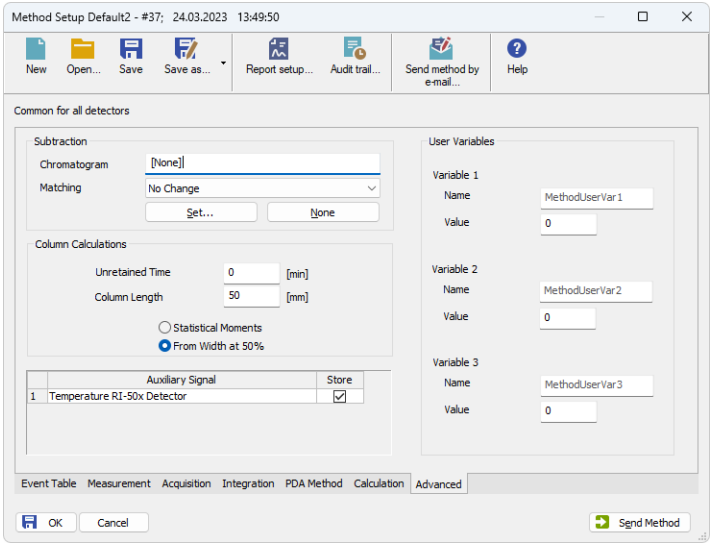

Fig. 5: Method Setup - Advanced

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.

4.3 Hardware Configuration

The *Hardware Configuration* dialog (invoked by using the *Det Status* button from the Method Setup - Acquisition dialog) displays the configuration of the **Shodex RI-501**, namely the communication type and its parameters.

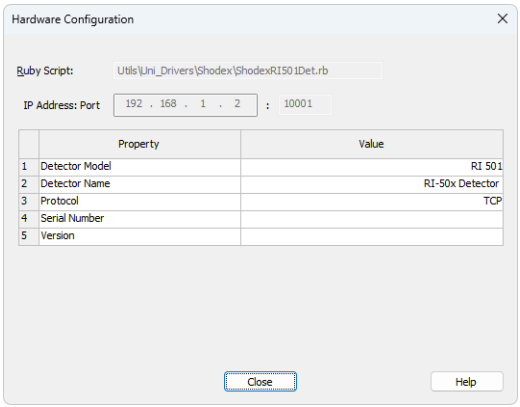

Fig. 6: Hardware Configuration

4.4 Device Monitor

The window with the detector status can be invoked by the *Monitor - Device Monitor* command from the ***Instrument*** window or using the *Device Monitor* icon.

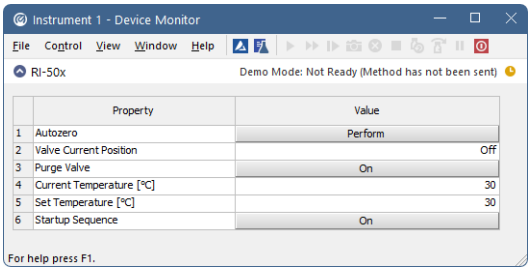

Fig. 7: Device Monitor - Detector

Autozero
Zeroes the connected detector.

Valve Current Position
Shows the state of the purge valve. The valve position can be changed using the *Purge Valve* row.

Purge Valve
Allows to set the purge valve on or off. The current state of the Purge valve is visible in the *Valve Current Position* row. Such action can only be performed outside of the analysis run.

Current Temperature [°C]
Shows the current temperature of the detector cell.

Set Temperature [°C]
Shows the set temperature of the detector cell.

Startup Sequence
Runs the Startup Sequence set in the detector. The button only enables when the detector temperature stability is reached and outside of the analysis run.

4.5 DataApex UNI Setup

The appearance of the *DataApex UNI Setup* dialog depends on the presence of the selected Ruby Script - if the script is not present, only the *Ruby Script* field is visible.

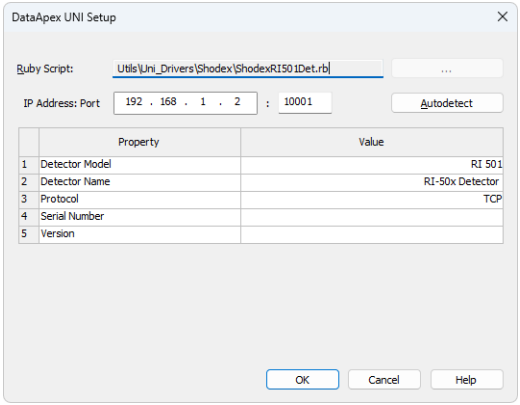

Fig. 8: DataApex UNI Setup

Ruby Script

Displays the selected Ruby Script. The correct SHODEXRI501DET.RB script for the **Shodex RI-501** detector can be found in the UTILS/UNI_DRIVERS/SHODEX subdirectory (accessible through the ... button) of the **Clarity** installation folder (C:\CLARITY\BIN by default).

IP Address

Defines the address on which the detector is present. Pressing the *Autodetect* button verifies that the connection to the detector on the given *IP Address* can be established.

Port

Defines the communication port used. The *Port* number for the **Shodex RI-501** detector is *10001*.

AutoDetect

It is used for verifying the device communication over the serial port selected above.

Detector Model

Allows you to set the type of the detector. The selection influences several settings further in *Method Setup - Acquisition* dialog.

Detector Name

Allows you to set the custom name of the detector. This name (entered into the *Value* column) will be used throughout the **Clarity** station.

Protocol

Displays the communication type. Currently only the *TCP* option is available.

Serial Number

Shows the serial number of the detector. The value is filled in upon successful autodetection.

Version

Shows the firmware version of the detector. The value is filled in upon successful autodetection.

5 Report Setup

The detector section on the method report can be enabled by checking the *Instrument Control* checkbox on the ***Method*** tab of the ***Report Setup*** dialog. Auxiliary signals setting made on ***Method Setup - Advanced*** tab will be also printed.

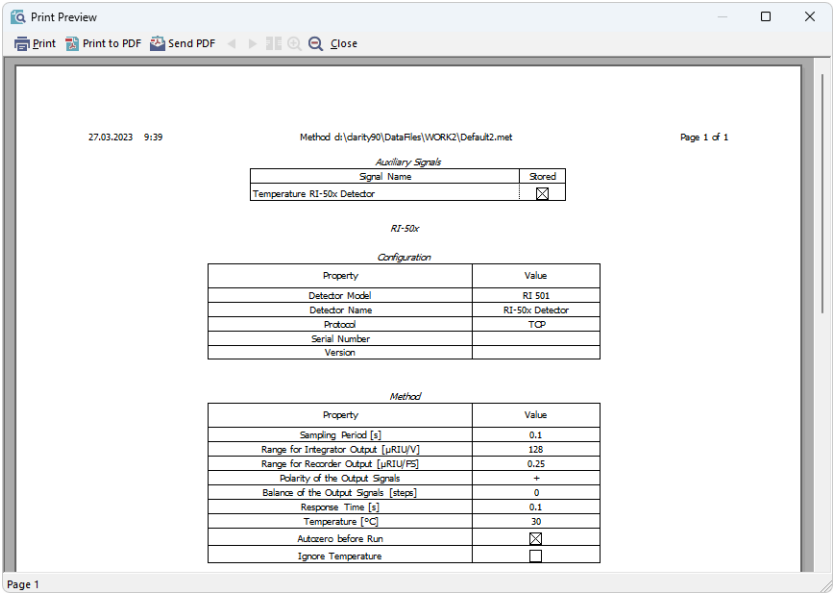

Fig. 9: Report Setup

All of the parameters set in the ***Method Setup - Acquisition*** dialog are reported, as well as the custom *Detector Name* and other parameters set in the ***DataApex UNI Setup*** dialog.

6 Troubleshooting

When the solution to a problem cannot be found easily, a recording of the communication between **Clarity** and the detector will significantly help **DataApex** support.

The data 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). The following section should be edited or added:

```
[TCP_IP 192.168.1.2:10001]
echo=on
textmode=on
filename=CommDrvShodex_RI-501_%D.txt
reset=off
```

Note: Instead of TCP_IP 192.168.1.2:10001, type the IP Address used to communicate with the **Shodex RI-501** detector. This address is displayed when the *Det Status* button in the *Method Setup - Acquisition* dialog is invoked, and must be filled in including the port (10001).

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 be of great help in the diagnosis of not documented errors and communication issues.

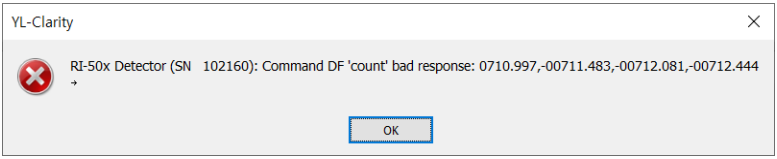

Fig. 10: Command DF 'count' bad response

No data from Acquisition. Command DF 'count' bad response error message pops-up.

Solution: Command DF failed or data are shorter than expected. It can be caused by overloading the processor or communication line, not all data will be read. To solve this problem increase the Sampling Period (resp. decrease the Sample Rate).