DataApex
Clarity™
CHROMATOGRAPHY SOFTWARE

UPCHURCH VALVES

Clarity Control Module ENG

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Contents

To facilitate the orientation in the **Upchurch Valves** 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 Upchurch Valves Control Module

This manual describes the setting of the **Upchurch V-2500** series valves. The control module enables direct control of the instrument over serial line.

Fig. 1: Upchurch valves

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

2 Requirements

- **Clarity** Installation USB with LC Control (p/n A24) or GC Control module (p/n A23).
- 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 RS232 port, the **MultiCOM** adapter (p/n MC01) is available.

- Appropriate cable provided by the valve's manufacturer. Different types of **Upchurch** valves may use different cables.

3 Installation Procedure

3.1 Upchurch valves communication

The **Upchurch** valves are controlled by serial (RS232) communication. It uses special serial cable provided by the valves manufacturer. On the computer side, it bears standard DB9F connector, on the valve's side there is usually S-video connector, though this may change with the type of the valve. Another cable is needed for chain-connecting the pumps.

The communication parameters are:

Baud rate *9600*, parity *N*, bits *8*, stop bit *1*.

3.2 Clarity Configuration

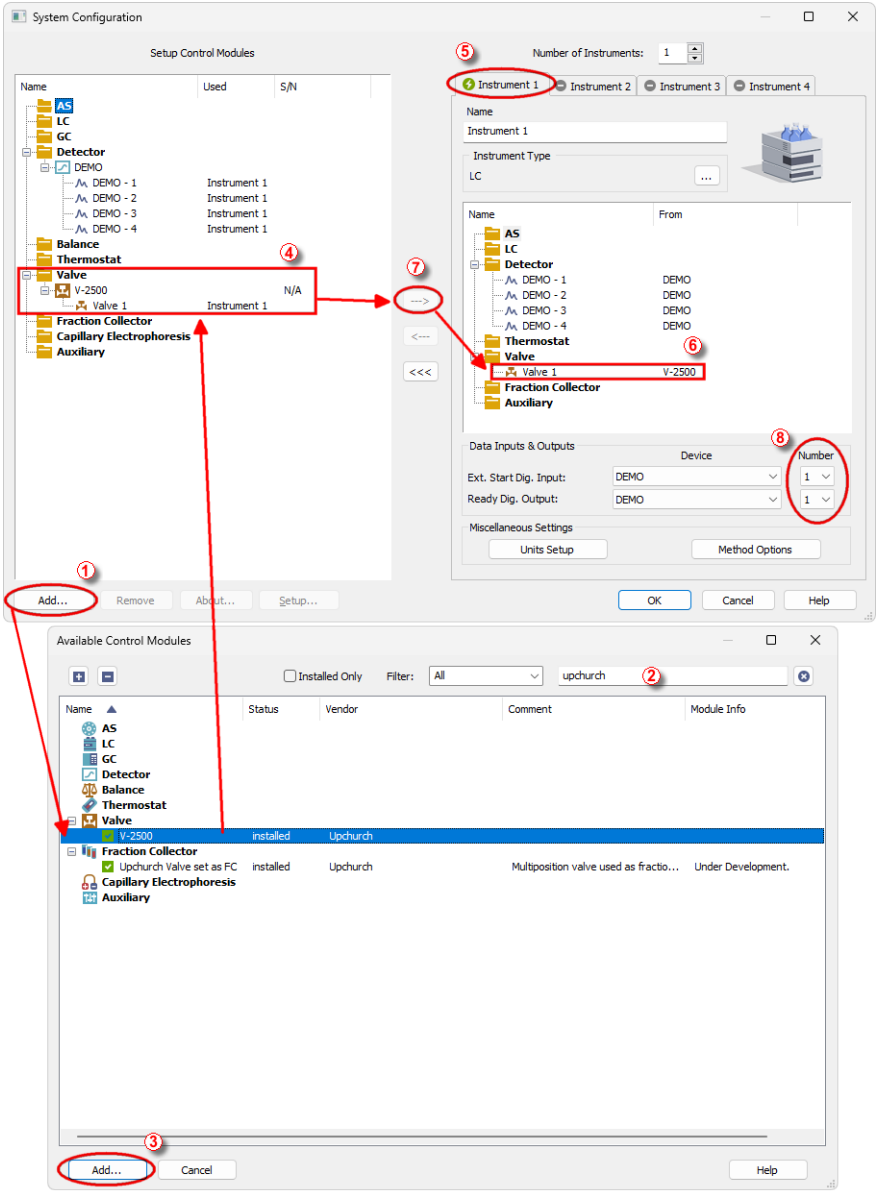

Fig. 2: System Configuration

- 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. 2** on pg. **4**.) to invoke the *Available Control Modules* dialog.
- You can specify the searching filter ② to simplify the finding of the driver.
- Select the **V-2500** item and press the *Add* ③ button.

The Upchurch Valve Actuator Setup dialog will appear.

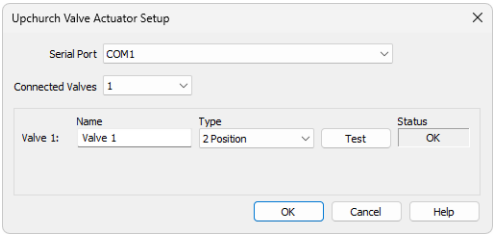

Fig. 3: Upchurch Valve Actuator Setup

- Select the *Serial Port* and correct configuration of your valves.
- You might want to fill in custom valve names for each valve.

Note: The Upchurch Valve Actuator Setup dialog is more closely described in the chapter **"Upchurch Valve Actuator Setup"** on pg. **10**.

- The **V-2500** item ④ will appear in the *Setup Control Modules* list of the *System Configuration* dialog, with the number valves according the value set in the Upchurch Valve Actuator Setup dialog.
- Drag the individual Valve icons 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).

Note: Individual Valves connected in the chain to the same Actuator can be configured on different Instruments.

- Set the *Ext. Start Dig. Input* and *Ready Dig. Output* numbers ⑧ for your acquisition card according to the wires being used for synchronization.

4 Using the control module

New Valves tabs (one for each valve assigned to the Instrument) are created in the *Method Setup* dialog. They can be accessed by switching to the desired valve in the *Select Valve* section on the top of the dialog.

4.1 Method Setup - Valves

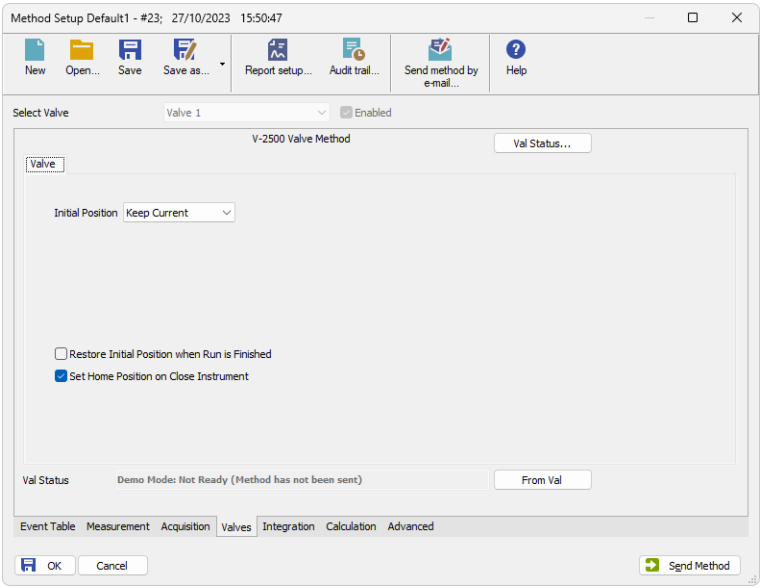

Fig. 4: Method Setup - Valves

Initial Position

Specifies the initial position to which the valve is switched at the sending of the method. Possible values differ for the Two-position valves and Multiposition valves.

Possible values for the Two-position valves are: *Keep Current*, *A*, *B*.

Possible values for the Multiposition valves are: *Keep Current*, *1*, *2*, ..., *X*, where *X* is the number of positions set for the valve.

Keep Current option does not change the valve position at the ending of the method.

Restore Initial Position when Run is Finished

This checkbox specifies what will happen after the acquisition is finished. If checked, the valve will return to the state specified in the *Initial Position* field.

Set Home Position on Close Instrument

This checkbox specifies what will happen after the Instrument is closed. When checked, the valve will return to the home position. When unchecked, the valve will

stay in current position or move to position set in Event Table. Default state is "checked".

From Val

Acquires the status of the active valve from the device and sets the values obtained to the active valve's *Valves* tab of the ***Method Setup*** dialog.

Val Status

Invokes the *Hardware Configuration* dialog showing the COM port and list of valves connected to it via valve actuator. The *OK* inscription is shown next to each valve if the connection was successful, other possible values are *NOT CONNECTED* (the particular valve is not connected or switched on) and *ERROR* (error occurred during the valve test). The dialog is specific to the valve it is invoked from, e.g. the result shown will depend on the particular valve when invoked from the Instrument with two actuators configured on it.

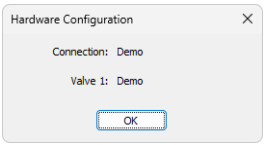

Fig. 5: Hardware Configuration

4.2 Method Setup - Event Table

Event Table tab of the ***Method Setup*** dialog is the place from where the switching of valve positions is governed.

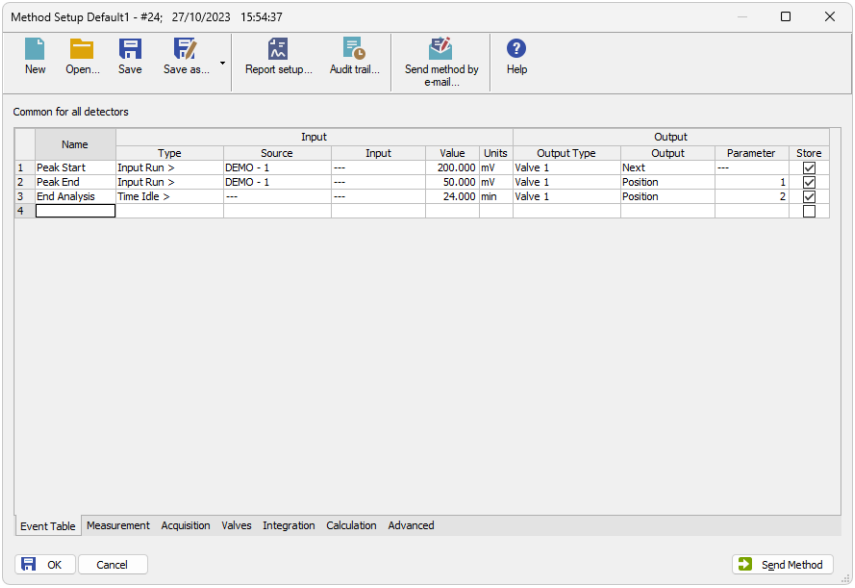

Fig. 6: Method Setup - Event Table

The change of the valve position can be triggered by any kind of *Input* (analog signal absolute or relative value getting over or under the specified value, the analysis time passed, digital input, ...) and switched to any possible position. The valve to be switched is set in the *Output Type* field, while the *Output* field allows to select whether the valve should be switched to the next position (*Next*) or to any position defined by its number (*Position*). In that case, the *Parameter* field tooltip shows the possible range interval and the field itself allows to fill in the actual position number to switch into. Check the checkbox of the particular row in the *Store* column to log the event of switching the valve to the **Audit trail**.

4.3 Device Monitor

The window with the detector status can be invoked by the *Monitor - Device Monitor* command from the ***Instrument*** window or using the *LC Monitor* icon. It displays the actual valve position for each valve and allows the user to change it if the analysis is not running.

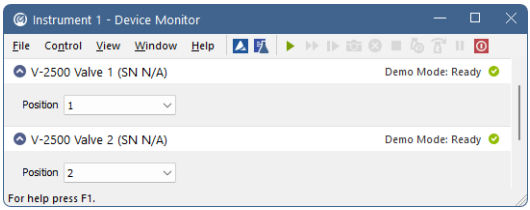

Fig. 7: Device Monitor

Position

Shows the position of the valve and allows the user to set the desired valve position. During the run, this field is inactive (shaded).

4.4 Upchurch Valve Actuator Setup

The appearance of the *Upchurch Valve Actuator Setup* dialog depends on the number of connected valves set - the dialog has some functions different when more than one valve is selected.

Caution: If using more than one valve, do not connect them all at once. See the section concerning multiple connected valves.

One connected valve only

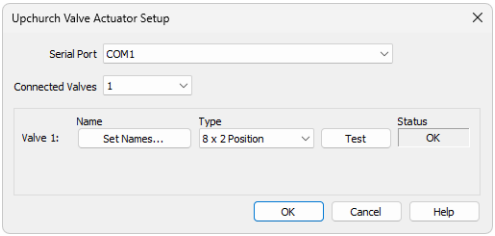

Fig. 8: Upchurch Valve Actuator Setup - 1 connected valve

Serial Port

Sets the number of the serial port, to which the valves are connected.

Connected Valves

Sets the number of valves connected in chain to the actuator; up to 10 valves may be connected this way.

Name

Sets the name of the valve. This name will be used throughout the **Clarity** station. When the valve *Type* is set to *8 x 2 Position*, the *Set Names…* button replaces the *Name* field, opening the *Valve Names* dialog. This dialog serves for setting the custom names of all eight valves included in this set.

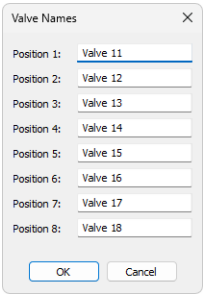

Fig. 9: Valve Names

Type

Select the number of positions the connected valve has.

Test

When invoked, checks the connection to the valve and displays the result in the *Status* field.

Status

Shows the current status of the particular valve. Possible states are:

OK - Valve is connected and ready.

NOT TESTED - Valve was not tested yet.

TESTING... - Valve is currently tested.

WRONG TYPE - Detected different valve type than it is selected.

NOT FOUND - Valve is not connected or is not switched on.

ERROR - Error occurred during valve test.

Multiple connected valves

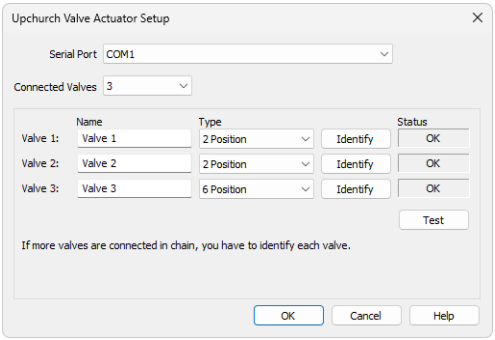

Fig. 10: Upchurch Valve Actuator Setup - more valves

The fields in this setup have the same meaning, except that the *Name*, *Type* and *Status* field are specific to the particular valve. The *Test* button is common to all connected valves and new *Identify* button is used.

Identify

Identifies the valve if more than valve is connected. A unique ID number is set to the valve by this procedure, which is consequently used in the communication to address this particular valve.

Caution: When configuring more than one valve, it is necessary to connect and identify those valves one by one. Connect the first valve and press the *Identify* button in the first row. Then disconnect it, connect the second valve, press *Identify* button in the second row and so on. After all valves have been identified, it is possible to connect them all and test their status by the *Test* button.

5 Report Setup

The report of the valve part of the method can be enabled by checking the *Instrument Control* checkbox on the *Method* tab of the *Report Setup* dialog. Each valve configured on the Instrument has its own report section.

Fig. 11: Report Setup

The number of positions and the initial valve position are reported for each valve.

To report the actual events of the valve switches, it is necessary to check the checkboxes on the rows of the **Event Table** connected to the valves (so that these events are stored to the **Audit Trail**) and then check the *Chromatogram Audit Trail* option on the *Audit Trail* tab of the *Report Setup* dialog.

6 Troubleshooting

When the remedy for some problem cannot be discovered easily, the recording of communication between **Clarity** and the valves 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=Upchurch_%D.txt
reset=off
```

Note: Instead of COM1 type the correct serial port used to communicate with the **Upchurch Valves**. This port number is displayed when the *Val Status* button in the Method Setup - Valve dialog is invoked or in the Upchurch Valve Actuator 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.