**DataApex**

# Clarity™

CHROMATOGRAPHY SOFTWARE

# SHIMADZU GC17A/GC14C

Clarity Control Module          ENG

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# Contents

To facilitate the orientation in the **Shimadzu GC17A/GC14C** 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 Shimadzu GC17A/GC14C

This manual describes the setting of the Shimadzu **GC17A** and **GC14C** GC chromatographs. The control module enables direct control of the instrument over serial line.



*Fig. 1: Shimadzu GC 17A series III*

*Caution:*   Do not confuse GC14C (model derived from GC17A) with GC14A (older Shimadzu product).

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

The GC14C model is based on the GC17A, with limited functionality (only manual gas flow control). The model type should be selected in the GC setup dialog window in System configuration. In this manual, the options to be selected will be described for the GC17A, with marked differences for GC14C.

*Note:*   Analysis conditions are all the options from the Method Setup - GC dialogs.

# 2 Requirements

- **Clarity** Installation with GC Control module (p/n A23).
- Free serial port in the PC (fast - 16550 UART).

*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.

- A/D card (e.g. INT7, NetPAD, Colibrick etc.)
- The chromatograph must have the **RS-232 Interface board** installed (this may be ordered from Shimadzu (Shimadzu P/N 221-44370-91) + cable (Shimadzu P/N 630-06420-06)). Alternatively the Opt-USB Adapter from **DataApex** (p/n OPT01) can be used.

# 3 Installation Procedure

## 3.1 Shimadzu GC 17A/14C setup - communication

The RS232 **"Interface board"** from Shimadzu or Opt- USB Adapter from **DataApex** must be installed.

The **Communication** setting is in **Function 15**

Most of the parameters must correspond with the setting from the Shimadzu GC-17A/14C Setup dialog.

**Current loop protocol** must be set to *EXTEND*.

**Baud rate** must correspond with the setting in the Shimadzu GC-17A/14C Setup dialog. Recommended value is *4800*.

**Communication protocol** must be set to *OPTICAL LINK*, not to RS- 232C (mistake of Shimadzu).

**File format** must be set *14CH MODE*.

**Parity** must correspond with the setting in the Shimadzu GC- 17A/14C Setup dialog.

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*Note:*     There is a Shimadzu mistake causing that EVEN = NONE and NONE = EVEN, but we have amended it by swapping the meanings too to provide corresponding settings.

## 3.2 Hardware - Wiring

*Start* and *Ready* signals are communicated with **Clarity** through the Serial cross DB9F-DB25M cable , so it is not necessary to connect additional starting cables.

The signal cable has to be connected according to the following scheme:
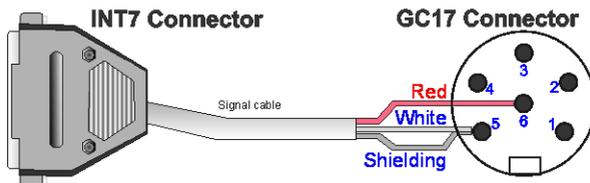


*Fig. 2: Signal cable wiring*

In a set with the **Autosampler** synchronization cables will be required.

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

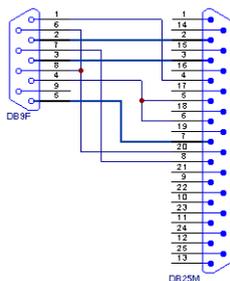Typical serial cable wiring is described in the picture.



*Fig. 3: Serial cross cable DB9F - DB25M*
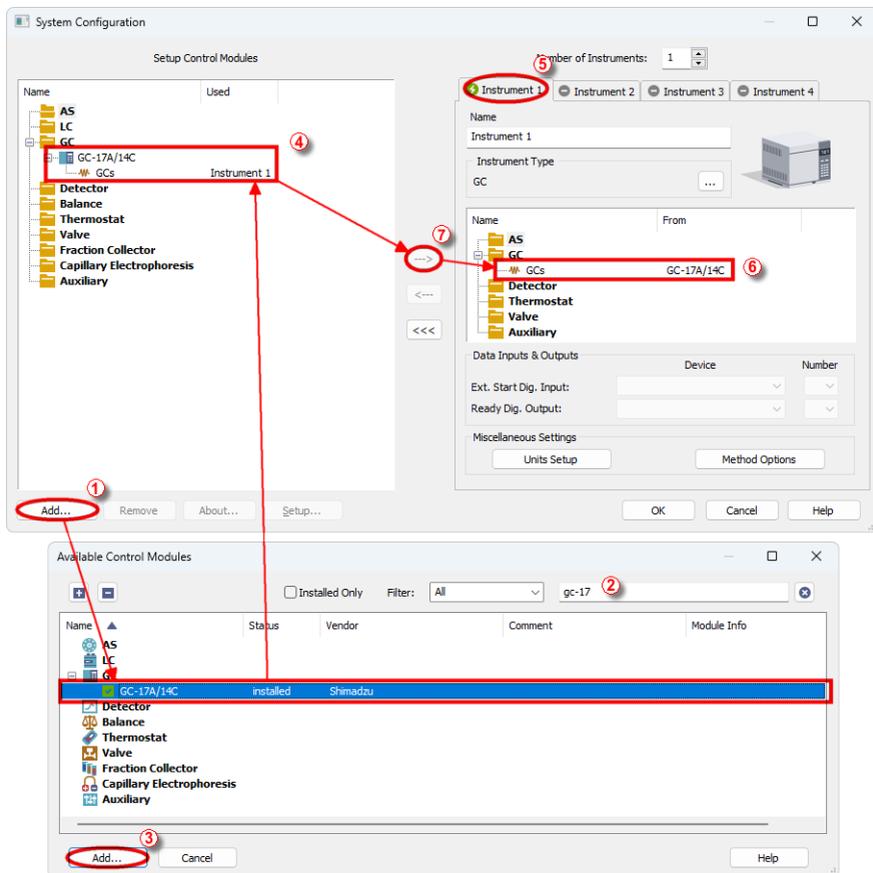
## 3.3 Clarity Configuration



*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 **3.3** 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 **Shimadzu GC17A/GC14C** device and press the *Add* ③ button.

The Shimadzu GC-17A/14C Setup dialog will appear.

*Fig. 5: Shimadzu GC-17A/14C Setup*

- Select the *COM Port*, *Rate*, *Parity* and *Stop* bits according to the settings in the GC (see the chapter **3.1**) and press the *OK* button.
- Select the corresponding GC model.
- Set up the configuration options to match the connected GC. Press the *OK* button.

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*Note:*       Other fields from this dialog are described later in the manual ("Shimadzu GC-17A/14C Setup" on page 16).

The Shimadzu GC-17A/14C item ④ will appear in the *Setup Control Modules* list of the *System Configuration* dialog.

- Drag the GC icon from the *Setup Control Modules* list on the left side to the desired *Instrument* tab ⑤ on the right side ⑥ , or use the --> button ⑦ to do so.

Set the *Start* and *Ready* input and output numbers for Colibrick, U-PAD2 or your acquisition card ⑧ according to the wires used for synchronization.

# 4 Using the control module

New [GC] tab appears in the *Method Setup* dialog, enabling the setting of the GC control method.

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*Caution:*    If the module does not get the method file, for example after the *Instrument* window opening or method file change, the *Single Run* measurement will run with the old method loaded to the **Shimadzu GC17A/GC14C** control module.

## 4.1 Method Setup - GC

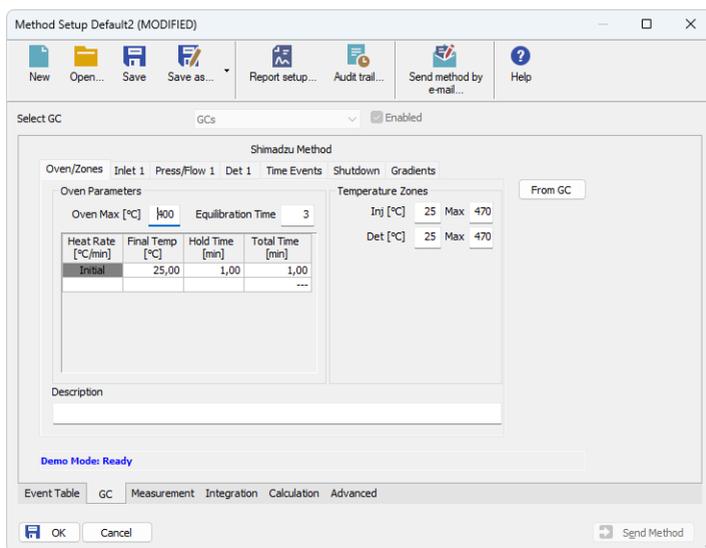## 4.1.1 Method Setup - GC - Oven/Zones



*Fig. 6: Method Setup - GC - Oven/Zones*

**Oven Parameters**

Sets the *Max Oven Temperature*, *Equilibry Time* and the *Oven Temperature* program.

**Oven Max**.

Possible values [*0 - 470*].

**Equilibry Time**

Time that the GC needs to reach the temperature equilibrium.

**Gradient Table**

Sets the *Heat Rate*, desired temperature (*Final Temp.*) and time to hold this temperature (*Hold Time*). The *Total Time* column will be calculated automatically.

*Note:*       Maximum of 5 rows is available. Delete the value in *Heat Rate* column to clear the
              selected row.

**Temperature Zones**

Sets the temperature of the zones that have been set in the Shimadzu GC-17A/14C
Setup dialog.

**Description**

Description of the method (this description is not sent to or read from GC, it serves
only for the information in **Clarity**).

# 4.1.2 Method Setup - GC - Inlet 1 (2)

Parameters of the Inlet may differ according to the inlet type. In some cases (when the options selected are not supported by the connected GC), the values will not be sent to the GC and null values will be get from the GC.
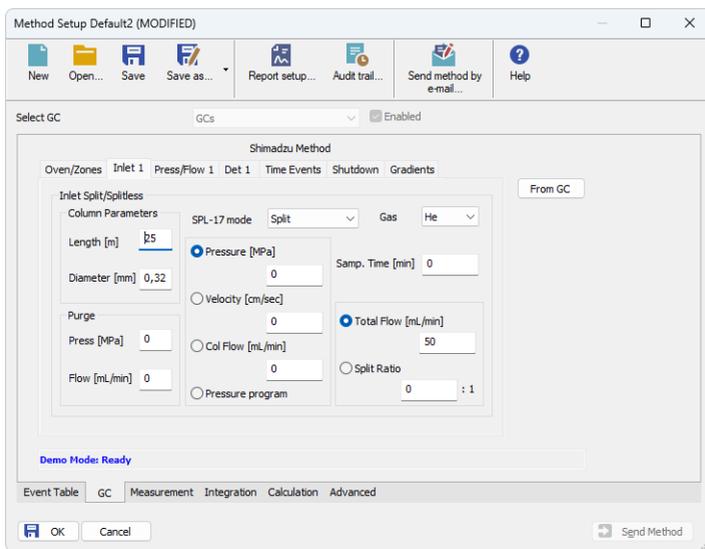


*Fig. 7: Method Setup - GC Control - Inlet*

**Column parameters:** Length, Diameter

**Purge parameters:** Press, Flow

**SPL mode:** is the same for both inlets

**Pressure, Velocity, Col Flow:**

*Caution:*    Only one value will be sent to GC, select which one, the other values will be calculated by the CG. When reading a method from the GC, all values will be read.

**Total Flow, Split Ratio:**

*Caution:*    Only one value will be sent to GC, select which one, the other values will be calculated by CG. When reading a method from GC, all values will by read.

## 4.1.3 Method Setup - GC - Press/Flow 1 (2)

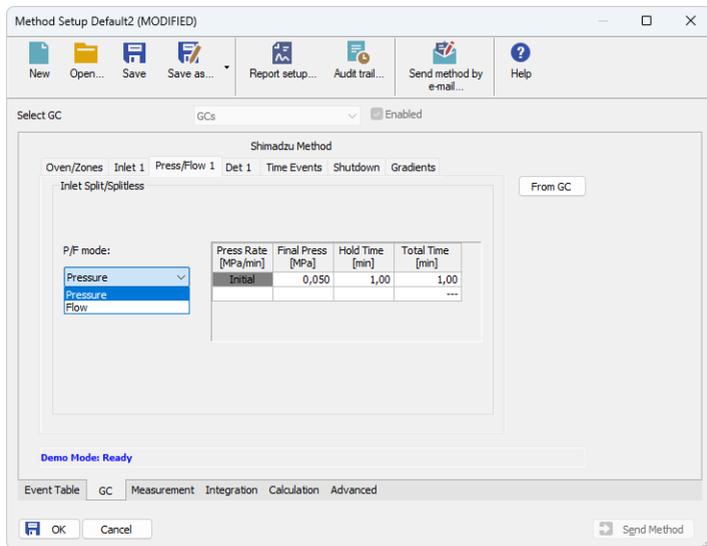*Caution:*      This tab is not available for the GC14C.



*Fig. 8: Method Setup - GC Control - Press/Flow*

**P/F mode**
 Select whether the gradient will be set in the pressure or flow mode.

**Gradient table**
 Pressure or flow program depends on the P/F mode

## 4.1.4 Method Setup - GC - Det 1 (2-X)

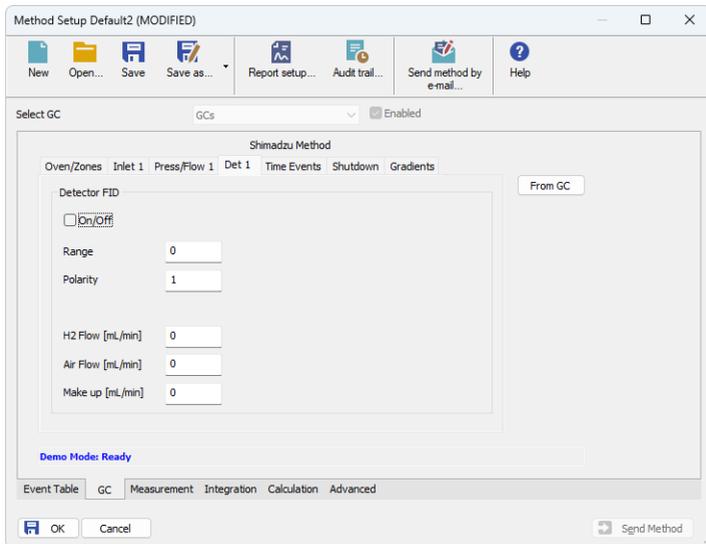These tabs define the settings of detectors defined in the Shimadzu GC-17A/14C Setup dialog.



*Fig. 9: Method Setup - GC Control - Detector*

The items of this dialog will be different for various types of detectors set in the Shimadzu GC-17A/14C Setup dialog and in the device.

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*Note:*          In some cases (options not supported by the connected GC) the values will not be sent to GC and null values will be get from GC.
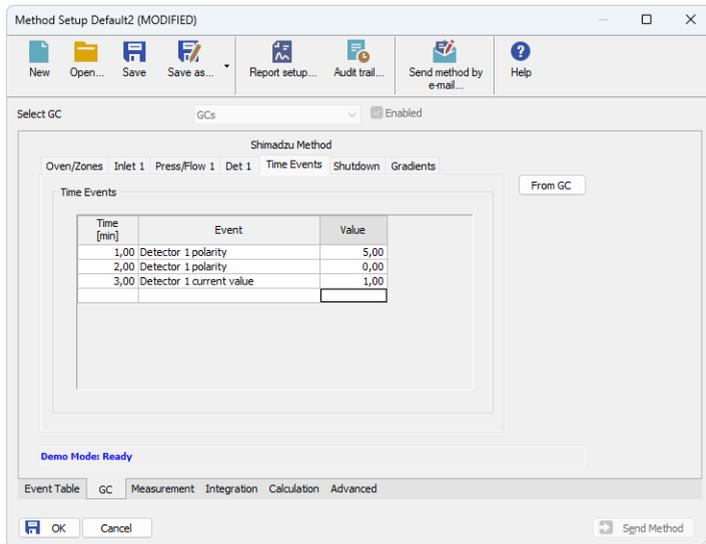
## 4.1.5 Method Setup - GC - Time events



*Fig. 10: Method Setup - GC Control - Time Events*

 **A table of time events:**
  Set time, type and value for every event.

  Values must correspond to the setting in the GC.

  Incorrect values will be ignored.

*Caution:*      Table is only sent to GC. It cannot be read from the GC to **Clarity**.

*Caution:*      The parameters are not checked for validity. Invalid values will be ignored.
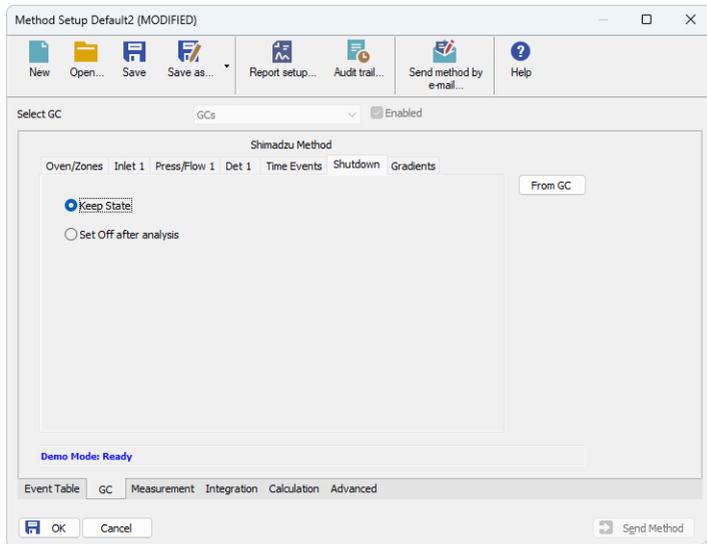
## 4.1.6 Method Setup - GC - Shutdown



*Fig. 11: Method Setup - GC Control - Shutdown*

The *Shutdown* tab of the GC control enables to switch off the oven heater after the analysis is finished.

- **Keep state** - the heater remains on
- **Set off after Analysis** - the heater will be switched off after the end of gradient program.

*Note:* When any method is sent to GC, the heater will be always switched On. Typically, the method with shutdown On will be used as the last one in a sequence. The automatic sending of the method to the instrument should then be disabled.
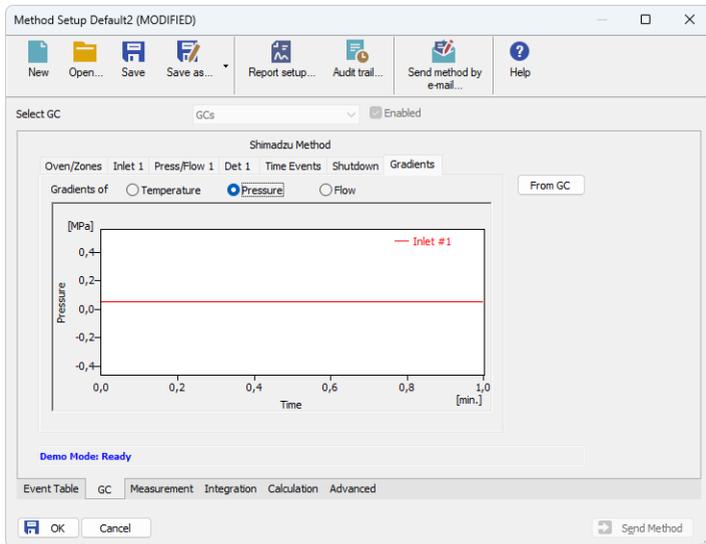
## 4.1.7 Method Setup - GC - Gradients



*Fig. 12: Method Setup - GC Control - Gradients*

Displays the gradients selected by the *Gradients of* radiobuttons (Oven temperature, Pressure or Flow).

## 4.2 Device Monitor

*Device Monitor - Shimadzu GC-17A/14C* dialog displays current values from the GC and **expected values** (= values sent to the GC). It also allow a direct control of the GC oven heater.

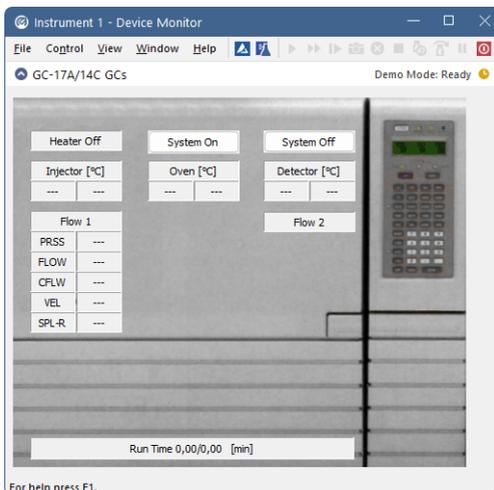*Note:*        For the **GC-14C** model, some of the fields in the *Device Monitor* window might be missing.



*Fig. 13:*

*Fig. 14: Device Monitor - Shimadzu GC-17A/14C*

The GC Heater can be set *On* or *Off* using the corresponding buttons *System ON* and *System Off* in the *Device Monitor* window.

*Note:*        When the *System Off* is pressed during run, the heater will be switched Off only after the analysis has been finished.

- **Temperature fields**

Left field contains the values set in the method. Right field contains real values read from the chromatograph. If there is a difference between required value and the real value the actual value is marked in by color.

- **Green** value means that the actual temperature is lower than the required.
- **Red** value means that the actual temperature is higher than the required.

*Note:*        The set *Oven* temperature is not updated during a gradient run, the initial set temperature will be displayed.

Any additional informative fields displayed will depend on the current GC configuration.

## 4.3 Shimadzu GC-17A/14C Setup



*Fig. 15: Shimadzu GC-17A/14C Setup*

**COM**
 Selection of the communication port.

**Rate**
 The speed of the communication port.
 Possible values [*1200*; *2400*; *4800*]

**Parity**
 The Parity of the communication port.
 Possible values [*None*, *Even*]

**Stop bits**
 The Stop bits of the communication port.
 Possible values [*1*; *2*]

**Model**
 Select model GC17A or GC14C.

**Injector and Detector Types**
 Sets the types of **Injectors** and **Detectors** that have been installed on the GC and attach corresponding Heat zones to them.