

Gas chromatograph Shimadzu GC-17A and UniChrom

Contents

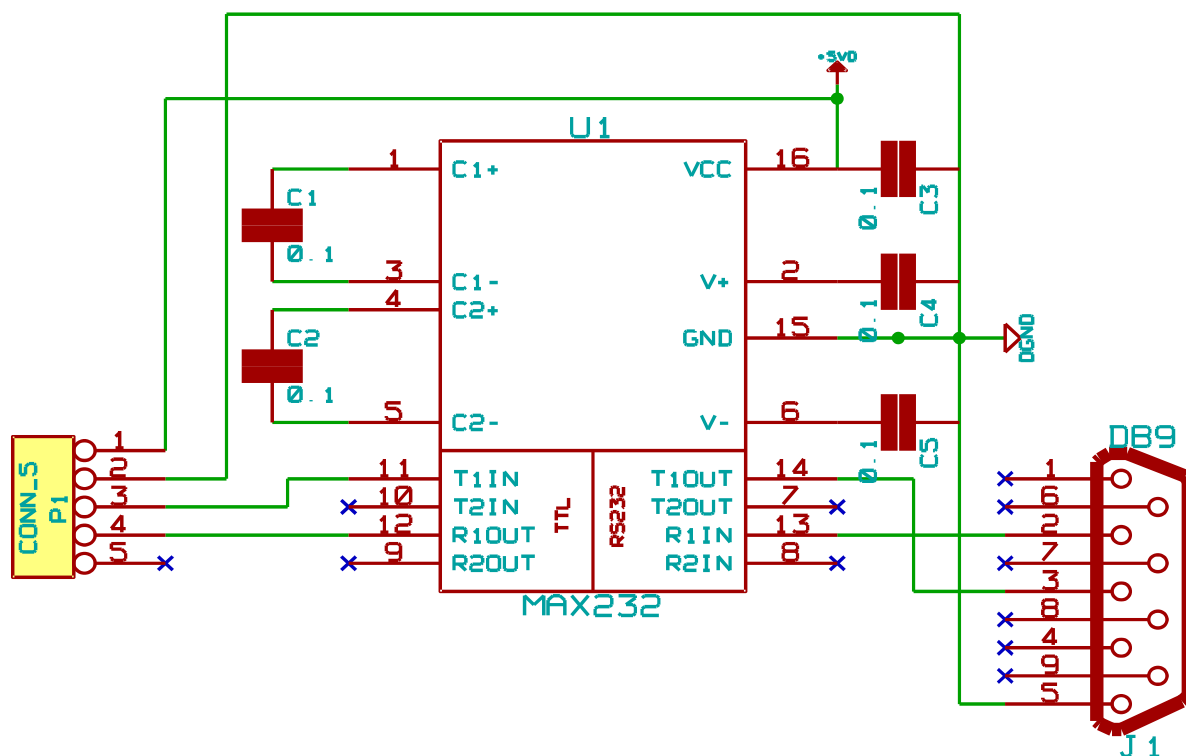
General information.....	3
Communication board.....	3
ADC.....	3
Direct connection to the FID.....	4
GC-17A instrument configuration with ADC.....	4
Cluster configuration parameters.....	4
Signal channel numbering inside cluster.....	5
Configuration of gas control channels.....	6
Cluster diagnostics.....	6
Working with instrument.....	7

General information

Gas chromatograph GC-17A is the digitally controlled instrument. Setting of methodical parameters can be done either from GC keyboard as through serial (RS-232) connection with controlling software. The main peculiarities of the instrument are: the absence of built-in ADC, but presence of detector amplifiers. Wide-range FID amplifier has output both linear and logarithmic signal in the range (0..1 V) at the rear instrument panel.

Communication board

To provide digital instrument control the special PCB have to be installed inside GC. The board is intended to translate TTL levels of GC-17A instrument motherboard to standard RS-232 voltage levels.



ADC

For analytical signal registration it is required the external ADC. In the stock GC-17A shipping there was 16-bit ADC Scientific Instruments SS420. This ADC is not supported, instead of it can be configured any ADC from the list, supported by UniChrom system.

Direct connection to the FID

Instrument electronics detects signal increase (baseline raise) during FID ignition. When stock FID amplifier is disconnected from FID, it is required during ignition to pass to the amplifier input the signal which makes instrument electronics to “believe” the ignition is done. For this purpose is possible to connect at FID input the photo-diode soldered to BNC connector. Before pressing [Ignite] the photo-diode have to be covered with finger, after ignition – finger have to be removed. The instrument makes a beep indication the FID flame ignition is done. Further the analyst have to control FID baseline to check if the flame is OK or gone.

GC-17A instrument configuration with ADC

To make for UniChrom two different devices, which are supported by different modules, look like single monolithic instrument intended the “Cluster” driver.

Cluster — composite device which repeats every operation taken over it for every constituent part (node) of the cluster. Every Node is being queried about presence of controlled zones in the order defined by Configuration Editor.

GC-17A cluster structure

Node	Driver	Oven	Injectors	Detectors	ADC channels
1.	GC-17A	+	+	+	-
2.	Any configured ADC	-	-	-	+
	Cluster	+	+	+	+

Cluster configuration parameters

Parameter	Intended for
Level1 ... Level8	Textual or numeric parameter containing the number of UniChrom instrument configuration hive. Hive number — the numeric part of registry hive, which holds the configuration of selected instrument (node driver). For example, when GC-17A was installed as the third in order, so its configuration would reside in hive I2 (0,1,2). The hive number can be seen at the page «General» in properties of every driver in UniChrom Configuration Editor. In our case the Level1 parameter have to be equal to 2.

Parameter	Intended for
DriverFreq	Signal acquisition frequency. The value have to correspond the frequency specified in ADC configuration hive.
InsType	Instrument type (technique) (gas chromatograph=0, liquid chromatograph=1, ADC=2). Cluster driver can contain different devices, so it is impossible to determine automatically which type the Cluster represents. For GC-17A, definitely , InsType=0
StartIndex1 ... StartIndex8	Start index from which zones of corresponding node start to respond. For example: there is a node with 2 detectors (indices 0,1) and yet another similar node with 1 detector. If the required system have to be with 3 detectors then for the corresponding node (Level2) have to be defined StartIndex2=2 (i.e. during cluster lookup the 0 th detector of second node become 3 rd detector of entire system)

Additionally for every of the cluster nodes analysed the following parameters (in the hive representing node but not cluster).

Parameter	Intended for
ChannelClass	0 — generic data channel registering time-dependent signal (kinetics,chromatogram) 1 — use additional data channel numbered by +1 greater than opened channel. Supplemental channel is considered as source of X-data. The first-one channel in that case transfer (XY) data pairs. Suitable for building XY chart recorders or spectrophotometers.
ChannelsSize	Actual number of channels of selected ADC.

Signal channel numbering inside cluster

Note that data acquisition channels have flat numbering (without zone binding) inside drivers, so to prevent overlapping of each node channel list the shift by 100 is used. I.e. channels of 1st node have numbers 1..99, the 2nd node channels numbered 101..199, the 3rd node channels numbered 201..299 etc.

For the cluster built from GC-17A (Level1) and ADC (Level2) data channel numbers (signal numbers) would be 101..199.

For the cluster built from ADC (Level1) and GC-17A (Level2) data channel numbers (signal

numbers) would be 1..99. But to prevent disappearing of GC oven the “StartIndex2” for 2nd node have to be configured to 0. Because all of heating and gas zones present only at 2nd level and does not need any shift.

Configuration of gas control channels

Mapping of the gas control channels to corresponding zones of injectors and detectors is done with the help of “Gas scheme” page in instrument driver properties.

Cluster diagnostics

Each cluster node can be tested separately from other, that is because each node is the independent instrument with own driver and own settings. After independent testing of each cluster node the cluster as a whole can be tested. For each of the nodes in UniChrom/log directory written the diagnostics log. The instrument log name forms like **iXXX.log** , where XXX — number of the hive where instrument configuration resides. If desired some nodes can be hidden (parameter «Use this device» on “General” page of instrument properties). After UniChrom system restart cluster components would not be visible as separate instruments.

Working with instrument

Immediately after successful connection the UniChrom obtains actual and methodical state of the instrument. Because of the manner instrument change it's state after loading “the whole” method, there is no sense in direct editing of «Chromatograph» device mode, the copy of instrument mode have to be done. To copy a mode right click with the mouse at «Chromatograph» tab and select «Make a Copy». All the necessary alteration have to be done in new mode, and after editing the new mode we can «Load» back to the instrument. Working with GC device modes is described in details in «UniChrom users guide and operation manual».