Gas chromatograph

Varian cp3800 and UniChrom

Instrument driver setup

Driver installation is the stock operation of UniChrom «Configuration Editor». To get this drag the «Varian cp3800» icon from the list of available instruments to the list of installed instruments. The instrument driver supports the following configuration parameters:
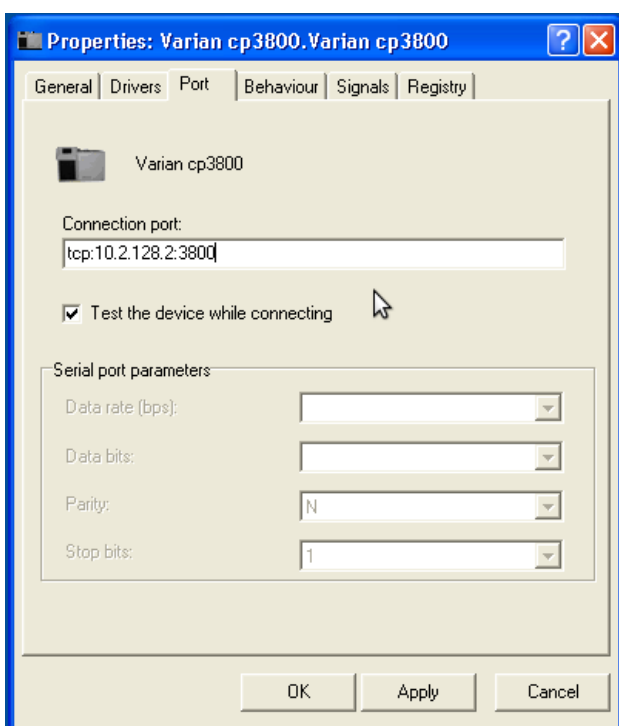
«Connection port» and «Wait Time»

«Connection port» have to be defined in style, which is common for all UniChrom-supported networked GCs.

tcp:IpOrHost:3800

where IpOrHost — decimal representation of IP address or DNS-registered host name.

For instance if the instrument has IP address 10.2.128.2, in the «Connection Port» required the following setting:

tcp:10.2.128.2:3800

Determination of Varian cp3800 IP address

In the simplest case when computer directly connected to the GC and the IP configuration is entered manually from GC keyboard. The IP address is visible in GC set-up menu — SETUP \ View Ethernet Settings.

In the case when GC is connected to the network with configured BOOTP server (boot protocol server), the instrument IP address would be assigned automatically. To determine the IP address – the network administrator have to be contacted.

Own BOOTP server can be also installed at local computer. The only parameter required for its configuration it the Ethernet MAC address, which can be determined in instrument menu SETUP \ View Ethernet Settings.

Varian software uses its own BOOTP server built into system configuration.
When the instrument configuration is made using Varian-provided configuration tools (Star Workstation, Galaxy Workstation), then simplest way to determine IP address of GC would be either:

A) Look into Varian software configuration editor

or

B) Use stock Windows utilities. To do this

1. Start Varian software

2. Connect to the instrument

3. Start Windows command prompt (Start\Run **cmd.exe**)

4. Execute in command line the following: **netstat -n**

The output string which contain TCP port number of 3800 would contain either the instrument IP address.

Checking the network connection

To verify if the instrument IP address is determined right and instrument responds to network connection the stock **ping** program can be used. Open the Windows command line (cmd.exe) or Linux console, and type:
ping IpOrHostName and press [Enter],
where IpOrHostName — decimal representation of IP address (e.g.10.2.128.5) or DNS-registered instrument host name.

If the IP connection is possible the **ping** utility will show ICMP-message exchange dialogue between PC and GC with approximate time required to get answer in milliseconds (microseconds).

When instrument does not respond to **ping** it is required to check if the GC and PC are in single IP subnet or check the routing between subnets. Routing have to be managed with qualified IT administration personnel.

The existence in single IP subnet means that IP addresses of GC and controlling PC are **DIFFERENT** (at least in single number which is not falling into network mask range), and the network masks are **IDENTICAL**.

For instance:

Chromatograph is configured to IP address **10.2.128.2** , and network mask **255.0.0.0**

Controlling PC has IP address **10.2.128.5** , and network mask the same as GC **255.0.0.0**

When the GC and PC are in common IP subnet, the **default gateway** parameter is not mandatory.

Specialities in Varian cp3800 controlling

Temperature control

The analysis length is determined by the length of GC oven temperature program.

Because the Varian cp3800 can not set the injectors and detectors temperature less than 50°C, defining temperature less than 50 in UniChrom would torn corresponding heater Off.

It is necessary to remember, that instrument does not control presence of gas in lines while turning heaters on, so there is possibility to heat the column without carrier gas. This «capability» is provided by instrument itself regardless of the control software. The only sign revealing gas absence would be **"not-ready"** state of corresponding pressure/flow controllers.

The instrument driver has the only configuration parameter «Wait Time», which defines the time interval for instrument parameters relaxation after setting to methodical values. Default value — 30 sec.

The instrument also has so-called «STAND-BY» state, which begins after passing time interval without PC control, specified in instrument settings. The «STAND-BY» time interval and conditions which would be set automatically are defined in instrument configuration (the [INSTRUMENT] button).

Gas flow and pressure control

UniChrom supports control of heating zones, flow and pressure regulators and also valves during runtime.

For split regulator supported only split ratio setting (not flow), i.e. value of 100, entered in injector split setpoint is the flow division ratio (1:100). At the column flow rate about 1 ml/min the split flow value and split ratio would be comparable in order of magnitude.

For inlet carrier flow/ pressure regulator (first gas regulator of inlet in UniChrom) supported the following control modes:

- pressure
- flow

Capillary column parameters (length and internal diameter), which are necessary for right gas control functioning, are defined in instrument configuration ([SETUP] button).

Detector activity control

GC detectors can be turned ON and OFF. This means for instance, the FID detectors turned OFF would not be controlled for flame presence. This functionality allows creation of special instrument "Modes" for "Cooling" instrument after work of for maintenance. For OFF-lined FIDs is possible set the hydrogen and air flows to 0.

Valve control

Valve control in UniChrom is different from Varian product representation model.

Valve events at the instrument panel:

Time, min	Valve #1	Valve #2	Valve #3	Valve #4	Valve #5	Valve #6	Valve #7
Initial state	+	-	-	-	-	-	-
Time1	-	-	-	-	-	-	-
Time2	+	-	-	+	-	-	-

Etc.

In the UniChrom is defined the following representation — 1 object at 1 time moment

Time, min	Object #	State
0	1	+
0	2	-
0	3	-
....	....	....
Time1	1	-
Time2	1	+
Time2	4	+

Etc.

Defining the state transition table is not necessary enter the objects which do not change their state.