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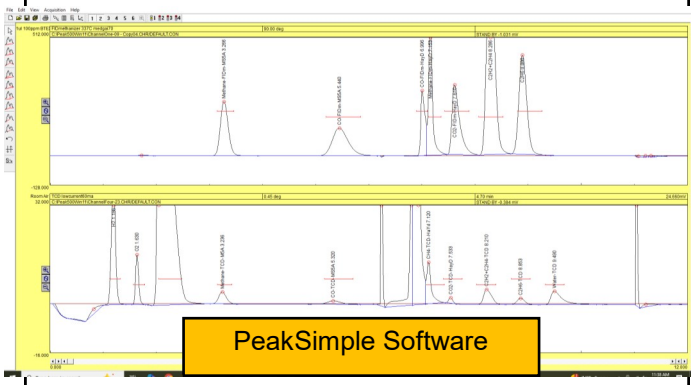
Multiple Gas #5 GC (Gas Chromatograph)

January 2026

The SRI Multiple Gas #5 GC (MG5) configuration has been developed over 30 years of continuous improvement to provide an economical means of measuring:

Hydrogen, Oxygen, Nitrogen, Carbon Monoxide, Carbon Dioxide, Methane, Ethane/Ethylene, Water, Propane, Butane, Pentane, Hexane, Methanol, Ethanol, and other molecules in that boiling point range.

The range of measurement is 1ppm to 100% for most molecules on the list above (but there are some exceptions). Lower detection limits for some molecules are possible with a pre-concentrator accessory.



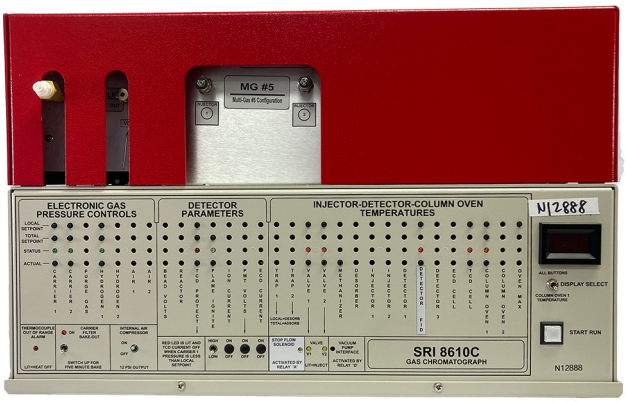
PeakSimple Software

PeakSimple Chromatography Integration and Control software is included and updates are “free”. There is no software license required so PeakSimple can be installed on multiple Windows computers. Up to 6 detector signals can be acquired simultaneously. More than one SRI GC can be controlled by a single PC. The GC can be controlled remotely via internet.

The MG5 can be operated to continuously measure a single gas stream (24/7) or with an optional accessory up to 20 streams in a repeating pattern.

Manual syringe injections can be made where the volume of sample is too small (< 20ml) for automated sample injection.

Optional detectors can be added to measure low levels of sulfur gases like H2S, higher boiling compounds like gasoline, chlorinated molecules “specifically”, greenhouse gases, ammonia and many others.



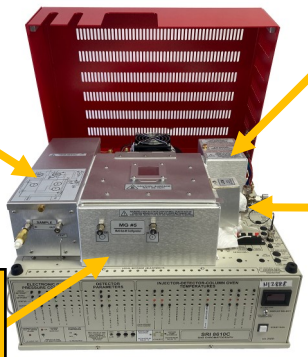
19” (48.3cm)

50 pounds (23kg)

13” (33cm)

14” (35.6cm)

Valve oven contains 2 gas sampling valves at up to 200C. Room for up to 4 valves.



TCD detector and/or optional 2nd TCD.

Flame Ionization Detector (FID) with Methanizer detector. Room for up to 6 detectors.

Column oven (temp programmable to 400C) fits multiple packed or capillary columns.

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The standard MG5 GC configuration has a TCD detector in series with a FIDmethanizer detector, but there is room to add additional detectors. The TCD detector responds to all molecules (H2, O2, N2, H2O etc) but is not as sensitive as the FIDmethanizer which measures CO, CO2 and all hydrocarbons.

The standard MG5 includes two gas sampling valves (**GSV**). One GSV injects the sample into a molecular sieve column (MS5A) which separates H2, O2, N2, CH4 and CO. All other molecules in the sample are retained by a pre-column which is then emptied/ backflushed as part of the analysis sequence. This protects the MS5A column from being contaminated with CO2, H2O and other high boiling molecules.

The 2nd GSV injects into a Haysep D column which separates CO2, ethylene/ethane, propane, butane pentane, hexane, methanol, ethanol and many other hydrocarbons. The 2nd GSV is plumbed to backflush any molecules remaining in the column after the last peak of interest has eluted, so every molecule injected is measured and accounted for. There are no molecules left in the column to contaminate the next analysis.

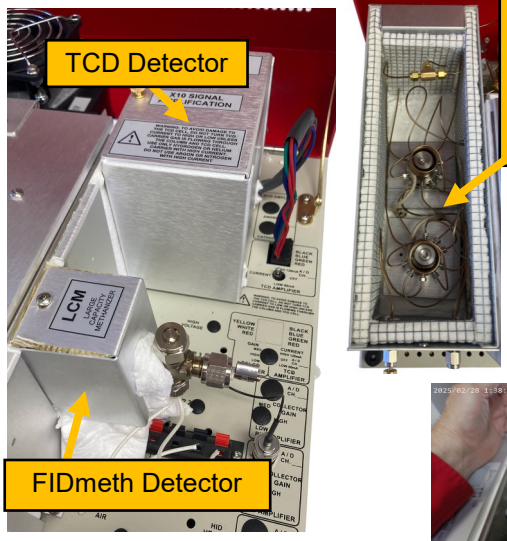
All the molecules injected pass through both detectors so molecules with low concentration (10ppm for example) that are too low for the TCD to detect are measured by the FIDmeth while high concentrations (50%) that are too high for the FIDmeth are measured by the TCD. Between the two detectors, the range of measurement for most molecules is 1ppm to 100%. This arrangement also permits the sample to contain any amount of water vapor so **NO** sample pretreatment is required (a limitation on many other GC systems).

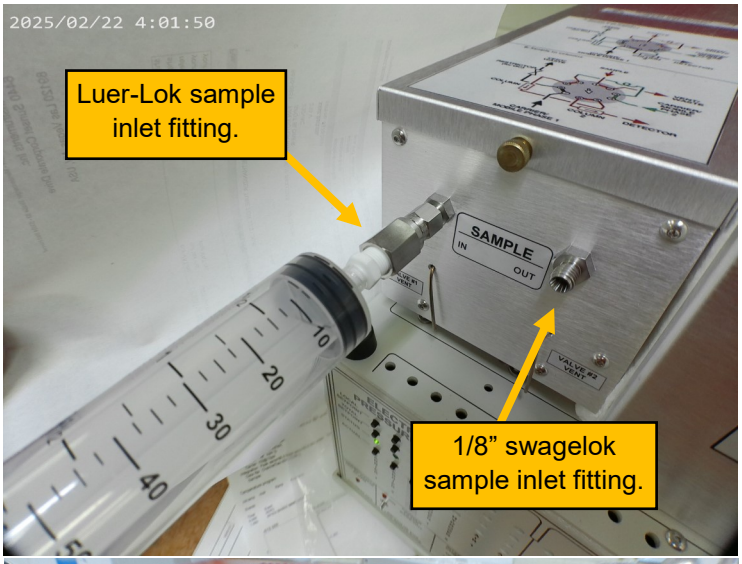
The sample can be injected multiple ways.

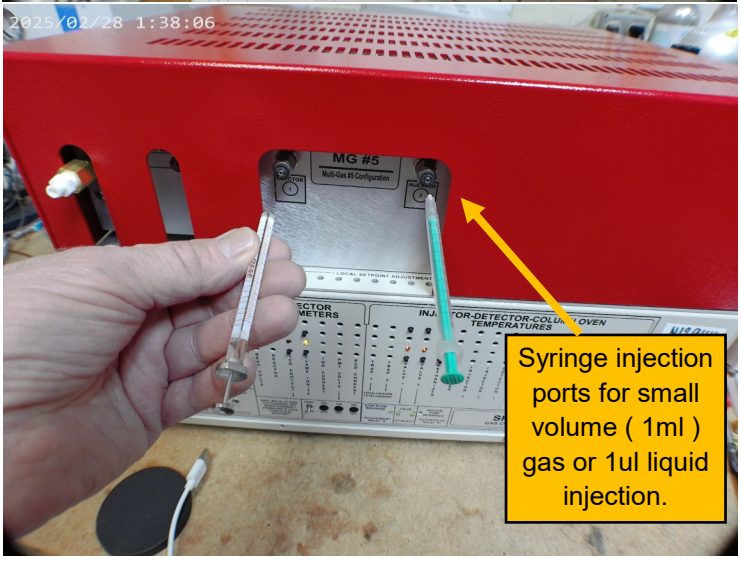
1) A syringe sample (usually contained in a 50ml syringe) can be conveniently attached to the Luer-Lok inlet fitting.

2) A continuous sample stream can be securely connected to the Swagelok inlet fitting. Multiple streams are possible with an accessory valve which can be added later.

3) Gas or liquid samples can be injected via gas tight or liquid syringes into either of the two on-column injection ports. This is helpful when there is not enough sample to purge the loops of the GSVs. Liquids like alcohols, solvents VFAs and many other liquids can easily be measured. A simple column change allows for liquid measurement up to the C40 (500C) boiling point range (gasoline, diesel, vegetable oils, etc).

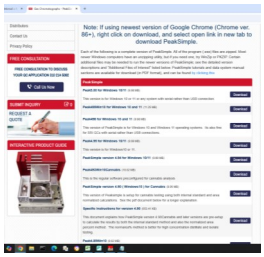






Multiple Gas #5 GC (Gas Chromatograph)

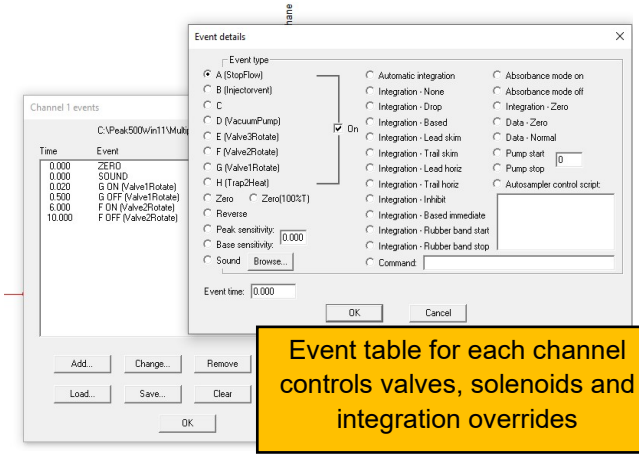
PeakSimple Chromatography software is **free** to download from the SRI web-site/ (www.srigc.com) and can be installed on unlimited computers with no license required. Every user can have their own copy of PeakSimple.



Software versions are available for all Windows operating systems from DOS through Win11. PeakSimple has been in continuous development since 1990 so its well de-bugged and reliable. Multiple versions (instances) can run on a single PC.

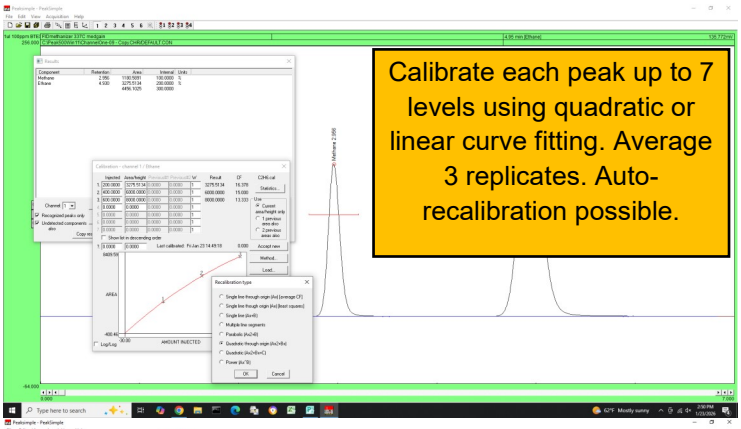
Peaksimple can acquire up to six detector signals simultaneously or asynchronously (only two are used on the standard MG5) while controlling the oven temperature program of up to three column ovens (only one is used on the MG5).

Each of the six channels has its own Event Table which controls integration over-rides and external events (8 relay outputs) like valve rotations or solenoid actuations..

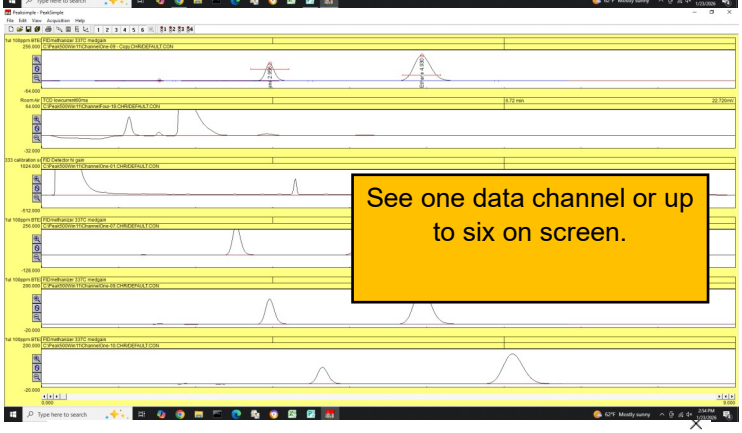


Event table for each channel controls valves, solenoids and integration overrides

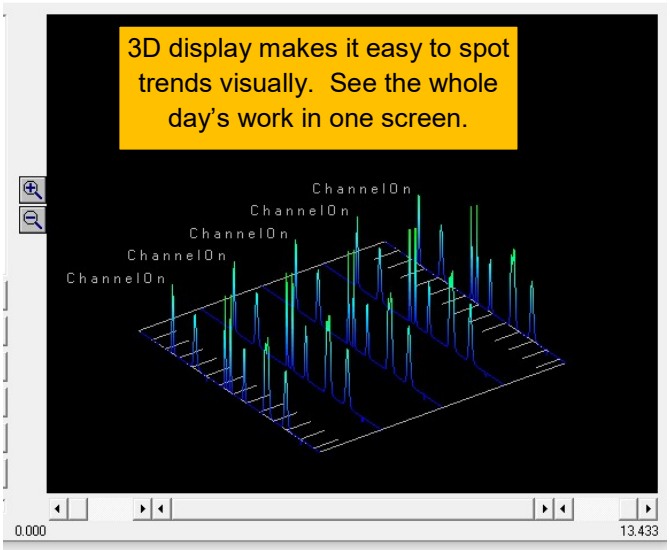
Multiple (no limit) chromatograms can be overlaid (manually or automatically) on a single 3D screen over which you can fly and look at the data from any angle. Integrated and calibrated data is accumulated in single (or multiple) comma separated variable (CSV) text files which can easily be exported (one mouse click) to Excel/Word along with a graphic of the chromatogram. This is great for producing reports. Data from multiple channels can be merged into one CSV file.



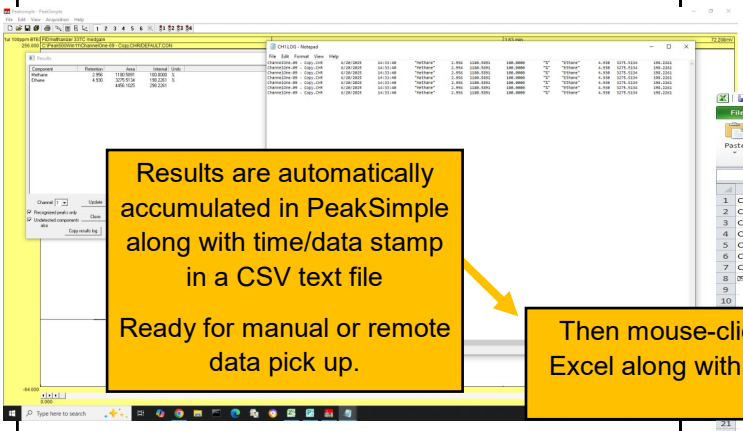
Calibrate each peak up to 7 levels using quadratic or linear curve fitting. Average 3 replicates. Auto-recalibration possible.



See one data channel or up to six on screen.

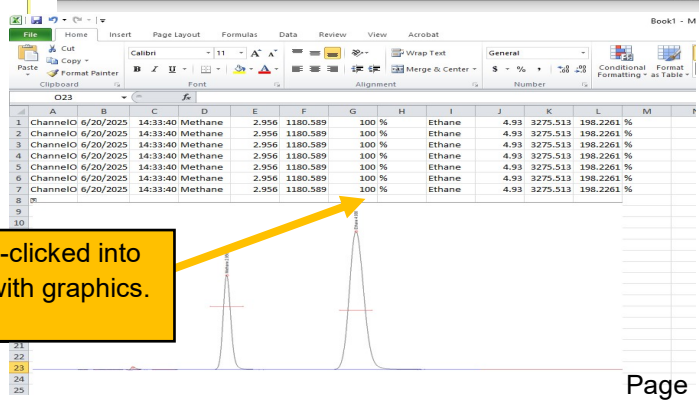


3D display makes it easy to spot trends visually. See the whole day's work in one screen.



Results are automatically accumulated in PeakSimple along with time/data stamp in a CSV text file

Ready for manual or remote data pick up.



Then mouse-clicked into Excel along with graphics.

Multiple Gas #5 GC (Gas Chromatograph)

This is a typical MultipleGas#5 (MG5) chromatogram of 1% each gas standard using argon carrier gas.

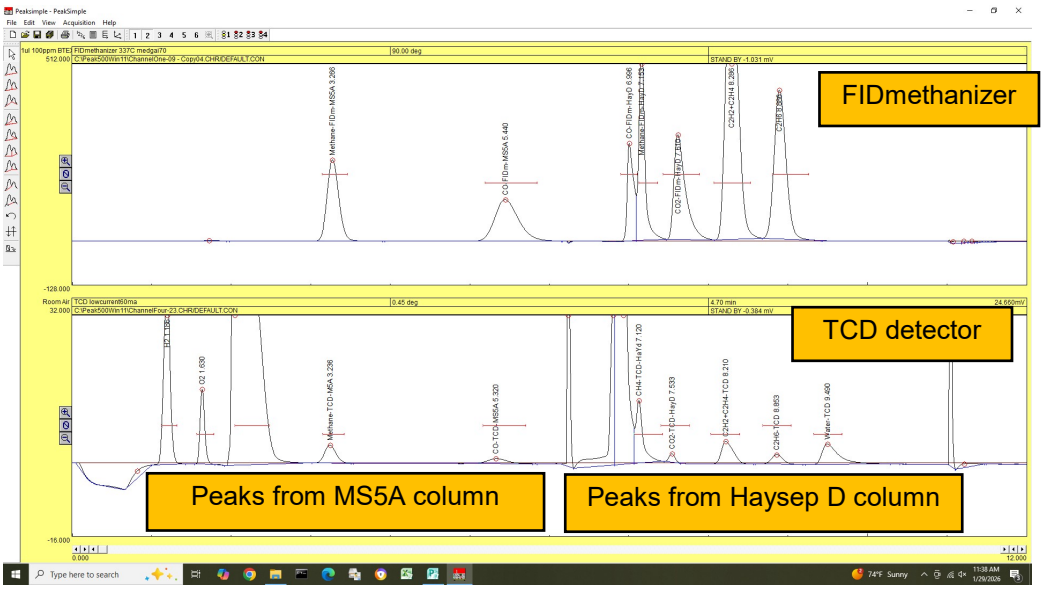
Peaks are:

Hydrogen, Oxygen, Nitrogen, CO, CO2, methane, ethylene, ethane and water.

Many peaks appear on both the TCD and FIDmethanizer detector channels.

The TCD data is used for H2, O2 and N2 which do not detect on the FIDmeth and also peaks at high concentration which would overload the more sensitive FIDmeth.

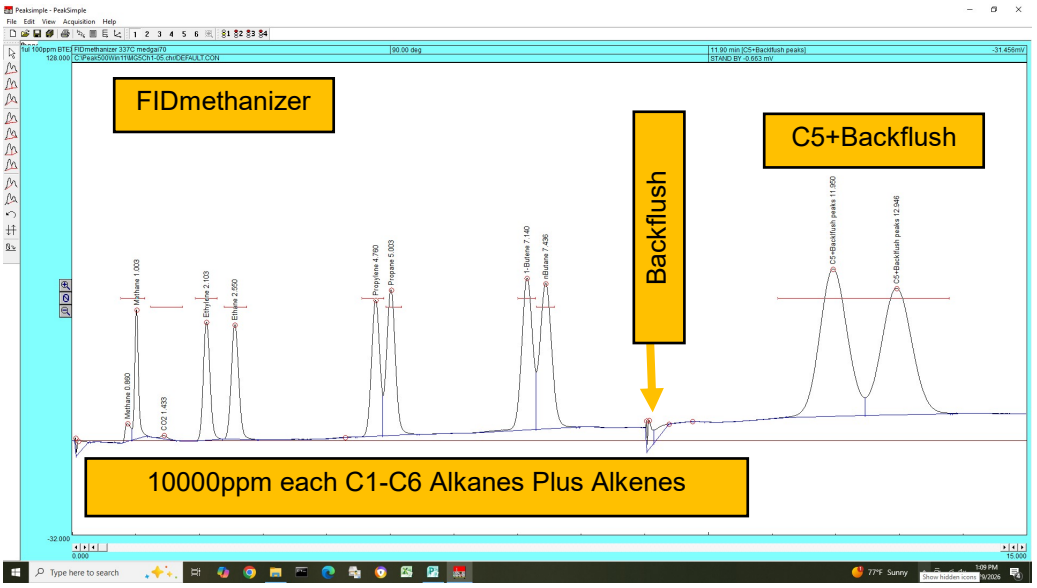
The different color backgounds help distinguish separate instances of PeakSimple when operating more than one GC on a single PC.



This chromatogram shows 1000ppm each C1-C6 Alkanes plus Alkenes.

The gas sampling valve backflushes (reverses the flow direction through the column) the Haysep D column after the butanes in this chromatogram, so there are no leftover molecules to contaminate the next analysis. The backflush can occur at any point in the chromatogram so if you don't care about any molecules after propane you could backflush earlier and see a C4+ group of peaks instead of a C5+ group.

The benefit of the backflush arrangement is that all peaks are measured even if not speciated (individually identified).



This chromatogram shows a 1ul manual syringe injection of 2500ppm alcohols in water using the on-column injection port.

This demonstrates the ability of the MG5 GC to handle gas or liquid samples.

For higher boiling liquids like gasoline or diesel its easy to change from the standard 6' Haysep D column to any .53mm capillary column.