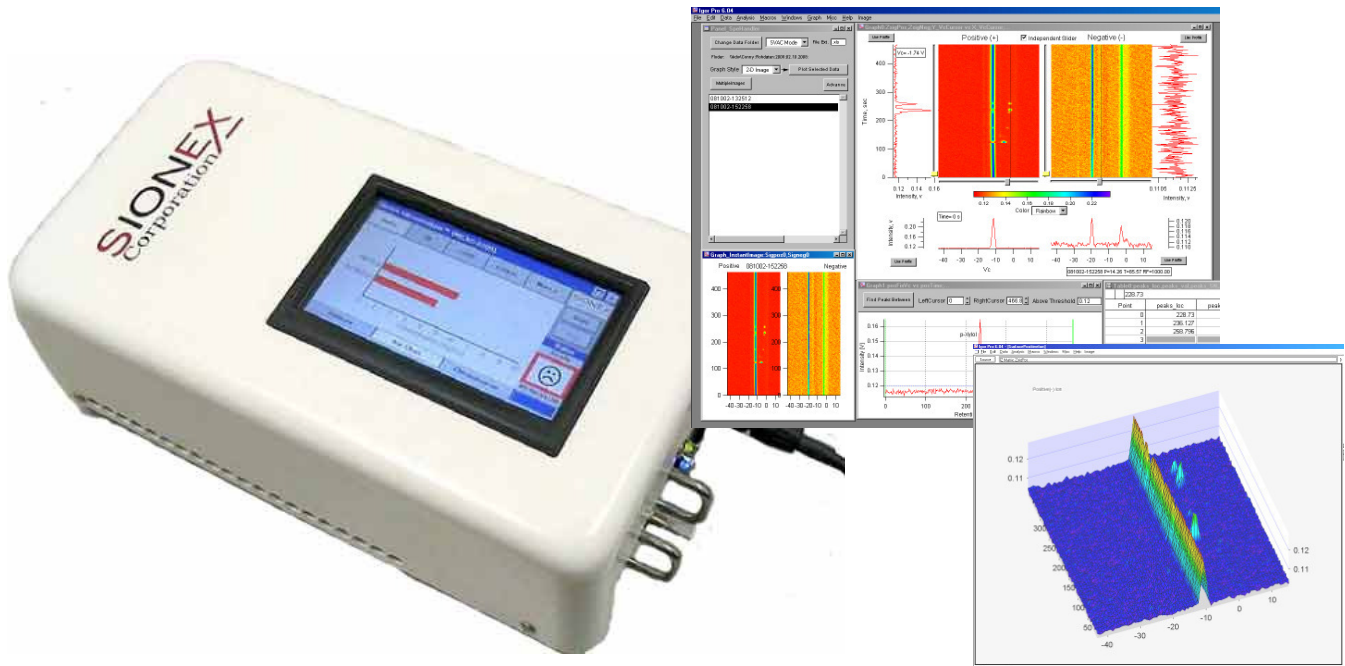


## Innovative Detection Technology

### microAnalyzer™



## Gas Chromatography and Differential Mobility Spectrometry for Ultra Trace Detection

- Higher Sensitivity
  - Greater Selectivity
  - Smaller Size
  - Field Deployable

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# Innovative Detection Technology

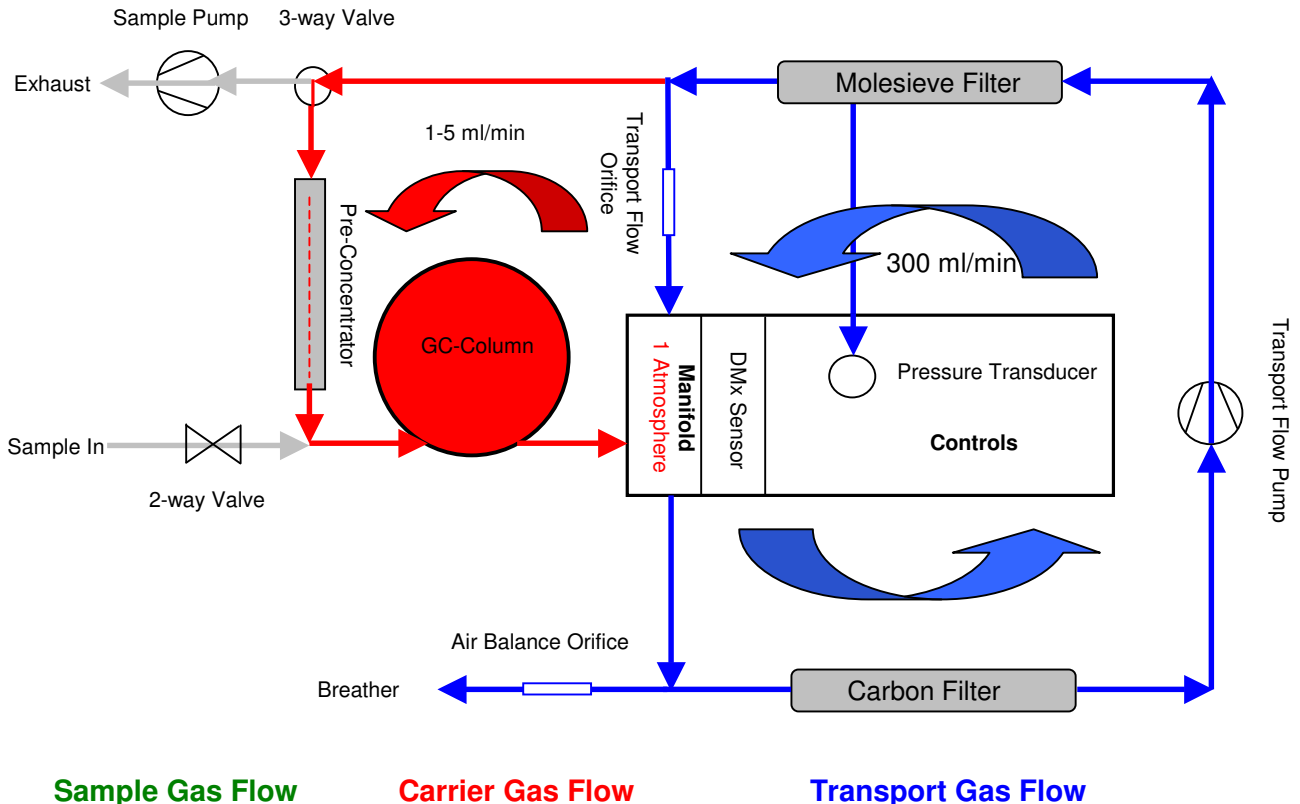
## Description

The Sionex microAnalyzer has a GC separation module as the heart of the system while the brain of the system is the microDMx detection technology. Incorporating these two independent but complimentary technologies enables the system to take advantage of the benefits of each.

Conventional GC separations have been fairly lengthy and are not well suited to fast detection requirements; typically GC separations can be up to 20-30 minutes in length. However, since the detection technology being employed here has some degree of separation itself, the separation can be shared between the GC and microDMx.

This enables the GC to be operated much faster while not adversely compromising the total system resolution. The sampling system incorporated into the microAnalyzer utilizes a pre-concentrator which allows extremely low concentrations of compounds to be detected.

The entire system operates in a fully automatic manner where the sample is taken into the pre-concentrator for a specific time; the sample is subsequently thermally desorbed into the gas chromatographic separation module and transferred to the microDMx for specific detection.

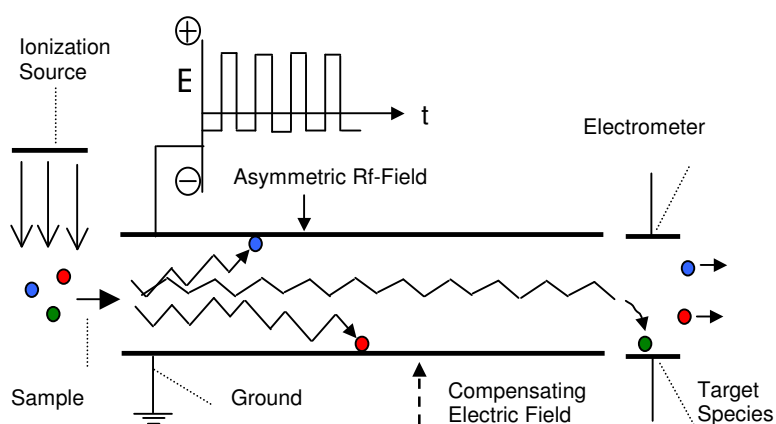


*The microAnalyzer flow schematic*

## The microDMx technology: basis of operation

The microDMx detection technology employs ionization of the target compounds which is achieved by the use of a Ni63 radioactive source or other non-radioactive source, UV.

A trace gas is ionized and the resultant ions are transported through the tunable ion filter region by a drift gas such as air. An oscillating asymmetric radio frequency electric field – “Rf” - (typically 1 mega Hz and ranging from 500 to 1500 volts) and a DC compensation electric field are applied across two parallel plates that are 0.5mm apart. This configuration produces a programmable high-field mobility filter. The RF field is applied perpendicular to the motion of the ions which causes the ions to move with a “zigzag”, up/down motion as the field is applied based upon their mobility characteristics.



Ions, whose movement up and/or down causes contact with either of the plates, are neutralized and consequently pass by the electrometers at the end of the channel without being detected. On the other hand, those ions whose net movement allows them to pass through the filter without touching the plates are subsequently detected.

In order to make the microDMx sensor tunable, a perpendicular DC tuning field, known as the compensation voltage (“Vc”), is also applied.

This DC field is superimposed on the oscillating asymmetrical field and keeps the ions of interest centered between the plates and thus detectable by the electrometers.

The electric field conditions required to permit a particular ion to pass through the filter to the detector are specific to each ion species. The compensation voltage can be adjusted to allow only specific ions to pass through the sensor.

### ***Compound Classes Detect:***

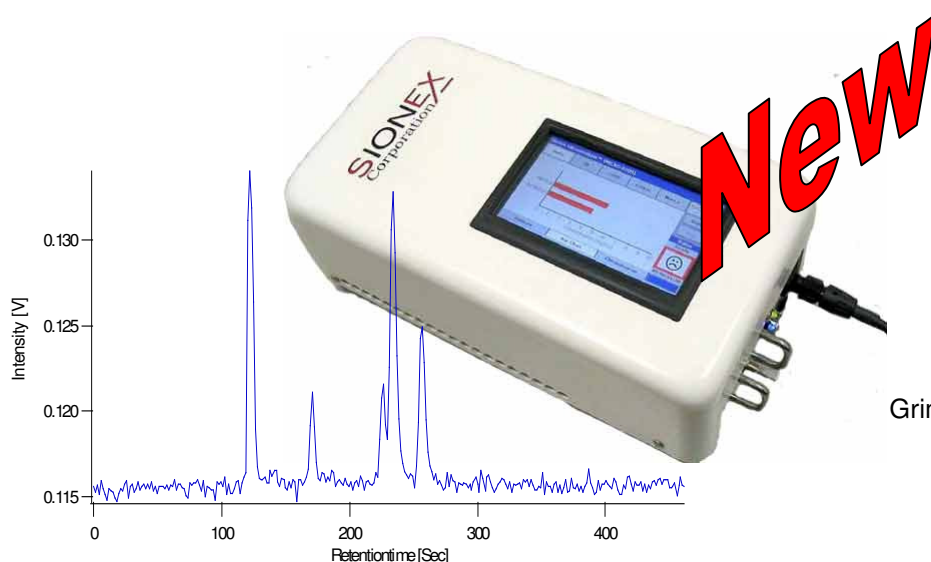
- Alcohols
- Aldehydes
- Alkanes, Alkenes, Alkynes
- Ammonia
- Aromatics (BTEX)
- Esters
- Fatty Acids
- Halogenated (Chlorine, Bromide, Iodine)
- Hydrogen Cyanide
- Hydrogen Sulfide
- Ketones
- Organosulfates (Mercaptans)
- Organophosphates

### ***Typically Applications:***

- Threat Detection
- Process Control
- Monitoring
- Medical Diagnostics

# Innovative Detection Technology

Specifications	
Quantization Range	ppt (trillion) to ppm (v/v) Dependant on application
Accuracy	+/- 10% (after calibration)
Repeatability	+/- 2% to +/- 5% RSD for 20 measurements for final quantitation.
Stability	< 2% RSD on a series of 20 consecutive runs and no more than 5% change in response over two weeks.
Chassis Dimensions	Length 9.5" (248 mm) Heigth 3.5" (97mm) Width 5.25" (134 mm)
Weight	3.8 lbs. (1.7 kg)
Input voltage	24 Volts 5 Amps
Power	120VAC/220VAC 50/60HZ
Operating Environment	Temperature = 10 °C to 30 °C Humidity = 0 to 95% RH non-condensing Max Altitude = 6,000' (1829 m)
Storage Temperature	0 °C to 80 °C
RF Voltage (V <sub>RF</sub> ) (Set in Expert Software)	Range 0V to 1500V Frequency 1.2 MHz +/- 0.1 MHz Duty Cycle 30%
Compensation Voltage (V <sub>C</sub> )	Range -40V to +15V (Set in Expert Software)
Ionization Source	<sup>63</sup> Ni foil tube - Nominal activity < 100 MBq (below the European exemption limit) UV-Lamp – 10.6 eV
Sample Gas Flow Rate	nominally 100 ml/min
Sample Gas Temperature	25 – 50 °C May be application specific.
Sample Gas Humidity	0-95% non-condensing
Sample Gas Pressure	Ambient pressure
Sample Gas Purity	Less than 5 micron particulate
Product Compliance	Designed to be compliant with UL, CE, CSA



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