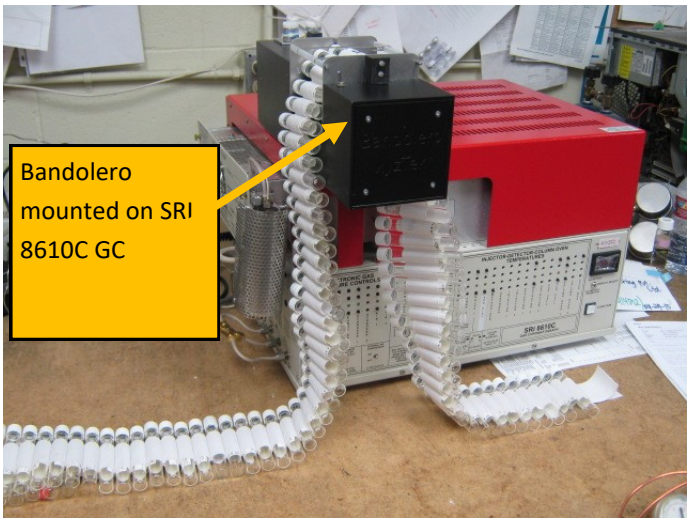
Bandolero Autosampler

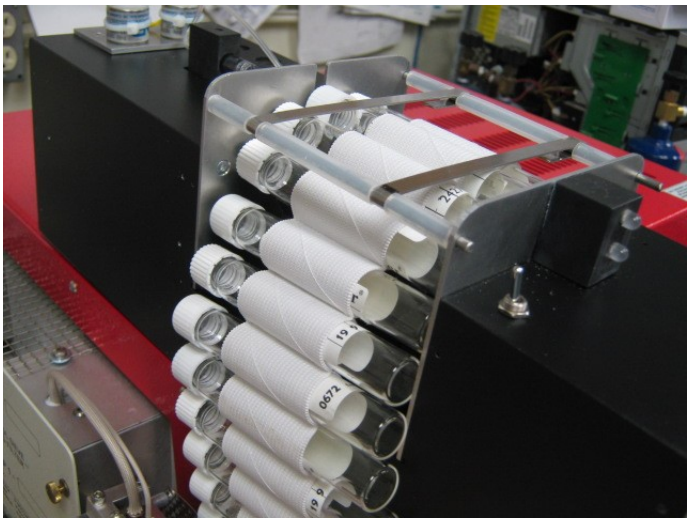
May 2023

The “Bandolero” autosampler for 12 ml Exetainer vials is a low cost solution for Greenhouse Gas applications and other gas samples.



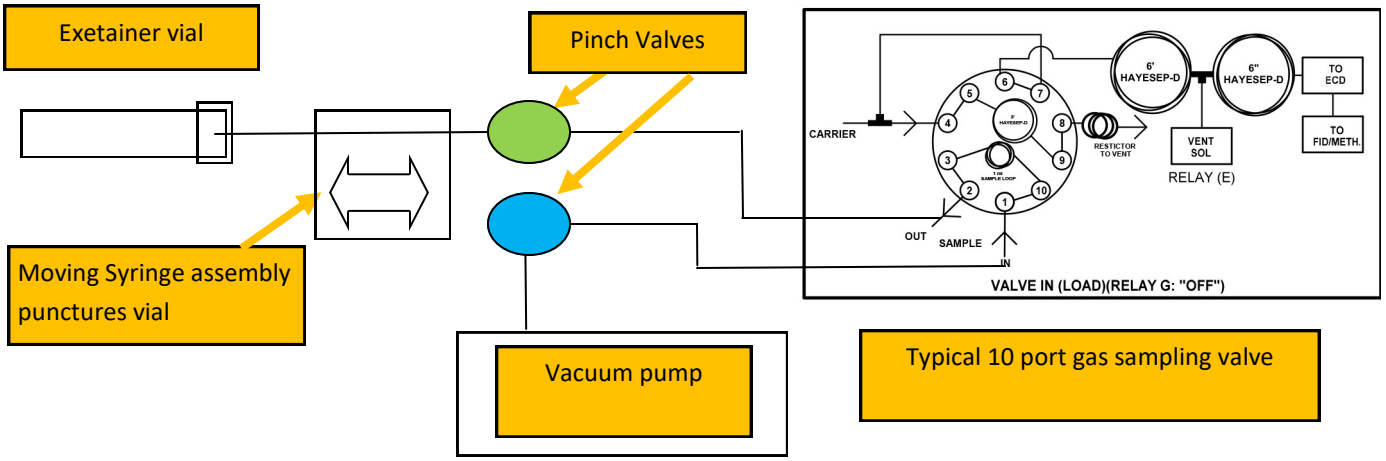
The 12ml Exetainer vial is widely used to collect samples in the field and costs about 90 cents.

The “Bandolero” comes with a 100 vial belt



Bandolero Autosampler

May 2023



The “Bandolero” autosampler starts its cycle when the GC ready signal illuminates.

1) The Blue pinch valve opens to let the vacuum pump evacuate the sample loop.
2) The Blue valve closes leaving the loop under vacuum
3) The syringe punctures the vial.
4) The Green pinch valve opens allowing the sample to flow into the sample loop.
5) The syringe retracts, allowing ambient air to flow into the tubing connecting the syringe to the sample loop. The air does not reach the loop, but allows the loop to equilibrate to ambient pressure.
6) The 10 port valve injects the loop contents.

To order: Price as of Sept 2025. Price subject to change

8640-1000 “Bandolero” vial autosampler with 100 vial belt. $10,000.

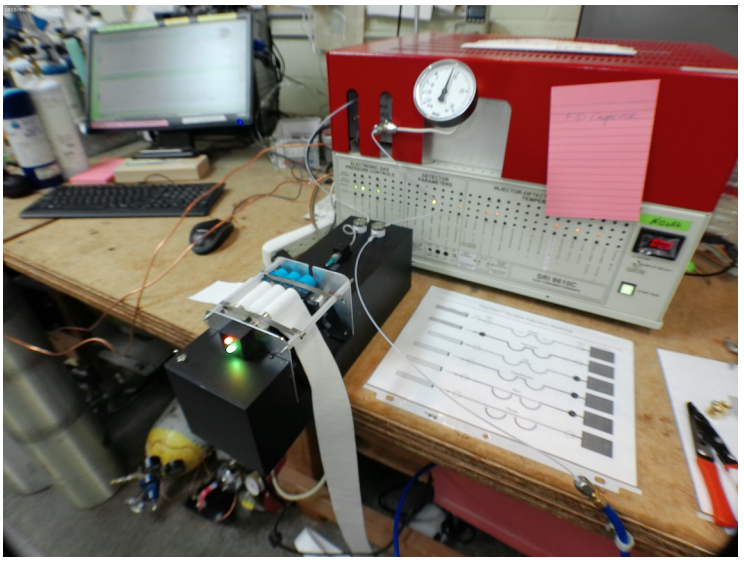
With universal 12volt power supply

If purchased with an SRI GC, there will be a power plug which can be controlled from the PeakSimple software into which you can plug any vacuum pump up to 200watts. The vacuum pump itself is ncluded.

Bandolero Autosampler

May 2023

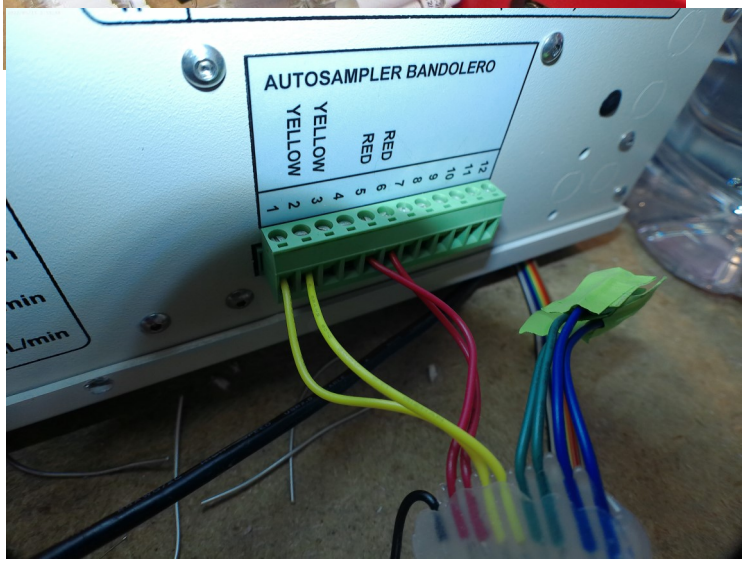
This photo shows the Bandolero connected to a SRI Greenhouse Gas GC. Exetainers are commonly used to collect gas samples in the field.



The Bandolero can mount anywhere the belt containing the Exetainers is free to travel.

The Bandolero interfaces to the GC with two sets of wires. The two yellow wires start the Bandolero cycle when the connection between the yellow wires is broken (open contact) not when the contact is closed.

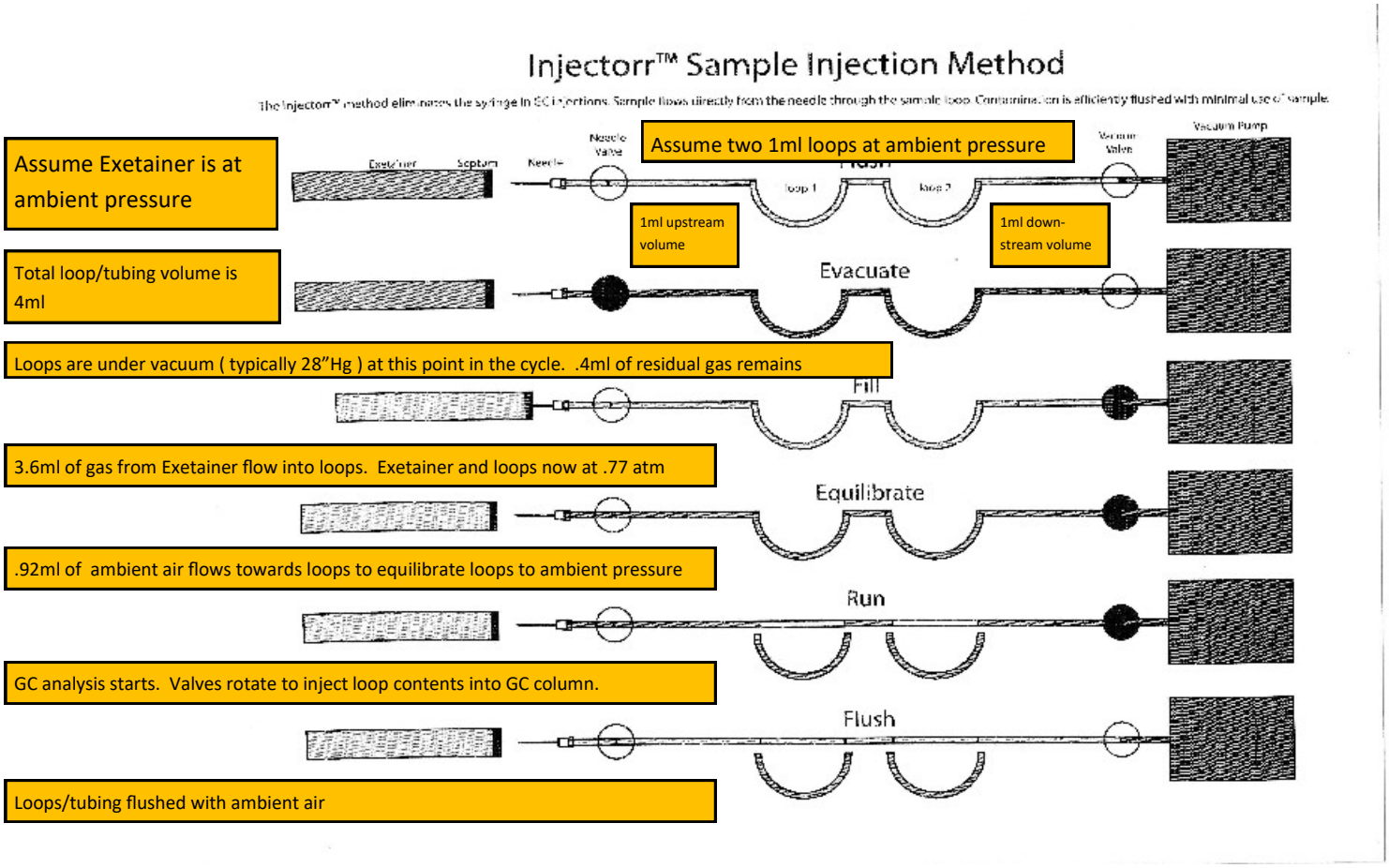
The two red wires start the GC when the Bandolero equilibrates the loop contents.



Note that the yellow wire label on the GC is wrong, but the wires are connected correctly.

Bandolero Autosampler

May 2023



This diagram shows the Bandolero cycle. It is important to understand that the vacuum pump evacuates the loop(s) to some pressure like 28”Hg (about .1 atmosphere) but not to absolute zero pressure. So there are still some gas molecules in the loop when the needle punctures the Exetainer. The residual gas molecules have to go somewhere so the volume between the loop and the downstream pinch valve has to be large enough to contain those molecules when the loop equilibrates to atmospheric pressure.

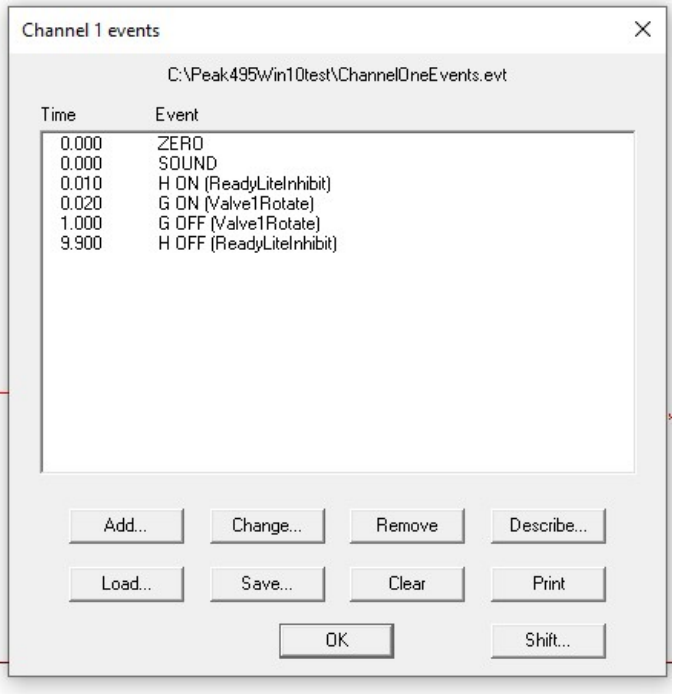
Similarly, the volume of the tubing between the upstream pinch valve and the loop has to be large enough that the slug of ambient air which flows towards the loop (in the fill part of the cycle) does not reach the loop.

Bandolero Autosampler

May 2023

A typical Event table used with the Bandolero is shown.

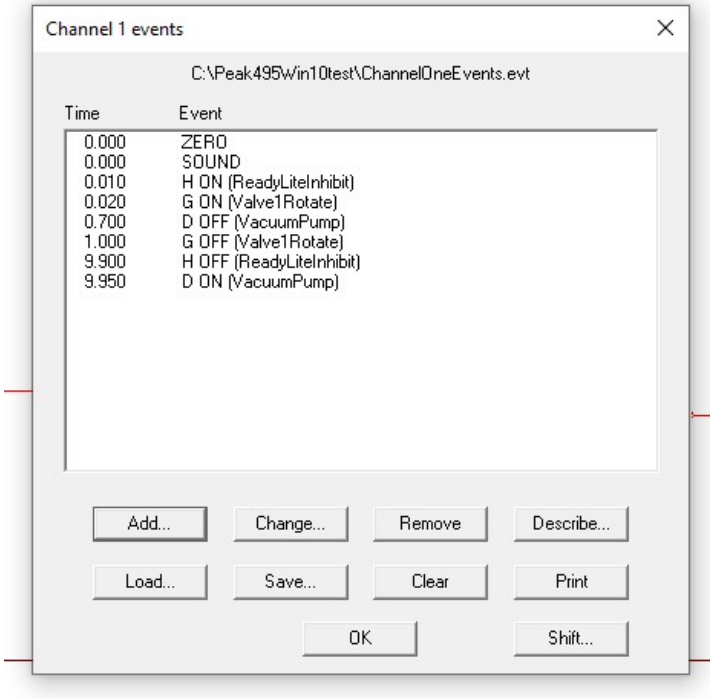
Relay H inhibits the Ready lite on the GC from illuminating. The Bandolero is waiting for the Ready lit to start its next cycle so Relay H makes sure it stays off until the GC is really ready for the next run. Relay H turns off at the end of the run 9.9 minutes.



Here is the same event table but the vacuum pump is turned off by Relay D at .7 minutes. The Bandolero has finished its cycle by this time so no need to keep the vacuum pump running.

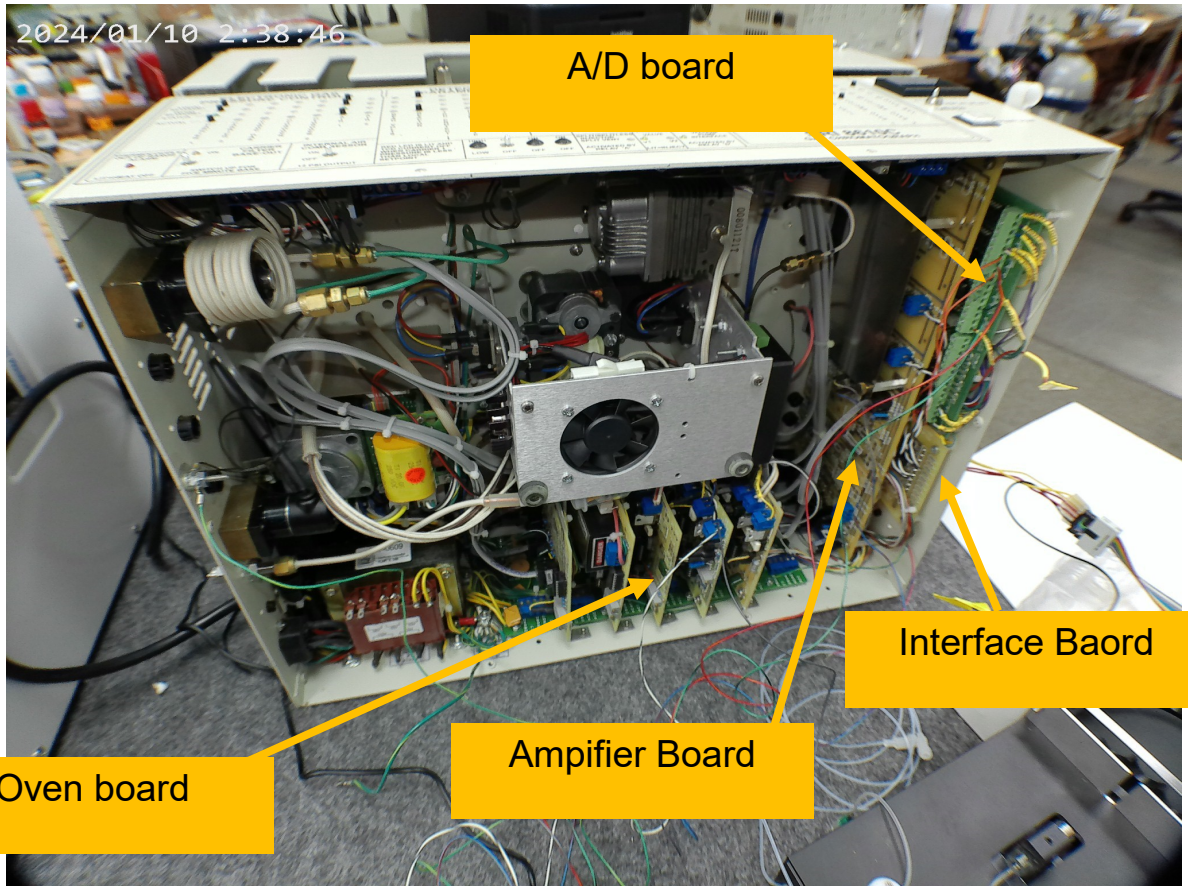
At 9.95 minutes Relay D turns the vacuum pump back on in preparation for the next Bandolero cycle.

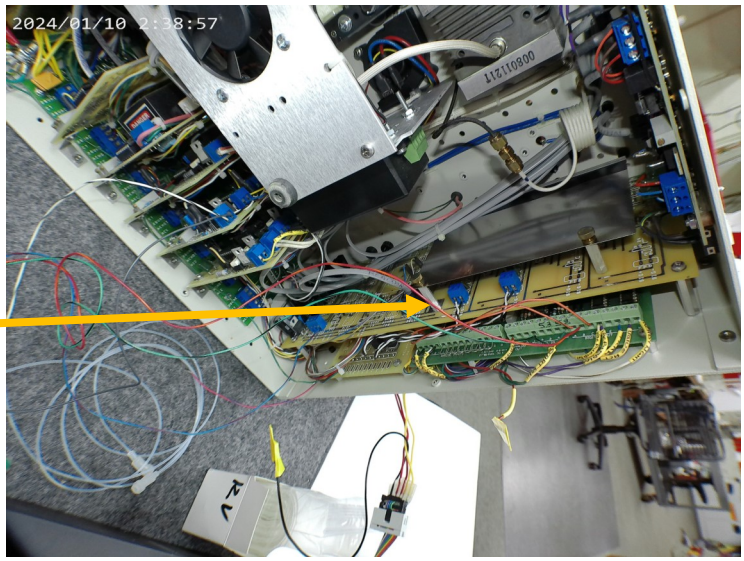
To make this work, Un-check the box in the Edit/Overall screen labelled “Reset Relays at End of Run”



Bandolero Autosampler Installation

December 2024





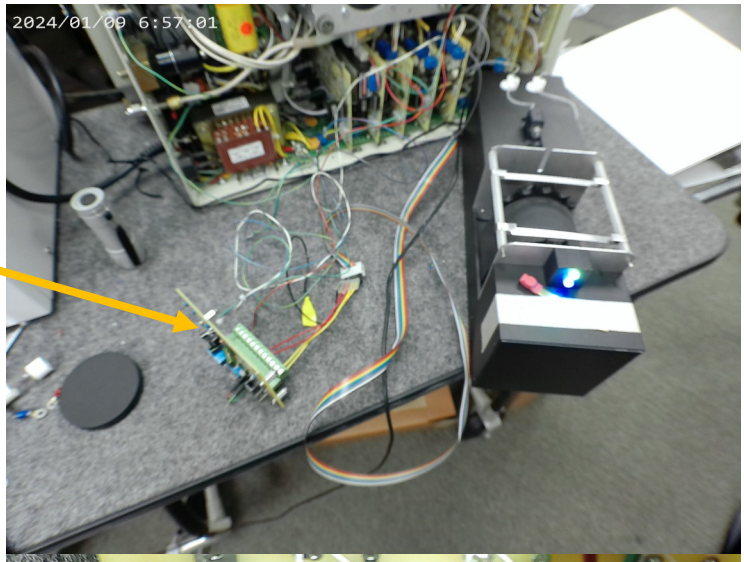
Different view of amp. A/D and interface boards

Bandolero Autosampler Installation

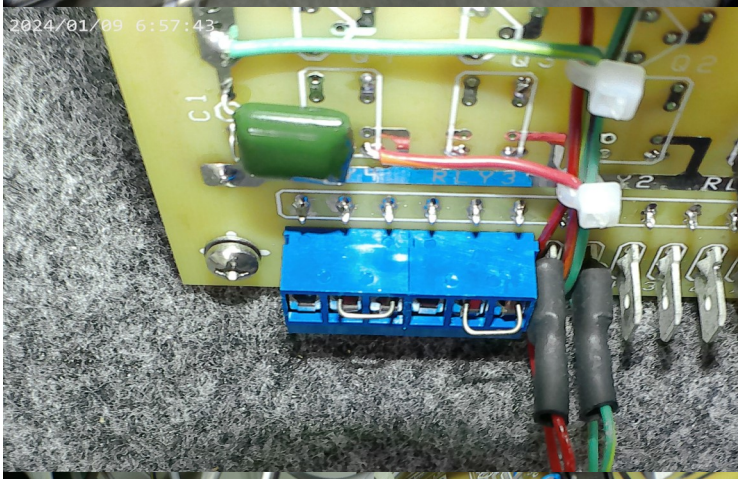
December 2024

The Bandolero Autosampler is controlled by a small interface board which is mounted in the SRI GC.

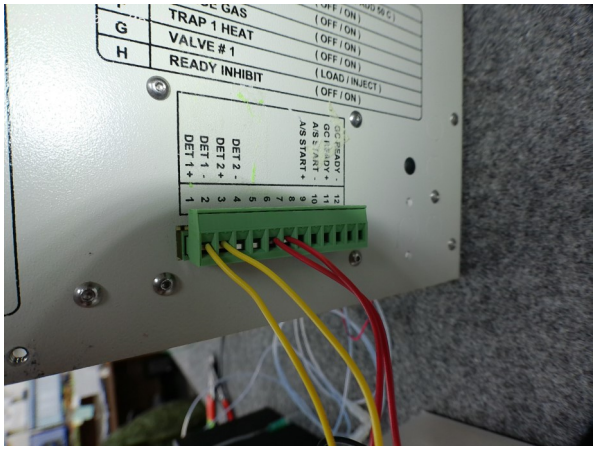
This photo shows the board with many wires connected from it to the GC before the board was physically mounted in the GC.

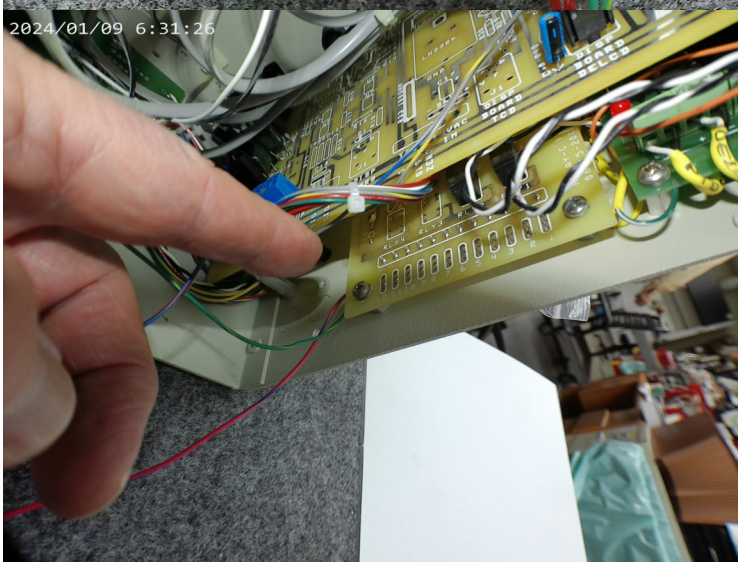


Verify that there are two jumper wires connected to the board in the positions shown.



The interface board will be mounted underneath the amplifier board so that the green connector part of the board projects thru the GC's right side where there is a pre-punched hole.



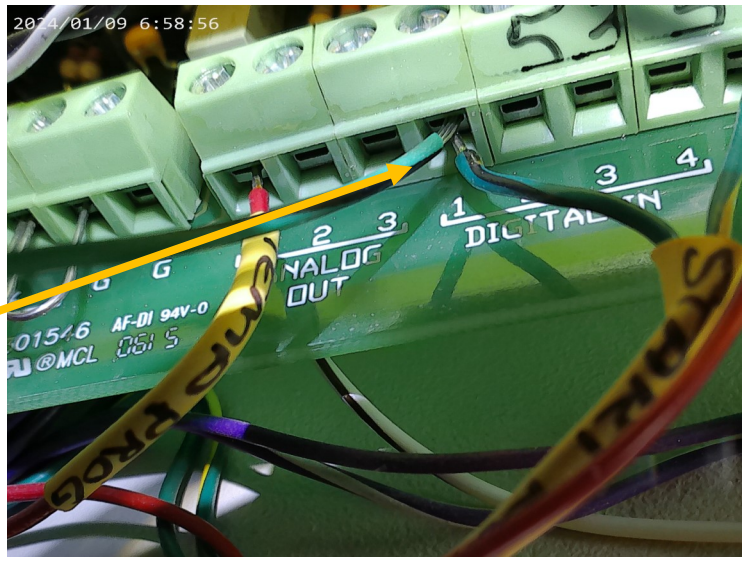


The wires connected to the interface board are color coded.

When we say green/black it means the wire is green with a black stripe.

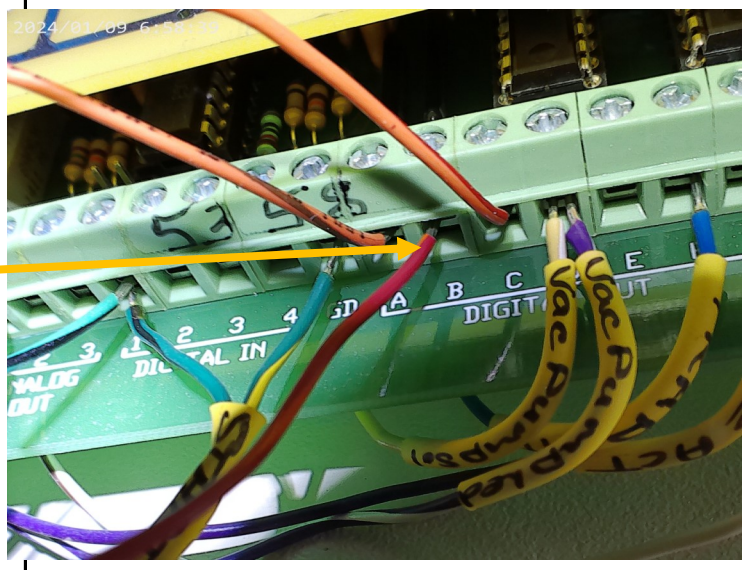
The green/black wire is connected to the “Digital In 1” terminal on the A/D board.

There will probably already be a green/black wire in this terminal from the start switch on the GC front panel. This wire is used to start the GC run. Both green/black wires can be connected to this terminal so the GC can be started either from the front panel or from the Bandolero.



The red/orange wire is connected to “Digital output B” on the A/D board.

This wire gives the Bandolero permission to run when Relay B is activated.

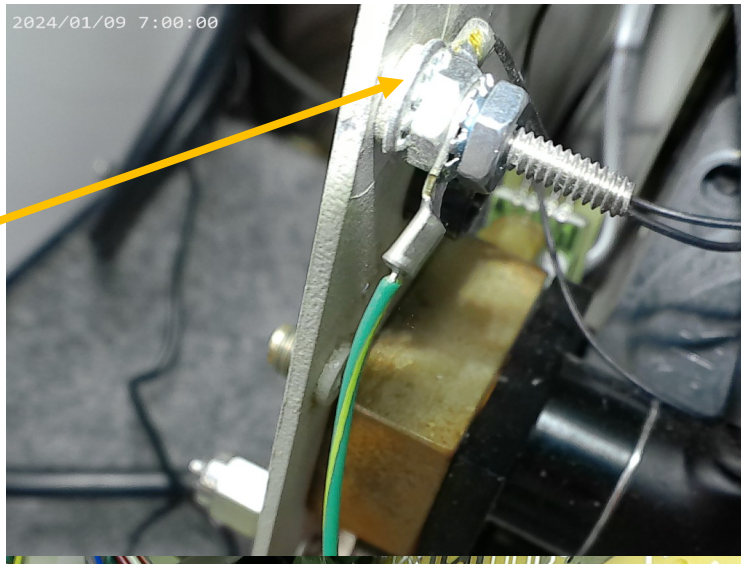


Bandolero Autosampler Installation

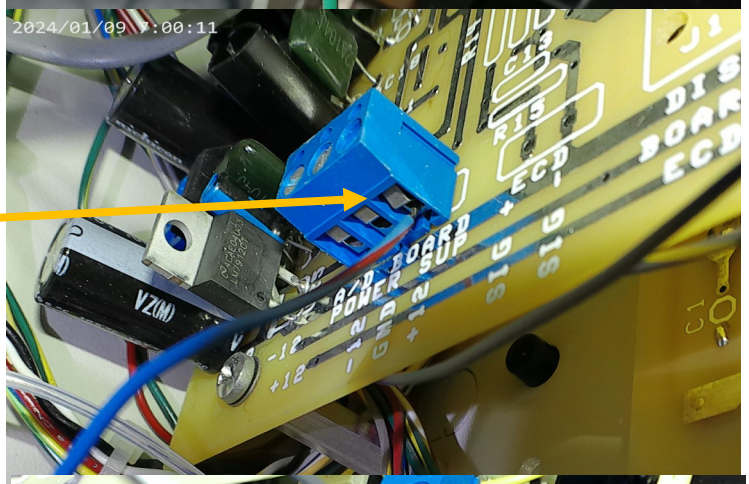
December 2024

The green/yellow wire is connected to one of the chassis ground studs located at various points around the inside of the GC chassis.

There will usually be a ring terminal crimped onto this wire already.

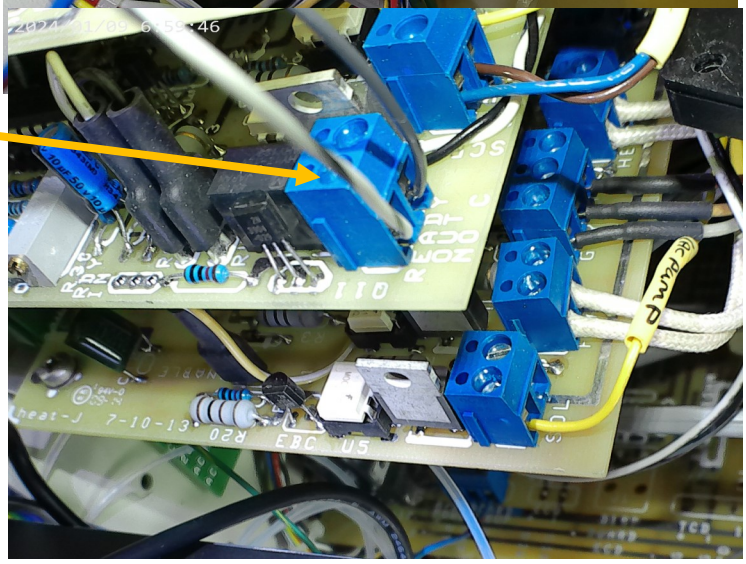


The blue/red wire is connected to the +12 volts terminal on the amplifier board. This wire powers the interface board.



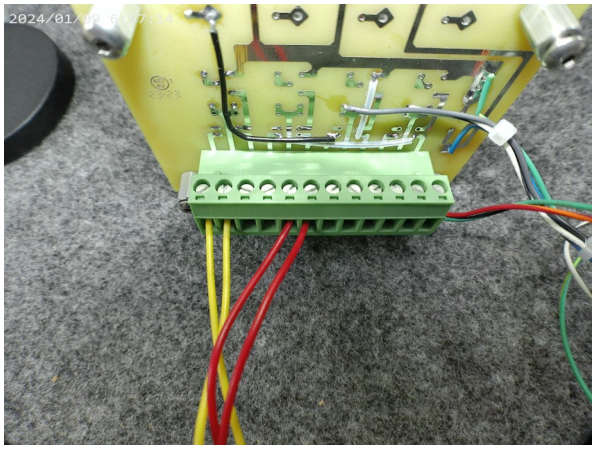
The grey and white/grey wires are connected to the “oven” board where there is a two position terminal block at the edge of the board. This relay closes when the GC ready light illuminates.

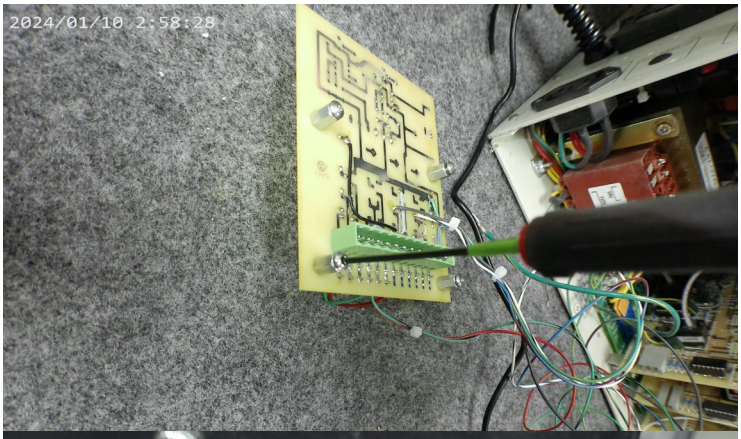
This triggers the Bandolero to start a cycle as long as Relay B is also activated

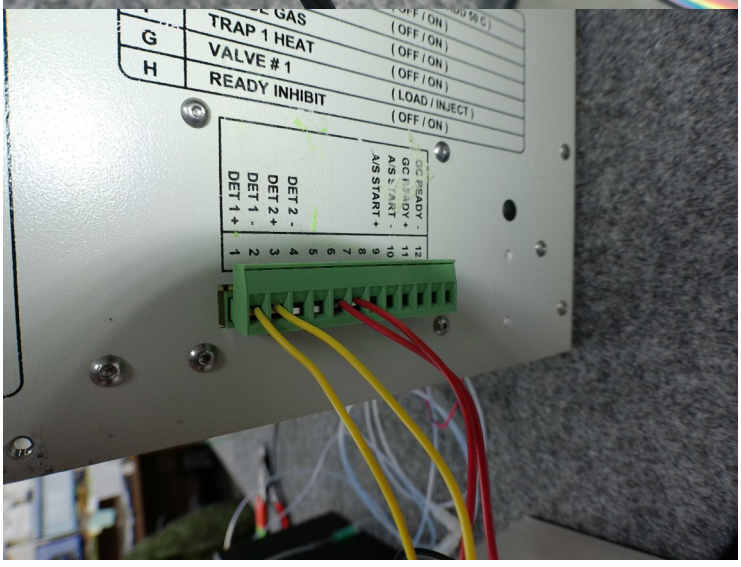


Once the wires are connected, mount the interface board so the external green connector protrudes thru the pre-punched hole in the GC's right side.

Connect the multi-colored flat cable from the back of the Bandolero to the green connector. The multi-colored cable is broken out into two yellow and two red wires. It does not matter which yellow wires are connected to which screw terminal as long as they are connected to the correct screw terminals





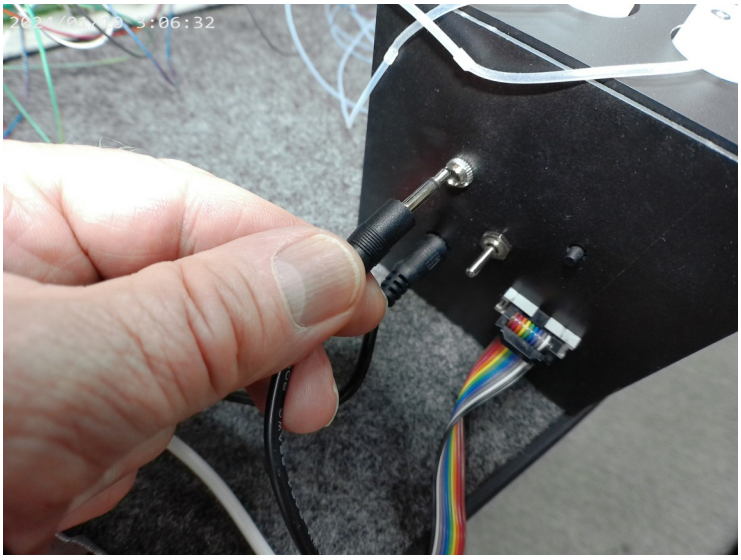


Bandolero Autosampler Installation

December 2024

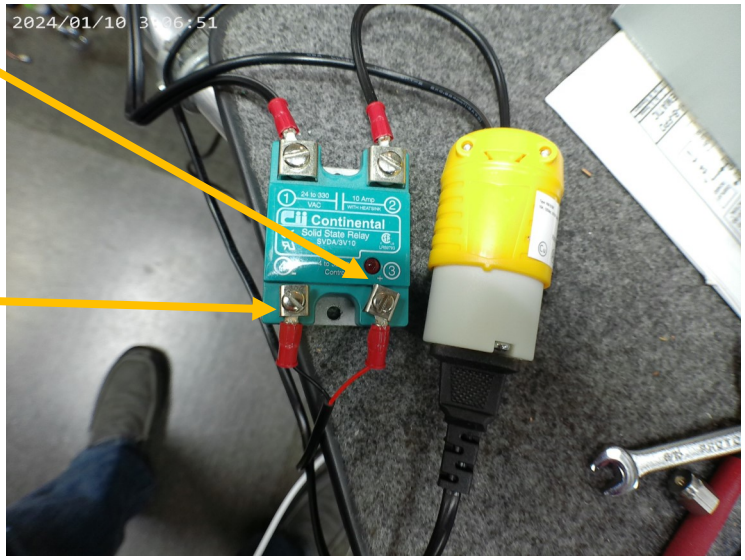
Plug the Bandolero supplied red and black wire cable into the back of the Bandollero to control a vacuum pump.

The vacuum pump does not need to run constantly and its much quieter if it only operates during the part of the Bandolero cycle where is evacuates the sample path.



The red wire goes to the + input of a zero crossing solid state relay (SSR) like the one shown in the photo.

The black wire goes to the - input of the zero crossing SSR.



The other two screws on the SSR control the line voltage powering the vacuum pump. In the photo, a US type power jack is what the vacuum pump plugs into. **User should mount the SSR in a safe location since there is exposed high voltage.**

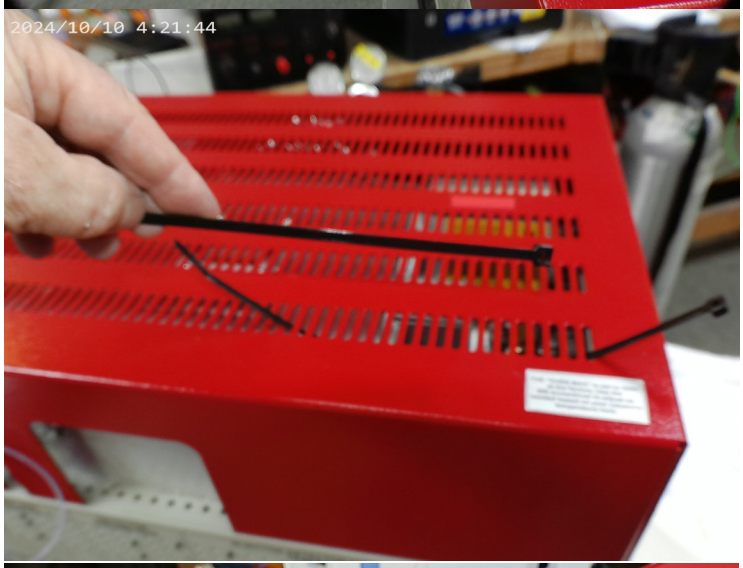
Bandolero Autosampler Installation

September 2025

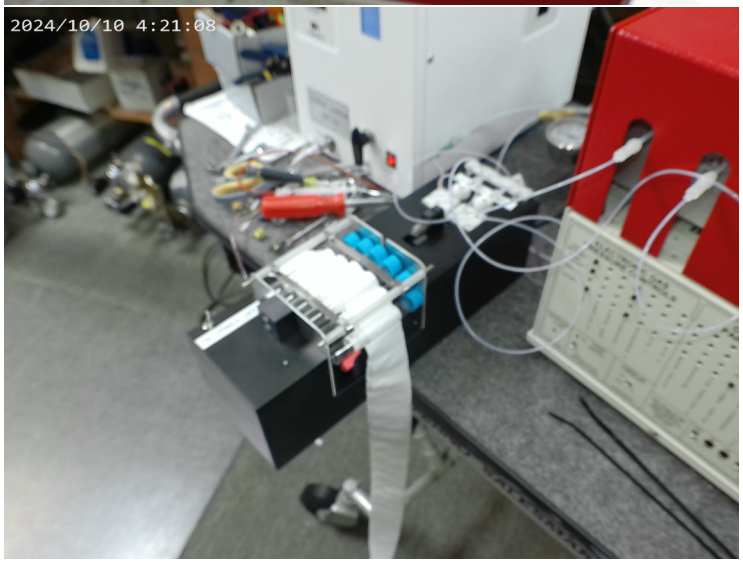
The 2025 version of the Bandolero vial autosampler is shown here attached to the top of an SRI 8610C GC.

This particular GC is intended to measure Greenhouse Gases like methane, CO2 and nitrous oxide.

The Bandolero is secured to the top of the GC with heavy duty tie wraps.



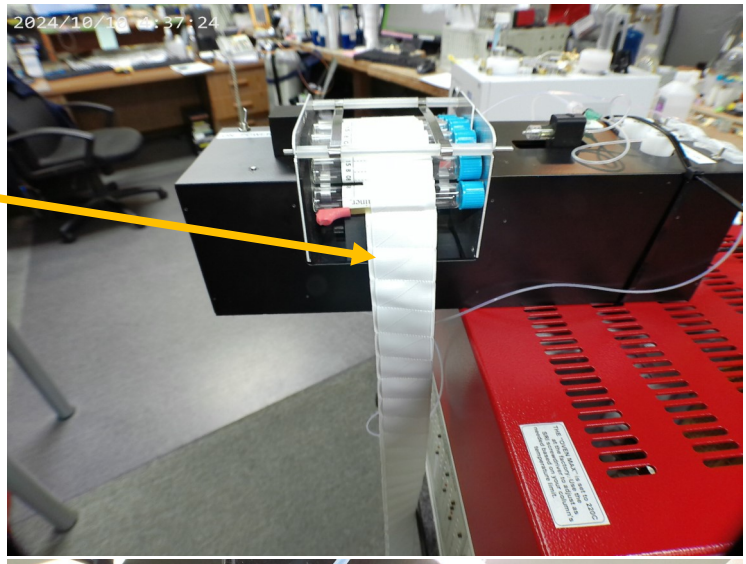
The Bandolero can also be mounted on a bechtop near the GC but must be secured so it can not fall.



Bandolero Autosampler Installation

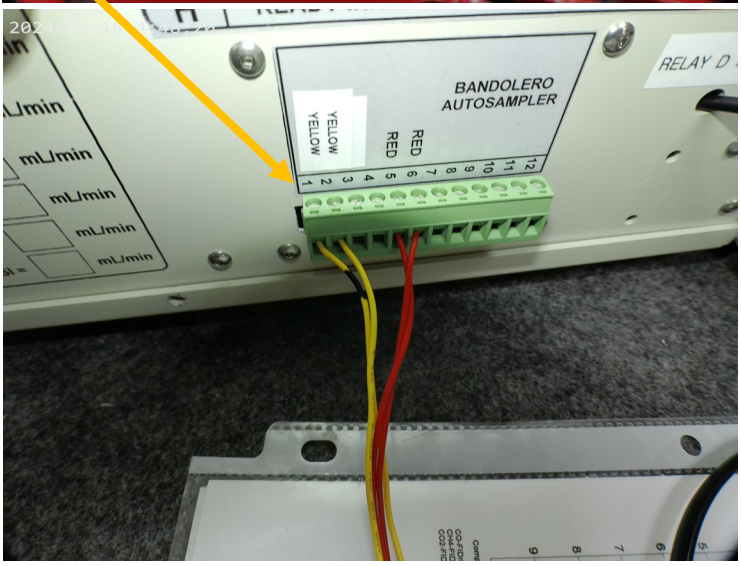
September 2025

The important thing is to locate the Bandolero where the belt can travel freely.



Plug the three wires into the back of the Bandolero:

1) Power from the 12volt 2 am power supply.
2) The phone type plug which goes to the control board inside the GC. This has a green terminal that can be plugged in or removed.
3) The vacuum pump control which goes to a wire that is permanently connected to the A/D board Relay D terminal inside the GC.

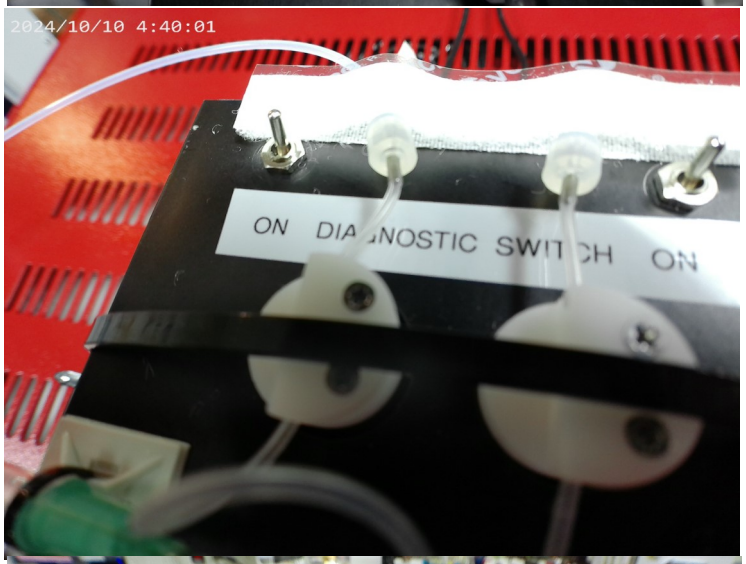


Bandolero Autosampler Installation

September 2025

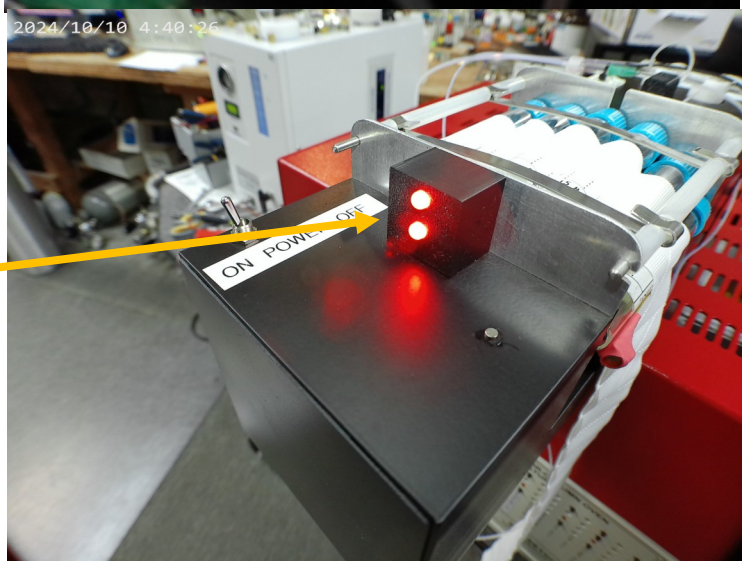
The power switch on the top of the Bandolero is ON when switched towards the front.

The two switches labeled “diagnostic switch are also in the ON position when switched towards the front.



If the power is switched ON and the diagnostic switches are also in the ON position at that time, the Bandolero goes into a diagnostic “test” mode which allows the operator to open and close the two pinch valves manually by flipping the switches.

When both LEDs are RED, both pinch valves are closed (no flow).



Bandolero Autosampler Installation

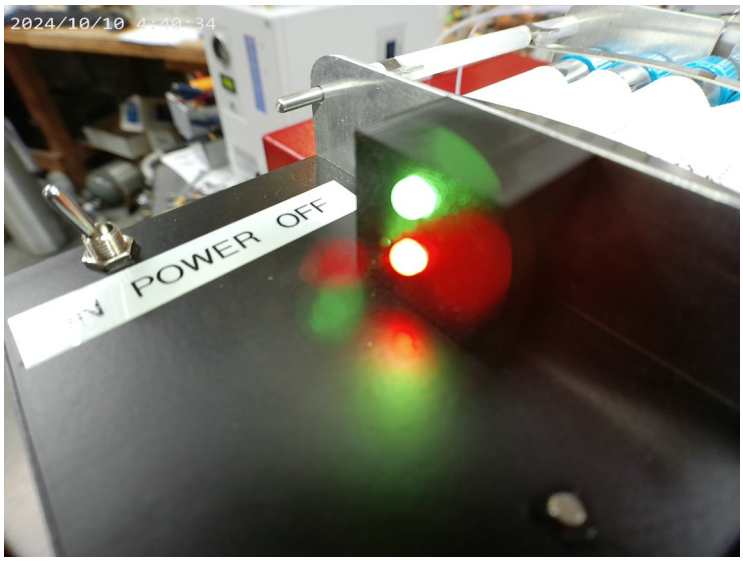
September 2025

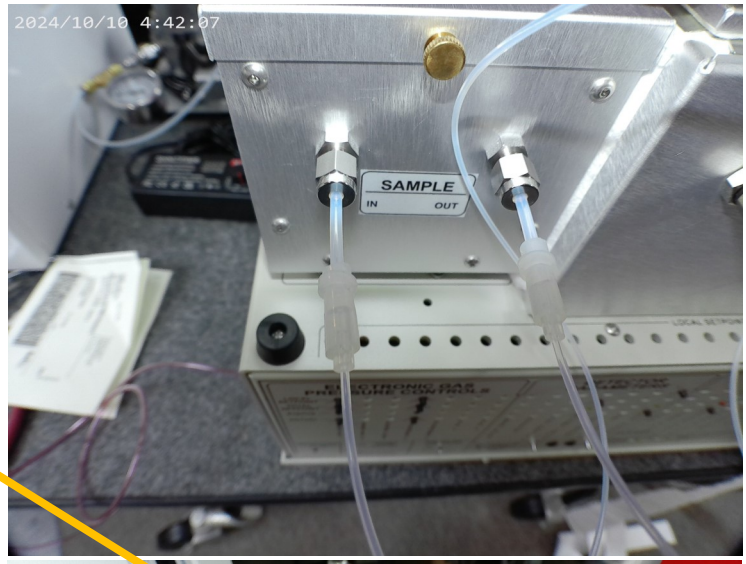
When one switch is flipped to the OFF position the pinch valve closest to the switch is de-activated allowing gas to flow through the silicone tube. One of the LEDs turns green.

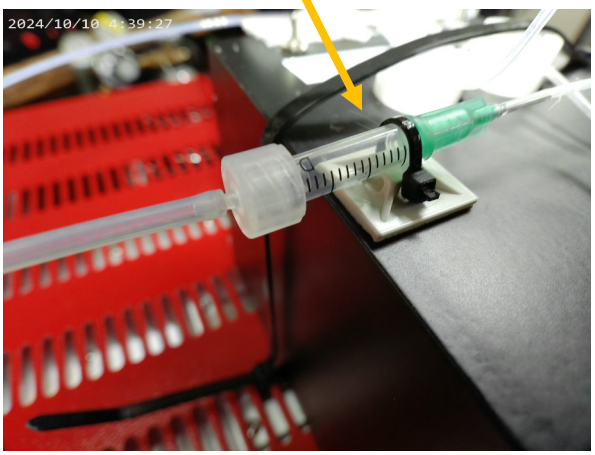
If both switches are activated, both LEDs turn green.

Connect the two small tubes from the pinch valves to the GC's sample in and out fittings. The Bandolero tubes just slide over the 1/8" Teflon tubes attached to the GC

Make sure the vacuum pump is plugged into its power jack on the left side of the GC and the Teflon tube from the vacuum pump is connected to the Luer-lok fitting leading to the right side pinch tube.







Bandolero Autosampler Installation

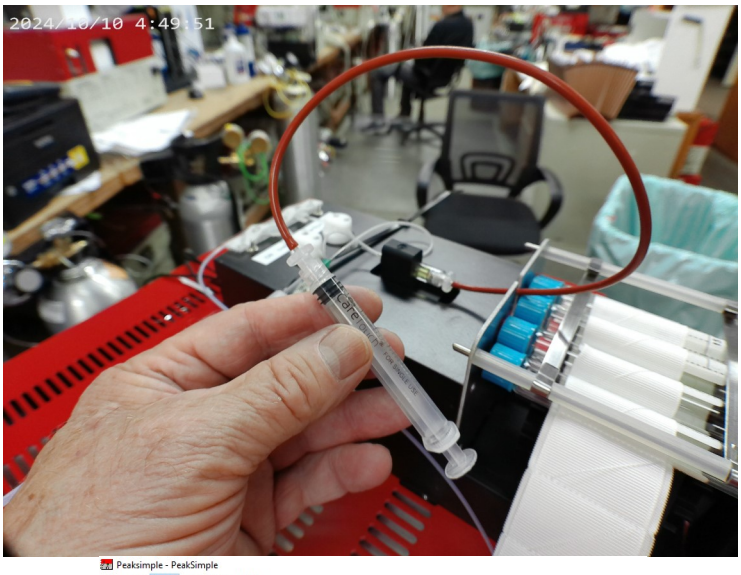
September 2025

Connect a plastic medical syringe to the syringe needle holder on the Bandolero.

The photo shows a 3ml syringe but any size syringe bigger than 1ml will work.

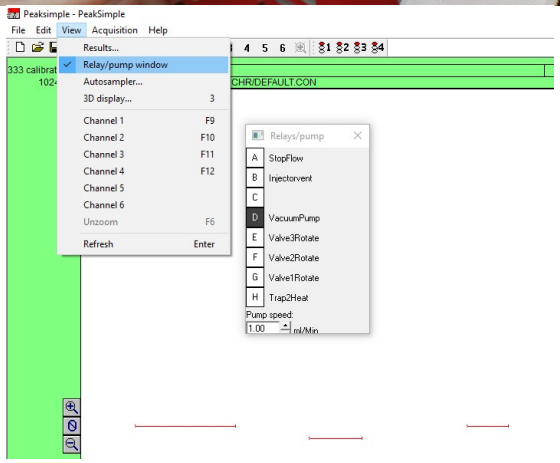
A 50ml syringe is ideal for this test.

Switch both Bandolero switches so both LEDs are green.



Turn on the GC and connect PeakSimple software so the computer is controlling the GC.

Activate (turn on) the vacuum pump using the View/RelayPumpWindow toolbar in PeakSimple.

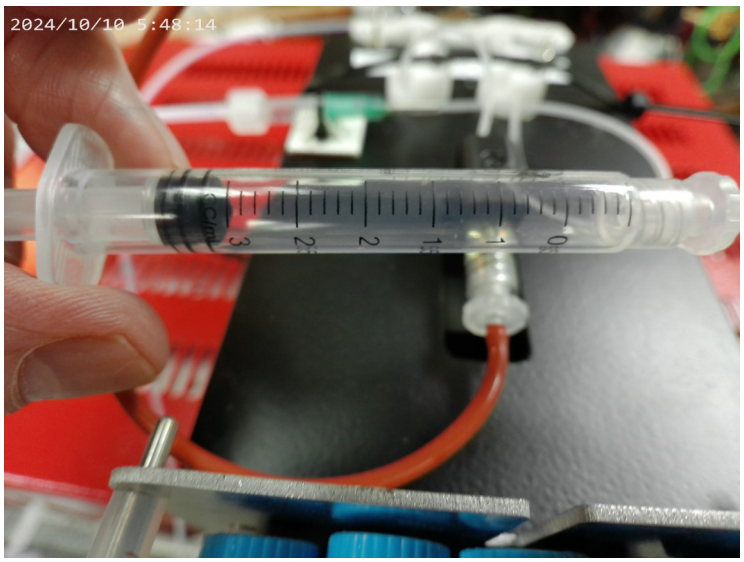


When Relay D is activated the vacuum pump should make some noise and any air in the plastic syringe should be sucked out causing the plunger to move.

This proves that the vacuum pump is working and that there is no blockage in the Bandolero tubing.

Turn off the vacuum pump using the Relay D control in PeakSimple.

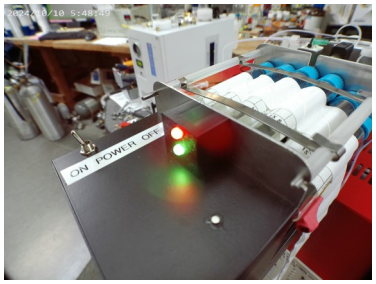
Fill the test syringe with air. A 3-10ml syringe is ideal for this test.



Bandolero Autosampler Installation

September 2025

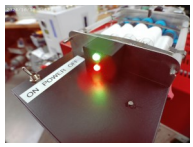
Switch the left side pinch valve to close it. The top LED should be red and the bottpm LED should be green



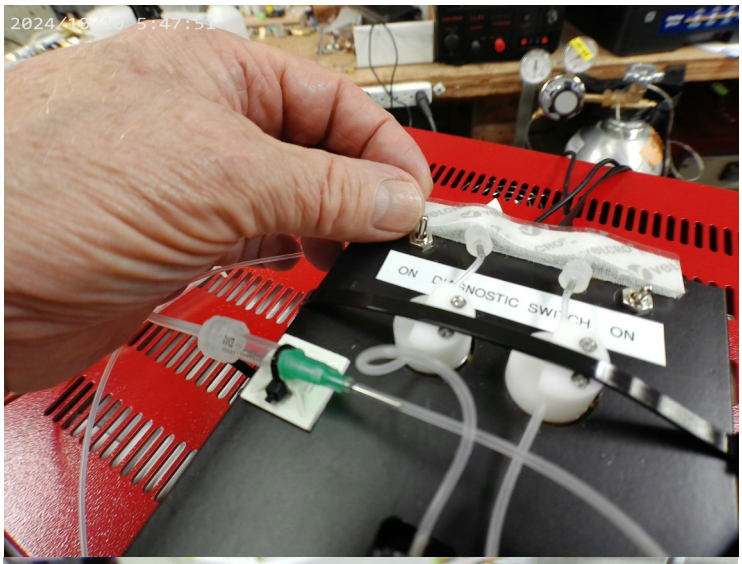
Turn on the vacuum pump from Peaksimple.

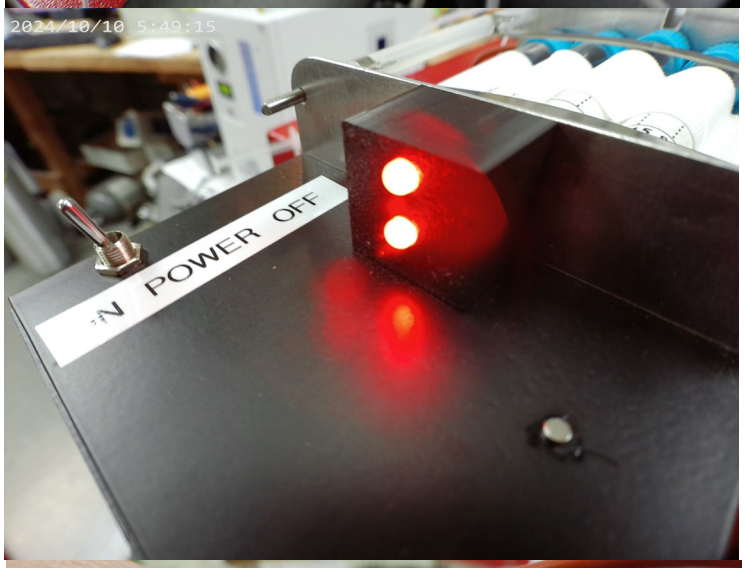
This will evacuate the entire sample path including the loop(s) of the gas sampling valve(s) inside the GC.

Switch the right side switch so both LEDs are red. This traps the vacuum in the sample path. You can turn off the vacuum pump or leave it running for this test.



Switch the left side pinch valve so the top LED is green. The vacuum trapped in the sample path will suck the plunger of the syringe forward and the amount the plunger travels will measure the approximate total volume of the sample path. Do this test promptly as the vacuum in the loop will decay quickly.





Knowing the volume of the sample path is important because you may need to adjust the volume of the tubing between the Exetainer and the GC to make sure that the volume of air which equilibrates the pressure in the loop is not so large that it reaches the loops.

If the Bandolero passes all the diagnostic tests, then verify the operation by comparing the size of a peak (methane for example) when presented to the Bandolero via a 50 ml syringe compared to the sample sample extracted from an Exetainer by the Bandolero.

Connect the 50ml syringe full of sample to the Bandolero syringe and run a Bandolero cycle. The loop inside the GC will be 100% full of the sample in the 50ml syringe.

Fill the Exetainer with the same sample and release any pressure so the Exetainer is at ambient pressure.

Run another Bandolero cycle with the test Exetainer.

The peak (s) from both injections should be identical or close to identical.

If this test is successful, the Bandolero is ready for use.