Mudlogger GC Auto-ranging Feature

June2016

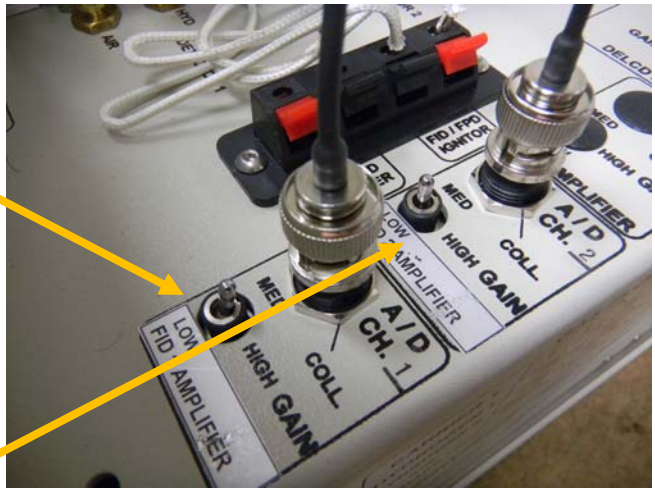
The SRI Mudlogger GC (ML) configuration is available in both RackMount and desktop versions. The RackMount version is shown in this document.

The ML GC includes two FID detectors which are mounted underneath the aluminum noise shield.

FID detector#1 measures the C1-C6+ individual hydrocarbons (the chromatogram) every minute or two.

FID detector#2 measures the Total Hydrocarbons (THC) continuously.

The FID#1 amplifier is normally set to medium gain.



For the auto-ranging feature, the FID#2 amplifier (THC) is set to high. The auto-ranging will automatically switch the gain to medium if the THC signal goes above a certain user selected limit.

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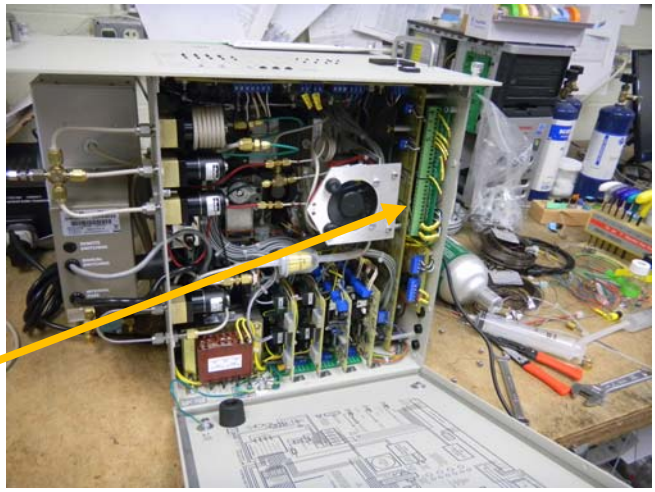
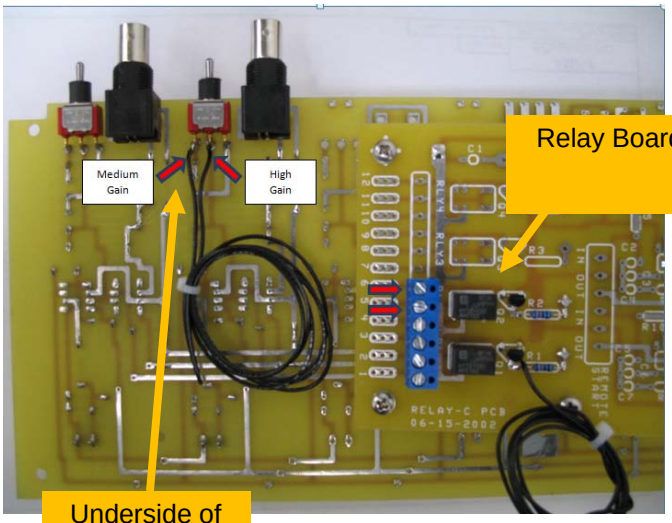
The gain change is performed by the electronics inside the GC chassis. The chassis is packed with electronic circuits so access to the amplifier board is easiest if the front panel is removed.



This is the amplifer board and relay board.

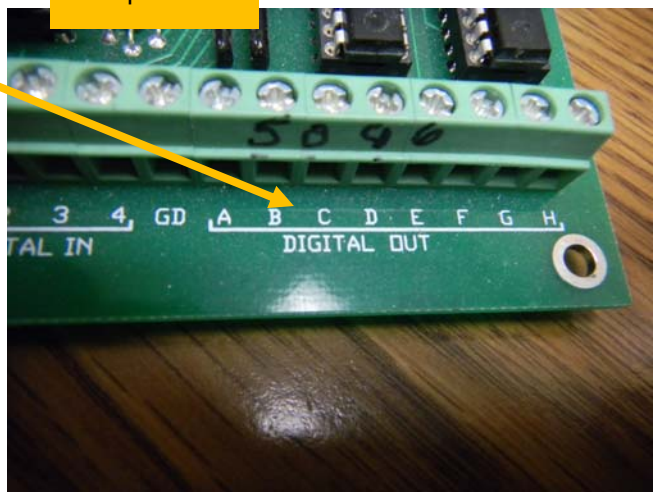
The relay performs the same action as the gain switch under control of the PeakSimple software.

To make the hardware modification, solder two wires to the gain switch as shown. Then connect the two wires to a relay on the relay board.



You may need a relay board, or if you have a relay board you may need to solder in another relay and screw terminal. SRI can provide these parts to retrofit older GCs. Mudloggers manufactured after May 2016 will have this modification already.

Connect the autorange relay control wire to the A/D board Relay C output if possible, as this is the Relay SRI GCs use by default for this function.



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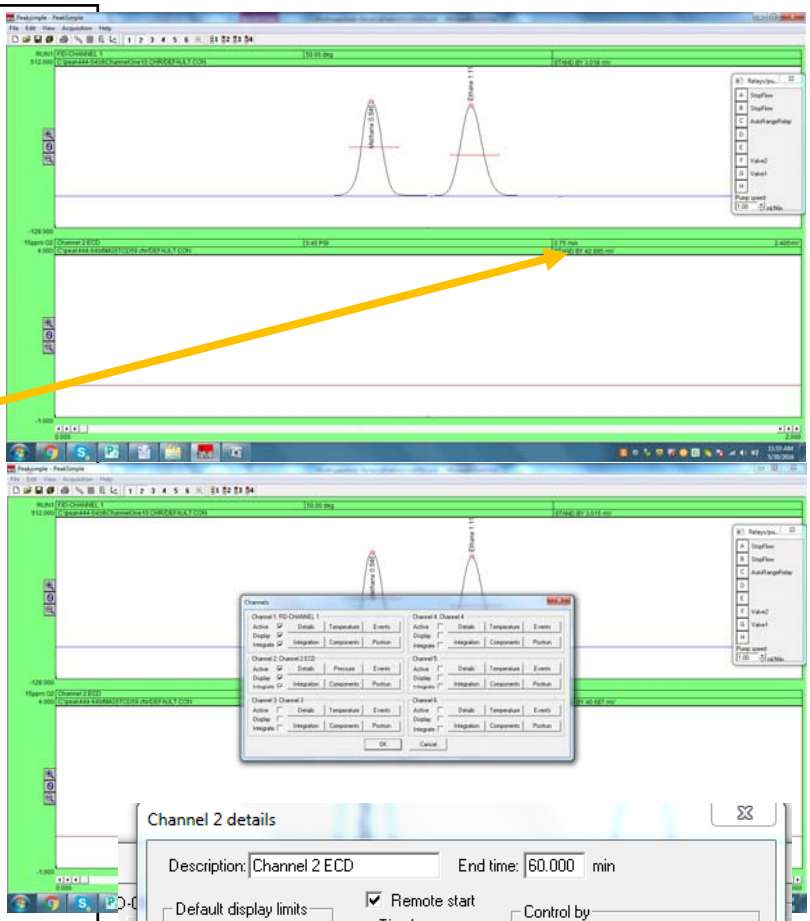
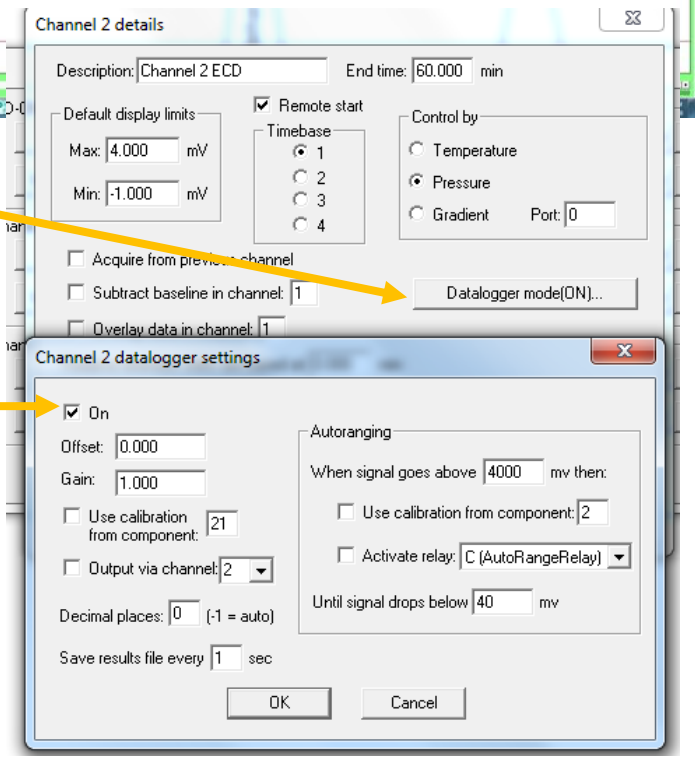
PeakSimple software after version 4.48 has the auto-ranging feature. PeakSimple will normally look like this when you first start. The C1-C6 chromatogram is on the top channel (channel 1). The Total Hydrocarbons are on channel 2.

At the top right of each channel you can see the millivolt signal. When the FID flame is lit, the gain is on High and there is no sample, the millivolts will be fluctuating a little between 10 and 50 millivotls.

Navigate to the Edit/Channels Screen and click on Channel 2 details.



From the Channel 2 Detail screen click on Datalogger mode.



In the Channel 2 Datalogger settings screen click on. For the time being leave all the other boxes unchecked.

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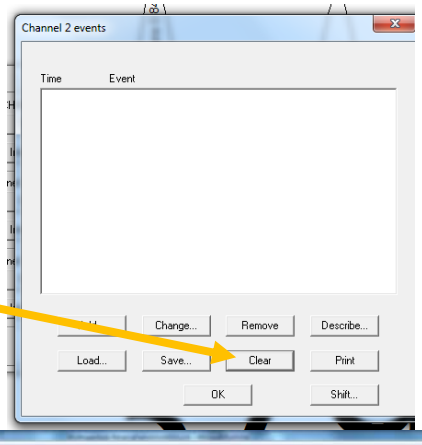
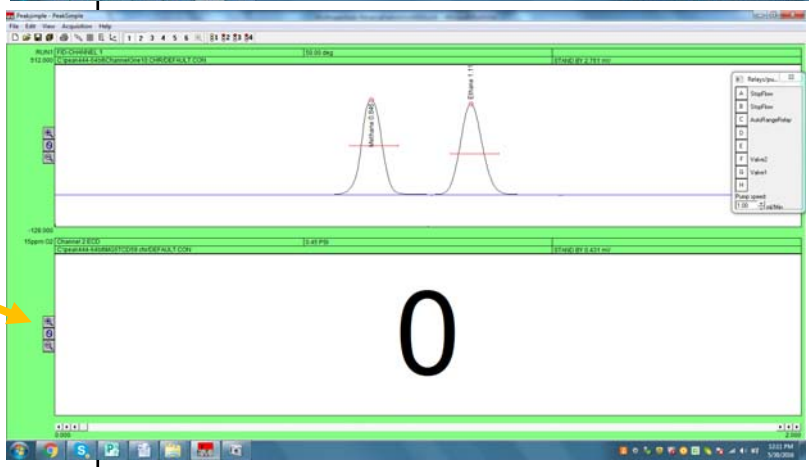
Navigate to the Channel 2 Events screen and clear all the Events. We especially do not want the Channel 2 THC signal to be auto-zeroed at the wrong time.



When you return to the chromatogram screen you will see that the millivolt signal which is still displayed at the upper right corner of the screen is now also shown in big numbers here.

Click the auto-zero button and the signal is zeroed.



While this step is not absolutely necessary it makes sense to zero the amplifier offset when there is no sample so the system reads zero under that circumstance.

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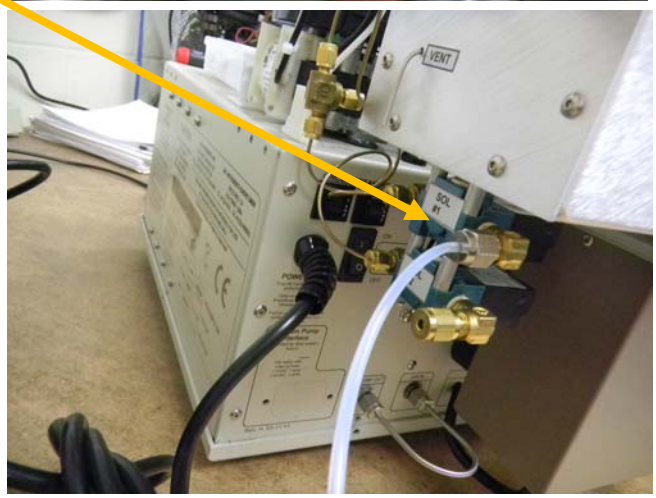
Connect a THC standard gas to the GC inlet.

In this case its 1% methane.

The Mudlogger GC needs to have the sample presented to the GC at some constant pressure, typically about 10psi.

Connect the 10psi sample to the inlet. Some Mudlogger GCs have two solenoids as inlets so the sample can be turned on/off under software control (Relays A and B). Other Mudloggers may not have this feature and just have one inlet.



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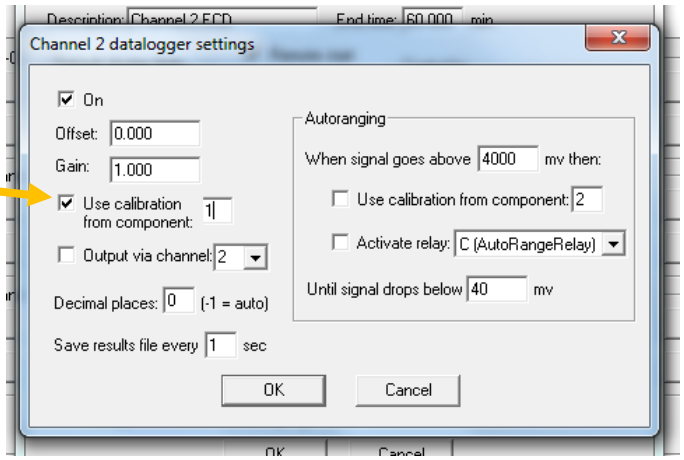
Click Relay A in the View Relay/Pump Window

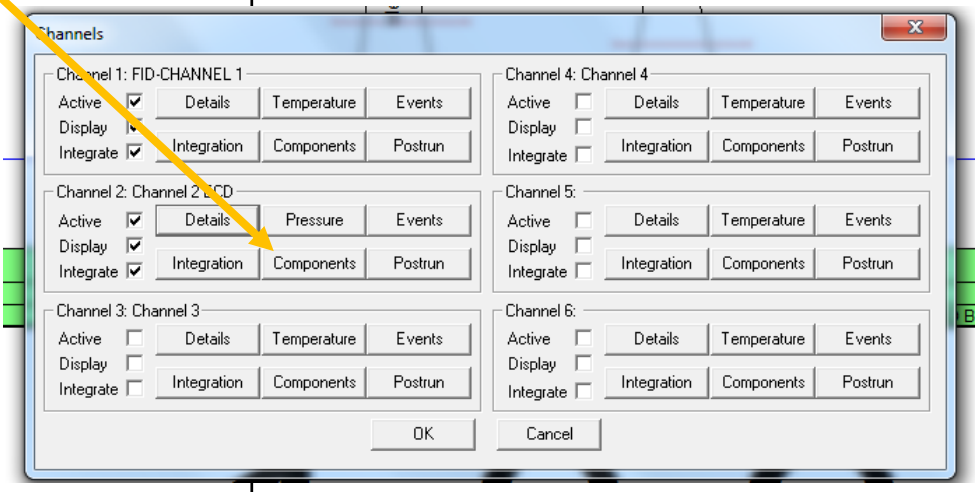
This makes the 1% methane gas flow to the THC FID and the millivolt reading changes to about 1000.

Maybe we would rather this read 50 units of gas instead.

If so, navigate back to the Channel 2 Data-logger settings screen and click the box “ Use Calibration from Component” then enter a component number like 1, but it can be any number.



Then go to the Component table for channel 2.



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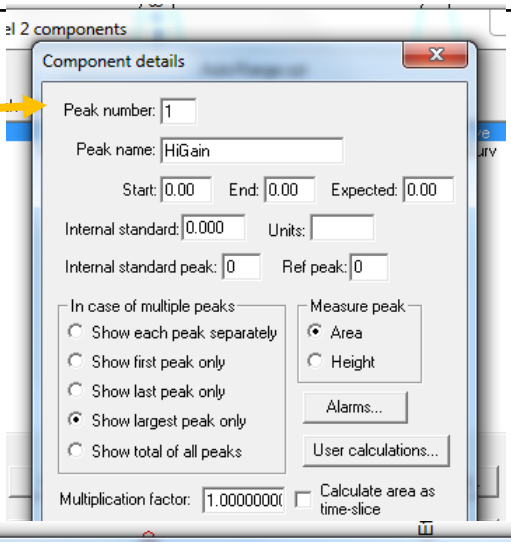
Create a Component with the Peak Number you choose. Here we created a Component with the number 1.

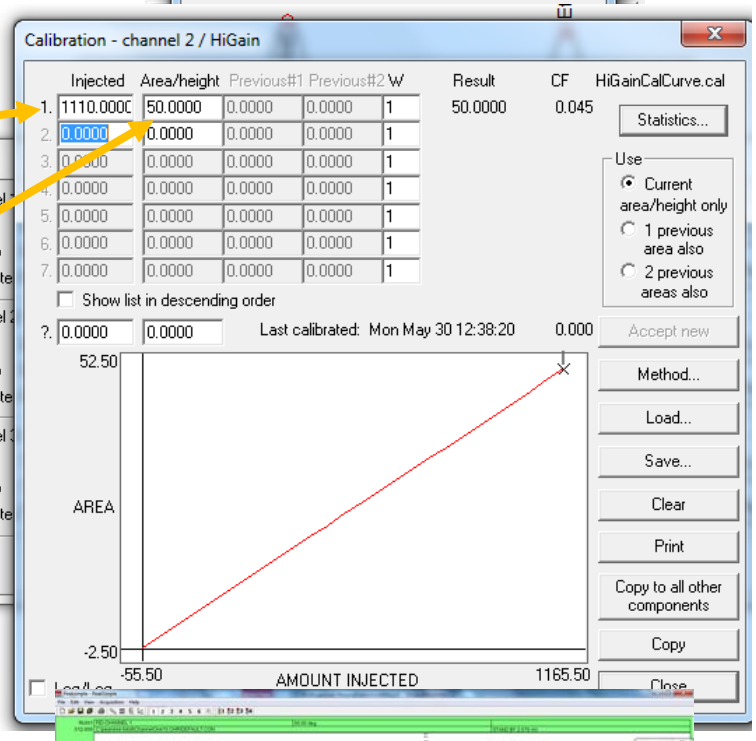


Then make a calibration curve.

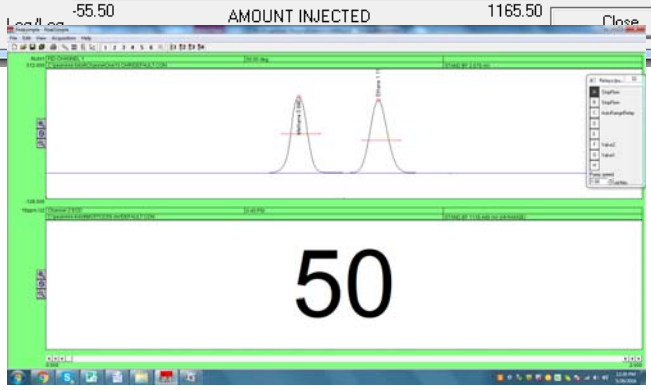
Enter the actual number of millivolts the THC FID is displaying in the first column.

Enter the number you want this transformed into in the 2nd column.

Then save this calibration curve under some name like " HighGainCalCurve".



When you return to the chromatogram screen, the number which is displayed is transformed in-to 50 (units). Note that the real millivolt signal is still displayed at the top right.



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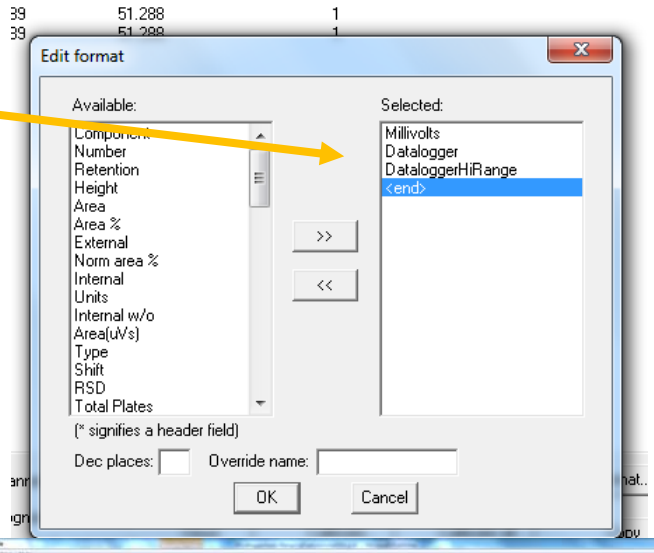
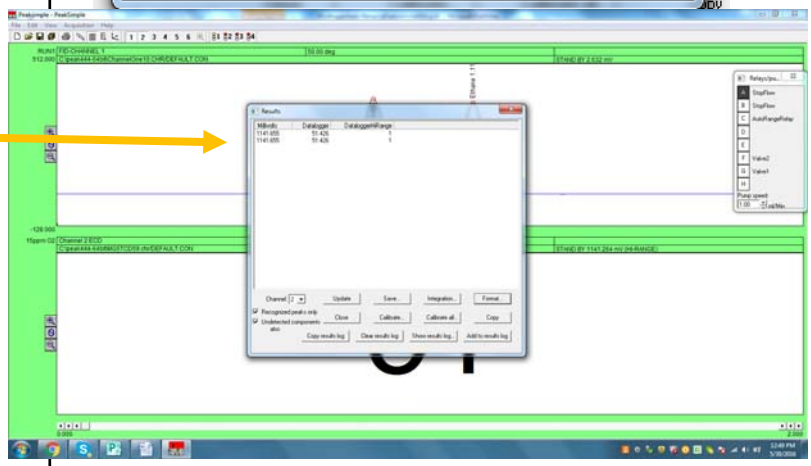
Navigate to the View/Results screen and click the Format button. Configure the Results to show Millivolts, Datalogger and Datalogger Range.

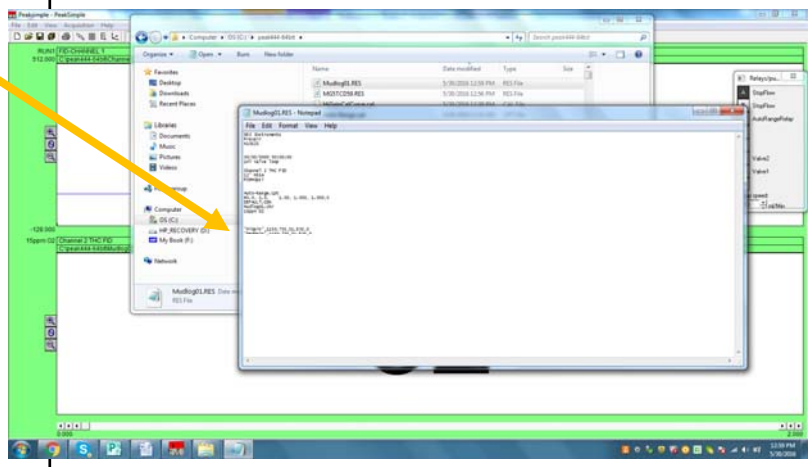


The THC FID millivolts and transformed datalogger result (50) are displayed and updated every second. These numbers are also saved to the C:drive on your computer every second in the *datafilename*.res file. (You choose the name).



Your external mudlog software only needs to read this file to get real time THC data.

This is what the file Mudlog01.chr looks like in the Peaksimple folder and in Notepad.



These numbers get updated every second.

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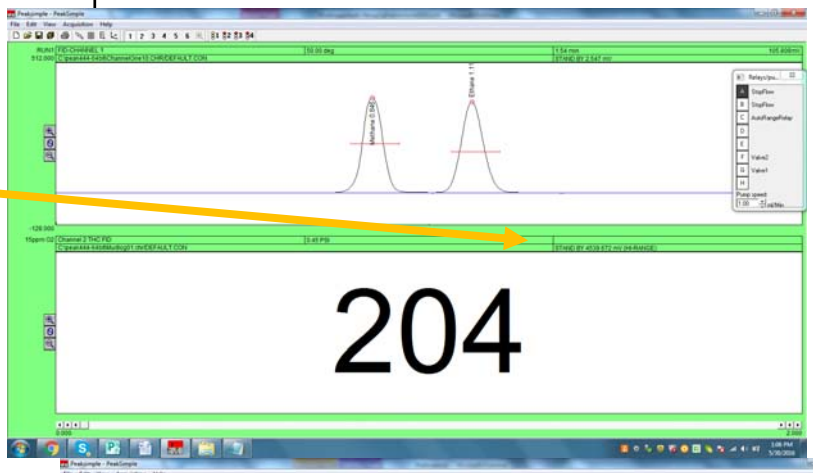
Connect a higher range calibration gas standard.

In this case 10% methane.

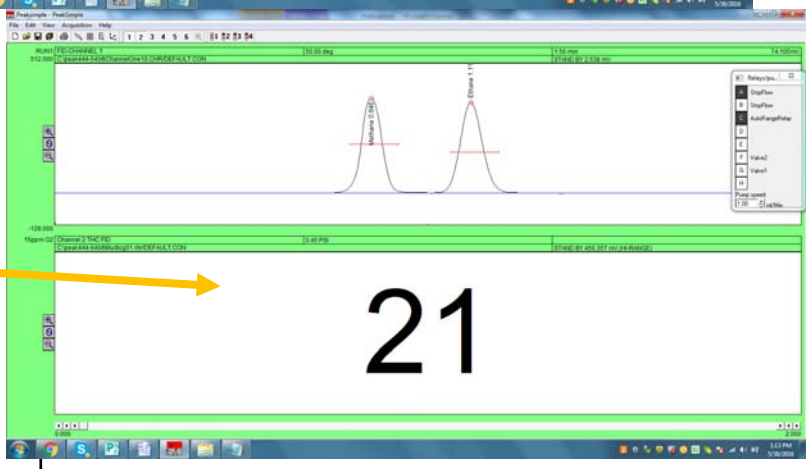
This is what PeakSimple displays.

Notice that the real millivolts are reading above 4500 which is the maximum millivolt signal. 10% methane on high gain produces the maximum millivolt signal, so in effect, the signal is “maxed out”.



Use the View/RelayPump window to click Relay C which changes the electronic gain on channel 2 from high to medium.

This causes the millivolts to now read 450 which is transformed by the Component 1 calibration curve to 21 units.



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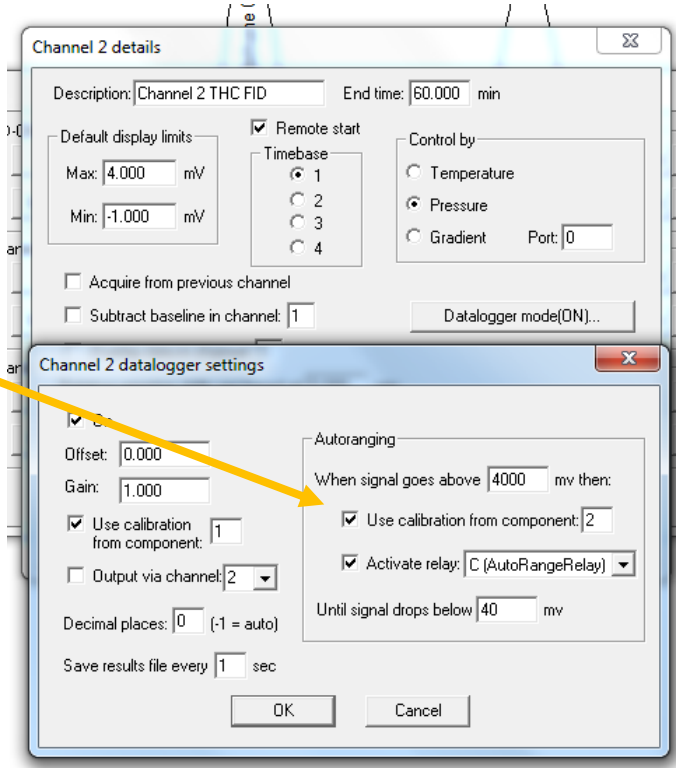
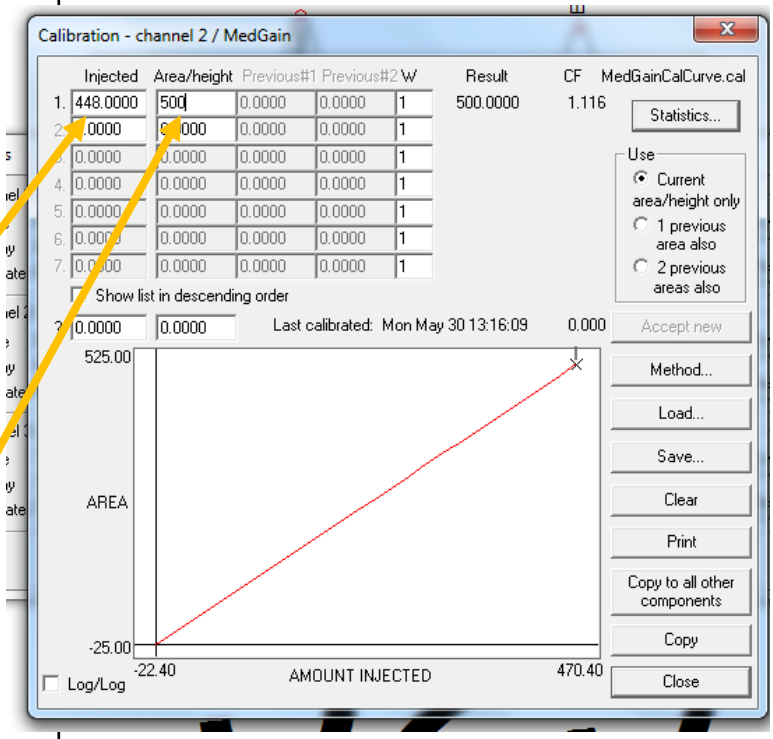
Navigate back to the Datalogger Settings page and check the boxes to use Calibration curve #2, and activate Relay C if the millivolt signal exceeds 4000.



Create a calibration curve #2 and name it something like " MediumGainCalCurve".

Enter the millivolts generated by the THC FID on medium gain when the sample is 10% methane (448 millivolts).

In the second column enter the number of units this should be transformed into (500).



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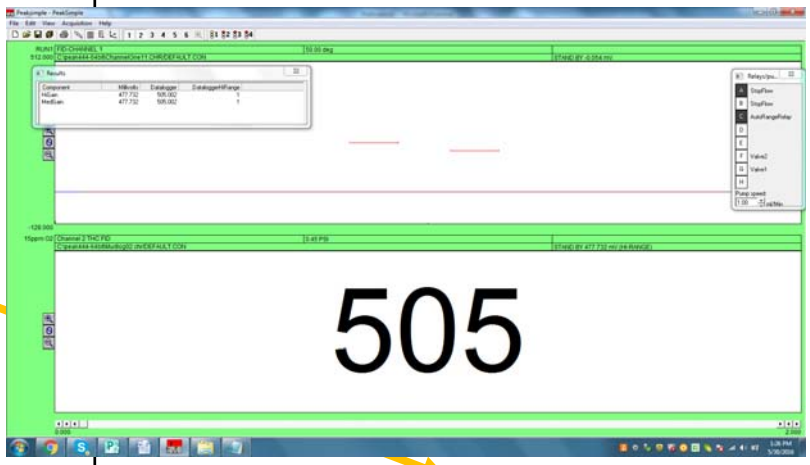
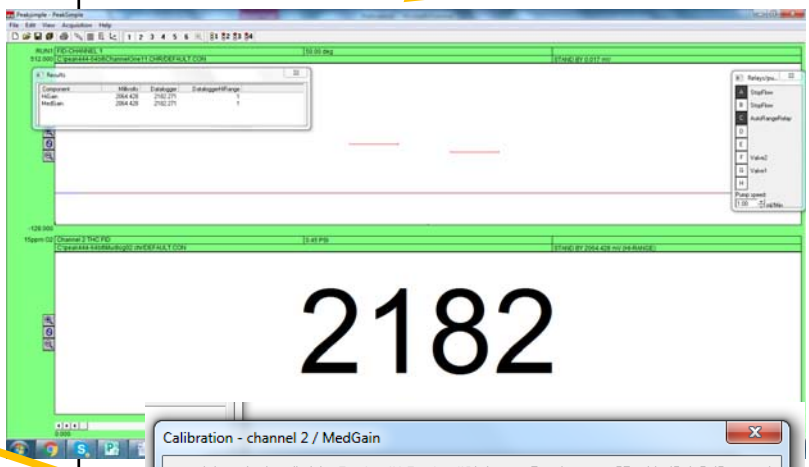
So now the #2calibration curve transforms the millivolts into the correct “Units”



Connect a 50% methane gas standard.

PeakSimple displays about 2200 units instead of 2500 units due to some non-linearity in the FID response.



No problem. Enter a 2nd level in the calibration curve to linearize the output