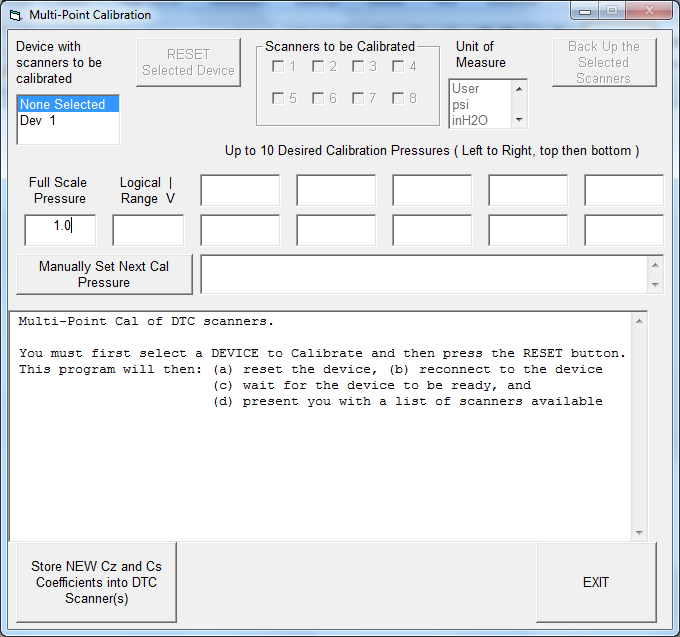
Multi-Point Span Calibration of DTC Scanners using INITIUM data system

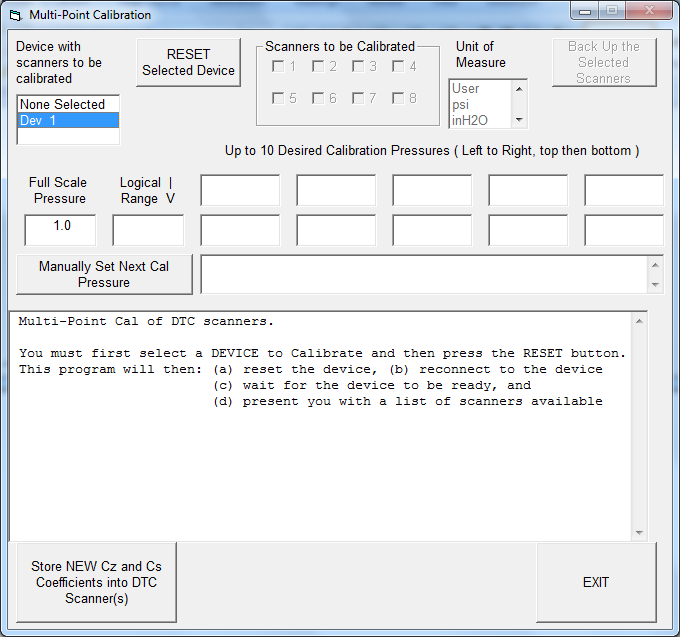
The Multi-Point Span Calibration is done in 10 steps

1. The DEVICE used for the calibration must be selected. This is usually DEV 1, but some customers have more than one Initium, and so we allow for more than one device.
2. The selected device must be RESET by the program
3. The SCANNERS TO BE CALIBRATED must be selected
4. The Unit of Measure must be selected
5. Each of the selected scanners must be “backed up” – This process
   1. Records a FILE – on disk – for each scanner
   2. Containing the COMPLETE CURRENT CALIBRATION of the scanner
   3. This allows us to RESTORE THE SCANNER to the before calibration state, should that be necessary.
6. The FULL SCLE must be specified – in the CURRENT UNIT-OF-MEASURE
   1. If PSI was specified – Full Scale must be in PSI
   2. If KPa was specified – Full Scale must be in KPa
   3. And so on
7. The LOGICAL RANGE ( normally 1 ) must be specified
8. UP TO TEN ( 10 ) Calibration pressures must be entered
   1. TWO calibration pressure is the absolute minimum allowed
   2. BEST RESULTS occur with between 5 and 7 pressures
   3. TEN is the absolute maximum number of pressures allowed
   4. I recommend that you use 5, 6, or 7 calibration pressures, your choice.
9. The CALIBRATION PRESSURES must be applied, and the Data Taken
   1. This is the real calibration process
   2. You MAY – OPTIONALLY – put in the ACTUAL pressure generated, if it does not match the pressure you PLANNED ( step 8 ) to use. NOT REQUIRED, but available
10. A REPORT is generated – on screen and on disk
11. IF the results are good – you may STORE THE NEW COEFFICIENTS into the scanner(s)

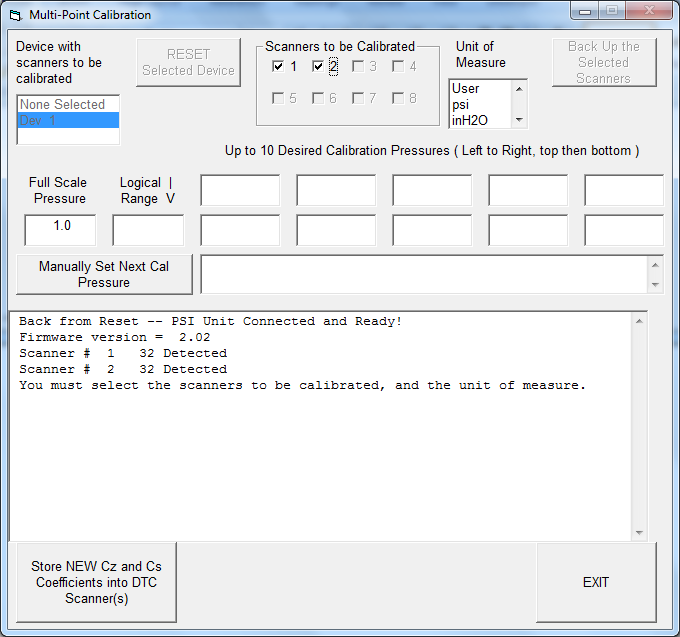
STEP 1: Select the DEVICE to be used for the Calibration. Normally, this is Dev 1



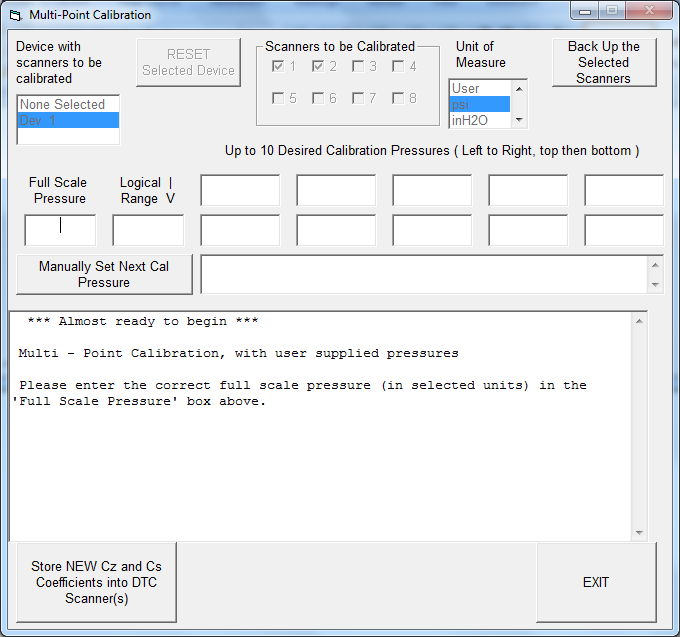
STEP 2: RESET the selected device



STEP 3: Select the SCANNERS TO BE CALIBRATED – in this example, 2 scanners are available, and both have been selected



STEP 4: Select a UNIT OF MEASURE - in this example, PSI was selected. You may choose any other unit of measure that is proper for your equipment.



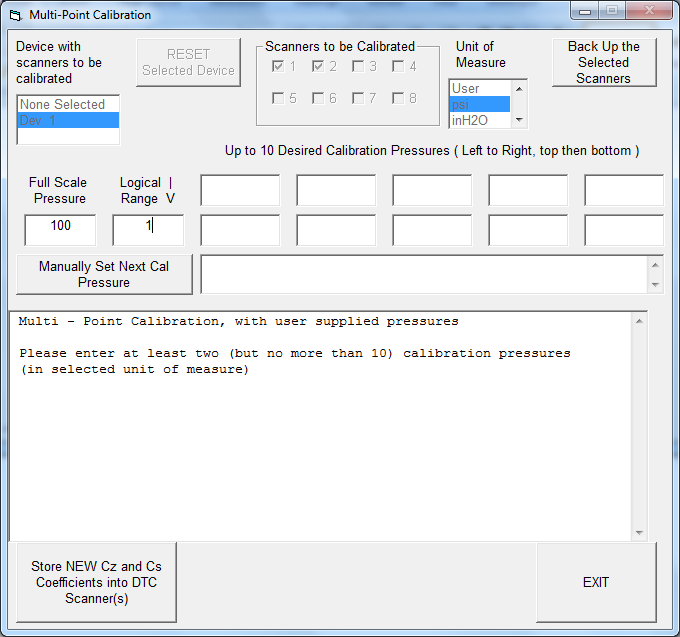
STEP 5: BACK UP THE SELECTED SCANNERS

THIS IS VERY IMPORTANT. The program will not allow you to go on without completing this step. This guarantees that you can return the scanner to the “before calibration” condition, should something go wrong in the process.

IT IS ALWAYS GOOD TO HAVE A BACKUP FILE OF THE CALIBRATION FOR EACH SCANNER.

This will produce ONE FILE PER SCANNER. The File name will be Exxxxxx-yyyy-mm-dd.COF

E – followed by the SERIAL NUMBER OF THE SCANNER – Followed by Year – month-day .COF



STEP 6: ENTER the FULL SCALE of the scanner(s) – in the correct Unit of measure.

This example is for 2 scanners, both 100 PSI pressure range.

STEP 7: Enter the LOGICAL RANGE NUMBER – in this case, LOGICAL RANGE 1 was used ( recommended )

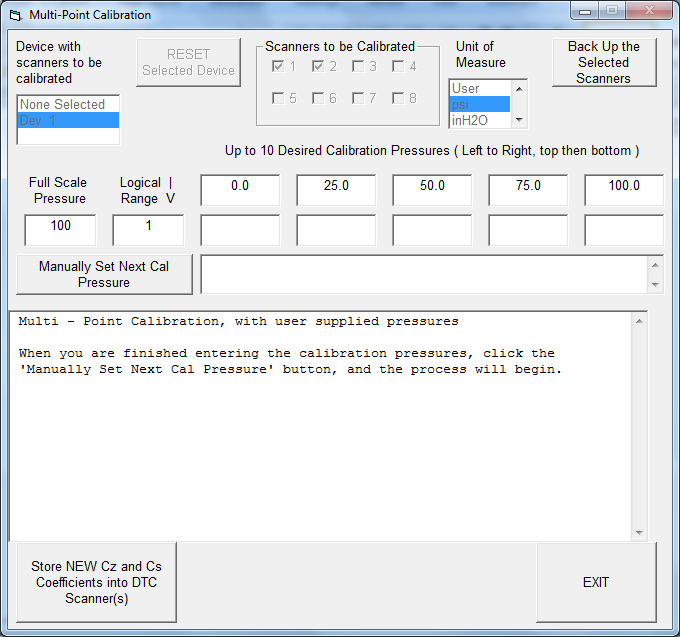
STEP 8: Enter the CALIBRATION PRESSURES PLANNED

1. This example is using PSI for unit of measure
2. And has 100 PSI FULL SCALE scanners

c) Five (5) calibration points will be used: 0.0 psid, 25.0 psid, 50 psid, 75 psid, and 100 psid

d) You DO NOT have to enter decimal points – these are the NOMINAL PRESSURES

WHEN THIS IS COMPLETE – CLICK on “Manually Set Next Cal Pressure“



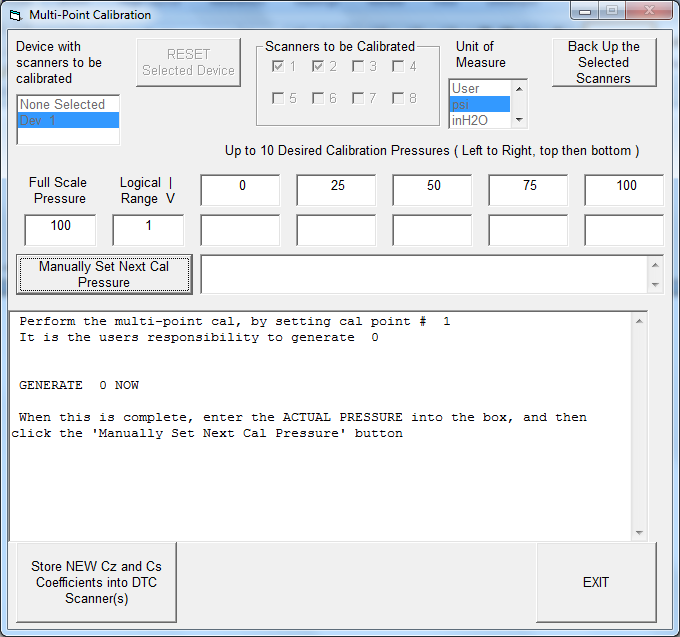
STEP 9: The CALIBRATION PRESSURES must be applied, and the Data Taken

The program now knows that you are ready. It tells you to “GENERATE X NOW”

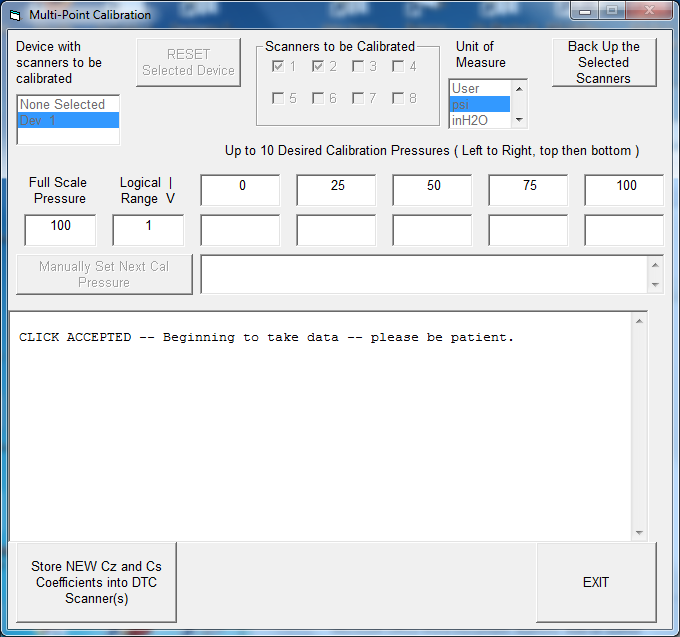
X in this case is ZERO – my first cal point

WHEN YOU HAVE THE PRESSURE GENERATED – YOU MAY ENTER THE EXACT VALUE IN THE BOX

Entering the EXACT VALUE ( in place of the PLANED VALUE ) that is OPTIONAL - BUT YOU MUST CLICK ON “Manually Set Next Cal Pressure“ again to continue. ( This screen is step 9-A )



The PROGRAM will tell you that it is taking data – and give you information about the progress. DO NOTHING until it tells you to GENERATE THE NEXT PRESSURE

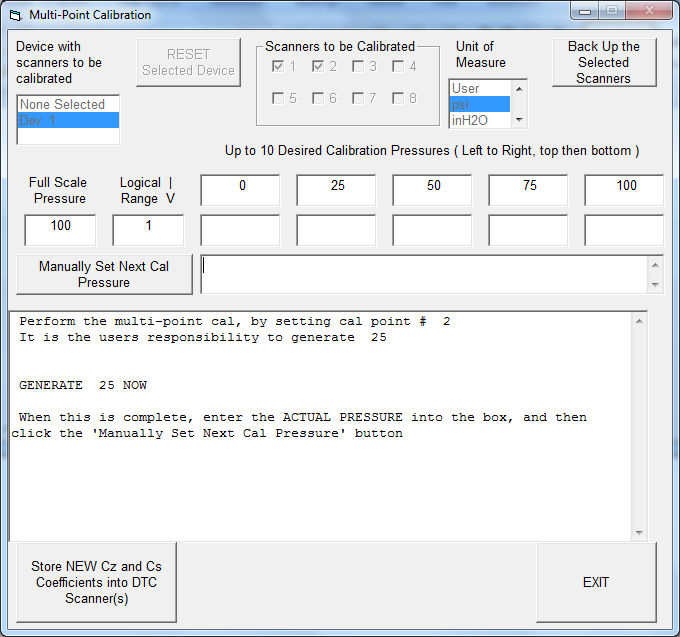


When the FIRST CALIBRATION POINT IS COMPLETE – the program will PROMPT you to GENERATE THE NEXT PRESSURE.

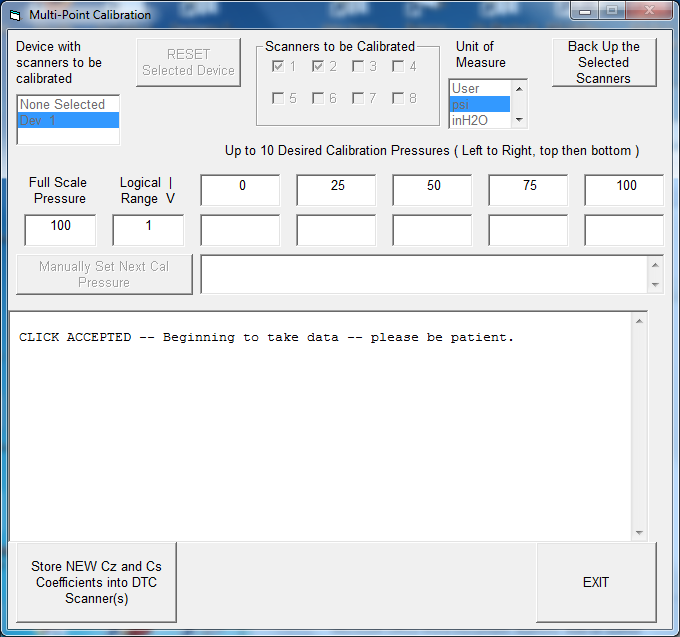
This example is prompting me to Generate 25 PSID NOW – and when complete, to enter the ACTUAL VALUE ( in place of the 25 ) and click on “Manually Set Next Cal Pressure“

You can see that 25 PSID was my #2 calibration pressure

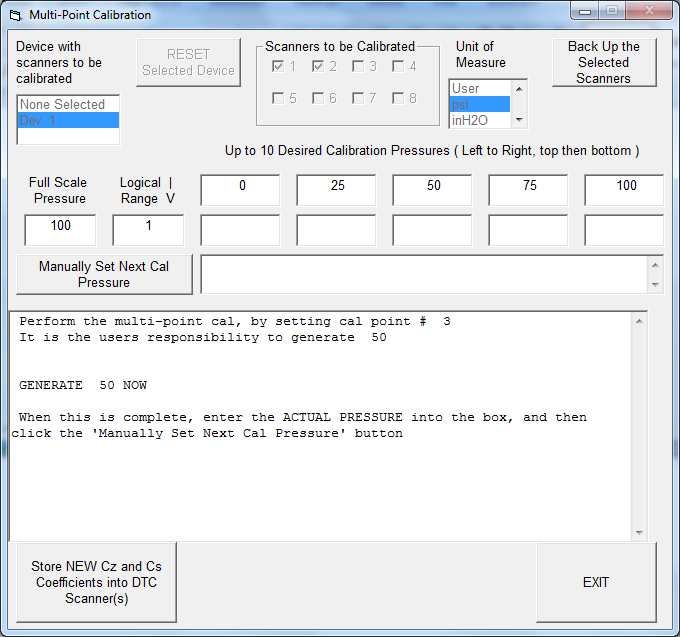
When 25.00 psid is READY, I can enter the actual value ( or not ) – and click “Manually Set Next Cal Pressure“ again.



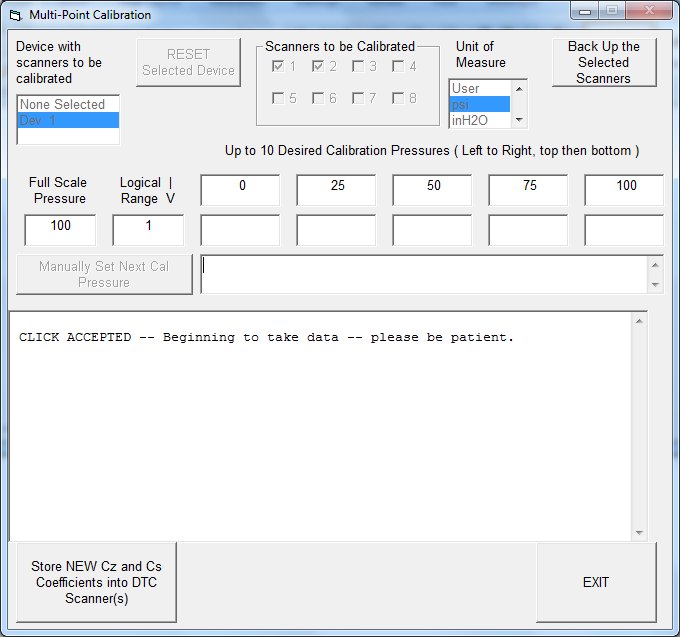
Again, we take data, and wait for DATA POINT # 2 to finish



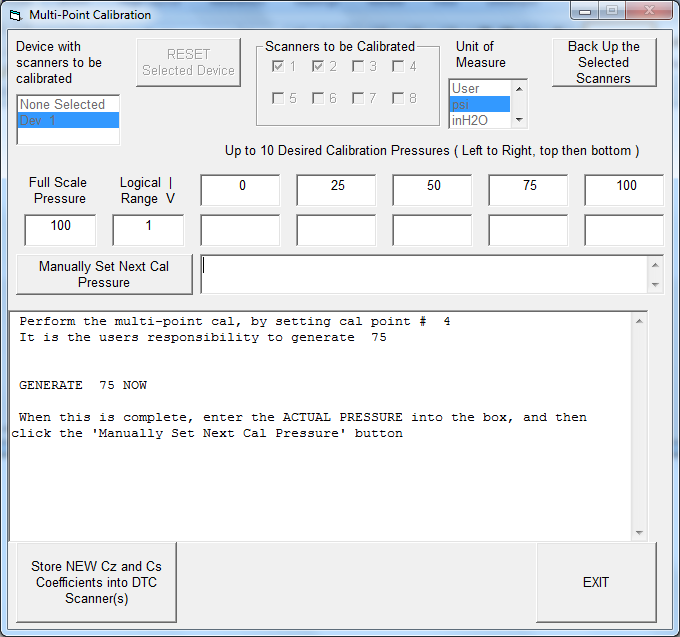
REPEAT for CAL POINT # 3



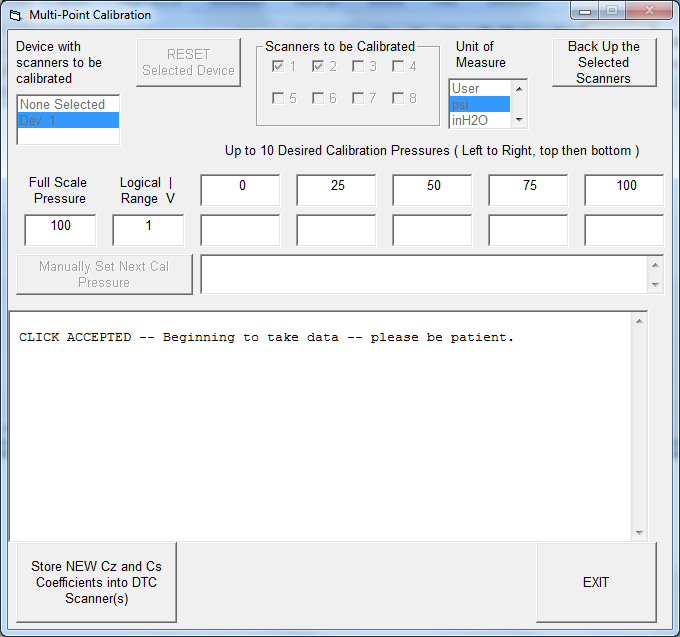
Taking Data for CAL POINT # 3



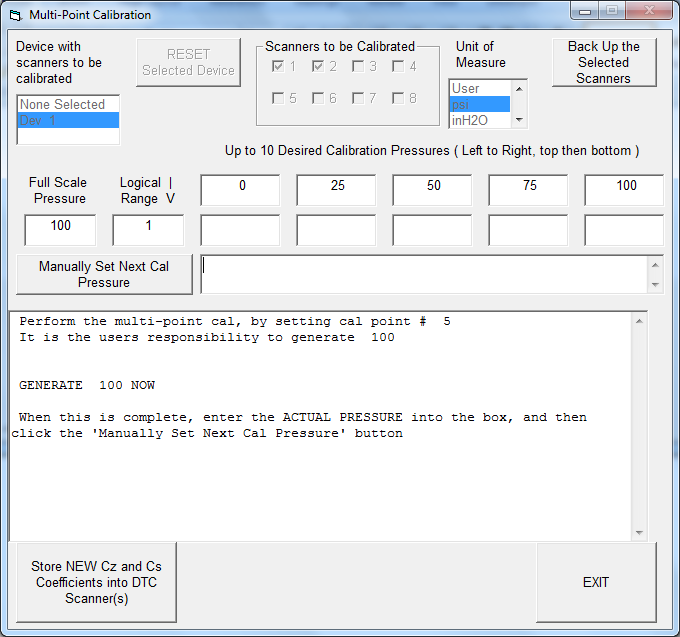
REPEAT FOR CAL POINT # 4



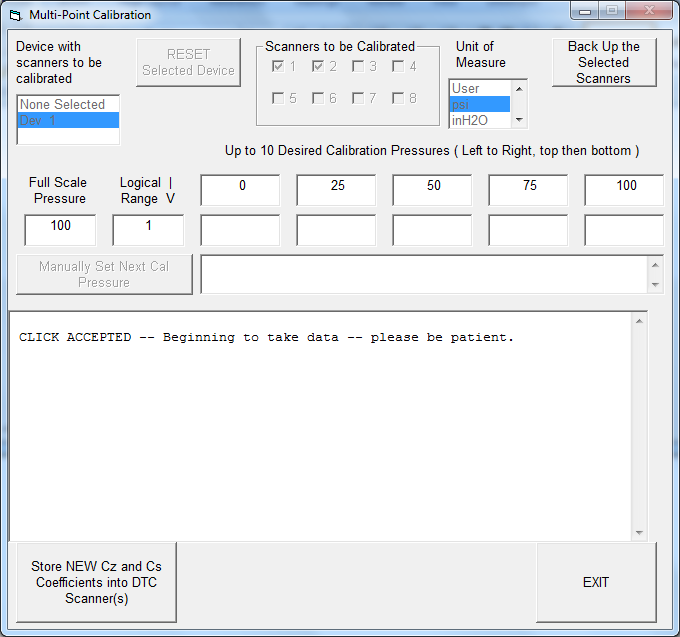
Taking Data for CAL POINT # 4



REPEAT FOR CAL POINT # 5



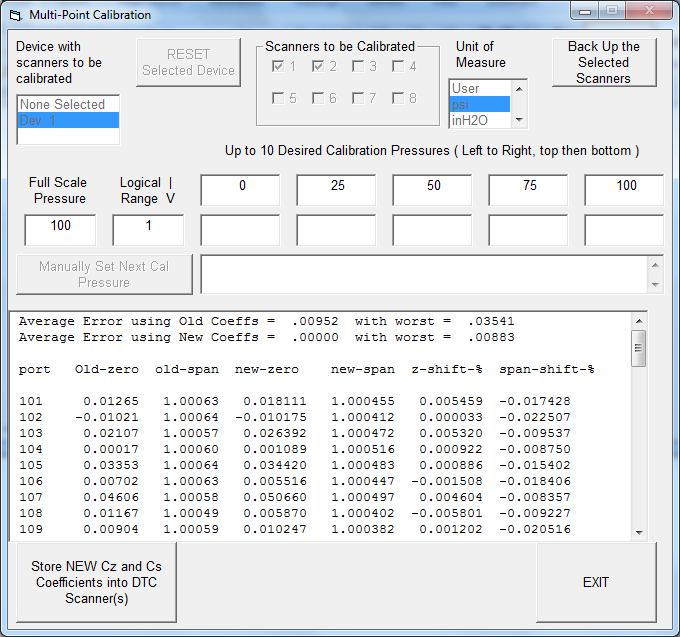
Taking Data for CAL POINT # 5 -- LAST CAL POINT IN THIS EXAMPLE



STEP 10: THE PROGRAM will GENERATE A REPORT

1. The NEW SPAN should be NEAR 1.0 – always – within 0.15 %
2. The NEW ZERO should be less than 5 % of scanner range
3. SHIFT % should be small

The REPORT is on SCREEN ( you can click on it, select all, and copy into a document ) – and it is also a TEXT FILE on the disk. CALRPT.TXT.



IF THE PREDICTED AVERAGE ERROR WITH NEW COEFFICIENTS is GOOD – then SAVE THE COEFFICIENTS INTO THE SCANNERS!

SAMPLE OUTPUT

Average Error using Old Coeffs = .00952 with worst = .03541

Average Error using New Coeffs = .00000 with worst = .00883

port Old-zero old-span new-zero new-span z-shift-% span-shift-%

101 0.01265 1.00063 0.018111 1.000455 0.005459 -0.017428

102 -0.01021 1.00064 -0.010175 1.000412 0.000033 -0.022507

103 0.02107 1.00057 0.026392 1.000472 0.005320 -0.009537

104 0.00017 1.00060 0.001089 1.000516 0.000922 -0.008750

105 0.03353 1.00064 0.034420 1.000483 0.000886 -0.015402

106 0.00702 1.00063 0.005516 1.000447 -0.001508 -0.018406

107 0.04606 1.00058 0.050660 1.000497 0.004604 -0.008357

108 0.01167 1.00049 0.005870 1.000402 -0.005801 -0.009227

109 0.00904 1.00059 0.010247 1.000382 0.001202 -0.020516

110 -0.04671 1.00064 -0.049891 1.000525 -0.003182 -0.011539

111 0.03120 1.00078 0.032889 1.000654 0.001691 -0.012434

112 -0.01728 1.00071 -0.021572 1.000521 -0.004290 -0.018620

113 0.01529 1.00055 0.013807 1.000441 -0.001485 -0.011110

114 0.17292 1.00073 0.171606 1.000658 -0.001316 -0.007248

115 0.01670 1.00017 0.014616 1.000020 -0.002079 -0.015342

116 -0.03583 1.00019 -0.034884 1.000036 0.000944 -0.015104

117 0.03571 1.00071 0.038996 1.000531 0.003286 -0.017476

You have COMPLETED THE CALIBRATION.