DRAC Information

This document will attempt to summarize a bunch of information regarding the GM "Digital Ratio Adapter/Controller" (DRAC) used in many vehicles between 92 and 94 or so. The info in this document was obtained primarily from multiple other sources (people)- many thanks to them.

The DRAC is a small circuit board that is usually housed inside a white plastic box. Many applications have the thing placed behind the glove box. The DRAC's primary function is to accept the Vss signal (AC Signal) from the drive train and buffer/modify it for the ECM etc. The DRAC is where you go to adjust the speedometer reading when you do a gear or tire size change. The focus of this document is in the area of this "adjustment"

Disclaimer:
This information is for experimental purposes only. Any damage caused by the use of this information is the responsibility of the user. Always be careful when modifying anything. Never take your eyes off the road to fool with on board electronics. Be Kind- Please Rewind.

Take a Tour of the DRAC

The following figures provide you with a look at theDRAC and some preliminary information.

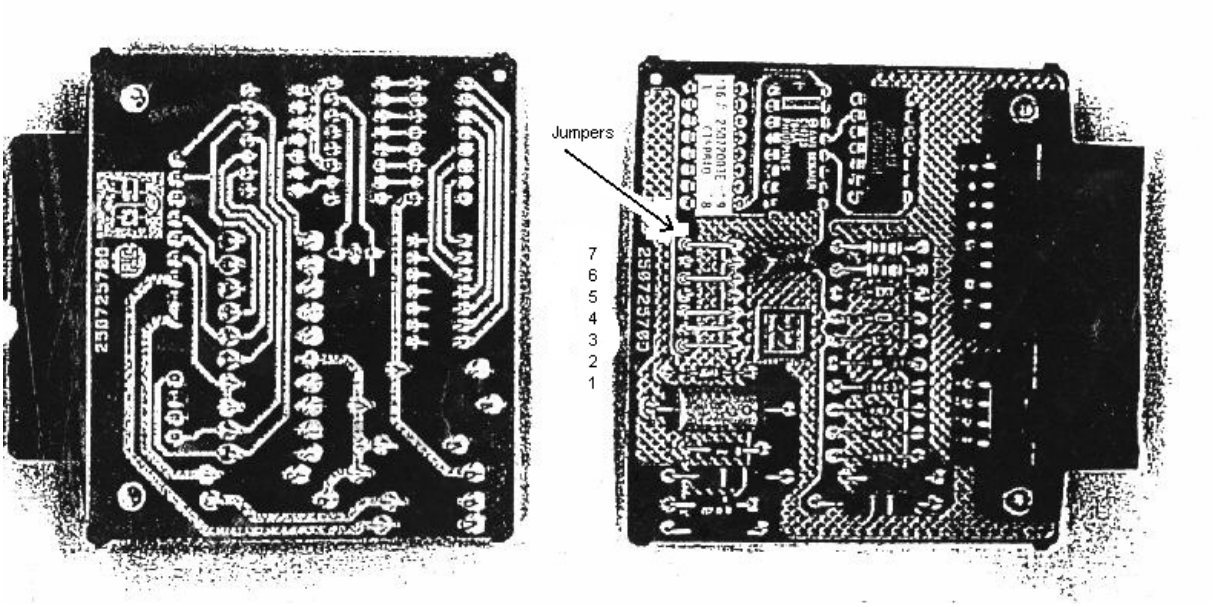


Figure 1: 92-93 DRAC

The main thing to notice are the jumpers pointed to by the above arrow. These will be discussed later.

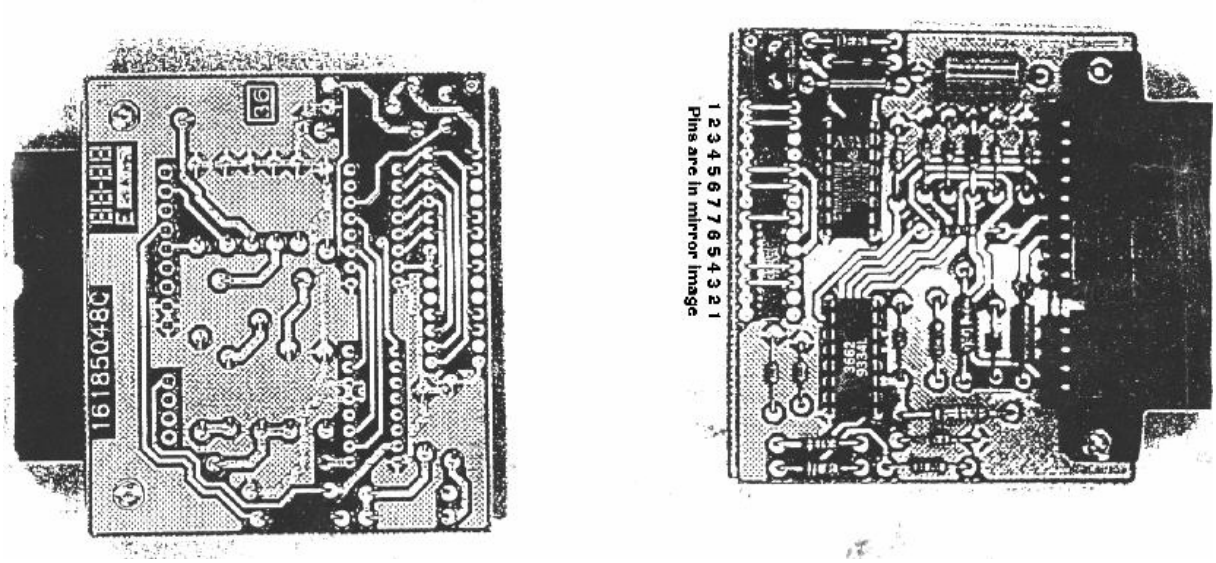


Figure 2: 94 DRAC

Note that the 94 DRAC has “redundant” jumpers.

The DRAC has a couple connectors on the edge of the PCB. The following pinout of the DRAC was obtained from a 92 GM truck service manual.

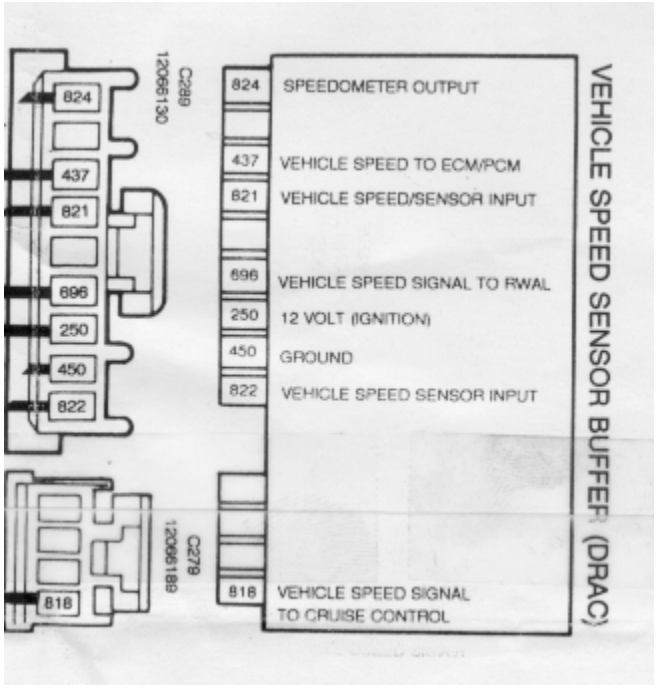


Figure 3: DRAC pinout

The next figure contains additional pinout information. Some of this info may not have been verified.

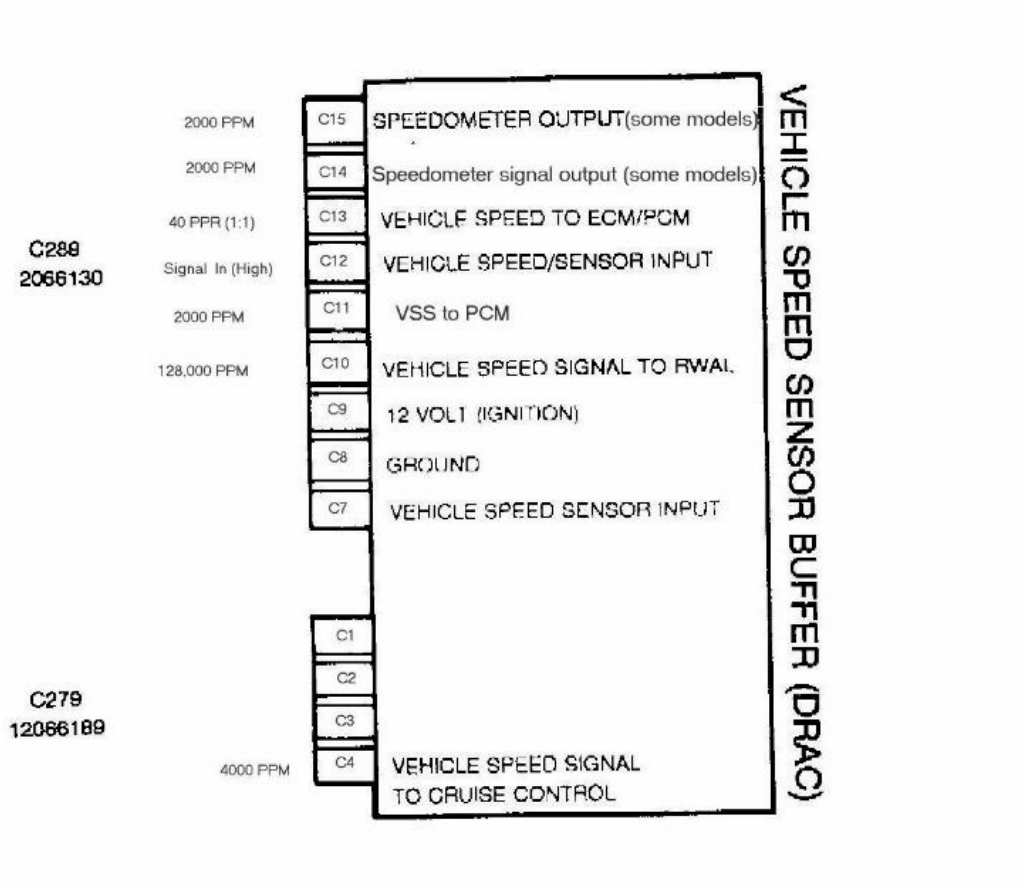


Figure 4: Additional DRAC pinout information

This document lists three ways to go about re-calibrating (or obtaining the correct calibration for) your DRAC. - Let's get started...

Method #1

Calculate a number called the"InputRatio" using the following formula:

$$\text{InputRatio} := \frac{63360 \cdot XR \cdot P}{RC \cdot 128000}$$

Where:
63360 = Number of inches in a mile
RC = tire circumference in inches
XR = axle ratio
P= # of speed sensor output pulses per output shaft revolution.
For the 700R4 with VSS (not speedo cable) this number is 40.

128,000 pulses per mile is DRAC output to RWAL module in fullsize pickup application.

To obtain the actual tire circumference:
Mark line on tire and corresponding line on floor. Roll vehicle back until tire makes complete revolution. Mark 2nd line on floor and measure distance between 2 lines.

If you can accurately measure the diameter of your tire you can also use the following formula
RC = 3.14159 * D
Where:
D = tire diameter

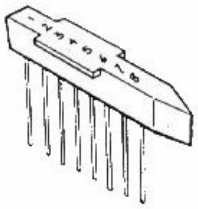
Remember- a "35" tire is not truly 35" in diameter!

To check your usage of the above formula- verify that a 73.8" rolling circumference and a 3.73 axle radio yield a 1.00 divide ratio.

Now that you have calculate your desired InputRatio simply see figure 5 and 6 to find the correct jumper settings.

QUARTZ CRYSTAL INSTRUMENT PANEL

LEAVE PIN = 0
REMOVE PIN = 1



PROGRAMMING CLIP
PART NUMBER
25084374

TABLE 1

PIN NUMBER							DIVIDE RATIO
7	6	5	4	3	2	1	
0	0	0	0	0	0	1	0.500000
0	0	0	0	0	1	0	0.505859
0	0	0	0	0	1	1	0.511230
0	0	0	0	1	0	0	0.517090
0	0	0	0	1	0	1	0.522949
0	0	0	0	1	1	0	0.528809
0	0	0	0	1	1	1	0.534668
0	0	0	1	0	0	0	0.540527
0	0	0	1	0	0	1	0.546875
0	0	0	1	0	1	0	0.552734
0	0	0	1	0	1	1	0.559082
0	0	0	1	1	0	0	0.565430
0	0	0	1	1	0	1	0.571777
0	0	0	1	1	1	0	0.578125
0	0	0	1	1	1	1	0.584473
0	0	1	0	0	0	0	0.591309
0	0	1	0	0	0	1	0.598145
0	0	1	0	0	1	0	0.604492
0	0	1	0	0	1	1	0.611328
0	0	1	0	1	0	0	0.618164
0	0	1	0	1	0	1	0.625448
0	0	1	0	1	1	0	0.632324
0	0	1	0	1	1	1	0.639648
0	0	1	1	0	0	0	0.646484
0	0	1	1	0	0	1	0.653809
0	0	1	1	0	1	0	0.661133
0	0	1	1	0	1	1	0.668457
0	0	1	1	1	0	0	0.676270
0	0	1	1	1	0	1	0.683594
0	0	1	1	1	1	0	0.691406
0	0	1	1	1	1	1	0.699219
0	1	0	0	0	0	0	0.707031

PIN NUMBER							DIVIDE RATIO
7	6	5	4	3	2	1	
0	1	0	0	0	0	1	0.714844
0	1	0	0	0	1	0	0.723145
0	1	0	0	0	1	1	0.731445
0	1	0	0	1	0	0	0.739258
0	1	0	0	1	0	1	0.747559
0	1	0	0	1	1	0	0.756348
0	1	0	0	1	1	1	0.764648
0	1	0	1	0	0	0	0.773438
0	1	0	1	0	0	1	0.781738
0	1	0	1	0	1	0	0.790527
0	1	0	1	0	1	1	0.799805
0	1	0	1	1	0	0	0.808594
0	1	0	1	1	0	1	0.817871
0	1	0	1	1	1	0	0.827148
0	1	0	1	1	1	1	0.836426
0	1	1	0	0	0	0	0.845703
0	1	1	0	0	0	1	0.854980
0	1	1	0	0	1	0	0.864746
0	1	1	0	0	1	1	0.874512
0	0	0	0	0	0	0	0.877441
0	1	1	0	1	0	0	0.884277
0	1	1	0	1	0	1	0.894043
0	1	1	0	1	1	0	0.904297
0	1	1	0	1	1	1	0.914551
0	1	1	1	0	0	0	0.924805
0	1	1	1	0	0	1	0.935059
0	1	1	1	0	1	0	0.945801
0	1	1	1	0	1	1	0.956055
0	1	1	1	1	0	0	0.966797
0	1	1	1	1	0	1	0.978027
0	1	1	1	1	1	0	0.988770

Figure 8. Programming Clip Ratio Chart

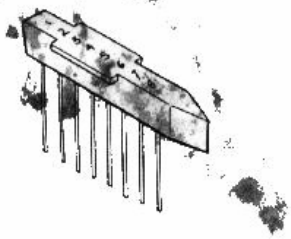
NOTE: Do not remove pin 8 for any reason. Doing so will ruin the programming clip.

Jumpers -DRAC 1992-93 8 7 6 5 4 3 2 1
DRAC 1994 +1 2 3 4 5 6 7 7 6 5 4 3 2 1

GROUND is ground

Figure 5: DRAC Jumper settings

QUARTZ CRYSTAL INSTRUMENT PANEL



PROGRAMMING CLIP
PART NUMBER
25084374

TABLE 2

PIN NUMBER							DIVIDE RATIO
7	6	5	4	3	2	1	
1	0	0	0	0	0	1	1.000000
1	0	0	0	0	1	0	1.011719
1	0	0	0	0	1	1	1.022461
1	0	0	0	1	0	0	1.034180
1	0	0	0	1	0	1	1.045898
1	0	0	0	1	1	0	1.057617
1	0	0	0	1	1	1	1.069336
1	0	0	1	0	0	0	1.081055
1	0	0	1	0	0	1	1.093750
1	0	0	1	0	1	0	1.105469
1	0	0	1	0	1	1	1.118164
1	0	0	1	1	0	0	1.130859
1	0	0	1	1	0	1	1.143555
1	0	0	1	1	1	0	1.156250
1	0	0	1	1	1	1	1.168945
1	0	1	0	0	0	0	1.182617
1	0	1	0	0	0	1	1.196289
1	0	1	0	0	1	0	1.208984
1	0	1	0	0	1	1	1.222656
1	0	1	0	1	0	0	1.236328
1	0	1	0	1	0	1	1.250977
1	0	1	0	1	1	0	1.264648
1	0	1	0	1	1	1	1.279297
1	0	1	1	0	0	0	1.292969
1	0	1	1	0	0	1	1.307617
1	0	1	1	0	1	0	1.322266
1	0	1	1	0	1	1	1.336914
1	0	1	1	1	0	0	1.352539
1	0	1	1	1	0	1	1.367188
1	0	1	1	1	1	0	1.382812
1	0	1	1	1	1	1	1.398438
1	1	0	0	0	0	0	1.414062

PIN NUMBER							DIVIDE RATIO
7	6	5	4	3	2	1	
1	1	0	0	0	0	1	1.429688
1	1	0	0	0	1	0	1.446289
1	1	0	0	0	1	1	1.462891
1	1	0	0	1	0	0	1.478516
1	1	0	0	1	0	1	1.495117
1	1	0	0	1	1	0	1.512695
1	1	0	0	1	1	1	1.529297
1	1	0	1	0	0	0	1.546875
1	1	0	1	0	0	1	1.563477
1	1	0	1	0	1	0	1.581055
1	1	0	1	0	1	1	1.599609
1	1	0	1	1	0	0	1.617188
1	1	0	1	1	0	1	1.635742
1	1	0	1	1	1	0	1.654297
1	1	0	1	1	1	1	1.672852
1	1	1	0	0	0	0	1.691406
1	1	1	0	0	0	1	1.709961
1	1	1	0	0	1	0	1.729492
1	1	1	0	0	1	1	1.749023
1	0	0	0	0	0	0	1.754883
1	1	1	0	1	0	0	1.768555
1	1	1	0	1	0	1	1.788086
1	1	1	0	1	1	0	1.808594
1	1	1	0	1	1	1	1.839102
1	1	1	1	0	0	0	1.849061
1	1	1	1	0	0	1	1.870117
1	1	1	1	0	1	0	1.891602
1	1	1	1	0	1	1	1.912109
1	1	1	1	1	0	0	1.933594
1	1	1	1	1	0	1	1.956055
1	1	1	1	1	1	0	1.977539

ure 9. Programming Clip Ratio Chart Cont'd

Figure 6: DRAC Jumper settings continued.

A ‘1’ in the above chart means that a jumper should be installed in the indicated position, a 0 means that the position should remain open. The chart refers to a “programming clip”- apparently some instrument clusters used this “clip” programming method. In that case- the clip resides on the rear of the instrument cluster.

Additional Notes:

1227747 ECM recieves 1.11hz/mph signal

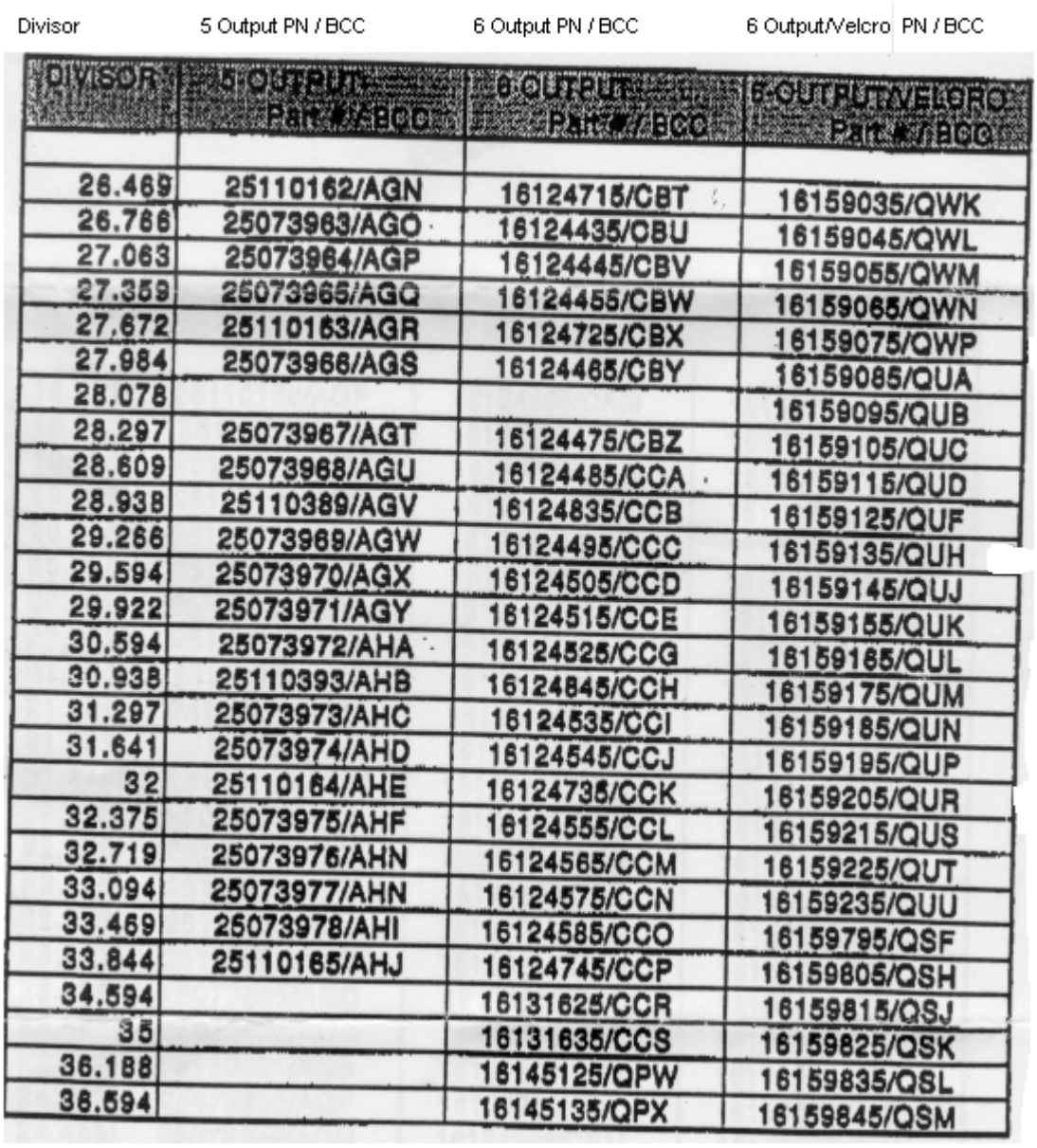
Method #2

This method also involves using a formula. The result of this formula is used to find the GM part number of the DRAC required.

$$\text{Divisor} := \frac{63360 \cdot XR}{RC \cdot 100}$$

Where:
63360 = Number of inches in a mile
RC = tire circumference in inches
XR = axle ratio

Once you have calculated the required Divisor you can use figures 7 and 8 to find the GM part number of the DRAC you need. (Good luck however, many DRAC PN's seem to be discontinued- instead your parts man will refer you to a local contractor who will re-cal/repair yours for a healthy sum).



Divisor	5 Output PN / BCC	6 Output PN / BCC	6 Output/Velcro PN / BCC
26.469	25110162/AGN	16124715/CBT	16159035/QWK
26.766	25073963/AGO	16124435/CBU	16159045/QWL
27.063	25073964/AGP	16124445/CBV	16159055/QWM
27.359	25073965/AGQ	16124455/CBW	16159065/QWN
27.672	25110163/AGR	16124725/CBX	16159075/QWP
27.984	25073966/AGS	16124465/CBY	16159085/QUA
28.078			16159095/QUB
28.297	25073967/AGT	16124475/CBZ	16159105/QUC
28.609	25073968/AGU	16124485/CCA	16159115/QUD
28.938	25110389/AGV	16124835/CCB	16159125/QUF
29.266	25073969/AGW	16124495/CCC	16159135/QUH
29.594	25073970/AGX	16124505/CCD	16159145/QUJ
29.922	25073971/AGY	16124515/CCE	16159155/QUK
30.594	25073972/AHA	16124525/CCG	16159165/QUL
30.938	25110393/AHB	16124845/CCH	16159175/QUM
31.297	25073973/AHC	16124535/CCI	16159185/QUN
31.641	25073974/AHD	16124545/CCJ	16159195/QUP
32	25110164/AHE	16124735/CCK	16159205/QUR
32.375	25073975/AHF	16124555/CCL	16159215/QUS
32.719	25073976/AHN	16124565/CCM	16159225/QUT
33.094	25073977/AHN	16124575/CCN	16159235/QUU
33.469	25073978/AHI	16124585/CCO	16159795/QSF
33.844	25110165/AHJ	16124745/CCP	16159805/QSH
34.594		16131625/CCR	16159815/QSJ
35		16131635/CCS	16159825/QSK
36.188		16145125/QPW	16159835/QSL
36.594		16145135/QPX	16159845/QSM

Figure 7: GM DRAC Part Numbers

Divisor	5 Output PN / BCC	6 Output PN / BCC	6 Output/Velcro PN / BCC
DIVISOR	5 OUTPUT Part # / BCC	6 OUTPUT Part # / BCC	6 OUTPUT/VELCRO Part # / BCC
18.297	25110156/AGF	16124655/CAM	16158755/QWR
18.703	25110357/AFI	16124755/CAO	16158765/QWS
19.563	25110361/AFM	16124765/CAS	16158775/QWT
19.781	25110121/AFN	16124595/CAT	16158785/QWU
20.016	25110365/AFO	16124775/CAU	16158795/QWW
20.234	25110122/AFP	16124605/CAV	16158805/QWX
20.469	25110157/AFQ	16124665/CAW	16158815/QWY
20.922	25110123/AFS	16124615/CAY	16158825/QWZ
21.156	25110369/AFT	16124785/CAZ	16158835/QXA
21.391	25110124/AFU	16124625/CBA	16158845/QXB
21.641	25110158/AFV	16124675/CBB	16158855/QXC
21.875	25110145/AFW	16124635/CBC	16158865/QXD
22.125	25073955/AFX	16124355/CBD	16158875/QXF
22.375	25110146/AFY	16124645/CBE	16158885/QXH
22.625	25110373/AFZ	16124795/CBF	16158895/QXJ
22.875	25110159/AGA	16124685/CBG	16158905/QXK
23.141	25110377/AGB	16124805/CBH	16158915/QXL
23.406	25073956/AGC	16124365/CBI	16158925/QUW
23.656	25073957/AGD	16124375/CBJ	16158935/QUX
23.922	25110381/AGE	16124815/CBK	16158945/QUY
24.203	25073958/AGF	16124385/CBL	16158955/QUZ
24.469	25073959/AGG	16124395/CBM	16158965/QWA
24.75	25073960/AGH	16124405/CBN	16158975/QWB
25.016	25110385/AGI	16124825/CBO	16158985/QWC
25.297	25073961/AGJ	16124415/CBP	16158995/QWD
25.594	25110160/AGK	16124695/CBQ	16159005/QWF
25.875	25110161/AGL	16124705/CBR	16159015/QWH
26.172	25073962/AGM	16124425/CBS	16159025/QWJ

Figure 8: GM DRAC Part Numbers continued

Note:

The InputRatio of Method 1 and the Divisor discussed here are related by the following equation:

$$\text{InputRatio} := \frac{\text{Divisor}}{32}$$

Method #3

This method may surprise some but works remarkably well. It was successfully used to recalibrate the DRAC for a 94 Chevy Blazer. In short... the method is simply *good old fashioned trial and error*. This process can be shortened by removing all jumpers and installing a "DIP" switch in place. In this way, quick changes to the jumper settings can be made even while on the fly. Just find a buddy with a speedometer you trust and make a few runs. **(Obligatory Disclaimer: Of course you should keep both hands on the wheel at all times. Take along a 3rd friend to perform the adjustments, or make frequent stops. <u>Never</u> take your eyes off the road to fiddle with DRAC settings).**

One note of caution, touching any part of the DRAC circuit board while the vehicle is in motion was observed to cause wild and erratic speedometer movement. This often times will light the ABS warning indicator and cause other strange behavior.

Good Luck!