Electronic Ratio Adapter (ERA)

Now You Have the Solution to Your Speedometer Inaccuracy Problems...

Any change in a vehicle's tire size or rear axle ratio will cause the speedometer reading to be inaccurate. The Electronic Ratio Adapter (ERA) is designed to correct this problem. With the ERA, you simply hook up four wires, set the DIP switches according to the calibration table included with your order, and you are ready to go.

What does the Electronic Ratio Adapter do?

The automotive industry has a great variety of part sizes, types, shapes and descriptions, but regardless of make, model or year, a few things are standard. One of those standards has been the number of revolutions a speedometer cable will make for each mile traveled. Nowadays, electronic pulses have replaced the rotating cable, but the same principle applies. The *Pulse Ratio* (the number of pulses per mile traveled) remains the same, regardless of speed, since the same distance is traveled and the same number of pulses have occurred each mile no matter what the speed was during that mile.

However, this *Pulse Ratio* can be made to vary from the true when modifications are made which change the number of electronic pulses per mile on a particular vehicle. This is most commonly caused by changing the tire size (increasing the outside diameter of the tires will cause the tire to travel further before making a complete revolution), but other modifications could have the same result. When the *Pulse Ratio* is thrown off, the speedometer/odometer will be inaccurate and corrections must be made.

This relative difference between true speed and the speed indicated on the speedometer is called the *Variance Ratio*, and it is corrected using the Abbott Electronic Ratio Adapter (ERA).

The first step is to Calculate the *Variance Ratio* precisely. There are several ways to calculate this ratio on a particular modified vehicle.
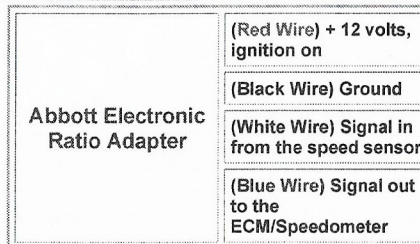
One way is to run the modified vehicle exactly ten miles as measured by highway mile markers and note the speedometer's mileage (odometer) reading at the course's start and finish. Subtract starting odometer reading from the ending odometer reading to determine indicated mileage over the ten mile course. Divide the *actual distance* traveled by the *odometer's indicated mileage* to get the *Variance Ratio*.   Example:10 divided by ?? equals Ratio.

Another way is by comparing your vehicles speedometer indicated speed, to a dynamometer, radar, or by driving along side of someone (if their speedometer is accurate).   Divide the *actual speed* by your *shown speed* to get the *Variance Ratio*.   Example: Actual divided by shown equals Ratio.

Figure your *Variance Ratio* and *Calculate* your new settings.
Calculations Page

The next step is to look up this *Variance Ratio* in the *"ratio"* column of the *"Abbott Electronic Ratio Adapter Calibration Table"* and set your dip switches accordingly. The signal from the speed sensor is inputted into the *Abbott Electronic Ratio Adapter*, modified to compensate for the *Variance Ratio*, and outputted as the *correct signal* to your ECM/Speedometer.

Wiring Diagram of Abbott Electronic Ratio Adapter:

Abbott Electronic Ratio Adapter	(Red Wire) + 12 volts, ignition on
	(Black Wire) Ground
	(White Wire) Signal in from the speed sensor
	(Blue Wire) Signal out to the ECM/Speedometer

Cable-X   ERA   Calculations/Conversions   Variance
Ratio (Calibration) Chart

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Abbott Electronic Ratio Adapter (ERA)
Calibration Table

"1" Represents switch "on" or "closed"
"0" Represents switch "off" or "open"

Ratio	Switch Settings	Ratio	Switch Settings	Ratio	Switch Settings
3.500	111110001110	3.160	001101011001	2.815	010010111001
3.490	001000001001	3.145	001101101001	2.800	010011001001
3.475	100100001010	3.130	100110111010	2.785	101001101010
3.460	001000101001	3.115	001110001001	2.770	010011101001
3.445	001000111001	3.100	001110011001	2.755	010011111001
3.430	001001001001	3.085	001110111001	2.740	010100001001
3.415	001001011001	3.070	001110111001	2.725	010100011001
3.400	001001101001	3.055	100111011010	2.710	010100101001
3.385	111001001001	3.040	001111011001	2.695	110101001011
3.370	110010011011	3.025	001111101001	2.680	101010011010
3.355	001010001001	3.010	001111101001	2.665	010101001001
3.340	001010011001	2.995	111100111101	2.650	010101011001
3.325	001010101001	2.980	010000001001	2.635	101010111010
3.310	110010101011	2.965	101000001010	2.620	111010101100
3.295	001011011001	2.950	010000101001	2.605	010110001001
3.280	001011001001	2.935	010000111001	2.590	010110011010
3.265	001011101001	2.920	010001001001	2.575	010110101001
3.250	111001011100	2.905	010001011001	2.560	010111001001
3.235	001100001001	2.890	010001101001	2.545	010111001001
3.220	100100001010	2.875	111010001100	2.530	010111011001
3.205	001100101001	2.860	010010001001	2.515	010111101001
3.190	110011001011	2.845	101001001010		
3.175	001101001001	2.830	010010101001		

Ratio	Switch Settings	Ratio	Switch Settings	Ratio	Switch Settings
2.500	111110101110	1.915	000010101000	1.570	001101101000
2.485	011000001001	1.905	000010111000	1.560	100110111001
2.470	101100001010	1.900	000011001000	1.555	001110001000
2.455	011000101001	1.890	000011011000	1.545	001110011000
2.435	110110001011	1.885	000011101000	1.540	001110101000
2.420	011001001001	1.875	111000011011	1.530	001110111000
2.405	011001011001	1.865	000100001000	1.525	001111001000
2.390	011001101001	1.860	000100011000	1.515	001111011000
2.375	111011001100	1.850	000100101000	1.505	001111101000
2.360	011010001001	1.845	000100111000	1.500	111110011101
2.345	101101001010	1.835	000101001000	1.490	010000001000
2.330	011010011001	1.830	100010101001	1.485	010000011000
2.310	011010111001	1.820	000101011000	1.475	010000101000
2.295	011011001001	1.810	000101111000	1.470	010000111000
2.280	101101101010	1.805	000110001000	1.460	010001001000
2.265	011011101001	1.795	000110011000	1.455	101000101001
2.250	111011011100	1.790	000110101000	1.445	010001101000
2.235	011100001001	1.780	110001101010	1.435	110100011010
2.220	101110001010	1.775	000111001000	1.430	010010001000
2.205	011100101001	1.765	000111011000	1.420	101001001001
2.185	110111001011	1.755	000111101000	1.415	010010101000
2.170	011101001001	1.750	111000111011	1.405	101001011001
		1.745	001000001000	1.400	010011001000

Ratio	Switch Settings	Ratio	Switch Settings	Ratio	Switch Settings
2.155	011101011001	1.735	001000011000	1.390	101001101001
2.140	011101101001	1.725	001000101000	1.380	010011101000
2.125	111011101100	1.720	001000111000	1.375	101001111001
2.110	011101111001	1.710	001001011000	1.365	010100011000
2.095	011110011001	1.705	100100101001	1.360	101010001001
2.080	011110101001	1.695	001001101000	1.350	010100101000
2.065	110111101011	1.690	111001001011	1.345	010100111000
2.045	011111001001	1.680	001010001000	1.335	010101001000
2.030	011111011001	1.670	100101001001	1.330	010101011000
2.015	011111101001	1.665	001010101000	1.320	010101101000
2.000	111110111110	1.655	001010111000	1.315	110101011010
1.995	000000001000	1.650	001011001000	1.305	010110001000
1.985	100000001001	1.640	100110011001	1.295	101011001001
1.975	000000101001	1.635	001011101000	1.290	010110111000
1.970	100000011001	1.625	110010111010	1.280	010110111000
1.960	000001001000	1.615	001100001000	1.275	010111001000
1.955	000001011000	1.610	001100011000	1.265	101011101001
1.945	000011001000	1.600	001100111000	1.255	010111011000
1.935	110000011010	1.595	110011001010	1.250	010111101000
1.930	000010001000	1.585	001101001000	1.240	011000001000
1.920	000010011000	1.575	100110101001	1.235	011000011000

Ratio	Switch Settings	Ratio	Switch Settings	Ratio	Switch Settings
1.225	011000101000	.910	000101100111	.675	010100100111
1.220	101100011001	.905	000101110111	.670	010101000111
1.210	011001001000	.900	100011001000	.665	101010101000
1.205	101100101001	.895	000110100111	.660	010101100111
1.195	011001101000	.890	000110110111	.655	110101011001
1.185	011010001000	.885	000111100111	.650	010110100111
1.180	011010101000	.880	000111100111	.645	010110100111
1.170	101101001001	.875	100011111000	.640	101011011000
1.165	011010101000	.870	001000000111	.635	010111000111
1.155	011011001000	.865	001000010111	.630	010111100111
1.150	011011001000	.860	100100011000	.625	111110101100
1.140	101101101001	.855	001001000111	.620	011000000111
1.130	011011101000	.850	001001100111	.615	011000100111
1.125	011011111000	.845	110010011001	.610	011000110111
1.115	011100001000	.840	001010010111	.605	011001000111
1.110	011100011000	.835	001010010111	.600	011001010111
1.100	011100101000	.830	001010100111	.595	011001110111
1.090	011100111000	.825	001011000111	.590	011010000111
1.085	101110101001	.820	001011010111	.585	011010010111
1.080	101110101001	.815	001011100111	.580	011010100111
1.070	011101101000	.810	001100000111	.575	011011000111
1.060	110111011010	.805	100110001000	.570	011011010111
1.055	011110001000	.800	001100100111	.565	011011100111
1.045	011110011000	.795	001101000111	.560	011011110111
1.040	011110101000	.790	001101010111	.555	101110001000
1.030	110111101010	.785	001101100111	.550	011110100111
1.025	011111001000	.780	111001101010	.545	101110011000
1.015	011111101000	.775	100110001000	.540	011101010111
1.010	011111101000	.770	001110010111	.535	011101110111
1.000	110111111010	.765	100111011000	.530	011101110111
.995	000000000111	.760	001111000111	.525	101111001000

.990	000000100111	.755	001111100111	.520	011110100111
.985	110000001001	.750	110011111001	.515	110111101001
.980	000001000111	.745	010000000111	.510	011111000111
.975	100000101000	.740	010000100111	.505	011111100111
.970	110000011001	.735	101000011000	.500	101111111000
.965	000010000111	.730	010001000111	.495	000000100110
.960	100001001000	.725	010001010111	.490	000001000110
.955	100001011000	.720	110100011001	.485	000001100110
.950	000011000111	.715	010010000111	.480	100001000111
.945	100001101000	.710	010010010111	.475	000011000110
.940	000011100111	.705	010010110111	.470	000011100110
.935	000100000111	.700	010011000111	.465	000100010110
.930	100010001000	.695	010011010111	.460	110001001000
.925	000100100111	.690	010011100111	.455	000101100110
.920	100010011000	.685	111010011010	.450	000110010110
.915	000101010111	.680	010100010111	.445	000110110110

.435	001000000110	.400	001100100110	.365	010001000110
.430	110010001000	.395	001101000110	.360	111010001001
.425	100100100111	.390	001101110110	.355	101001000111
.420	001100100110	.385	001110100110	.350	010011000110
.415	110010101000	.380	001111000110	.345	010011100110
.410	100101100111	.375	111111001100	.340	010100010110
.405	001011110110	.370	010000010110	.335	010101000110
				.330	010101100110

Instructions for use of this table:

The Abbott Electronic Ratio Adapter (ERA) will make corrections when speedometer readings vary from actual speeds. This can occur when tire sizes are changed or rear axle ratios are changed.

To calculate your correction factor, divide the actual road speed by the speedometerreading.   Example: Speed shows on speedometer as 55 but is actually running 60 mph. To calculate correction, divide actual speed of 60 mph by speedometer reading of 55 mph as follows: 60 (actual) / 55 (shown) = 1.0909 (correction ratio)

Locate your correction ratio on the table above and set the switches as indicated. Example: the table shows that 1.090 = 011100111000, with "1" representing the "on" position and "0" representing the "off" position of the switches.

* * * * * * * * * * * *

"Extended Range" Calibration Charts:

When such dramatic changes have been made to your speedometer calibration that the standard "Abbott Electronic Ratio Adapter (ERA) Calibration Table" does not fully cover the ratio settings you require, the "Extended Range" charts below can be used to =Speed It Up= or =Slow It Down=

==Speed It Up==

Use this chart *only* if your speedometer is too *'SLOW'*
("1" represents the switch is "on" or "closed")
("0"represents the switch is "off" or "open")

Ratio	Increase Factor	Switch Setting
1.000	X1	110111111010
2.000	X2	111110111110
3.000	X3	111110011110
4.000	X4	011111111010
5.000	X5	111010111101
6.000	X6	001111101010
7.000	X7	000111101010
8.000	X8	011111111011
9.000	X9	110110111101
10.000	X10	111010111110
11.000	X11	101001101100
12.000	X12	001111101011
13.000	X13	001011001011
14.000	X14	000111101011
15.000	X15	100001101100
16.000	X16	011111101100
17.000	X17	011101011100
18.000	X18	011011011100
19.000	X19	011001011100

20.000	X20	110101111110
21.000	X21	010101011100
22.000	X22	010011011100
23.000	X23	101000101101
24.000	X24	001111001100
25.000	X25	110011011110
More ratios are available if required.		

==*Slow It Down*==

Use this chart *only* if your speedometer is too 'FAST'

("1" represents the switch is "on" or "closed")
("0"represents the switch is "off" or "open")

Ratio	Decrease Factor	Switch Setting
1.000	Divide by 1	110111111010
.500	Divide by 2	101111111000
.333	Divide by 3	010101000110
.250	Divide by 4	011111110110
.200	Divide by 5	001100100101
.166	Divide by 6	010101000101
.142	Divide by 7	101101010110
.125	Divide by 8	111110111010
.111	Divide by 9	000110110100
.100	Divide by 10	001100100100
.090	Divide by 11	010001010100
.083	Divide by 12	010101000100
.076	Divide by 13	011000010100
.071	Divide by 14	011011010100
.066	Divide by 15	011101100100

.062	Divide by 16	101111110101
.058	Divide by 17	000011100011
.055	Divide by 18	110001100101
.052	Divide by 19	100100110100
.050	Divide by 20	001100100011
.047	Divide by 21	001111000011
.045	Divide by 22	101000100100
.043	Divide by 23	101001100100
.041	Divide by 24	010101000011
.040	Divide by 25	010110110011

More ratios are available if required.

Abbott Electronic Ratio Adapter (ERA). The solution to your speedometer inaccuracy problem.

Cable-X   **ERA**   **Calculations/Conversions**   **Variance**
Ratio Chart

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