MN12 EEC Tuner User Guide

The purpose of this guide is to give you an understanding of what each Scalar, Function, & Table is when recalibrating your EEC-IV.

Checksum Base Address:

This is Ford's internal program checksum designed to verify that the original EEC program is correct. If set to 0 you disable the checksum and the fault code 15 *ROM test failed* is not displayed during a KOEO or KOER test of the EEC.

WOT Voltage:

This is Throttle Position voltage when the EEC goes into closed loop. All WOT functions and scalars are read once the EEC goes into WOT. The EEC calculates WOT by TP_REL. To get TP_REL, the EEC takes the voltage at closed throttle when the key is turned on. It then takes this voltage and subtracts it from the actual voltage from the sensor to get voltage relative to closed throttle. This voltage is then converted into A/D counts from 0 to 1020. If you have .8 volts at closed throttle, and actual voltage from the sensor is 2.8 volts, you subtract .8 from 2.8 and get 2 volts. You take 2volts/5 volts (the max possible voltage) and multiply by 1020. In this example, you get .4*1020 or 408 TP_REL counts. If you just remember to add the voltage at closed throttle (.8v) to the WOT_VOLTAGE 2.44144 you get WOT activated at 3.24144v .

Engine Displacement:

Defines the cubic inch displacement of the engine. The SC engine size is defined as 231.728. Increasing the engine size lowers the calculated engine load value. Engine Displacement, MAF Transfer, and Injector Size are all used by the EEC to calculate engine load.

Global Spark Adder:

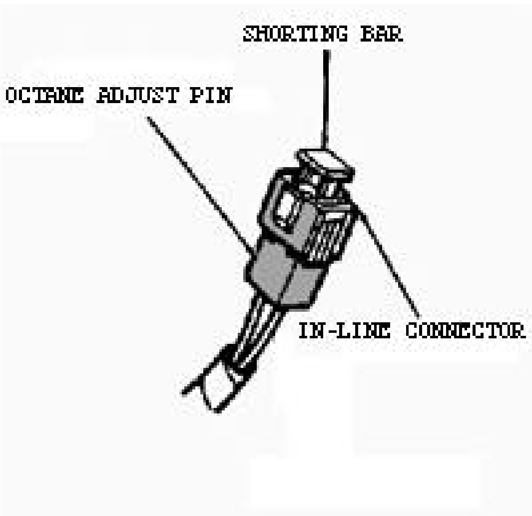
This Scalar function allows additional ignition timing to be set. Increase this above 0 to advance the ignition timing. Advance in .25 increments. This adds an additional amount of timing to the spark table values. Equivalent to advancing the crank sensor on DIS cars or advancing the distributor on non DIS cars.

Max Spark Retard:

This is the maximum amount of ignition timing the EEC pulls out of the engine when the knock sensor signals the EEC of detonation. The EEC pulls timing out in .25 degree increments. Set to 0 to disable.

Octane Plug Spark Adder:

On DIS cars the octane plug is connected to the wiring harness near the MAF sensor. The Octane plug looks the same as the SPOUT connector so make sure you have the correct plug. Refer to you shop manual for correct EEC PIN. The Octane plug looks like this:



Tip-In Retard:

This is the maximum amount of ignition timing the EEC pulls out of the engine during shifts. The EEC pulls timing out in .25 degree increments. Set to 0 to disable.

Min Tip-In Spark:

This is the minimum actual spark allowed during shifts and throttle tip-in. Set to 50 to ensure maximum spark is set and ignition advance is not removed.

Base Spark Table:

A higher number increases ignition advance and a lower number decreases ignition advance. Base and Altitude spark tables are used based on barometric pressure. Barometric pressure above 26in/hg and the EEC will use the Base Spark Table while a barometric pressure below 26in/hg will use the Altitude Spark Table. To configure spark set all 3 spark tables *(Base, Alt, & BDS)* to the same values. The spark tables are read in column's top to bottom.

Example: Assuming you are using the stock X any Y normalizers. You are drag racing and while waiting at the light you are idling at 900 rpm's which puts the spark in column 0 (500rpm's) then the car accelerates to WOT. Before the rpm's reach the next defined rpm's in the Spark Table X normalizer which is column 6 (2000rpm's) the spark does not change. This is based on a 140% load from idle column 0 to column 6. Even though the table has 9 rows for spark it only reads what is defined in the X normalizer. In this case it is 2000rpm's where the EEC will set the timing at 12 degrees and then column 8 (3000rpm's) where will set timing at 20 degrees and so on.

BASE SPARK

0		**15%**	30	30	30	35	35	35	35	35	35	36	38
1		**30%**	30	30	30	30	30	34	34	35	35	36	38
2	**L**	**45%**	20	21	23	26	26	27	29	30	34	36	38
3	**O**	**60%**	16	19	20	22	23	23	25	27	32	34	35
4	**A**	**75%**	13	17	18	20	18	18	25	28	30	33	34
5	**D**	**90%**	11	13	14	16	21	22	24	27	29	29	33
6		**105%**	7	10	11	13	15	16	20	23	26	28	29
7		**120%**	3	6	8	11	12	13	15	20	23	27	28
8		**140%**	0	3	5	7	9	10	12	17	20	25	27
			500	**700**	**900**	**1100**	**1300**	**1500**	**2000**	**2500**	**3000**	**4500**	**5000**

RPM

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

Base Altitude Spark Table:

A higher number increases ignition advance and a lower number decreases ignition advance. Base and Altitude spark tables are used based on barometric pressure. Barometric pressure above 26in/hg and the EEC will use the Base Spark Table while a barometric pressure below 26in/hg will use the Altitude Spark Table. To configure spark set all 3 spark tables *(Base, Alt, & BDS)* to the same values.

BASE ALTITUDE SPARK

0		**15%**	30	30	30	30	30	30	30	33	34	36	38
1		**30%**	30	30	22	24	25	29	29	33	34	36	38
2	**L**	**45%**	15	16	18	21	21	22	24	27	34	36	38
3	**O**	**60%**	10	10	10	12	17	18	19	25	32	32	35
4	**A**	**75%**	10	9	9	10	12	13	14	18	20	25	30
5	**D**	**90%**	8	8	8	8	7	8	12	16	18	23	29
6		**105%**	7	7	7	6	6	7	10	14	16	21	25
7		**120%**	3	6	7	6	6	6	8	12	14	19	23
8		**140%**	0	3	5	6	6	6	6	10	12	17	22
			500	**700**	**900**	**1100**	**1300**	**1500**	**2000**	**2500**	**3000**	**4500**	**5000**

RPM

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

Borderline Detonation Spark Table:

Borderline Detonation Spark is a table that protects the engine from detonation by limiting total timing. To configure spark set all 3 spark tables *(Base, Alt, & BDS)* to the same values.

BORDERLINE DETONATION SPARK

0		**15%**	60	60	60	60	60	60	60	60	60	60	60
1		**30%**	60	60	60	60	60	60	60	60	60	60	60
2	**L**	**45%**	19	21	23	26	26	27	29	30	34	36	38
3	**O**	**60%**	18	19	20	22	23	23	25	27	32	34	35
4	**A**	**75%**	9	10	8	10	12	13	20	23	28	39	41
5	**D**	**90%**	0	1	3	9	10	11	15	20	24	28	30
6		**105%**	-5	-4	0	4	6	9	12	17	18	22	24
7		**120%**	-10	-9	-4	0	1	4	8	12	15	20	22
8		**140%**	-10	-10	-9	-4	-1	2	3	8	13	16	18
			500	**700**	**900**	**1100**	**1300**	**1500**	**2000**	**2500**	**3000**	**4500**	**5000**

RPM

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

SPARK TABLE RPM SCALING:

Spark Table **X** normalizer lists the RPM and Column number. Each table has 11 column's for spark 0-10. You can make custom **X** normalizers by changing the RPM and Column numbers. Column 0 is 500 rpm's while Column 10 is 5000 rpm's. See example:

Stock Values			**Modified Values**		
RPM	**Column**	***RPM***	***RPM***	***Column***	***RPM***
16383.8	10	*5000*	*16383.8*	*10*	*5000*
5000	10	*5000*	*6000*	*10*	*5000*
3000	8	*3000*	*5000*	*8*	*3000*
2000	6	*2000*	*4000*	*6*	*2000*
500	0	*500*	*3000*	*4*	*1300*
0	0	*500*	*2000*	*2*	*900*
0	0	*500*	*500*	*0*	*500*

SPARK TABLE LOAD SCALING:

Spark Table **Y** normalizer lists the Load value (calculated by EEC) and Row number. Each table has 9 rows for spark 0-8. You can make custom **Y** normalizers by changing the Load and Row numbers. **.149994** value is **15%** load and **1.39999** Value is **140%** load*. Note:Engines making higher than 200% load should have the* ***Engine Displacement*** *increased to lower the calculated engine load.*

Stock Values			**Modified Values**		
Load	**Row**	***Load***	***Load***	***Row***	***Load***
1.99997	8	*140%*	*1.99997*	*8*	*140%*
1.39999	8	*140%*	*1.90000*	*8*	*140%*
1.20001	7	*120%*	*1.60000*	*7*	*120%*
.149994	0	*15%*	*1.40000*	*6*	*105%*
0	0	*15%*	*1.00000*	*5*	*90%*
0	0	*15%*	*.800000*	*4*	*75%*
0	0	*15%*	*.149994*	*0*	*15%*

WOT 1-2 Shift Point:

Change the rpm to increase the shift point at WOT. Each WOT shift point is different so you should try 500 rpm increments until you find the correct WOT shift rpm.

WOT 2-3 Shift Point:

Change the rpm to increase the shift point at WOT. Each WOT shift point is different so you should try 500 rpm increments until you find the correct WOT shift rpm.

WOT 3-4 Shift Point:

Change the rpm to increase the shift point at WOT. Each WOT shift point is different so you should try 500 rpm increments until you find the correct WOT shift rpm.

ECT1 HS Fan On:

Turns the radiator high-speed fan on. Lowering the number causes the fan to come on sooner. Change in 1 degree increments.

ECT2 HS Fan On:

Turns the radiator high-speed fan on. Lowering the number causes the fan to come on sooner. Change in 1 degree increments.

ECT HS Fan Off:

Turns the radiator high-speed fan off. Change this number so it is a few degrees lower than the High Speed ON temp. Change in 1 degree increments.

ECT LS Fan On:

Turns the radiator low speed fan on. Lowering the number causes the fan to come on sooner. Change in 1 degree increments.

ECT LS Fan Off:

Turns the radiator low speed fan off. Change this number so it is a few degrees lower than the Low Speed ON temp. Change in 1 degree increments.

Enable Stage 2 RPM Limiter:

Engine RPM limit. Increase to 7000 to disable.

Enable Stage 3 RPM Limiter:

Engine RPM limit. Increase to 7000 to disable.

Max Output Shaft Speed:

Drive shaft speed in MPH. Change to 232 MPH to disable.

Max RPM Closed Throttle Idle:

The idle maximum in RPM's. Set to 0 to disable.

First Gear Ratio:

Represents the transmission first gear ratio on automatics. Changing ratio higher or lower causes the transmission to shift sooner or later.

Second Gear Ratio:

Represents the transmission second gear ratio on automatics. Changing ratio higher or lower causes the transmission to shift sooner or later.

Third Gear Ratio:

Represents the transmission third gear ratio on automatics. Changing ratio higher or lower causes the transmission to shift sooner or later.

Fourth Gear Ratio:

Represents the transmission fourth gear ratio on automatics. Changing ratio higher or lower causes the transmission to shift sooner or later.

Note: When changing the differential gear ratio you will want to use the formula: ***new differential gear ratio (3.73)/stock differential gear ratio (3.31)= increase in ratio (1.12688) * transmission gear ratio (2.83997)= new first gear ratio (3.20032)***

Low Injector Slope:

Size of injector you have installed. Set number to 30, 36, 38, 42, or 50 depending on the injector size you have installed.

High Injector Slope (Injector Size):

Size of injector you have installed. Set number to 30, 36, 38, 42, or 50 depending on the injector size you have installed.

Note: Both Low and High Injector Slopes are different on stock calibrations. After upgrading the factory fuel pump to 190lph or 255lph you should set BOTH injector slopes to the same injector size.

Neutral Idle:

Idle RPM with transmission in Park, Neutral (*automatics*) or Neutral (*manual*).

Drive Idle:

Idle RPM with transmission in gear (*automatics*). Set to same RPM as Neutral Idle on manual transmissions.

Open Loop Fuel Multiplier:

Global open loop fuel adder. Increase value over 1 to lower injector pulse width (*less fuel*) and decrease the number under 1 to increase the injector pulse width (*more fuel*) during open loop operation.

EGR Type:

Controls EGR operation, change EGR Type to 2 to disable operation. Disabling the EGR does not disable the EGR Vacuum Regulator or EGR Pressure Sensor.

First Speed Limiter On:

Turns rev limiter on when MPH is reached. Set to 232 to disable.

First Speed Limiter Off:

Turns rev limiter off when MPH is reached. Set to 232 to disable.

Second Speed Limiter On:

Turns rev limiter on when MPH is reached. Set to 232 to disable.

Second Speed Limiter Off:

Turns rev limiter off when MPH is reached. Set to 232 to disable.

Half Fuel Limiter On:

Turns rev limiter on when RPM is reached. Set to 7000 to disable.

Half Fuel Limiter Off:

Turns rev limiter off when RPM is reached. Set to 7000 to disable.

Neutral Stage 2 RPM Limiter :

Turns rev limiter on when RPM is reached. Set to 7000 to disable.

Neutral Stage 3 RPM Limiter :

Turns rev limiter on when RPM is reached. Set to 7000 to disable.

SIL RPM On:

Turns on SIL (***shift indicator light***) rev limiter. Set to 7000 to disable.

The Thunderbird SC SIL will light and an audible chime will sound under the following conditions:

- Key in RUN, engine off.
- At high vehicle speeds when engine speed is too high for the transmission gear selected:
  Greater than 93 mph (4000 rpm) in 3rd gear for A/T.
  Greater than 121 mph (4300 rpm) in 4th gear for M/T.

At the same time the SIL and chime are activated at high speed, the Powertrain Control Module (PCM) will take action to prevent engine damage from overheating. If coolant gets too hot, or 60 seconds elapse at high speeds, the PCM will shut off three injectors until a safe operating speed is reached or transmission is upshifted to top gear.

SIL RPM Off:

RPM at which the engine rev limiter is turned off. Once SIL is activated RPM's will have to drop to SIL RPM OFF: before acceleration can occur again. Set to 7000 to disable.

PIP:
Lower number gives a higher rev limit. Set PIP to **858** to set rev limit to 7000

PIP = 6006250/maxRPM
maxRPM = 6006250/PIP

PIP = 961 maxRPM = 6006250/961= 6250 rpms

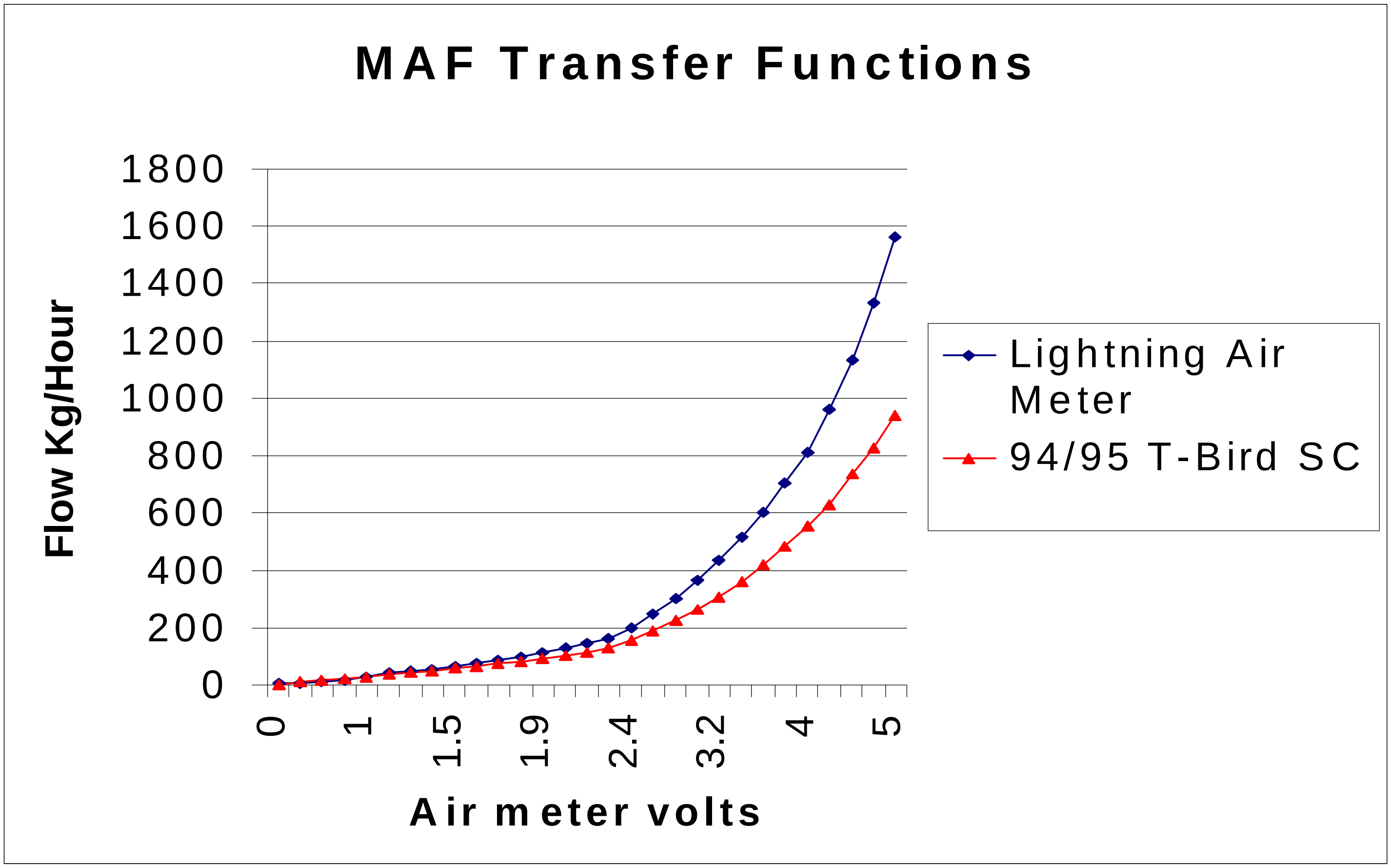
The PIP is a sample rate frequency that limits the PCM program operating loop to a minimum rate. If the loop is sampled less then PIP times within one operating cycle (2 crankshaft revolutions), the PCM limits rpm.

MAF Voltage:

Maximum Mass Air voltage recognized by the EEC for calculating air flow into the engine.

MAF Function:

Hotwire type sensor, the actual "hotwires" taking the form of film type semiconductor resistors. On 89-93 Thunderbird SC's the EEC-IV processor speed was 12mhz while the 94-95 Thunderbird SC's used a 15mhz processor. Ford used a 55mm MAF on 89-91 Supercoupes then changed to a 70mm MAF for the 92-95 years. All 89-91 55mm MAF can be replaced with the larger 70mm MAF used on the 92-95 Supercoupes. Essentially the sensor consists of two semiconductor film resistor elements connected together in "half bridge" configuration so that the same current passes through both. The circuit is supplied with a constant voltage. One of the elements is exposed to the intake airflow the other is shielded from the flow. The purpose of the second element is to provide temperature compensation. The current passing through both resistors heats them both reducing the resistance however the cooling effect of the airflow on the exposed element has the opposite effect. As a result the voltage at the point in the circuit between the resistors will increases with increasing airflow. MAF transfer table lists voltage then kg/hour (*airflow rate*). Increase the voltage or increase the kg/hour number to increase load calculation. Decrease the voltage or decrease the kg/hour number to decrease load calculation. Changes to the MAF table is not usually necessary unless your fuel injectors are insufficient or you have a MAF installed for a different injector size. (*Note: To check fuel injector millisecond pulse using a Ford diagnostic NGS or equivalent the ms injector pulse should be no more than 25ms @WOT at 4,000rpm's.)* If you choose to use a different MAF calibration you can modify the MAF Transfer Function to match the flow curve of the new MAF. Using the flow sheet that came with the MAF you can change the voltage and KG/HR values to match the new meter.



The above chart shows the difference between the Stock SC MAF curve and the 99 Lighting MAF curve. To use the 99 Lighting MAF or another MAF on a Supercoupe we have to address the limitations of the EEC-IV processor. The 94-95 Supercoupe EEC-IV processor is capable of only processing upto 1,700kg/hr MAX. The 89-93 Supercoupe processors are only capable of processing upto 1,400kg/hr. A 3.8L SC engine making 400hp on a dyno will use about 1,500kg/hr while the 94-95 SC processor is capable of supporting the higher kg/hr values needed the 89-93 processors are not. To get around this limitation in the 89-93 processor you multiply the following: MAF kg/hr values, Engine displacement, & Injector values by a factor of .65 to reduce the MAF kg/hr numbers below 1,400kg/hr*. For example: **1,565kg/hr** multiplied by .65 is **1017kg/hr**.* The engine displacement for the 3.8L SC is **231.728** so by multiplying this number by .65 we have **150.6232** . The Injector values should both have the same slopes. **LOW_INJECTOR_SLOPE** & **HIGH_INJECTOR_SLOPE** would both have the same injector value*. For example: you have 50lb injectors you would multiply the value of 50 by .65 to get **32.5**.* These three: MAF kg/hr values, Engine displacement, & Injector value calculate the **Engine Load** the EEC-IV uses for Fuel and Timing tables.

Volts	Lightning KG/HR	94/5 3.8L S/C KG/HR
0	4	0
0.4	8	10
0.6	11	15
0.8	18	20
1	28	28
1.2	41	39
1.3	48	45
1.4	56	51
1.5	65	59
1.6	75	66
1.7	87	74
1.8	99	82
1.9	112	92
2	129	101

2.1	**143**	**114**
2.2	**161**	**127**
2.4	**201**	**155**
2.6	**248**	**189**
2.8	**303**	**225**
3	**365**	**265**
3.2	**436**	**308**
3.4	**515**	**362**
3.6	**604**	**419**
3.8	**703**	**483**
4	**812**	**551**
4.25	**963**	**629**
4.5	**1136**	**735**
4.75	**1335**	**830**
5	**1565**	**939**

(15.9998, 992.662)   (4.75, 992.662)   (4.5, 884.619)
(4.25, 754.715)   (4, 661.247)   (3.80005, 576.333)
(3.6001, 497.44)   (3.3999, 428.052) (3.19995, 362.783)
(3, 310.187)   (2.80005, 262.027)   (2.6001, 218.303)
(2.3999, 179.015) (2.19995, 145.747)   (2, 115.647)
(1.80005, 95.0522)   (1.6001, 76.9923) (1.3999, 58.2987)
(1.19995, 42.7735)   (1, 29.783)(0.899902, 24.7136)
(0.800049, 20.2778)   (0.600098, 14.2578)   (0.300049, 5.70313)
(0, 0)   (0, 0)   (0, 0) (0, 0)   (0, 0)   (0, 0)

WOT Fuel Multiplier vs. RPM:

First number is RPM and second number is multiplier. Increase multiplier value of 1 to decrease injector pulse width (*less fuel*) and decrease the number under 1 to increase the injector pulse width (*more fuel*). You can also change the RPM value to add or remove fuel at any RPM.

*Note: The EEC calculates WOT by TP_REL. To get TP_REL, the EEC takes the voltage at closed throttle when the key is turned on. It then takes this voltage and subtracts it from the actual voltage from the sensor to get voltage relative to closed throttle. This voltage is then convertered into A/D counts from 0 to 1020. If you have .8 volts at closed throttle, and actual voltage from the sensor is 2.8 volts, you subtract .8 from 2.8 and get 2 volts. You take 2volts/5 volts (the max possible voltage) and mulitply by 1020. In this example, you get .4*1020 or 408 TP_REL counts. If you just remember to add the voltage at closed throttle (.8v) to the WOT_VOLTAGE 2.44144 you get WOT activated at 3.24144v.*

RPM	Multiplier
16383.8	1
1750	1
1250	0.898428
1000	0.796875
0	0.796875
0	0.796875
0	0.796875

WOT_FUEL_MULTIPLIER_VS_RPM   # WOT Fuel Multiplier
(16383.8, 1)   (1750, 1)   (1250, 0.898438)
(1000, 0.796875)   (0, 0.796875)   (0, 0.796875) (0, 0.796875)   (0, 0.796875)

WOT Advance vs. RPM:

The first number is RPM and the second is timing advance. This table sets the minimum spark during WOT operation. This table is compared to the spark tables and the lower value will be used. This table is used when the TPS voltage reaches 3 volts or higher.

RPM	TIMING
16383.8	26
5000	26
4000	24
3000	20
2500	17
1500	10
0	8
0	8

(16383.8, 26) (5000, 26) (4000, 24)
(3000, 20) (2500, 17) (1500, 10) (0, 8) (0, 8)

Accelerator Pump vs. TP Voltage:

The first number is TP voltage and the second is accelerator multiplier. Increase value over 1 to decrease injector pulse width (*less fuel*) and decrease the number under 1 to increase the injector pulse width (*more fuel*). To disable set Multiplier to all 1's. *Note: Once the TP_REL voltage reaches 2.44141 volts additional fuel pulse width is added.*

TP_REL	Multiplier
4.98047	0.5
2.44141	0.75
0	1
0	1
0	1

(4.98047, 0.5) (2.44141, 0.75)
(0, 1) (0, 1)   (0, 1)

Accelerator Pump Fuel Table:

A higher number adds more fuel.

	-30	3	4	8	14	20	23	32	35
	0	3	4	8	14	20	23	32	35
E	**30**	2.5	3	7	10	14	22	28	30
C	**60**	2.5	3	7	10	14	22	28	30
T	**90**	1.25	1.5	2	2	3	6	12	17
	120	0.5	0.75	1.5	2	3	6	10	15
	150	0.5	0.75	1.5	2	2	4	7	10
		16	**32**	**48**	**64**	**80**	**96**	**112**	**128**

Throttle Rate (deg/sec)

Crank Fuel Pulse Width vs. ECT:

First number is ECT and the second number is injector pulse width. This table determines how much the fuel injector pulses while the engine is cranking. To compensate for larger injector use the following formula:

Stock Values(30lb)			Modified Values(36lb)	
ECT	PULSE		*ECT*	*PULSE*
65534	0.00256348		*65534*	*0.00213623*
190	0.00256348		*190*	*0.00213623*
90	0.0072937		*90*	*0.0060780*
70	0.0072937		*70*	*0.0060780*
40	0.00999451		*40*	*0.0083287*
0	0.0167999		*0*	*0.0139999*
-20	0.026001		*-20*	*0.0216675*
-65536	0.026001		*-65536*	*0.0216675*
-65536	0.026001		*-65536*	*0.0216675*
-65536	0.026001		*-65536*	*0.0216675*
-65536	0.026001		*-65536*	*0.0216675*

stock injector size (30)/new injector size (36)= decrease in ratio (0.83333) * crank fuel pulsewidth (0.00256348)= new crank fuel pulsewidth (0.00213623)

(65534, 0.00256348) (190, 0.00256348) (90, 0.0072937)
(70, 0.0072937) (40, 0.00999451) (0, 0.0167999)
(-20, 0.026001) (-65536, 0.026001) (-65536, 0.026001)
(-65536, 0.026001) (-65536, 0.026001)

Exhaust Pulse Delay:

Increase the numbers higher for long tube headers. Changes the injector timing calculations. Currently no formula is know for corrected values with long tube headers.

Exhaust Pulse Delay

LOAD					
	15%	10	10	10	10
	45%	9	9	9	9
L	**60%**	5	6	7	9
O	**75%**	5	6	7	9
A	**90%**	7	7	8	9
D	**105%**	7	7	7	9
	120%	7	7	7	9
	140%	7	7	7	9
		700	**900**	**1950**	**3000**

RPM

Closed Throttle Open Loop (OL) Fuel Multiplier:

First number is RPM and second number is multiplier. Increase multiplier value of 1 to decrease injector pulse width (less fuel) and decrease the number under 1 to increase the injector pulse width (more fuel). You can also change the RPM value to add or remove fuel at any RPM.

(16383.8, 1) (850, 1) (700, 0.898438)
(0, 0.898438) (0, 0.898438) (0, 0.898438)

Dynamic 1-2 TV Pressure vs. TP voltage:

First number is throttle position (TP) voltage and second number is TV pressure. Increase the TV pressure number to add more line pressure during 1-2 shifts.

(4.98047, 21) (1.46484, 15) (0.742188, 15)
(0.488281, 7) (0, 7) (0, 7)
(0, 7) (0, 7) (0, 7)

Dynamic 2-3 TV Pressure vs. TP voltage:

First number is throttle position (TP) voltage and second number is TV pressure. Increase the TV pressure number to add more line pressure during 2-3 shifts.

(4.98047, 243)(0.253906, 243) (0, 0)
(0, 0) (0, 0) (0, 0)
(0, 0) (0, 0) (0, 0)

Dynamic 2-1 TV Pressure vs. TP voltage:

First number is throttle position (TP) voltage and second number is TV pressure. Increase the TV pressure number to add more line pressure during 2-1 shifts.

(4.98047, 246)(0.976562, 246) (0, 0)
(0, 0) (0, 0) (0, 0)
(0, 0) (0, 0) (0, 0)

Dynamic 3-2 TV Pressure vs. TP voltage:

First number is throttle position (TP) voltage and second number is TV pressure. Increase the TV pressure number to add more line pressure during 3-2 shifts.

(4.98047, 25) (1.46484, 25) (1.46484, 0)
(0, 0) (0, 0) (0, 0)
(0, 0) (0, 0) (0, 0)

Second Gear TC lockup:

First number is throttle position (TP) voltage and second number is MPH. Increase or decrease the MPH to lock torque converter clutch in third gear.

(4.98047, 50) (2.92969, 50) (2.92969, 105)
(1.34766, 105)(1.34766, 30) (0.976562, 30)
(0.605469, 10)(0, 10)(0, 10)
(0, 10)

Third Gear TC lockup:

First number is throttle position (TP) voltage and second number is MPH. Increase or decrease the MPH to lock torque converter clutch in third gear.

(4.98047, 32) (0.976562, 32)(0.488281, 17.5)
(0, 17.5) (0, 17.5) (0, 17.5)
(0, 17.5) (0, 17.5) (0, 17.5)
(0, 17.5)

Fourth Gear TC lockup:

First number is throttle position (TP) voltage and second number is MPH. Increase or decrease the MPH to lock torque converter clutch in third gear.

(4.98047, 56) (0.898438, 56) (0.742188, 54)
(0.253906, 40) (0.253906, 35.5) (0, 35.5)
(0, 35.5) (0, 35.5) (0, 35.5)
(0, 35.5)

1-2 Part Throttle Upshift Speed vs. TP Voltage:

First number is throttle position (TP) voltage and second number is MPH. Increase or decrease the MPH to change part throttle 1-2 upshift.

(4.98047, 50) (2.92969, 50) (2.92969, 30)
(1.95312, 30) (1.62109, 25) (1.01562, 19)
(0.820312, 12) (0.488281, 10) (0, 10)
(0, 10)

2-3 Part Throttle Upshift Speed vs. TP Voltage:

First number is throttle position (TP) voltage and second number is MPH. Increase or decrease the MPH to change part throttle 2-3 upshift.

(4.98047, 80) (2.92969, 80) (2.92969, 68)
(2.03125, 68) (1.42578, 52) (1.23047, 45)
(1.01562, 35) (0.605469, 23) (0.410156, 20)
(0, 20)

3-4 Part Throttle Upshift Speed vs. TP Voltage:

First number is throttle position (TP) voltage and second number is MPH. Increase or decrease the MPH to change part throttle 3-4 upshift.

(4.98047, 116) (3.06641, 116) (2.34375, 107)
(1.83594, 93) (1.17188, 65) (0.253906, 40)
(0.253906, 35.5) (0, 35.5) (0, 35.5)
(0, 35.5)

2-1 Part Throttle Downshift Speed vs. TP Voltage:

First number is throttle position (TP) voltage and second number is MPH. Increase or decrease the MPH to shift part throttle 2-1 downshift.

(4.98047, 28) (3.53516, 28) (3.53516, 25)
(2.55859, 25) (1.23047, 9) (0, 9)
(0, 9) (0, 9) (0, 9)
(0, 9)

3-2 Part Throttle Downshift Speed vs. TP Voltage:

First number is throttle position (TP) voltage and second number is MPH. Increase or decrease the MPH to shift part throttle 3-2 downshift.

(4.98047, 70) (3.53516, 70) (3.53516, 50)
(2.44141, 50) (2.20703, 40) (1.23047, 20)
(1.13281, 18.5) (0, 18.5) (0, 18.5)
(0, 18.5)

4-3 Part Throttle Downshift Speed vs. TP Voltage:

First number is throttle position (TP) voltage and second number is MPH. Increase or decrease the MPH to shift part throttle 4-3 downshift.

(4.98047, 100)(3.18359, 100)(3.18359, 92)
(2.38281, 80) (2.20703, 70) (1.71875, 50)
(1.52344, 40) (1.09375, 33.5) (0, 33.5)
(0, 33.5)

Spark Adder ECT:

Table is not used. You can add spark using this table. Example:

(254, 5) (210, 4) (150, 3)
(60, 2)(0, 1) (-50, 0)
(-256, 0)

WOT Advance vs. ECT:

The first number is engine coolant temp (ECT) and the second is ignition timing in degrees that is added or removed.

(254, -4) (230, -4) (216, 0)
(150, 0) (100, 4) (-256, 4)
(-256, 4)

WOT Advance vs. ACT:

The first number is air charge temp (ACT) and the second is ignition timing in degrees that is added or removed between temperatures.

(254, -3) (240, -3) (150, -4)
(120, 0) (-256, 0) (-256, 0)

Advance vs. BP:

The first number is barometric pressure and the second is ignition timing in degrees that is added or removed.

(31.875, 0)(27.75, 0) (26.5, -32)
(0, -32) (0, -32)

Advance Rate vs. RPM:

First number is RPM and the second is ignition advance rate. Increase the advance rate in .25 increments.

(8160, 0.5)(1600, 0.5)(800, 0.75)
(0, 0.75) (0, 0.75) (0, 0.75)

Dashpot Clip:

(16383.8, 0.100098) (2200, 0.100098) (1200, 0.0600586)
(0, 0.0600586)(0, 0.0600586)

Dashpot Decrement Rate:

(15.9998, 0.0161133) (2, 0.0161133)(0.399902, 0.00390625)
(0.100098, 0.00390625) (0, 0.000732422) (0, 0.000732422)
(0, 0.000732422)

Spark Adder RPM:

The first number is RPM and the second is additional timing advance. Similar to the Global Spark Adder as it adds additional spark advance. Increase the spark adder number and increase the ignition timing at that RPM. Change the RPM value and change when spark is added.

(16383.8, 10) (5000, 10) (3000, 8)
(2000, 6) (500, 0) (0, 0)
(0, 0)

Spark Adder Load:

The first number is Load and the second is additional timing advance. Adds spark advance based on EEC load calculations. Increase the timing advance number and increase the ignition timing at that load. Change the load value and change when spark is added.

(1.99219, 8) (1.60156, 8) (0.398438, 0)
(0, 0) (0, 0) (0, 0)

Stabilized Open Loop (OL) Air Fuel (AF) Ratio:

A higher number decreases fuel delivery and a lower number increases fuel delivery. Each column lists the fuel ratio for that ECT. *Example: The ECT is between 180-209 degrees. While tuning the car on a dyno using a wide band 02 sensor you will see 120% to 140% load during the run. You decide a A/F ratio of 11 or 11 to 1 is a better ratio so to change the Engine A/F of row 180 (shaded) from **12** @120% and **12** @140% to a richer A/F ratio of **11** for 120% and 140% load. If the engine has a lean spot at say part throttle you can change the A/F ratio in the 60%, 75%, 90% to a richer setting so the engine does not lean under boost. To really get the A/F dialed in you should be using a Wide Band 02 sensor during your tuning to verify the accuracy. To connect the wide band 02 sensor to the exhaust you may remove one of the stock 02 sensors and screw in the wide band 02 in it's place. Once the car is started you will have to wait about 2 min before the engine turns that 02 sensor off and throws a check engine code. Don't worry about the check engine code during the dyno run as WOT runs switch the EEC into open loop anyway.*

Stabilized OL Fuel Ratio

LOAD										
15%	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64
45%	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64
60%	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64
75%	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.75	12.125	12.125
90%	14.64	14.64	14.64	14.64	14.64	14.64	14.64	13.625	11.25	11.25
105%	14.64	14.64	14.64	14.64	14.64	14.64	14.125	12	10.875	10.875
120%	132.625	13.625	13.625	13.625	13.625	13.625	12.75	**12**	10.375	10.375
140%	12.75	12.75	12.75	12.75	12.75	12.75	12.75	**12**	10.375	10.375
	-30	**0**	**30**	**60**	**90**	**120**	**150**	**180**	**210**	**240**

ECT

Startup Open Loop (OL) Air Fuel (AF) Ratio:

A higher number increases fuel delivery and a lower number decreases fuel delivery.

Startup OL Fuel Ratio

S	**0**	9.625	9.125	9.125	8	6.375	6.375	4.75	3.25	3.25	3.25
E	**4**	7.5	6.875	5	4	4	2.375	1.625	1.625	1.625	1.625
C	**8**	5.5	3.875	3.5	3.5	3.5	1.625	1.25	1.25	1.625	1.625
O	**12**	4	2.25	2.25	2.25	2.25	0.75	1.125	1.125	1.125	1.125
N	**16**	3	0.75	0.625	0.625	0.625	0	0.75	0.75	0.75	0.75
D	**20**	2.75	0	0	0	0	0	0.75	0.75	0.75	0.75
S	**24**	1.75	0	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0	0	0
		-30	**0**	**30**	**60**	**90**	**120**	**150**	**180**	**210**	**240**

ECT

Base Open Loop (OL) Fuel:

A higher number decreases fuel delivery and a lower number increases fuel delivery.

Base OL Fuel Ratio

	15%	15.25	15.25	15.25	14.64	14.64	14.64	14.64	14.64	14.64	14.64
	45%	15.25	15.25	15.25	14.64	14.64	14.64	14.64	14.64	14.64	14.64
L	**60%**	13.75	14.375	14.75	14.64	14.64	14.64	14.64	14.64	14.64	14.64
O	**75%**	12.75	13.625	14.375	15.375	14.64	14.64	14.64	14.64	14.64	14.64
A	**90%**	12	12.125	13.5	14.375	15.25	15.375	15.375	15.375	15.375	15.375
D	**105%**	12	12	12.75	13.5	14.375	14.875	14.875	14.875	14.875	14.875
	120%	10.75	10.75	12.125	13.5	14.375	14.375	14.375	14.375	14.375	14.375
	140%	10.25	10.25	11.5	12.75	13.625	13.625	13.625	13.625	13.625	13.625
		-30	**0**	**30**	**60**	**90**	**120**	**150**	**180**	**210**	**240**

ECT

Spark Adder vs. ECT:

Increasing the number will add ignition advance and a negative number will retard ignition advance.

Spark Adder vs. ECT

L	**15%**	15	10	5	0	0	0
O	**45%**	10	10	0	0	0	0
A	**75%**	0	0	0	0	-2	-3
D	**105%**	0	0	0	0	-2	-3
	140%	0	0	0	0	-3	-4
		-50	**0**	**60**	**150**	**210**	**254**

ETC

Engine Torque:

Calculates transmission line pressure based on Engine Torque (lb-ft). Max value is 512. Higher number increases TV line pressure at that load vs. RPM. Used on 4R70W transmission equipped cars only.

Engine Torque

	15%	14	22	22	30	28	18
L	**30%**	108	120	128	130	130	122
O	**60%**	184	208	222	222	220	216
A	**90%**	246	286	302	304	302	302
D	**120%**	302	348	378	380	376	378
	140%	346	398	440	448	450	448
		500	**1000**	**1500**	**2000**	**3000**	**5000**

RPM

Engine Frictional Torque:

Engine Friction Torque is used in conjunction with the Engine Torque table. Lower the value and it increases the transmission TV pressure at that load vs. RPM. Most transmission clutches slip under high load .75%-.90% so to increase line pressure under those conditions decrease the Engine Frictional value on those lines until needed TV line pressure is achieved. Used on 4R70W transmission equipped cars only.

Engine Frictional Torque

	15%	26	30	38	46	54	62
L	**30%**	24	30	40	52	68	84
O	**60%**	24	30	44	60	80	104
A	**90%**	22	30	48	68	92	122
D	**120%**	20	30	50	74	102	138
	140%	18	30	54	82	116	156
		500	**1000**	**1500**	**2000**	**3000**	**5000**

RPM

MN12 Performance
4110 Plaza Lane
Fairfax, VA 22033
703-968-6513
richt@erols.com

EEC Tuner Software Install

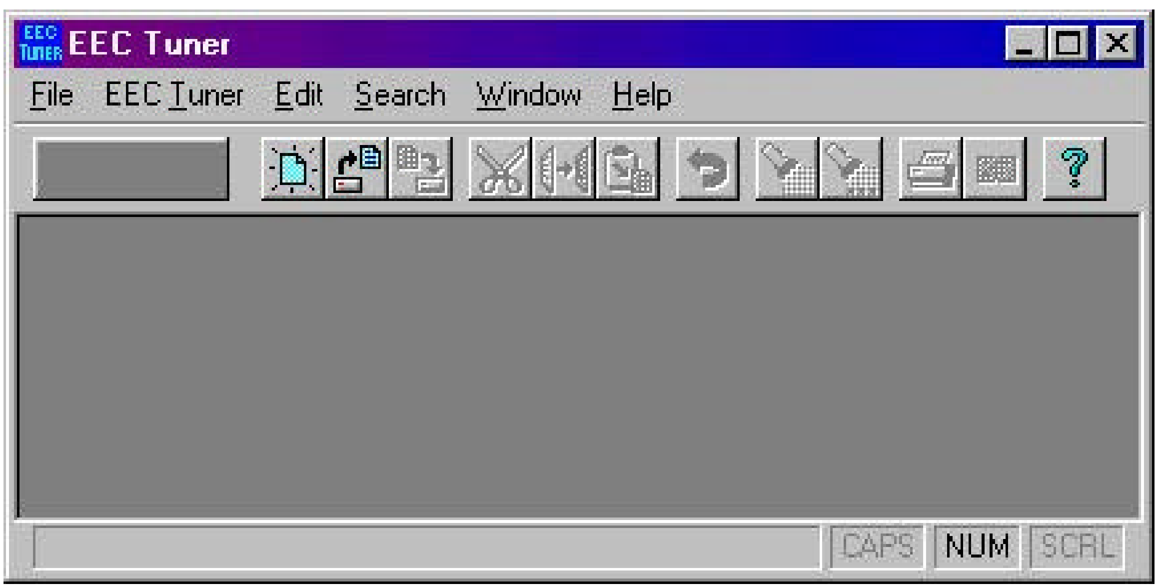
Insert diskette in drive **A:** and run setup.exe

Once software is installed "**double click**" on EECTUNER icon. 

Once the program is loaded connect the serial cable from the EEC Tuner board to your serial port. **Com1:** is the default but you can change the com port setting by editing the *eectuner.ini* file in the program directory. Change the section below to the correct com port for your system.

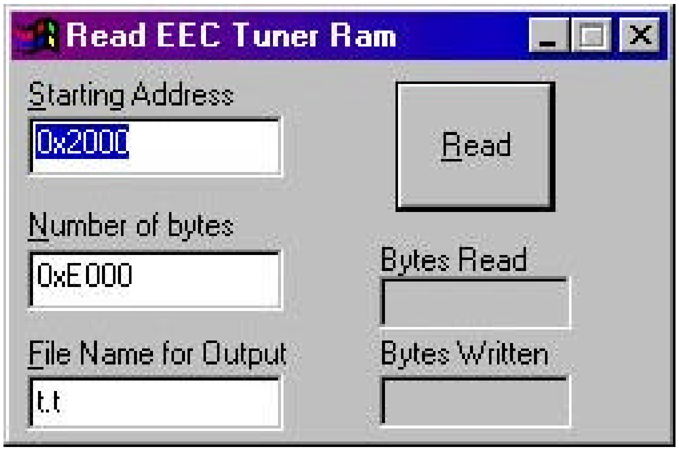
[EEC Tuner]
PORT=COM1

Your Tuner board already has a "performance enhanced" file loaded for your calibration when you get it. You can choose to start the car with the "pre installed" calibration or retrieve the Tuner board modifications and make changes. Included on the diskette are the "performance enhanced" calibrations in EEC format. You can retrieve the EEC file that is calibrated for your EEC-IV calibration if needed. You can program the EEC Tuner board outside the EEC-IV box by powering the unit with the power supply included with the kit or installed in the EEC-IV back in the car with the cars wiring harness reconnected. Do not install the tuner board in the EEC and connect the power supply at the same time. To program the EEC Tuner in the car you must turn the ignition on before attempting to **Retrieve Modifications** or **Download** to the EEC Tuner board.



Reading EEC Tuner ROM is available by clicking **EEC Tuner** and **selecting Read Ford ROM**.

Click **Read** and the pre programmed calibration will be read from the EEC-IV processor. The Ford ROM code is stored in the file entered in the "*File Name for Output*" field. The image is stored in text format as a series of hex bytes. The raw binary image is always saved in file **t.bin** in the program directory. To preserve the contents of the t.bin you must rename the binary image file before performing another read operation. The text-formatted file, **t.t** is automatically opened in the EEC Tuner application as a plain text file. This t.t file is for information use only and the EEC Tuner cannot read this file format. Use the **t.bin** file created in the program directory to read the modified calibration from the EEC Tuner. This BIN file can be used by "chip makers" to make custom chips.



To verify the EEC Tuner board is operating properly click on **EEC Tuner** and select **Verify EEC Tuner**. The program will respond that the EEC Tuner board is working properly. If any "error messages" are displayed DO NOT start the vehicle and call MN12 Performance 703-968-6513 for technical assistance. To retrieve the Tuner boards current calibration click on **EEC Tuner** pull down menu and select **Retrieve Modifications**. To download your calibrations to the EEC Tuner board it is recommended that you save the file under another name before downloading the calibration to the board.

Calibrations are grouped into "families" each family has a "catch code" like M2Y. Several calibrations make up a "family". See listing of calibrations and the associated family below.

A9U2 *(family)*	**W1M** *(family)*
B9A1	E1X
COS	H2M
LOE1	W1M
A9U2	

M2Y *(family)*	**W4D2** *(family)*
Z1Z1	T4J1
D2L	W4D2
H2M1	
M2Y	
U2Y	
X1A2	
Z1Z2	
X1A2	

Note: Software updates will be available through the MN12 Performance web site at http://www.mn12performance.com/eecsoftware/update.html