



Tuning Guide

Optimizing ignition timing can increase torque and horsepower and also increase efficiency and fuel economy. **INCORRECT IGNITION TIMING CAN CAUSE ENGINE DAMAGE!!** Too much timing advance can cause detonation. Detonation at full throttle can sound like pinging. Detonation at part throttle is much more difficult to detect. It can sound like a rattle or like valve train noise. Detonation WILL cause engine damage over time. If any detonation is heard, immediately reduce timing advance. Always leave a margin of safety of a few degrees. **Every engine is different. These are general tips for most classic American V8 engines.**

The Progression Ignition distributor and app gives you a great deal of control over your timing.

- Air density and RPM roughly equate to **engine load**, which is the single most important factor for setting the ignition timing. The timing table uses MAP and RPM.
- The timing cells can be set to any number within the range of 10-50 degrees BTDC
- The distributor will interpolate smoothly between adjacent cells on the table in all directions. It's not necessary to make tables that are smooth from column to column or row to row. The distributor will smooth it automatically. When the bubble is directly centered on a timing cell, the timing will be exactly that number. When the bubble is between two columns or rows, the timing will be interpolated between them.
- The RPM values at the bottom of the screen and MAP values on the left side of the screen can all be changed. The RPM range is 300-9990. The MAP range is 20-253. If you want to rescale all of the RPM or MAP values, start at the highest value and work your way down to the lowest value.

Manifold Absolute Pressure (MAP) vs Vacuum

The distributor uses a MAP sensor and the vertical scale of the timing table is absolute pressure using kiloPascals (kPa) as units. Absolute pressure in KPa is always a positive number.

Why is MAP used to tune ignition timing?

- **Manifold Absolute Pressure (MAP)**
 - MAP measures pressure relative to a perfect vacuum (zero pressure). This means the reference point used to determine pressure is fixed and cannot change. MAP measures the **actual** air pressure inside the manifold.
- **MAP Advantages**
 - It is **not** affected by changes in altitude. If the vehicle drives from sea level to a high altitude, the atmospheric pressure drops. Since the timing table uses absolute pressure, the tuner can make a timing table to compensate for the thinner air, ensuring consistent performance.
 - The MAP sensor can easily read both vacuum (pressure below atmospheric) and boost pressure (pressure above atmospheric). This allows the tuner to manage the engine across its entire operating range, from deep vacuum at idle or deceleration to high boost at wide-open throttle. Using kPa as units, the vertical scale is always a positive number. It would be confusing to use negative psi or negative in/hg.

In summary, the MAP sensor is an electronic sensor that gives the distributor a consistent, absolute, and wide-ranging electrical signal that directly correlates to the actual mass of air available for combustion. This level of precision is critical for optimizing performance and fuel economy.

Why isn't vacuum used to tune ignition timing?

- **Vacuum**
 - A vacuum gauge measures pressure relative to the surrounding atmosphere. Its reference point is the atmosphere which is **always** changing. It measures the **difference** in pressure between the manifold and the outside air.
- **Vacuum Disadvantages**
 - The vacuum gauge reading is **always** affected by altitude and weather, making it an inconsistent reference for ignition tuning.
 - Since a vacuum gauge reading is a relative value. It will read the **same** at high altitude and at sea level for a given engine load, **even though the total air mass is drastically different**, leading to poor tuning.
 - A vacuum gauge is only designed to read pressure below the atmosphere (vacuum). It would be unable to provide data once the engine enters a boost condition, making it useless for forced-induction engines.

Since most classic car owners are used to using a vacuum gauge, we have included a vacuum/boost gauge on both the active table screen and the gauges

screen. These gauges convert the MAP data to in/hg when in vacuum, and psi when in boost.

The diagram illustrates three engine operating zones and their corresponding timing values from a table:

- WIDE OPEN THROTTLE** (ZERO VACUUM) points to the first column of the table (15).
- IDLE RANGE** points to the second column of the table (23).
- DECELERATION** (HIGH VACUUM) points to the third column of the table (18).

	15	18	20	23
101	15	18	20	23
94	23	18	21	24
86	23	18	22	25
79	23	18	22	25
71	23	18	23	26
64	23	18	24	27
57	23	18	25	28
49	23	18	26	29
42	23	18	27	30
34	23	18	20	31
27	23	18	20	32
20	23	18	20	33
***	550	750	1070	1390

Tuning Zones

1. Cranking transition

- The distributor always cranks at 15 degrees BTDC up to 300 RPM. When transitioning to the timing table, the cells shown below are usually the first to be used, because the engine isn't spinning fast enough to make any vacuum. Edit these cells for best starting. Make these cells the same as idle timing for engines with low vacuum.

The table shows timing values for various RPM ranges. The first column (15) is circled in red, indicating the cranking transition zone.

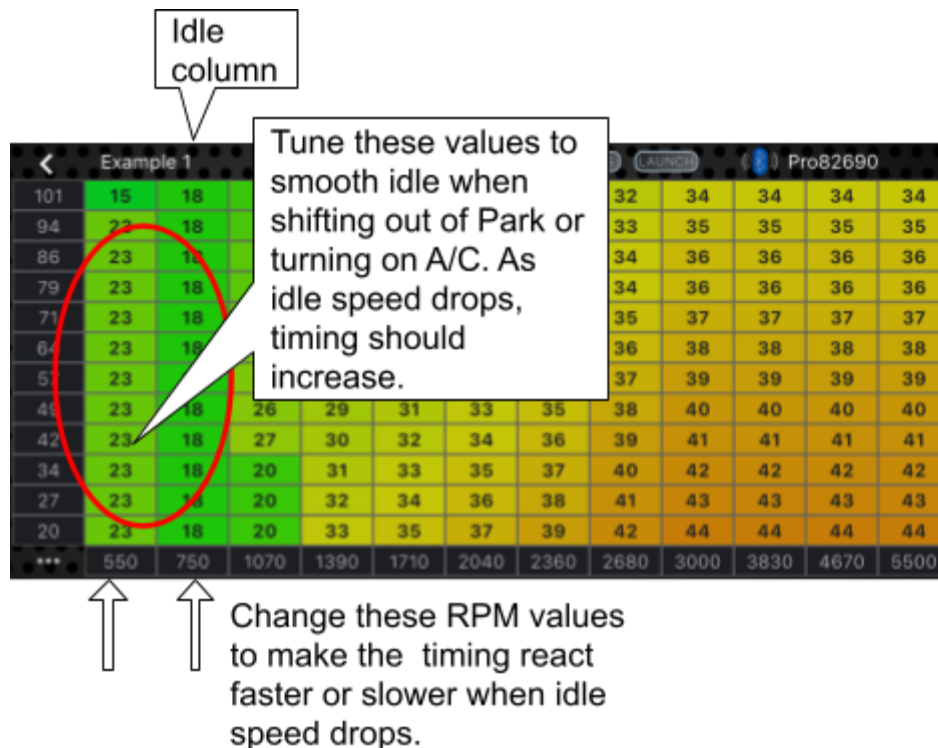
	15	18	20	23	25	27	29	32	34	34	34	34
101	15	18	20	23	25	27	29	32	34	34	34	34
94	23	18	21	24	26	28	30	33	35	35	35	35
86	23	18	22	25	27	29	31	34	36	36	36	36
79	23	18	22	25	27	29	31	34	36	36	36	36
71	23	18	23	26	28	30	32	35	37	37	37	37
64	23	18	24	27	29	31	33	36	38	38	38	38
57	23	18	25	28	30	32	34	37	39	39	39	39
49	23	18	26	29	31	33	35	38	40	40	40	40
42	23	18	27	30	32	34	36	39	41	41	41	41
34	23	18	20	31	33	35	37	40	42	42	42	42
27	23	18	20	32	34	36	38	41	43	43	43	43
20	23	18	20	33	35	37	39	42	44	44	44	44
***	550	750	1070	1390	1710	2040	2360	2680	3000	3830	4670	5500

2. Idle tuning

- The Idle column is the second column from the left and the bubble should be on this column when in Park/Neutral. If the bubble isn't sitting in the idle column, change the

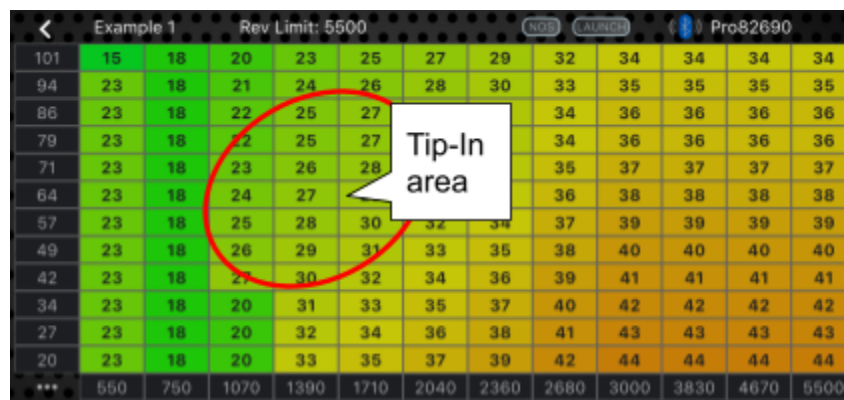
RPM value in the idle column to match the engine idle speed. The distributor does not target idle speed.

- Maximum torque at idle can be up to 25-30 degrees. Typically idle timing is between 10-18 degrees. This creates a torque reserve. You can use that reserve by increasing advance to help maintain a smooth idle when engine load increases. Examples of increasing load would be shifting an automatic transmission from Park into Drive or turning on an accessory like air conditioning.
- The Generator in the app sets this up for you automatically. If engine load increases, RPM will decrease and the table increases timing to increase torque and compensate for the additional load. See below.

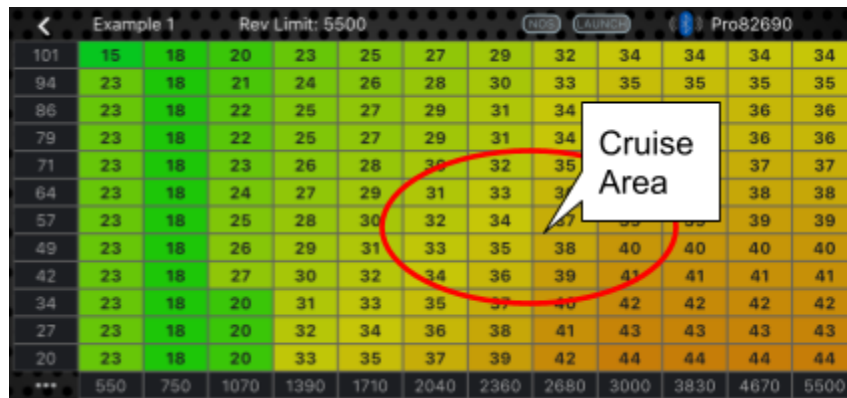


3. Tip-In- this is the area of the table that is used when increasing throttle to accelerate from a stop. The engine will quickly move through this area. Optimizing timing here can increase torque quickly and provide great throttle response.

- You want maximum torque here. Timing can go as high as 25-30 degrees. If MAP keeps increasing, timing must taper back down



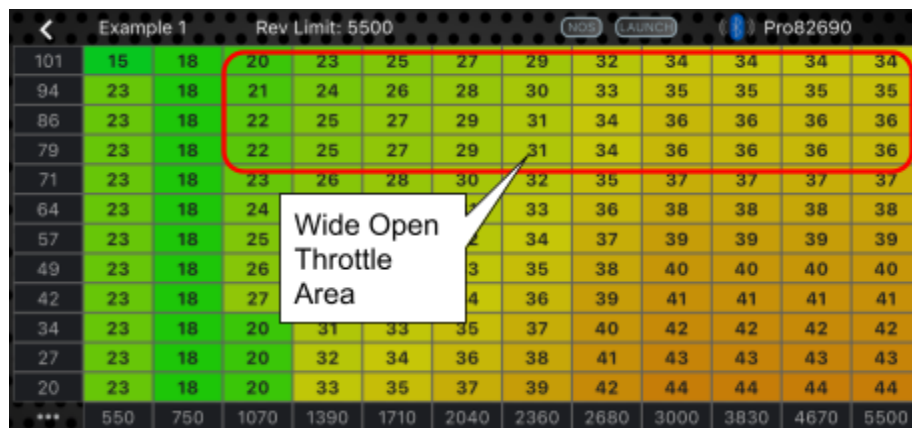
- 4. Cruise-** Optimizing timing during cruise will maximize fuel economy. Cruise RPM varies widely due to the variety of transmissions and rear end ratios. Timing is generally in the 35-45 degree range, perhaps higher on engines with older cylinder head designs combined with non-overdrive transmissions. See below.



A timing chart titled "Example 1" with a "Rev Limit: 5500". The chart shows timing values in degrees for various RPMs (101, 94, 86, 79, 71, 64, 57, 49, 42, 34, 27, 20) across a range of engine speeds (550 to 5500). A red circle highlights the "Cruise Area" where timing values are generally between 32 and 40 degrees. A callout box labeled "Cruise Area" points to this region.

	550	750	1070	1390	1710	2040	2360	2680	3000	3830	4670	5500
101	15	18	20	23	25	27	29	32	34	34	34	34
94	23	18	21	24	26	28	30	33	35	35	35	35
86	23	18	22	25	27	29	31	34		36	36	
79	23	18	22	25	27	29	31	34		36	36	
71	23	18	23	26	28	30	32	35		37	37	
64	23	18	24	27	29	31	33	36		38	38	
57	23	18	25	28	30	32	34	37		39	39	
49	23	18	26	29	31	33	35	38	40	40	40	40
42	23	18	27	30	32	34	36	39	41	41	41	41
34	23	18	20	31	33	35	37	40	42	42	42	42
27	23	18	20	32	34	36	38	41	43	43	43	43
20	23	18	20	33	35	37	39	42	44	44	44	44
***	550	750	1070	1390	1710	2040	2360	2680	3000	3830	4670	5500

- 5. Wide Open Throttle-** Optimize timing for maximum power. Older small block V8's typically see max power at 34-36 degrees at high RPM. Newer cylinder head designs generally see max power around 28-32 degrees at high RPM. Be careful when tuning here as detonation can quickly destroy an engine at WOT. See below.



A timing chart titled "Example 1" with a "Rev Limit: 5500". The chart shows timing values in degrees for various RPMs (101, 94, 86, 79, 71, 64, 57, 49, 42, 34, 27, 20) across a range of engine speeds (550 to 5500). A red rectangle highlights the "Wide Open Throttle Area" where timing values are generally between 20 and 36 degrees. A callout box labeled "Wide Open Throttle Area" points to this region.

	550	750	1070	1390	1710	2040	2360	2680	3000	3830	4670	5500
101	15	18	20	23	25	27	29	32	34	34	34	34
94	23	18	21	24	26	28	30	33	35	35	35	35
86	23	18	22	25	27	29	31	34	36	36	36	36
79	23	18	22	25	27	29	31	34	36	36	36	36
71	23	18	23	26	28	30	32	35	37	37	37	37
64	23	18	24				33	36	38	38	38	38
57	23	18	25				34	37	39	39	39	39
49	23	18	26				35	38	40	40	40	40
42	23	18	27				36	39	41	41	41	41
34	23	18	20	31	33	35	37	40	42	42	42	42
27	23	18	20	32	34	36	38	41	43	43	43	43
20	23	18	20	33	35	37	39	42	44	44	44	44
***	550	750	1070	1390	1710	2040	2360	2680	3000	3830	4670	5500

- 6. High RPM/Low load-** This area of the table is not used much unless the driver is purposely holding the car in a low gear at high RPM with light throttle. Timing should be very high around 40-50 degrees. Retarded timing here will excessively heat exhaust components.

Example 1 Rev Limit: 5500 NOS LAUNCH Pro82690

101	15	18	20	23	25	27	29	32	34	34	34	34
94	23	18	21	24	26	28	30	33	35	35	35	35
86	23	18	22	25	27	29	31	34	36	36	36	36
79	23	18	22	25	27	29	31	34	36	36	36	36
71	23	18	23	26	28	30	32	35	37	37	37	37
64	23	18	24	27	29	31	33	36	38	38	38	38
57	23	18	25	28	30	32	34	37	39	39	39	39
49	23	18	26	29	31	33	35	38	40	40	40	40
42	23	18	27	30	32	34	36	39	41	41	41	41
34	23	18	20	31	33	35	37	40	42	42	42	42
27	23	18	20	32	34	36	38	41	43	43	43	43
20	23	18	20	33	35	37	39	42	44	44	44	44
...	550	750	1070	1390	1710	2040	2360	2680	3000	3830	4670	5500

High RPM/
Low Load
Area

- 7. Deceleration-** This is when your foot is completely off the throttle. MAP is at its lowest (highest vacuum). Timing is generally between 35-50 degrees. A popping sound in the exhaust can indicate too much timing advance here. See below.

Example 1 Rev Limit: 5500 NOS LAUNCH Pro82690

101	15	18	20	23	25	27	29	32	34	34	34	34
94	23	18	21	24	26	28	30	33	35	35	35	35
86	23	18	22	25	27	29	31	34	36	36	36	36
79	23	18	22	25	27	29	31	34	36	36	36	36
71	23	18	23	26	28	30	32	35	37	37	37	37
64	23	18	24	27	29	31	33	36	38	38	38	38
57	23	18	25	28	30	32	34	37	39	39	39	39
49	23	18	26	29	31	33	35	38	40	40	40	40
42	23	18	27	30	32	34	36	39	41	41	41	41
34	23	18	20	31	33	35	37	40	42	42	42	42
27	23	18	20	32	34	36	38	41	43	43	43	43
20	23	18	20	33	35	37	39	42	44	44	44	44
...	550	750	1070	1390	1710	2040	2360	2680	3000	3830	4670	5500

Deceleration
Area

- 8. Turbo/Supercharger tuning-** Edit the MAP values to tune for boost. The highest MAP value allowed is 253 kPa (22 psi boost). 1 psi equals 7 kPa and 101 is atmospheric pressure at sea level. Use the boost conversion chart below. In the example picture, the top MAP value is 136 or 5 psi boost and there is a 5 degree retard at 5 psi. If the boost goes up off the table, the highest row is used for timing.

⬅	5 psi 5 retard				Rev Limit: 6000				NOS		LAUNCH	
136	10	13	16	18	21	23	26	28	31	31	31	31
124	12	15	18	20	23	25	28	30	33	33	33	33
113	13	16	19	21	24	26	29	31	34	34	34	34
101	15	18	21	23	26	28	31	33	36	36	36	36
91	23	18	22	24	27	29	32	34	37	37	37	37
81	23	18	23	25	28	30	33	35	38	38	38	38
71	23	18	24	26	29	31	34	36	39	39	39	39
61	23	18	26	28	31	33	36	38	41	41	41	41
50	23	18	27	29	32	34	37	39	42	42	42	42
40	23	18	21	30	33	35	38	40	43	43	43	43
30	23	18	21	32	35	37	40	42	45	45	45	45
20	23	18	21	33	36	38	41	43	46	46	46	46
...	550	750	1070	1390	1710	2040	2360	2680	3000	4000	5000	6000

BOOST CONVERSION CHART

kPa	Boost psi		kPa	Boost psi
108	1		184	12
115	2		191	13
122	3		198	14
129	4		205	15
135	5		212	16
142	6		218	17
149	7		225	18
156	8		232	19
163	9		239	20
170	10		246	21
177	11		252	22