



KILLSHOT™



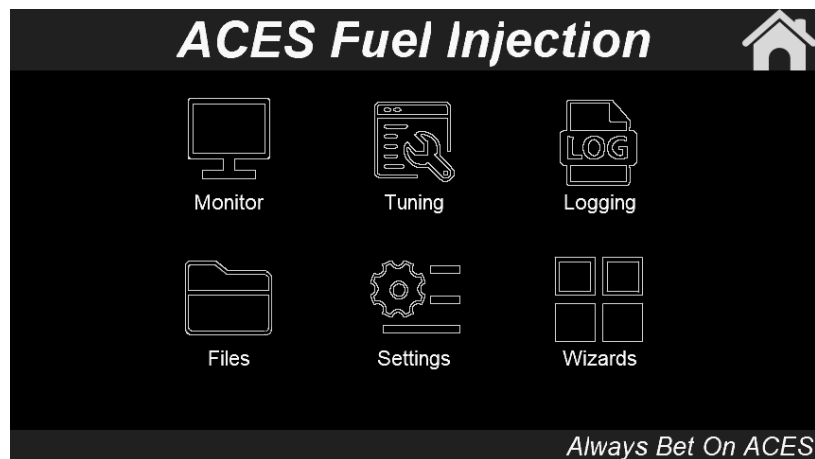
KILLSHOT™ EFI TUNING REFERENCE MANUAL

The KILLSHOT™ EFI allows the user to adjust some basic tuning changes to help optimize engine performance. The tuning is split up into “Basic ” and “Advanced ”.

The Basic Tuning allows changes basic calibration data of **Idle, Spark, Fuel, Fuel Pump, System Setting and System IO**. The Advanced Tuning is control function and 2D table that are less commonly used. These parameters require some understanding before changing.

The Main Menu has 6 selections (see following figure): **Monitor, Tuning, Logging, Files, Settings, Wizards**.

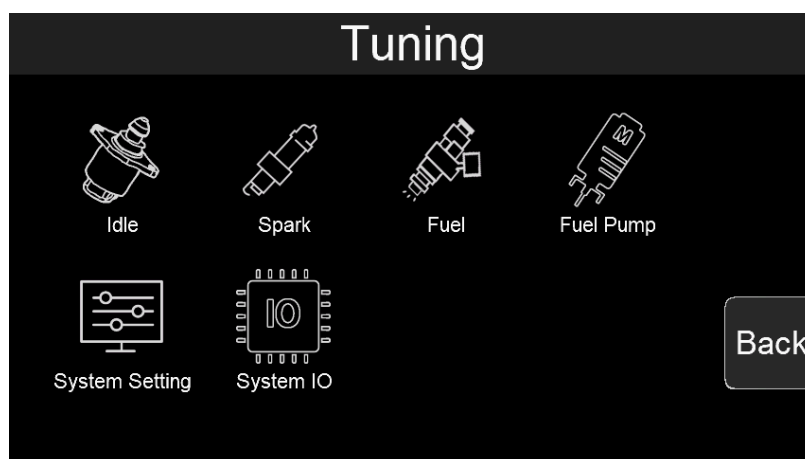
Click the "🏠" icon in the upper right corner to return to the Home Screen.



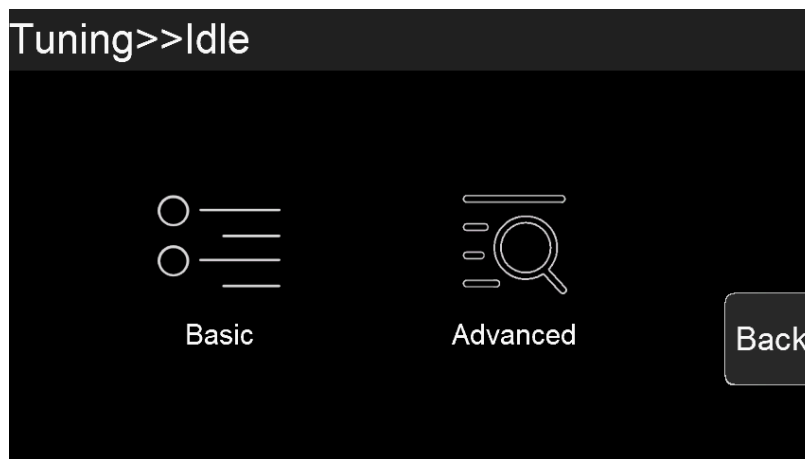
1.0 IDLE

The goal of the engine operating states is to define the state of the engine related to its operating point. This state depends basically on engine speed and load. The following states are defined here: **engine stopped, startup, idle, push, WOT, push fuel cutoff, follow**. **Follow** is a engine operating state to make engine get to idle smoothly

Click the Idle icon to enter the idle screen.



Tuning Screen



Idle Screen

1.1 Basic Idle Parameter

Tuning>>Idle>>Base			
Hot Idle Speed	800	RPM	▲
Idle IAC Min Step	2	Step	▬
Idle Blanking Window Pos	25	RPM	▬
Idle Blanking Window Neg	-5	RPM	▬
Follow Above Idle Min RPM	75	RPM	▼
Push Above Idle Min RPM	125	RPM	
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Basic Idle Screen

Hot Idle Speed

This is the target RPM that will be enable at coolant temperatures above 160° F

Idle IAC Min Step

The minimum of IAC steps.

Idle Blanking windows Pos -- At engine idle state, when current idle speed is greater than the target idle speed, the difference between the current speed and target idle speed is less than this value, and the IAC closed-loop control is not performed. This parameter is a positive value.

Idle Blanking windows Neg -- At engine idle state, when current idle speed is less than the target idle speed, the difference between the current speed and target idle speed is less than this value, and the IAC closed-loop control is not performed. This parameter is a positive value.

Follow above idle Min RPM -- Min threshold RPM to get into follow states.

Push above idle Min RPM -- Min threshold RPM to get in to push states.

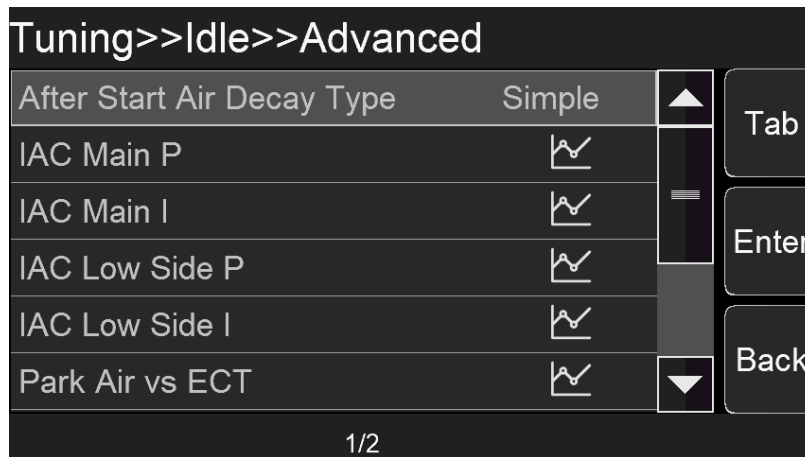
Push above idle Max RPM -- Max threshold RPM to get in to push states

Startup Air Fast Decay Cycle -- After the engine is started, the starting air quickly decays to the target idle speed according to a certain period. The smaller the value, the faster the air decays.

Startup Air Slow Decay cycle -- After the engine is started, the starting air quickly decays to the target idle speed in

a certain period. When the actual speed is close to the target idle speed, the air decay speed should be slowed down. The larger the value, the slower the air decay.

3.2 Advanced Idle Parameter



Advanced Idle Screen

After Start Air Decay Type -- If you select this option, the speed of starting air attenuation is determined by the 1D table, and the attenuation speed is determined by the ECT look-up table

IAC Main P

Current idle speed is higher than target idle speed, the setting of proportion.

IAC Main I

Current idle speed is higher than target idle speed, the setting of integrate.

IAC Low Side P

Current idle speed is lower than target idle speed, the setting of proportion.

IAC Low Side I

Current idle speed is lower than target idle speed, the setting of integrate.

Park Air vs ECT

This is the % position the IAC motor will be at during cranking and immediately after the engine starts. If it is too high, the engine will be at too high of an RPM once it starts - too low and poor starting will result. Note that this is a temperature based table. The percentage value changed in the handheld offsets this entire curve.

Speed Raise Air

This is the % position of IAC for adjusting peak RPM after engine startup.

Startup Air Fast Decay Cycle

1D table for Startup Air is decaying fast to get to target idle speed

Startup Air Slow Decay Cycle

1D table for Startup Air is decaying slow to get to target idle speed

2.0 SPARK

2.1 Basic Spark Parameter

Tuning>>Spark>>Base			
Cranking Ignition Timing	15.0 Deg	▲	Tab
Idle Ignition Timing	15.0 Deg	■	
Cruise Ignition Timing	37.0 Deg	—	Enter
WOT Ignition Timing	32.0 Deg	■	
Static Timing	15.0 Deg	■	Back
Engine Max RPM	6500 RPM	▼	
1/2			

Basic Idle Screen

Crank Ignition Timing

Crank ignition advance is normally setting to 15 for most of engine to help quick start.

Idle Ignition Timing

18-34 degrees is typically used at idle. The larger the camshaft, the more timing is usually used.

Cruise Ignition Timing

32-48 degrees is typically used when cruising for optimal fuel economy.

WOT Ignition Timing

Older V8 engines are usually between 32-38 degrees.

Static Timing

These parameters should be used when having the KILLSHOT EFI control the ignition timing to sync actual engine timing with commanded timing. Use the “static timing set” function and set the timing to a fixed value such as 15 degrees. Rev the engine up as high as possible (using appropriate caution/safety). Verify that the engine timing matches at all RPMs the Static Value setting. If it does not, the inductive delay will need to be changed in the Ignition Setup Screen until the timing of the engine matches the value set in the Static Timing Screen.

Engine Max RPM

Max RPM of engine, Rev limiter is spark control.

☐ **Cut Ign&Fuel** – Cut ignition and fuel when the Engine Max RPM is hit. Means that ignition and fuel will be removed from individual cylinders as needed to limit RPM.

***The strategy of fuel and ignition cut is individual cylinder control, it performs engine stable and smooth at Max RPM, Launch RPM, Burn RPM status.**

Ign Advance Min

Min threshold of ignition advance

Ign Advance Max

Max threshold of ignition advance

Coil Output Dwell

The time of KILLSHOT dwell ignition coil, KILLSHOT drive the ACES high performance ignition coil AC2008 has 90mj spark energy with 3ms dwell time

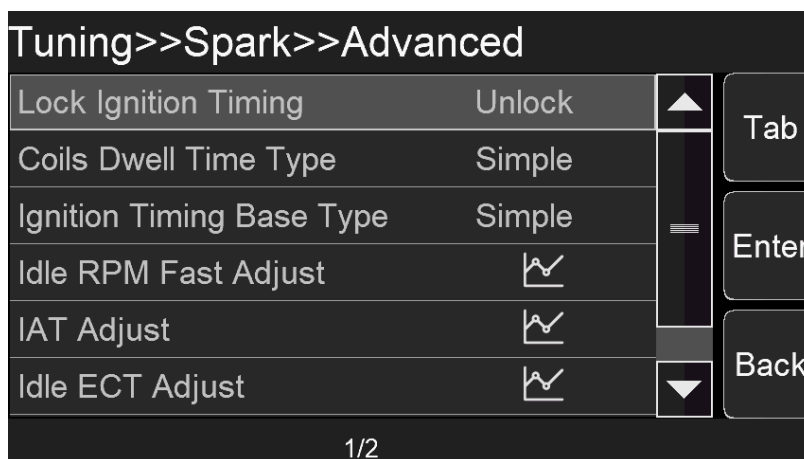
2.2 Advanced Spark Parameter

Lock Ignition Timing

This is a switch to lock or unlock ignition timing, verifying ignition timing by lock status to check ignition timing or distributor sync, leave **Unlock** with ignition wire -timing control setts, you can have the KILLSHOT control timing.

Coil Dwell Time Type

Default setting is simple, this option is to select **Simple** or **1D** table for coil dwell time



Advanced Spark Screen

Ignition Timing Base Type

Default setting is **Simple**, this option is to select simple or **2D** table of MBT Timing, Using the ACES PC Tuning software allows for a user to build a custom ignition timing curve.

The MBT Timing is the main ignition table in the calibration. The MBT Timing Table is a 3D table used for setting ignition timing throughout the operating range of your engine. The first step in calibrating the MBT Timing table is to use the table below to fill in your timing values. This table gives you a general idea of during starting, idle, cruise, transition or high load, and deceleration. These values will get you in a safe area to start the tuning process.

Idle RPM Fast Adjust

The ECU modifies commanded timing at idle to help maintain the target idle speed. This is a 1D graph used to vary ignition timing to help regulate idle speed. The horizontal axis of the graph represents the difference between the actual idle speed and the target idle speed, and the vertical axis of the graph represents the number of degrees to alter the ignition timing. If the idle speed is too high, the ECU will retard the timing by the amount specified in the graph. If the idle speed is too low, the ECU will advance the timing by the amount specified in the graph. It is recommended to set this entire table to zero as a starting point. Add timing trim only if you are otherwise unable to achieve a smooth, stable idle.

IAT Adjust

The IAT Adjust table is used to trim the ignition timing vs. inlet air temperature. Often used on boosted applications as a safety mode. Ignition timing is reduced at very high air temperature readings to avoid detonation. Note that the trim values in this table are added (positive values) or subtracted (negative values) from the base ignition timing.

Idle ECT Adjust

The Idle ECT Adjust is used to trim the ignition timing vs coolant temperature at idle. Sometimes used on N/A applications with very large camshafts to help with warmup. A few degrees of additional timing during warmup can help quite a bit. Note that the trim values in this table are added (positive values) or subtracted (negative values) from the base ignition timing.

Ign Dwell Time

1D table of Dwell time, Time vs battery voltage.

3.0 FUEL

3.1 Basic Fuel Parameter

Tuning>>Fuel>>Base			
Idle AFR	13.7	A/F	▲
Cruise AFR	14.7	A/F	■
WOT AFR	12.0	A/F	■
Fuel Loop Min ECT	86	F	■
Fuel Learn Min ECT	-40	F	■
Clear Flood TPS	65.0	Deg	▼
1/2			

Basic Fuel Screen

Idle AFR

Target AFR of fuel control when the engine is at Idle, typically between 13.5 and 14.7. Engines with larger cams may need a richer setting for smoothest idle .

Cruise AFR

Target AFR of fuel control when the engine is at Cruise, typically between 13.5 and 14.7. Engines with larger cams may need a richer AFR.

WOT AFR

Target AFR of fuel control when the engine is at WOT, typically between 12.5 and 13.2 on Naturally Aspirated engines. Running richer may reduce power. Running leaner may reduce power or cause potential engine damage .

Fuel Loop Min ECT

Minimum of engine coolant temperature enable **Fuel Loop**. Fuel loop will be active above this setting.

Fuel Learn Min ECT

Minimum of engine coolant temperature enable **Fuel Learn**. Fuel Learn will be active above this setting.

Clear Flood TPS

If the TPS value is at 65 or higher during cranking, the ECU will operate in **Clear Flood** mode, meaning that it will trigger the ignition but will not fire the injectors.

Fuel Prime Percent

This value is multiplying fuel PW of first injection during engine cranking.

Rated Injector Pressure

This value is injector working pressure, fuel pressure of ACES fuel injector is 43PSI.

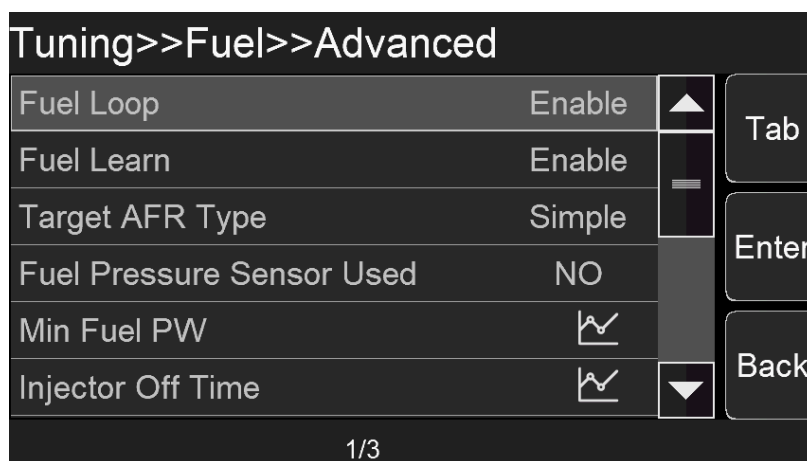
After Start Decay Cycle

After engine startup, engine RPM will get to idle from peak RPM, during this period start air will decay out, smaller number of decay cycle will decay fast, engine goes to idle more fast.

After Start Decay Rate

After engine startup, engine RPM will get to idle from peak RPM, during this period start air will decay out, bigger number of decay rate will decay fast, engine goes to idle more fast.

3.2 Advanced Fuel Parameter



Advanced Fuel Screen

Fuel Loop

This option is to enable or disable fuel loop control default setting is Enable fuel loop control. There is typically no reason to turn off closed loop operation unless you suspect an oxygen sensor problem and want to disable the sensor.

Fuel Learn

This option is to enable or disable fuel learn control, default setting is Enable fuel learn control. If enabled, self-tuning is performed. Learning should be enabled when an engine is first run with the Jackpot and the tuning process is occurring.

Target AFR type

The Simple option is a value at different engine state, The Target AFR Table is a 2D table used for setting target air/fuel ratios throughout the operating range of the engine.

Fuel Pressure Sensor Used

Fuel pressure sensor default setting is NO in KILLSHOT EFI system. KILLSHOT EFI system fuel pressure setting is 3 bar or 45 psi.

Min Fuel PW

Injector close time.

Injector Off Time

Injector opening time vs different battery voltage.

MAT Fuel Enrichment

The **Manifold Air Temp Enrichment** table is used to compensate for air density changes with inlet air temperature. It can also be used in a safety mode to add additional cooling fuel at very high inlet air temperatures on boosted applications.

After Start Decay Rate

This table is displayed as a 2D graph of the rate at which the after start enrichment will decay out based on engine

temperature. The decay rate is shown as the number of crank pulses that must be received by the ECU to reduce the after start enrichment. The higher you set these values, the longer it would take for the after start fuel to decay out once it was applied.

Acceleration Enrichment vs TPS

Adds additional, momentary fuel based on the rate of change of the TPS. Same function as an accelerator pump on a carburetor.

TPS Acceleration Enrichment vs ECT

Displays a 2D graph of acceleration enrichment fuel applied in ECT change. This 2D graph is increasing or decreasing the 3D table of TPS base fuel which is activated to running at engine state of acceleration and deceleration.

MAP Acceleration Enrichment vs ECT

Displays a 2D graph of acceleration enrichment fuel applied in ECT change. This 2D graph is increasing or decreasing the 3D table of MAP base fuel which is activated to running at engine state of acceleration and deceleration.

TPS Acceleration Decay Rate

Displays a 2D graph of TPS acceleration enrichment fuel decay rate applied in ECT change.

MAP Acceleration Decay Rate

Displays a 2D graph of MAP acceleration enrichment fuel decay rate applied in ECT change.

4.0 Fuel Pump

4.1 Turn Off RPM

Engine RPM lower than setting numbers, fuel pump will turn off.

4.2 Key On Pump Hold Time

When Key on without engine crank, how long time fuel pump will be power on.

4.3 Turn Off After Lose RPM

When ECU lose crank signal, how long time ECU turn off fuel pump.

5.0 System Setting

5.1 Basic System setting

Number Of Injector

This parameter is a part of the ECU calculation to determine the amount of fuel to inject. Enter the number of cylinders the engine has. This must be entered correctly, or the engine will not run correctly, if at all in some cases. For the KILLSHOT is 4 injectors.

Engine Displacement

This parameter is a part of the ECU calculation to determine the amount of fuel to inject when running . Enter the engines displacement in cubic inches. This must be entered correctly, or the engine will run richer or leaner than intended.

Tuning>>System Setting>>Base

Number Of Injector	4	Numbers	▲	Tab Enter Back
Engine Displacement	348	CID	▬	
Injector Flowrate	100.53	lb/hr	▬	
Hot Idle Speed	800	RPM	▬	
Fan1 On ECT	192	F	▬	
Fan2 On ECT	199	F	▼	

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Basic System Setting Screen

Injector Flowrate

This parameter is a part of the ECU's calculation to determine the amount of fuel to inject when running . It is also used for fuel flow and mileage calculations. Enter the flow rate of the injectors in lb./hr. This must be entered correctly, or the engine will run richer or leaner than intended. Keep in mind that fuel pressure affects flow rate. When manufacturers rate injectors, it is at a certain fuel pressure. Injectors from ACES are rated at 45 psi.

Hot Idle Speed

Set idle speed of warm engine.

5.2 Advanced System setting

Tuning>>System Setting>>Advanced

Dual WBOS	Only WBOS1	Enter Back
Force TPS Zero Learn	NO	
Key Off Clear Learn Data	YES	
RPM To Killshot/Ign Type	Magnetic	
Camshaft Type	Stock/Mild	

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Advanced System Setting Screen

Dual WBOS

Select Only WBOS1 for your KILLSHOT EFI system.

Force TPS Zero Learn

Throttle zero position is auto-learn strategy in Jackpot ECU, choose yes to do TPS Zero Learn again.

Key Off Clear Learn Data

Choose YES, then turn the ignition key off, wait 5 seconds, then turn the key on, all the Learn data (fuel learn table, IAC learn steps, ETC learn steps etc.) will be clear up.

RPM To KILLSHOT / Ignition Type

Select your ignition type:

- **Coil (-)** [no timing control]
- **CD Ignition Box** [no timing control]
- **Magnetic** [ECU Controlled Timing]

Camshaft Type

Select your camshaft type:

- **Stock/Mild** = This selection will work well on most applications equipped with stock or “street performance” camshafts. Choose **Stock/Mild** If you are unsure of your camshaft specs.
- **Street/Strip** = Select this if your engine has between 8” and 13” of manifold vacuum.

6.0 System IO

Fan1 On ECT--195° F

Fan2 On ECT--205° F

Fan1 Off ECT--180° F

Fan2 Off ECT--190° F

Fan1 On Delay Time

Fan2 On Delay Time

The ECU has an output to operate a cooling fan. This output switches to ground and is wired to the negative terminal of a relay to activate the fan. This parameter defines the coolant temperature that must be exceeded to activate the fan. It needs to be set higher than **Fan Off Temperature (*F)**.

The screenshot shows a configuration menu titled "Tuning>>System IO>>Base". It contains a table of settings for two fans. To the right of the table are three buttons: "Tab", "Enter", and "Back". At the bottom of the screen is a "1/2" indicator.

Tuning>>System IO>>Base	
Fan1 On ECT	192F
Fan2 On ECT	199F
Fan1 Off ECT	189F
Fan2 Off ECT	194F
Fan1 On Delay Time	2.5 s
Fan2 On Delay Time	1.0 s

1/2

System IO Screen