PLEASE NOTE:
This document contains both the Wild Card Installation and Tuning Guide
as well as the Wild Card Tuning Reference Manual.

Wild Card™ MPFI FUEL INJECTION SYSTEM

INSTALLATION & TUNING MANUAL

About Us

ACES Fuel Injection specializes in developing and manufacturing state-of-the-art performance-engine management systems and ignition components geared toward do-it-yourself automotive enthusiasts. Our company was founded on an electromechanical engineering background, and our talented staff always keeps a grip on the newest technology available. We use our expertise to guarantee top-notch, high-quality components and constant innovation of new products and services for car and truck enthusiasts around the world.

Our greatest advantage is the overall simplicity of our products. From a painless installation to real-time tuning in just hours, our fuel injection systems offer a great advantage over the competition. Our WILD CARD™ series MPFI EFI system features a built-in interface that allows users to have full control of the engine without the need of a PC. This allows you to install the system at home without the need of special tools or software. We also offer several other components to help seamlessly integrate our advanced technology into your V8-equipped vehicle.

Our craftsmanship and technology are built upon a foundation of extreme performance. With a history of producing winning results in a wide variety of applications, our pedigree offers proof of our commitment to attain the best results, wherever we compete. With more than 10 years of experience developing and designing high-performance products, ACES Fuel Injection has the product to fit your needs.

Mission

Research, innovate, and develop real, efficient, quality solutions, making engine management technology the key factor of success, and bring pride and satisfaction to customers by integrating them into the ACES Fuel Injection Team.

Vision

Become the world's leading company in engine management technology.

Values

Ethics, commitment, professionalism, teamwork, quality, pioneering spirit, creativity, continuous innovation, pursuit of results, and customer satisfaction.

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ACES EFI Wild Card™ EFI OVERVIEW

ACES Fuel Injection provides next-level performance for your Small-Block Chevy V8 engine with its Wild Card™ Sequential Multi-Port Injection EFI System. This kit features an aluminum intake manifold (available in two finishes, black and raw aluminum), throttle body, the fuel rails, 36 lb./hr. fuel injectors (8), and all the necessary sensors to get your SBC up and running. ACES Fuel Injection designed this fully sequential multiport fuel injection system to provide the best fuel distribution for your traditional SBC engine. Sequential multi-point fuel injection meters fuel more precisely than TBI-style systems, giving you more precise control over air-fuel ratio, better cold start, and improved fuel distribution through the entire RPM band. This results in improved fuel economy, increased power, and enhanced throttle response at any RPM!

The Wild Card™ ECU is built on ACES' 32-bit Power Architecture®. This technology allows the ECU to manage input and output signals and voltage (fuel injectors, ignitions coils, sensors and triggers), as well as RPM signal faster and more consistently than any other EFI system available. The Wild Card™ EFI kit includes a CNC-machined cast aluminum throttle body; high-quality cast aluminum, single-plane SBC intake manifold; fuel rails, 36 lb./hr. fuel injectors; sealed connectors; Bosch 4.9 wideband O2 sensors; and OE-quality sensors. Combined, this gives you the most advanced multi-port EFI system available.

ACES EFI's Wild Card™ EFI kit include a 5" high-resolution, full-color, LCD touchscreen handheld controller. The ACES EFI tuning software includes multiple base calibrations to choose from for either naturally aspirated or boosted applications. The calibration wizard allows you to answer a few simple questions about your specific combination, giving you the perfect start-up tune. Once the system is up and running, the Self-Tuning functionality monitors data and makes real-time changes to the calibration, taking all the guesswork out of the tuning process. The more you drive, the better the tune! If you have a higher-horsepower combination or require more advance tuning features, ACES EFI tuning software provides an easy-to-use software suite that allows full access for advanced users (laptop required).

Whether you are building a budget beater or a boosted race car, ACES EFI's Wild Card™ EFI system has the technology and advanced features to you need, in an easy-to-install, easy-to-tune package so you can take your ride to the next level!

AECS EFI Wild Card™ EFI Features
- The most versatile EFI system for your traditional Small-Block Chevy V-8 engine
- 32-bit Power Architecture® based MCU and IC driver chips for automotive powertrain applications. This technology manages input/output signals and voltage, and RPM faster and more consistently than the competition
- Advanced innovations make this system the perfect upgrade from any TBI system
- Easy-to-install design, can easily be done by the average enthusiast
- Easy-to-use calibration wizard makes initial start-up simple and easy without the need for custom tuning
- Speed Density-based airflow models and algorithm strategy
- Eight high-impedance injector drivers for sequential fuel injection
- Adaptive self-tuning strategy for idle control and fuel control
- Dual wideband O2 sensors for closed loop control
- High-quality Bosch 4.9 wideband sensors
- Supports boosted applications with 3bar TMAP sensor, OEM-quality TPS and IAC sensors
- Works with CDI Ignition (ACES High Roller CDI box)
- Dual electric fan control
- Integrated fuel pump relay for seamless key-on activation
- CAN communication for Handheld Controller-based calibration and display
- Free ACES advanced EFI Tuning Software for complete control of your Wild Card™ EFI system
- ACES CAN module adds inputs and outputs and connects to digital dash displays

Thank you for betting on ACES! We are proud to be your manufacturer of choice.

WARNINGS, NOTES, AND NOTICES

ADVANCED USER CAPABILITIES

The ACES WILD CARD™ EFI software does allow for advanced tuning functionality. A laptop is required to access the advance tuning functions. These functions are not recommended for enthusiasts without extensive EFI tuning knowledge and experience.
NOTE: Making changes to the calibration in the advanced tuning functions can lead to catastrophic engine damage if not done correctly. ACES is not responsible for any damage caused due to advanced tuning errors.

NOTE: This system does not contain fuel system components including the fuel pump, fuel filters, fuel pressure regulator, and lines. ACES fuel injection offers complete kits (coming soon), which can be purchased separately. This system is designed for stock and mild cam, naturally aspirated traditional Small-Block Chevrolet V8 engines.
WARNING! The Wild Card™ MPFI systems consist of numerous sophisticated components. Failure of any one component does not constitute, nor does it justify, warranty of the complete system. Individual service items are available for replacement of components.
WARNING! To preserve warranty, these instructions must be read and followed thoroughly and completely before and during installation. It is important that you become familiar with the parts and the installation of the Wild Card™ MPFI system before you begin. Failure to read and understand these instructions could result in damage to Wild Card™ MPFI components that are not covered by the warranty and could result in serious personal injury and property damage.
WARNING! The oxygen sensor in this kit is recommended for use with ONLY unleaded fuel. Use of leaded fuels will degrade the oxygen sensor and will result in incorrect exhaust gas oxygen readings and improper fuel delivery. Failure to follow these directions does not constitute the right to a warranty claim.
WARNING! Failure to follow the above will result in an improper installation, which may lead to personal injury, including death, and/or property damage. Improper installation and/or use of this or any ACES product will void all warranties.
WARNING! Use of some RTV silicone sealers will destroy the oxygen sensor used with this product. Ensure the RTV silicone sealant you use is compatible with oxygen sensor vehicles. This information should be found on the RTV package.
WARNING! For the safety and protection of you and others, only a trained mechanic having adequate fuel system experience must perform the installation, adjustment, and repair. It is particularly important to remember one of the very basic principles of safety: fuel vapors are heavier than air and tend to collect in low places where an explosive fuel/air mixture may be ignited by any spark or flame resulting in property damage, personal injury, and/or death. Extreme caution must be exercised to prevent spillage and thus eliminate the formation of such fuel vapors.
WARNING! This type of work MUST be performed in a well-ventilated area. Do not smoke or have an open flame present near gasoline vapors or an explosion may result.
WARNING: This installation is not for the tuning novice! Use this system with EXTREME caution! The ACES Wild Card™ EMS allows for total flexibility in engine tuning. Misuse or improper tuning of this product can destroy your engine! If you are not well versed in engine dynamics and the tuning of engine management systems DO NOT attempt the installation. Refer the installation to an ACES-trained tuning shop or call ACES for technical assistance.
NOTE: All supplied ACES FUEL INJECTION calibrations, Wizards and other tuning information are offered as potential starting points only. IT IS THE RESPONSIBILITY OF THE ENGINE TUNER TO ULTIMATELY CONFIRM IF THE CALIBRATION IS SAFE FOR ITS INTENDED USE. ACES FUEL INJECTION holds no responsibility for any engine damage that results from the misuse or mistuning of this product!

NOTE: ACES EFI Systems are NOT compatible with HEI ignition systems. These ignition systems produce and back feed noisy, dirty electrical signals that can interfere with the normal operation of the ACES EFI system. Any damage to the system found to be the result of using an HEI ignition system or components will void the warranty.

1.0 Part List

Item	Description	QTY	Service Part
1	Wild Card ECU	1	AS2013
2	Handheld	1	AS2009
3	Wire harness	1	AH2013
4	Wide band O2 sensor	2	AE1060
5	Clamp-on Oxygen Sensor Bung	2	AE1061
6	Coolant Temperature Sensor	1	AE1052
7	Gambler Series Distributor	1	AD2023
8	Fuel Injectors – 36 lb./hr.	8	AE1001
9	Four-Barrel Throttle Body	1	AM1004
10	SBC Intake Manifold w/ Fuel Rail Kit	1	AM2050 (AM2050B for Black Manifold)

2.0 Wild Card^{TM} MPFI SYSTEM INSTALLATION

These instructions are designed to cover a wide variety of vehicle applications. If your vehicle is not equipped with any items referred to in these instructions, such as transmission kick-down linkage, air conditioning, or power brakes, proceed to the next step. Also, if you are unfamiliar with any of the procedures in these instructions consult a shop manual for your vehicle and engine application.

2.1 Fuel System Requirements

The Wild Card^{TM} MPFI system requires a high-pressure fuel system providing a minimum of 45 psi of fuel pressure. The following recommended options are available separately.
NOTE: Fuel pressure has a direct role in how much fuel is delivered to the engine when the injectors are opened. Higher fuel pressure will deliver more fuel during an injector opening event. Lower fuel pressure will deliver less fuel during an injector opening event. It is critical for the proper operation of your fuel injection system that the fuel pressure matches the injector pulse widths demanded by the calibration for your specific application.
Fuel Pressure Regulator Vacuum Reference: The Fuel Pressure Regulator MUST reference manifold pressure to ensure a proper fuel pressure differential during an injector opening event under high-vacuum conditions. The vacuum reference will lower fuel pressure slightly under idle and cruise conditions. The amount of pressure reduction will vary from engine to engine. During wide open throttle conditions, the fuel pressure should read the set point value of 43psi . The fuel pressure regulator should always be set to the target pressure with the vacuum reference hose disconnected from the Fuel Pressure Regulator. The hose from the manifold MUST be plugged to prevent a vacuum leak when setting the pressure. Remove the plug and reconnect the vacuum line to the fuel pressure regulator after target pressure is achieved.

Suggested ACES MPFI Fuel System Kits and Installation

A complete high-pressure EFI fuel system must be installed for the ACES Wild Card^{TM} system to operate properly. The pump should be capable of supplying 255 liters/hour or 400 lb./hr. of fuel at the Wild Card^{TM} system requirement of 43 PSI. If using an in-line fuel pump, there should be a 100-micron pre-filter before the pump. All systems should contain a 10-micron post filter after the fuel pump. An EFI fuel pressure regulator is required. It should be installed after the fuel rail in a return-style configuration. If you need help with your fuel system components or configuration, please contact the Aces Technical Service department.

2.2 Oxygen Sensor Installation

The oxygen sensor should be mounted at a point where it can read a good average of exhaust from all the cylinders on each bank. This would be slightly after each bank of cylinders merge. Do NOT mount the sensor far back in the exhaust as this will negatively impact closed loop operation response. If you have long tube headers, mount the sensor approximately 1-10" after the collector. You must have no less than 18—24" of exhaust pipe after the sensor.

Wild Card™ EMS systems come with Bosch LSU 4.9 wideband oxygen sensors.
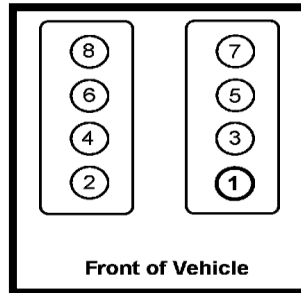
NOTE: Wild Card™ EFI kits include two (2) wideband O2 sensors. Install the wideband O2 sensor into exhaust pipe of Driver's Side bank then connect to plug labeled WBO1 on the Wild Card™ harness. Install the other wideband O2 sensor into exhaust pipe of the Passenger Side bank then connect to plug labeled WBO2 on the Wild Card™ harness. Installation and connection must be correct, or vehicle will not run properly.

Oxygen Sensor Mounting Procedure
NOTE: Never run the engine if the O2 sensors are not plugged in and powered by the ECU—it will damage the wideband sensors. If you need to plug the hole temporarily, use an O2 sensor plug, or a spark plug with an 18mm thread.
NOTE: Someone with experience in welding exhaust systems should install the oxygen sensor bung. Any competent exhaust shop will be able to perform this task at a minimum cost. (Note: If you weld on the car, make sure all wiring to the ECU is disconnected, and its best to remove the ECU from the vehicle when welding).
WARNING! Use of leaded fuel is not recommended!
WARNING! Use of some RTV silicone sealers will destroy the oxygen sensor used with this product. Ensure the RTV silicone sealant you use is compatible with oxygen sensor vehicles. This information should be found on the RTV package.
Locate a position for the oxygen sensor as close to the engine as possible. If your vehicle has catalytic converters, the oxygen sensor MUST be located between the engine and the catalytic converters.
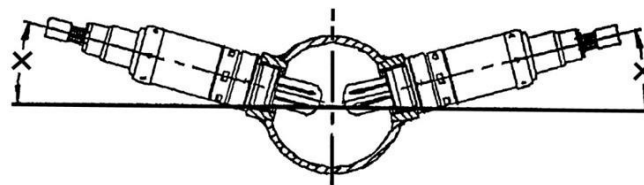
NOTE: Ensure the sensor is located at the approximate angle shown above. This will help prevent condensation in the exhaust tubing from entering the sensor. The sensor can be mounted on either side of the tubing. Be sure to pick a location where there is enough room around the exhaust pipe and sensor to easily install and remove the sensor without causing damage to the sensor or wiring.

Drill a 7/8" hole in the location picked for the sensor. Weld the threaded bung into the 7/8" hole. Weld all the way around the boss to insure a leak-proof connection. Once the bung and exhaust pipe are completely cooled, install the oxygen sensor into the threaded bung and tighten securely. It is a good idea to add anti-seize to the threads to aid in removal. Do not get any anti-seize on the tip of the sensor.

On vehicles equipped with an air pump, the oxygen sensor must be mounted before the air injection into the exhaust, or the air pump must be disconnected. ACES recommends that if the air is injected into both exhaust manifolds, mount the oxygen sensor into the pipe immediately after the exhaust manifold. Disconnect the air pump tube from the exhaust manifold and plug both ends. Check with local ordinances for the legality of this procedure in your area.

WARNING! Failure to disconnect the air pump or locating the oxygen sensor downstream from air injection will result in an extremely rich mixture, which could cause drivability problems and severe engine damage.

2.3 Check for Hood Clearance

Prior to removing your old manifold, we recommend making several columns of modeling clay and placing them on your air cleaner in various positions.

Close the hood completely and then reopen it.

Measure the clay columns and record your hood clearance.

Compare the A-B height of your old intake manifold with your new intake manifold. Also consider that the carburetor/air cleaner combination determines the difference in the air cleaner-to-hood clearance.

2.4 Remove Old Manifold Procedure

Disconnect the ground cable from the battery followed by the positive cable. The battery should be completed disconnected prior to the start of installation.

Clean any loose debris, dirt, and grease from the top of the engine adjacent to the intake manifold and valve covers. This will help prevent harmful debris from falling into the engine during the installation process.

Identify the vacuum and crankcase ventilation hoses (if any) leading to air cleaner and note the routing and connection points. Remove the air cleaner.

Prior to removing any other vacuum lines, identify the routing of the lines. Mark and remove the vacuum lines from the carburetor and/or intake manifold.

WARNING: Hot coolant and steam may be present if the engine is still warm.

Drain the radiator. (It may be necessary to remove the bottom radiator hose if there is no drain plug in the radiator).

Disconnect the throttle linkage, transmission kick-down linkage (auto trans only), and choke rod from the carburetor, (if applicable).

Loosen the gas cap to relieve pressure from the fuel system. Disconnect the fuel line at the carburetor. Plug the end of the fuel line to prevent fuel leakage.

Remove the carburetor.

Tag and disconnect the ignition coil and sensor wires. Remove the ignition coil bracket and the coil.

Remove the radiator hose, thermostat housing, and the thermostat.

Remove all water and vacuum fittings from the manifold.

Remove all remaining brackets (if any) from the manifold.

Loosen and remove the valve covers to assist in the manifold removal and the new manifold installation.

Remove Old Distributor Procedure:

CAUTION! FOLLOW THESE INSTRUCTIONS CAREFULLY, AS SERIOUS DAMAGE CAN OCCUR WHEN THE IGNITION IS NOT RE-INSTALLED CORRECTLY.

Rotate the engine to 12° Before Top Dead Center (BTDC) on the compression stroke of cylinder #1. It may be necessary to remove the spark plug from the #1 cylinder to establish when the engine is on the compression stroke.

Remove the distributor cap. Note the position of the rotor and make a mark on the distributor body in line with the rotor tip (it should point to the position of the cylinder #1 spark plug wire on the distributor cap).

Note the position of the distributor vacuum canister (or other distributor body feature) and place some type of reference mark on a convenient surface not attached to the intake manifold.

Note the position of the points, if open, how much; if closed, note the distance from the point block to the cam lobe. If the distributor has a magnetic pickup, note the position of the trigger wheel with respect to the pick-up.

Remove the distributor. DO NOT rotate the engine after removing the distributor (but if you do, the crankshaft timing marker is your reference).

Remove the 12 intake manifold bolts.

Remove the intake manifold. If the intake manifold is stuck to the mounting flanges, do not pry against cylinder head port flanges, as they could become damaged and compromise the gasket sealing with your new intake manifold. Double check that all the bolts have been removed and pry upward carefully at the engine block end seal surfaces.

2.5 Install the ACES Intake Manifold

Clean the cylinder head port flange and the engine block end seal surfaces. To prevent gasket pieces from falling into ports and the lifter valley when cleaning old gaskets from head surfaces, stuff paper towels into all the ports and lay rags in the lifter valley. When clean, carefully remove the paper towels from the cylinder head ports and then the rags from the lifter valley. Make sure that all particles that fell on the rags are completely removed. Wipe surfaces with rags soaked in solvent, such as brake cleaner or lacquer thinner to remove any oils or grease. This is a must for proper manifold/gasket sealing.

Apply a thin coat of gasket adhesive to the cylinder head side of the intake gasket surfaces and the cylinder head port flanges. Allow the adhesive to completely dry. Lay the manifold gaskets in place, making sure that gaskets are adhered to the cylinder head port flange and will not slip from their properly installed positions.
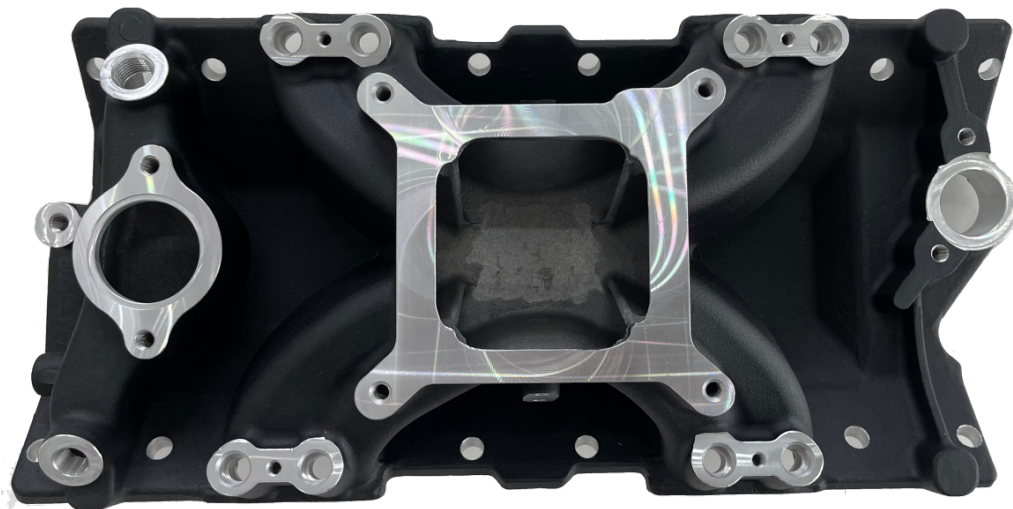
ACES Intake Manifold Small Block Chevy

Trial fit your new intake manifold before applying any RTV silicone sealant. Place the new intake manifold into position; check that it properly seats on the intake manifold gaskets. There should be gap between the engine block and the manifold at the end seal surfaces. Check to make sure all the intake manifold bolts can be installed. If there are any other fitment issues such as hood clearance or installation of components dependent on the manifold, they should be checked at this time.

When you are fully prepared to install the intake manifold, apply a ¼" wide bead of oil-resistant RTV-silicone sealant to the front and rear block-sealing surfaces, making sure to overlap manifold gaskets at all four corners. Do not use the cork or rubber end seal gaskets included in the gasket set. Apply a light film of RTV-silicone around the water passage openings.

Carefully, lay your intake manifold in place. If the manifold must be moved, the RTV-silicone may need to cleaned and re-applied. For the bolts to be installed in bolt holes that are drilled through, apply a dab of thread sealer on the threads. For the blind bolt holes, apply a drop of motor oil to the bolt threads. Install the intake bolts initially torquing to 10 ft./lbs., then 15 ft./lbs., following the factory GM sequence, and finally torque to 25 ft./lbs.

Apply a silicone lubricant to each fuel injector O-ring and insert injectors into the ports of the manifold. To avoid interference of the injector wiring harness with the throttle cable, orient injector connectors.

Apply thread locking compound to the 4-1/4-28 x .75 screws. Use these screws and 4-1/4" washers to attach the fuel rail brackets to the manifold. Orient the brackets for attaching the fuel rail. Torque each screw to 75 in-lbs., then torque again to 90 in-lbs.

Assemble the fuel rails to the injectors. Check to see that the fuel rail brackets are oriented correctly for attachment of the fuel rails, then attach fuel rails to brackets using 4 - ¼" washers and 4 - 14-28 x 1.0 low profile SHC screws with thread locking compound. Torque each screw to 75 in-lbs., then torque again to 90 in-lbs.

Attach each fuel rail to the intake manifold using 2 - ¼" washers and 2 - ¼-28 x .50 screws with thread locking compound. If using the shorter fuel rail brackets, the bottom hole on the manifold will be used. If using the taller fuel rail brackets, the upper hole of the manifold will be used. Torque each screw to 75 in-lbs., then torque again to 90 in-lbs.

Install the thermostat, gasket, and thermostat housing. Be sure that the thermostat housing is in good condition and has been cleaned of any old gasket material. If the mounting flange on the thermostat housing is not flat or is damaged, replace it before continuing.
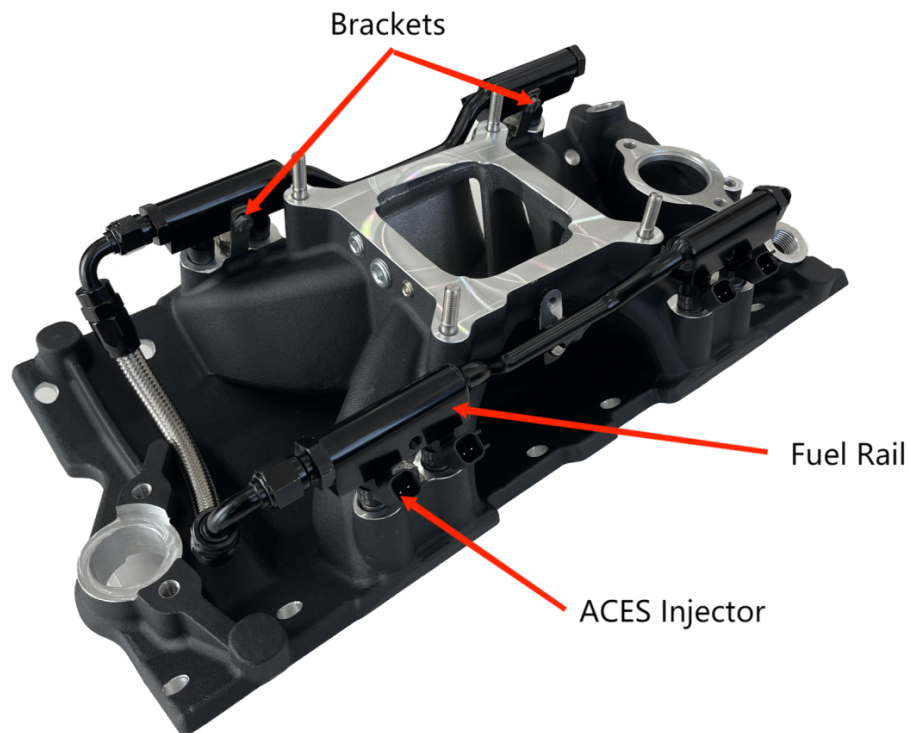
Install the heater hose fitting, heater hose, and radiator hoses. Use thread sealer on the threads of the heater hose fitting.

Install the engine coolent temperature (ECT) sensors and vacuum fittings into the manifold. Use thread sealer on the pipe threads of the sensors and fittings. Install pipe plugs in any unused water and vacuum ports in the manifold (plugs have been provided in the kit).

2.6 Install ACES The Gambler Series Distributor AD2023(SBC)

Verify the engine is still positioned at 12 degrees before top dead center with cylinder #1 on a compression stroke.

Install the gasket onto the distributor housing and apply a liberal amount of lubricant to the distributor gear.

NOTE: Disregard distributor housing O-rings on Chevrolet applications.

Install the ACES Gambler Series Distributor so that the rotor is pointed in the proximity of the #1 stamped on the outside of the distributor housing and the short trigger tooth is just entering the distributor sensor.

NOTE: You may need to remove and reinsert the distributor a few times to get the alignment correct. Make sure that the distributor seats down completely and has full engagement with the oil pump drive. You may need to rotate the oil pump shaft to ensure it is engaged properly.
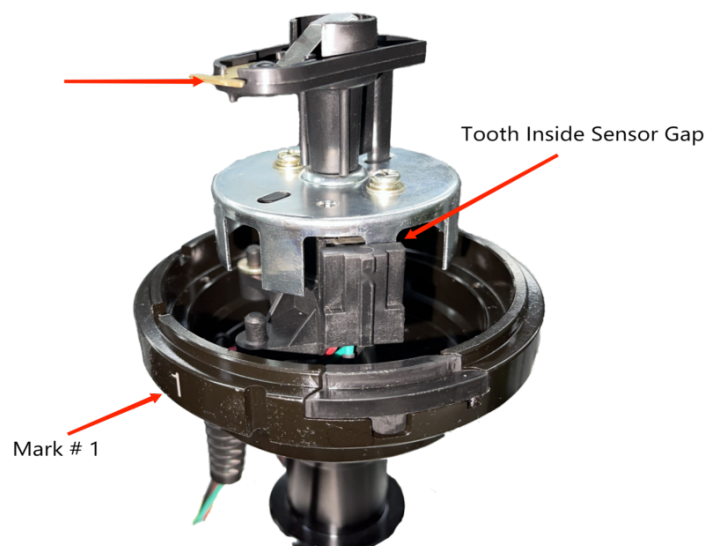
DISTRIBUTOR ROTOR LOCATION AT INSTALLATION POINTING TO #1 ON SIDE OF HOUSING WITH ENGINE AT 12° BTDC CYLINDER #1 ON COMPRESSION STROKE.

Tighten the hold down clamp leaving it just loose enough that you can rotate the distributor during the timing procedure, but not loose enough that the distributor will rotate on its own. The final timing will be set using ACES handheld.

Install the spark plug wires. Position cylinder 1 spark plug wire on the distributor cap post located at the 1 stamped on the distributor housing.

2.7 Install ACES Throttle Body and Others

Install throttle body studs in the manifold. Place the throttle body gasket on the clean carburetor pad. Do not use any type of sealant on the throttle body gasket.
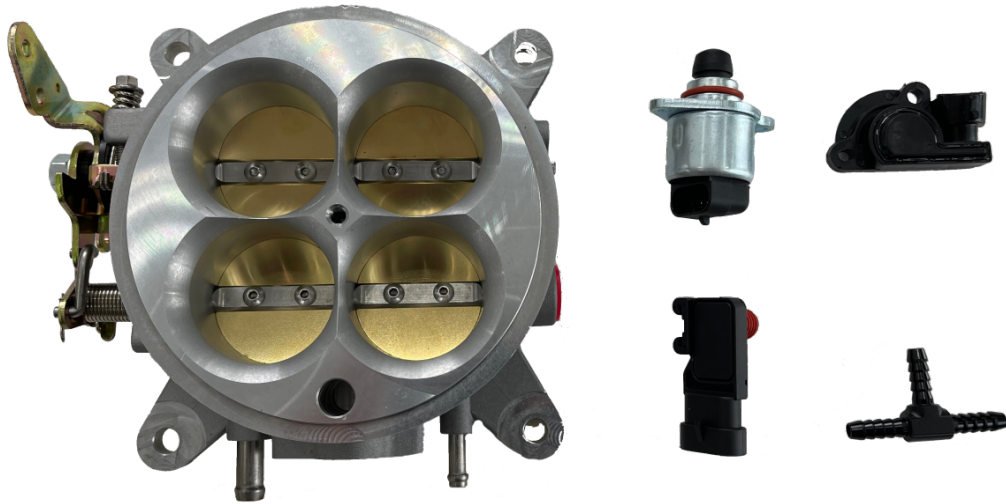
4 Barrel Throttle Body

Install the throttle body and throttle cable bracket. Connect all linkage and throttle springs. Rotate throttle lever to wide-open throttle position and check for smooth operation. Also be sure the throttle opens complete without the throttle blades rotating over center. If the throttle blades rotate over center, a hung throttle condition could occur.

Connect all vacuum and fuel lines. Refer to your tags or drawings for correct placement.

Automatic transmissions only: Attach transmission kick-down bracket if needed. Adjust kick-down or throttle pressure linkage for proper shift points (refer to your vehicle's shop manual for the proper adjustment procedure). Check all linkages, making sure that they function freely.

Reinstall valve covers and new gaskets.

Install the A/C and coil brackets, coil, wires, and all brackets that were removed from the manifold.

Close the drain and fill the radiator to the proper level with coolant. While filling, allow trapped air to bleed from the intake manifold at the heater hose fitting until coolant flows from the fitting. Then, re-install the heater hose and continue adding coolant to the proper level.

IMPORTANT! When the installation of the intake manifold is complete, change the oil to remove any coolant or debris that may have contaminated the crank case.

2.8 Wild Card^{TM} System

Main Power/Battery Connection

The Wild Card^{TM} ECU has a main battery power and ground connector on the Main harness. The loose wire of Wild Card^{TM} harness located approximately 20" from the ECU connectors is the ground (black wire). The black wire should go to the negative post DIRECTLY on the battery. The left position, the loose wire of Wild Card^{TM} harness located approximately 20" from the ECU connectors is the positive terminal (red wire). The red wire should go to the positive post DIRECTLY on the battery. If you have a ''dual post'' battery, it is a great idea to purchase separate posts/studs to connect the ECU power and ground to the non-used terminals. Always use the fused power cable with the proper connectors supplied by ACES only. Don't connect to the ECU until after ALL wiring and installation is performed.

ECU Connectors

Wild Card^{TM} ECU has one 34 pins connector:

PIA 34pin Connector					
PIN	DEFINATION		PIN	DEFINATION	
1	AGND		18	VMAIN	
2	S5V		19	GND	
3	APE2		20		
4	RE2+		21	Nitrous_in	
5	HT2		22	CTS	
6	RLY_PUMP		23	TACHOUT	
7	CANH		24	ACFAN	
8	IGNSW		25		
9	BAT		26	VMAIN	
10	COIL-		27	VMIAN	
11	COIL-		28	GND	
12	RT2		29	GND	
13	FAN2		30	AC_IN	
14	IPN2		31	FPS	
15	CANL		32	FAN1	
16			33		
17	CRANK_IN		34	MRD	
PIB 26pin Connector					
PIN	DEFINATION		PIN	DEFINATION	
1	INJ6		14	RE1+	
2	INJ8		15	IPN1	
3	INJ2		16	IAT	
4	VMAIN		17	VMAIN	

5	HT1		18	AGND	
6	OUTB		19	INJ4	
7	OUTD		20	RT1	
8	INJ5		21	APE1	
9	INJ7		22	TPS	
10	INJ1		23	MAP	
11	VMAIN		24	S5V	
12	OUTA		25	AGND	
13	OUTC		26	INJ3	

2) ECU Mounting

The ECU can be mounted inside the passenger compartment (preferable location) or in the engine compartment. If mounted in the engine compartment, follow these guidelines:

The ECU should be located such that water or road debris are not directly hitting it.

It should also be located such that it is not close to exhaust manifolds or headers, or any other heat sources.

It should be mounted such that it is as far away from spark plug wires, CD ignition boxes, or other ''electrically noisy'' devices as possible.

Make sure the connector end of the ECU is pointed DOWN such that water cannot make its way into the ECU terminals. Do not over-tighten mounting hardware if the ECU is not mounted on a flat surface

3.0 Harness Installation and Sensor Connection

The following indicates the primary sensors that are required to be connected. Each connector on the main harness is labeled with the sensor name. The name on this label for each sensor is in parenthesis below.

3.1 Wiring

An EFI system relies heavily on being supplied a clean and constant voltage source. The grounds of an electrical system are just as important as the power side. Wild Card^{TM} ECU's contain multiple processing devices that require clean power and ground sources. The wiring harnesses must be installed in such a manner that it is separated from "dirty" power and ground sources.

Install the main power and ground directly to the battery POSTS/TERMINALS, not to any other place!

Keep sensor wiring away from high-voltage or ''noisy/dirty'' components and wiring, especially secondary ignition wiring (plug wires), ignition boxes, and associated wiring. It is best that the plug wires not physically contact any EFI wires.

Properly crimp and solder any wire connections. Apply quality heat shrink over any of these connections.

It is critical that the engine has a proper ground connection to the battery and chassis.

NEVER run high-voltage or ''noisy/dirty'' wires in parallel (bundle/loom together) with any EFI sensor wiring. If wires need to cross, try to do so at as close to a 90-degree angle as possible.

Do not use the electric fan outputs to directly power a fan. They must only trigger a relay.

The fuel pump output lead can be used to power the fuel pump, but it is recommended to use the output as a trigger wire for a relay.

Do not use improper crimping tools.

Do not use things like ''t-taps'', etc. Use proper crimpers/solder and heat shrink.

It is never recommended to splice/share signal wires (such as TPS, etc.) between different electronic control units (i.e., ''piggyback'').

Do not connect the red/white switched +12V wire to ''dirty'' sources, such as the ignition coil, audio systems, or 12V sources connected to HID head lamps.
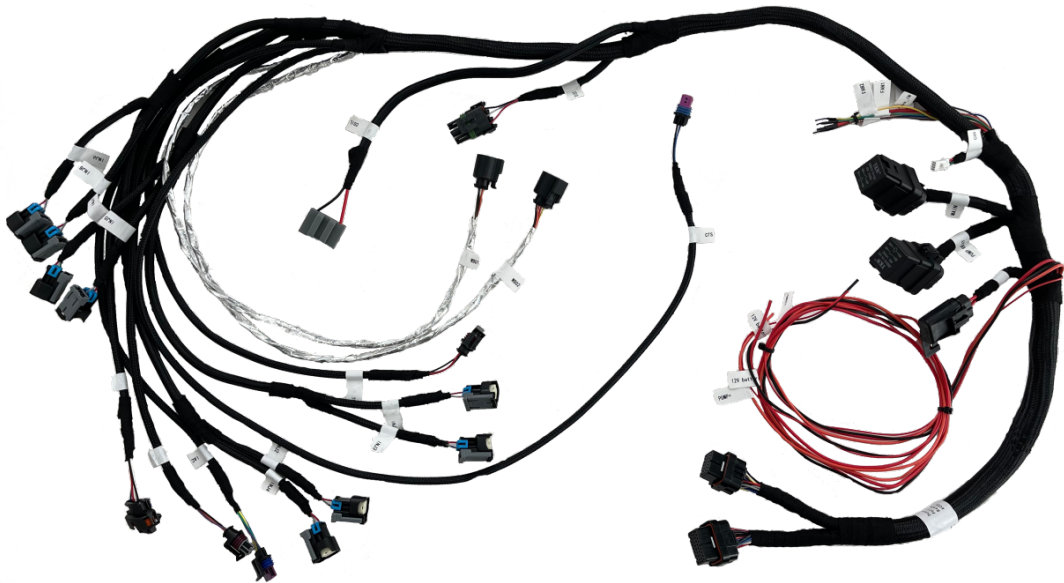
Wild Card Wire Harness

3.2 Coolant Temperature Sensor

Install the Coolant Temperature Sensor (Item 3) into a 3/8" NPT coolant passage in either the intake manifold or cylinder head. Do not overtighten, or damage to the cylinder head or intake may occur. It is best to drain some of the coolant before the sensor is installed if not changing the intake manifold. Use thread sealer or a small amount of thread tape. Do not install the sensor in the thermostat housing, or in an area that will not see a constant flow of coolant.

Connect the CTS connector to the sensor.

Coolant Temperature Sensor

3.3 Throttle Position Sensor (TPS)

Connect to the cable driven throttle body.

TPS Sensor

3.4 Idle Air Control (IAC)

Connect to the cable driven throttle body.

IAC Motor

3.5 Wide Band Oxygen Sensor (WBO1 and WB02)

Connect to the oxygen sensors previously installed. The Wild Card^{TM} systems are intended to be used with Bosch LSU 4.9 wideband oxygen sensors (supplied).

*Wild Card kits have two sensors, one for each bank. One sensor should be installed in exhaust pipe of the driver side, another one should be installed in exhaust pipe of passenger side. Plug wire connector labeled **WBO2 1** into oxygen sensor on driver side, plug wire connector labeled **WBO2 2** into oxygen sensor on passenger side*

Dual Wide Band O2 sensor

3.6 TMAP/MAP and IAT

Wild Card^{TM} EFI system kits include ACES 3Bar TMAP sensor AE1036.
Many other MAP sensors can be configured for use with Wild Card^{TM} ECU but will require custom calibrations to be made via software.

Manifold Temperature and Pressure Sensor

TMAP Adapter Harness

3.7 The AECS Gambler Series Distributor

The ACES Gambler Series Distributor is designed for ACES port injection systems. This distributor has a special reluctor wheel, designed not only to provide RPM signal to the ECU, but also to send cylinder #1 signal to ECU. The ECU uses this special signal to calculate sequential injection timing.

The distributor has a 3-pin connector—12 volts , ground and Hall signal

The Gambler Series Distributor

3.8 Ignition Coils

Ignition Coil (with Timing Control)

Wild Card™ ECU integrate ignition coil driver that use high-performance IGBT chip, ACES recommend using its high-performance ignition coil (PN AC2008) to get spark energy 90mj with 3ms dwell time without a CDI box. It is beneficial for cold start, idle stability, and fuel economy.

Connect coil connector to ignition coil AC2008 if you set harness connection and ECU configuration with timing control.

Ignition Coil Connector

AC2008 Ignition Coil
- Primary Resistance: 0.273Ω
- Primary Inductance: 2.63 mH
- Secondary Resistance: 3.42 kΩ
- Secondary Inductance: 15.77 H
- Output (50pF load): 47 kV
- Output Energy: 150 mJ
- Peak Secondary Current: 100 mA +/- 7%
- Arc Duration: 200 uS
- Turns Ratio 78:1

3.9 Fuel injectors

A fuel injector is a solenoid valve that can be opened and closed very quickly. To open the valve, current must flow through a solenoid contained in the upper part of the injector assembly. The Wild Card™ triggers the injector by providing a ground path to the negative terminal. Fused power is provided to the other terminal from the harness.

The Wild Card™ is compatible with high-impedance injectors only. For direct drive operation, injector coil resistance must be greater than 8 ohms.

ACES EFI recommend ACES injectors AE1001 36 lb/hr with 43 PSI fuel pressure for your classic V8 engine, it can support over 500hp. If you need high flow rate injectors, ACES fuel injector with OEM quality is your best choice.

ACES Injector	Flowrate	
AE1001	36.00	lb/hr
AE1002	65.00	lb/hr
AE1003	80.00	lb/hr
AE1004	100.00	lb/hr
AE1005	211.00	lb/hr

The Wild Card™ harness has EV6 connectors. The injection strategy of Wild Card™ ECU is sequential, make sure plug each injector connector into corresponding injector, otherwise damage engine properly.

The Wild Card™ ECU has dual lambda controller and dual wide band O2 sensor for 2 banks of a V8 engine, a closed loop lambda controller needs corresponding injectors and wide band O2 sensor. Connect injector connector to the corresponding injector, Connect WBO1 connector to driver side wide band O2 sensor, then connect WBO2 connector to passenger side wide band O2 sensor, these installation operations are very important to make Wild Card™ ECU Dual lambda closed loop working properly.

ACES Fuel Injector AE1001 36 lb/hr

3.10 Handheld

The handheld controller is used to create an initial calibration for the system, allows for simple tuning changes to be performed, and is also used to view various information of the EFI system. It should be installed such that the handheld controller can be easily used in the passenger compartment. The handheld plugs directly into the main harness at either connector labeled **"CAN."** This connector is located approximately 11.8 inches from the ECU connector. The handheld does not have to remain in the vehicle or utilized after the vehicle is set up and running properly.
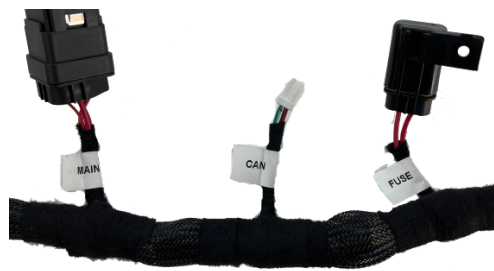
CAN connector

3.11 Loose Wires

The following loose wires in the main wiring harness should be connected as follows on all systems.

IGNSW (Red) Should be connected to a clean key-on/cranking +12V power source. Power source should only be active when the ignition is on (key-on power). Make sure the source has power when the engine is cranking as well (check with voltmeter). Not all sources apply power when the ignition switch is in "cranking" position. This wire is located approximately 20" from the ECU connectors. DO NOT connect to a "DIRTY" source like an ignition coil!

12V Battery + (Red) MUST be connected directly to the positive battery terminal. This powers the fuel pump and fuel injectors. This wire is protected by a fuse in a sealed fuse holder. The fuse holder is located about 8" from the ECU connector. A 20-amp (20A) fuse is pre-installed.

12V Battery - (Black) MUST be connected directly to the negative battery terminal. Using a traditional chassis ground can cause electrical issues with the WILD CARD™ ECU. This wire is located approximately 20" from the ECU connectors.

Pump (Color = Orange) Used to directly power a fuel pump (+12 volt). Do not use this wire to power fuel pumps that require over 15 Amps. Refer to your fuel pump manufacturer for amperage ratings. For high current pumps, use this wire to trigger a separate

relay and use larger gauge wire to feed the pump -10 gauge is recommended.

3.12 Additional Outputs

The following additional wire outputs in the main wiring harness should be connected as follows on all systems. These wires come out of the harness about 23" from the ECU connectors except **Point Out**.

Tach Out (Orange) This wire provides a 12V square-wave output and can be used to trigger a conventional tachometer.

Tach_In/Coil- (Grey) A tach output from an ignition box or other source like coil-. This is the tach input for the ECU when it is not controlling ignition timing.

Point Out (White) Points output is used for controlling timing when using an ignition box.

Fan1 (Purple) This output provides a ground output to trigger a relay used for a cooling fan. This output should never be directly connected to a fan but the relay that powers the fan. This wire is located approximately 32" from the ECU connectors.

Fan2 (Green) This output provides a ground output to trigger a relay used for a second cooling fan. This output should never be directly connected to a fan but the relay that powers the fan. This wire is located approximately 32" from the ECU connectors.

VMain (Red) This output will provide a 12V power supply from the main relay. This wire is located approximately 32" from the ECU connectors.

Nitrous_In (Purple) Nitrous oxide activation wire. Feeding 12V power to this wire tells the ECU that a nitrous oxide system has been activated.

AC_In (Orange) This is a 12V input that recognizes that the AC has been activated.

REV (Orange) Optional - Programmable ground output

4.0 Ignition Wiring--Timing Control

Wild Card^{TM} EFI can control timing using ACES The Gambler distributors like AD2023.

Option1-Drect Drive Coil

Wild Card^{TM} ECU integrate ignition coil driver that use high performance IGBT chip, ACES recommend using AC2008 high performance ignition coil to get spark energy 90mj with 3ms dwell time without CDI box, it is beneficial to cold start, idling stability, and fuel economy.

Option2-CDI Box

The loose wire "Point" is an ignition signal from Wild Card^{TM} ECU to another module like High roller CDI box or MSD etc. Or use the **Black wire** of Coil connector as ignition signal from Wild Card^{TM} ECU to another module.

VR(not used)

DIST

COIL-

Point

COIL

AS2013
wild card
Always flat on floor!

OR

VR(not used)

DIST

COIL

AS2013
wild card
Always flat on floor!

2
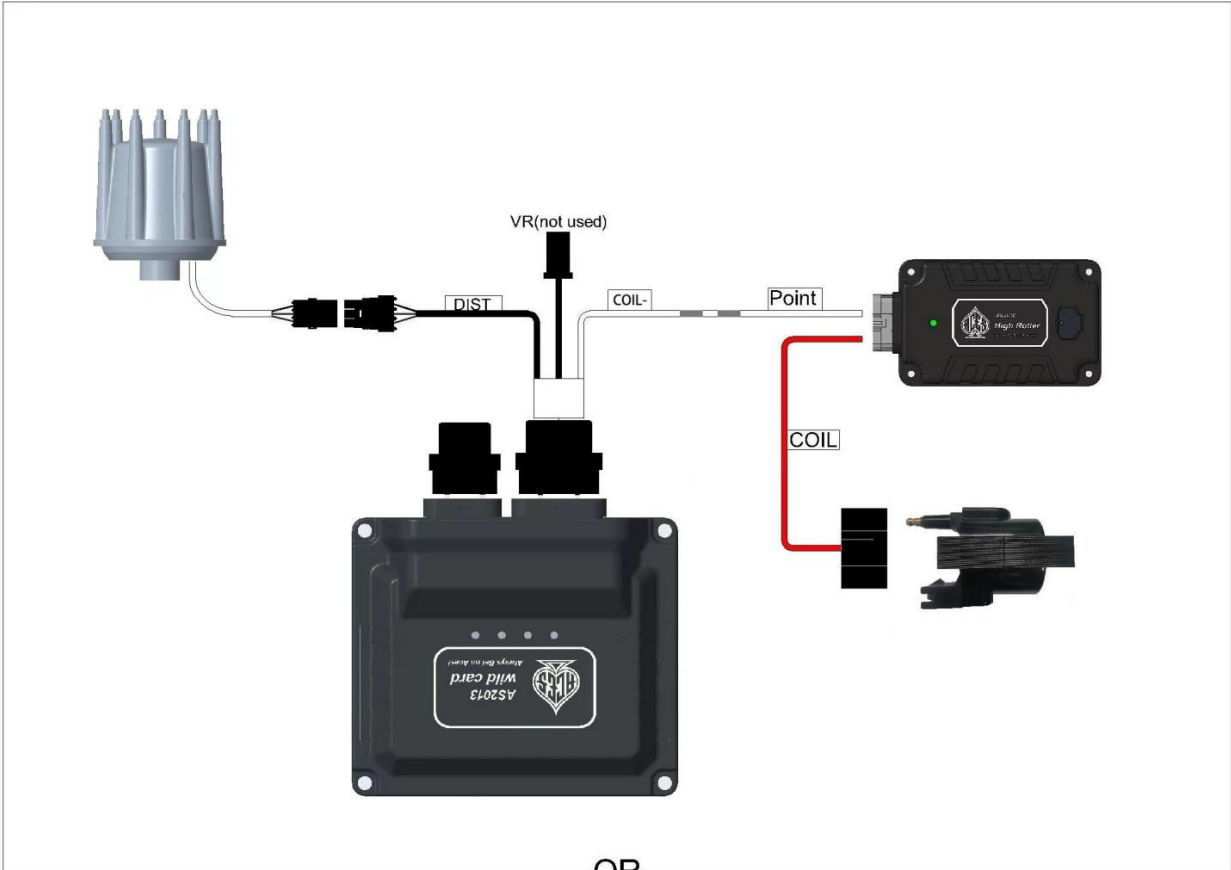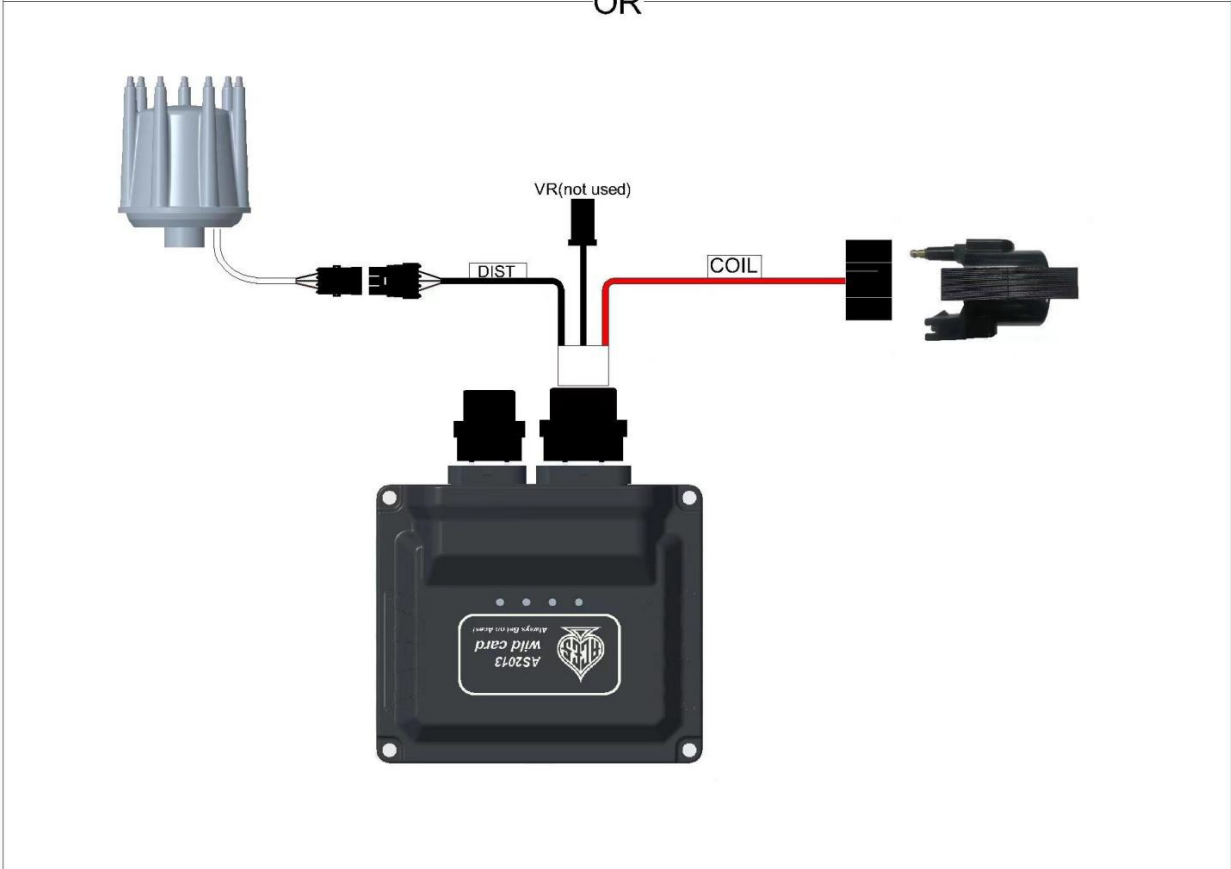
5.0 Handheld Navigation & Use

The handheld is composed of a 5.0-inch touch screen and six physical buttons. The LCD is with very delicate color display and large screen size. There are navigation buttons on both sides. The external interface is CAN bus interface and a type-C USB interface. All operations can be done by touching the screen or the physical buttons on both sides.

The handheld can be used to monitor and calibrate the system (for example: idle speeds, AFR targets, Fuel pump, etc.). The handheld needs to relate to the ECU. It is very portable and can be connected to ECU for monitoring and calibration at any time. There are touch screen buttons on sides of the display screen and there are physical buttons on sides of handheld. They match with each other. Different interfaces support different button operations. The user can operate the scan tool by touching the screen or the buttons on both sides, such as switching the interface and modifying the calibration data, upload/download calibration data, etc.

5.1 Making Adjustments

(1) Slider Bar: Slide the bar or click "<" and ">" to adjust the parameters, click "Save" to save, and click "Cancel" to cancel saving.

(2) Numeric keyboard: Click the edit box "100.0%" above the sliding bar to pop up the numeric keyboard.

	100.0	%	Range:(0.0~300.0)

7	8	9	-	Backspace
4	5	6	0	Cancel
1	2	3	.	OK

(3) 2D Graph: The user can drag the red dot on the graph or click the mechanical button on the left to adjust the parameters. When adjusting the parameters, the upper right corner will display the Y-axis coordinate value of the currently adjusted parameter. The three buttons on the left side of the interface will disappear after a short display. Click the mechanical button on the lower left corner to switch the position of the small yellow dot, click the middle button on the left to lower the yellow dot, and click the mechanical button in the upper left corner to lower the yellow dot. Click the mechanical button in the upper left corner to raise the yellow dot. The Y-axis coordinate value of the yellow dot is displayed in the upper right corner of the interface.

After the configuration is complete, click "Save" to download the calibration data to the ECU; click "Cancel" to cancel the modification.

5.2 Connection

The scan tool is connected to the ECU through the CAN bus, and its program can be upgraded through the Type-C USB interface.

5.3 Navigation buttons

ACES design is for reliable operation and use. There are buttons on both sides of the display and scan tool. They match with each other. Different interfaces support different button operations. The user can operate the scan tool by touching the screen or the buttons on both sides, such as switching the interface and modifying the calibration data, upload/download calibration data, etc.
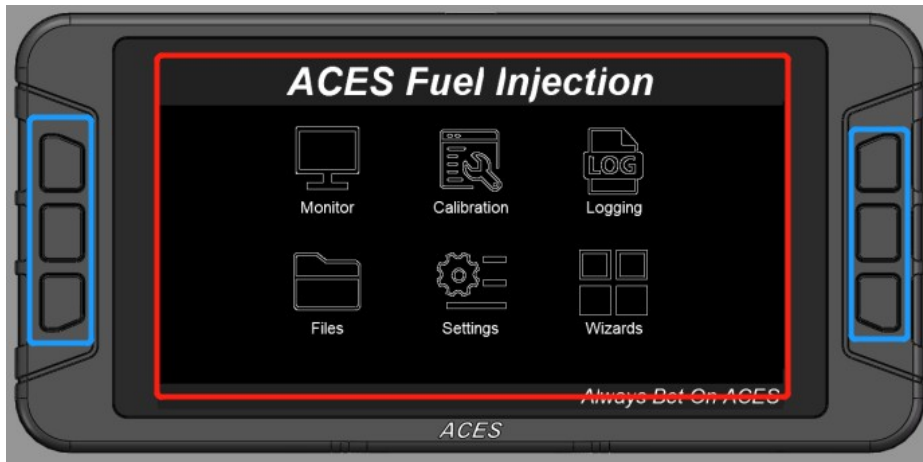
*The area of red frame is touch screen
*The area of blue frame is Navigation buttons

5.4 Main Menu
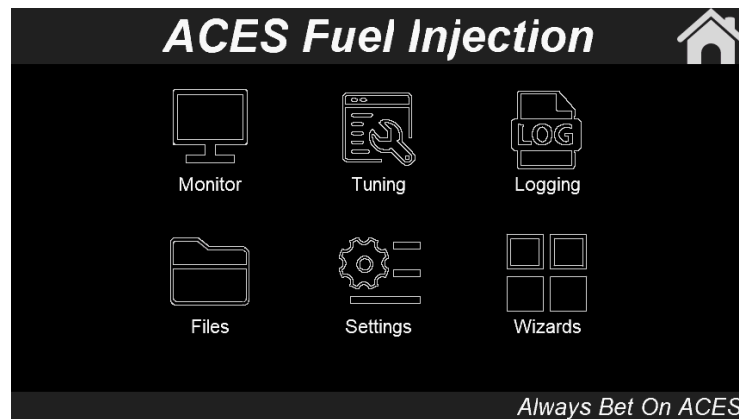
The home screen has 6 selections icon. They are explained in more details later in the instructions.

Monitor - A variety of gauge and dash displays.

Tuning - Allows for various parameters to be easily adjusted.

Logging - The user can freely choose the monitored object to write to the log file in order to better observe the ECU data.

File - Saves and loads calibrations. Also shows information about the ECU and handheld controller.

Setting - The local settings can adjust the backlight brightness, sound volume of button or touch, and information about the handheld.

Wizards - Creates a base calibration and performs the TPS Zero Auto learn function.

The Wild Card™ EFI system will build a custom calibration for your engine based on a few easy to answer questions. To begin, Choose the Wizards icon from the main menu.

6.0 CALIBRATION WIZARD

Select System High Roller Royal Flush Wild Card ☐ Don't show this again in next startup. Enter	**Select System** Connect handheld to wire harness and Power up ECU, Select your Wild Card™ EFI system to home screen
Wild Card FAN1 FAN2 PUMP Battery, V 13.0 MAP, Psi 11.8 TPS, Deg 0.0 ECT, F -40 IAC Position, Step 179 RPM 0 Actual AFR1, A/F 13.9 Ign Advance, Deg 16.9 Inj PW, ms 109.670 Fuel Loop1 State Open Loop Fuel Loop2 State Open Loop	**Home Screen** Click the "⚙" icon in the upper right corner to enter Main Menu.
ACES Fuel Injection 🏠 Monitor Tuning Logging Files Settings Wizards *Always Bet On ACES*	**Main Menu** Click the Wizards from main menu
Wizards Start Wizard TPS Autoset Back	**Start Wizard** Click the Start Wizards to go to configure you Wild Card™ EFI system
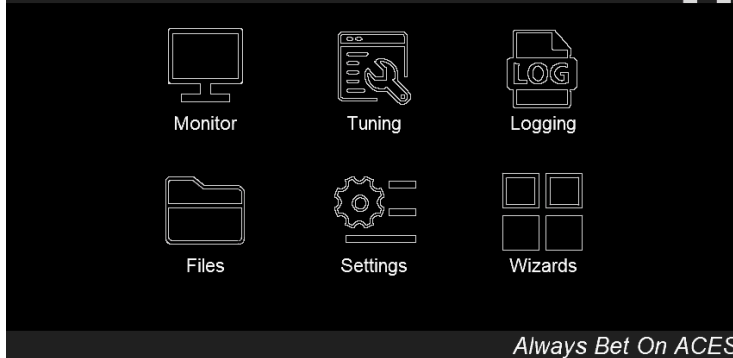
Wizard - Camshaft Type Street/Strip Stock/Mild Exit Back Next	**Camshaft Type** Select your camshaft type: lllStock/Mild = This selection will work well on most applications equipped with stock or "street performance" camshafts. Choose Stock/Mild If you are unsure of your camshaft specs lllStreet/Strip = Select this if your engine has between 8" and 13" of manifold vacuum Press Next
Wizard - Crankshaft Type Crankshaft 8x Exit Back Next	Crankshaft Type Select your engine Crankshaft RPM signal type, The ACES Gambler distributor has 8x reluctor wheel which is 7 long teeth and one short tooth indicated cylinder1.
Wizard - Dual WBOS Only WBOS1 Dual WBOS Exit Back Next	**Dual WBOS** Select Dual WBOS for your Wild Card™ Press Next
Wizard - Number Of Injecters < 8 Number > 4 8 Exit Back Next	**Number Of Injector** Select 8 injectors for you Wild Card™ Press Next
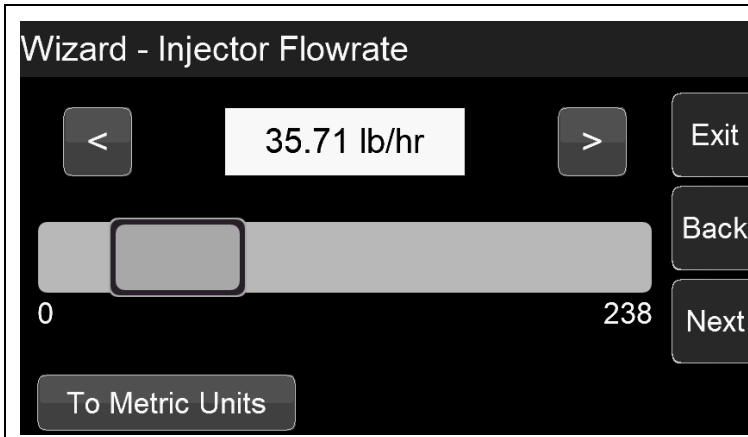
Wizard - Injector Flowrate `<` 35.71 lb/hr `>` Exit Back 0 238 Next To Metric Units	**Injector Flowrate** The injector of Wild Card™ throttle body is 36 lb/hr Press Next
Wizard - Engine Displacement `<` 348 CID `>` Exit Back 3 3661 Next To Metric Units	**Engine Displacement** Use slide bar to set your engine displacement Press Next
Firing Order (Need to reboot to take effect) Current:1-8-4-3-6-5-7-2 Select:1-8-4-3-6-5-7-2 Cyl #1 Cyl #8 Cyl #4 Cyl #3 Cyl #6 Cyl #5 Cyl #7 Cyl #2 1 2 3 4 Back 5 6 7 8 Next	**Firing Order** Set your engine firing order for Wild Card™ ECU, ECU needs firing order to make sequential injection to match each other, correct setting is important to let engine work well properly, otherwise poor performance or engine damaged. The default setting of firing order is 1-8-4-3-6-5-7-2.
Wizard - Hot Idle Speed `<` 800 RPM `>` Exit Back 500 1500 Next	**Hot Idle Speed** Use the slider bar to set your hot idle speed. This is the target RPM that will be enable at coolant temperatures above 160 °F Press Next
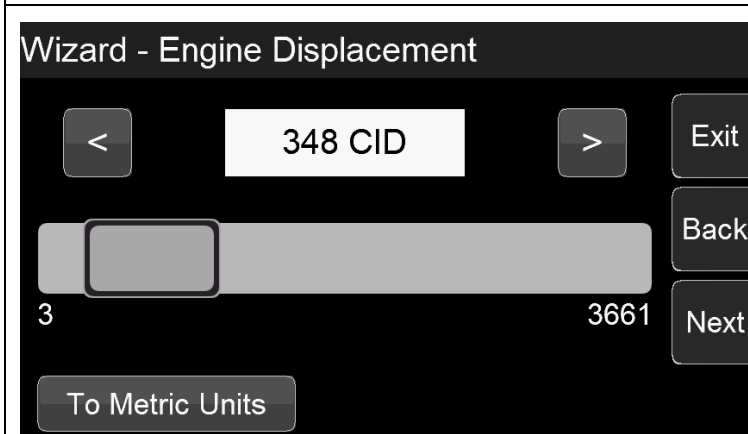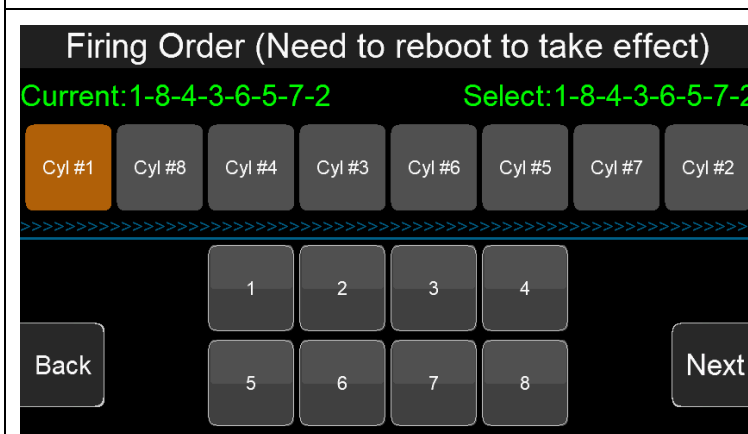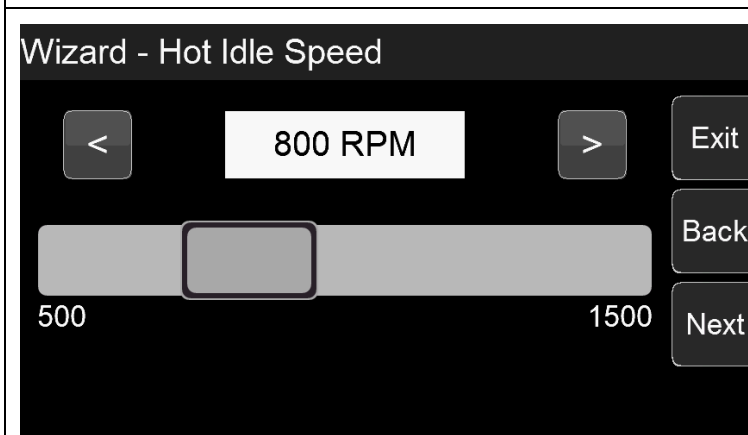
Wizard - details	
1. Camshaft Type---Stock/Mild	▲ Home
2. Dual WBOS---Only WBOS1	
3. RPM To Killshot/Ign Type---Magnetic	▬ Back
4. Number Of Injector---4 Numbers	
5. Injector Flowrate---100.53 lb/hr	Save
6. Engine Displacement---348 CID	▼

Click "Save" to save the configuration to the ECU, click "Back" to return to wizard for modifying configuration, click "Home" to return to the main menu.

7.0 SENSOR VERIFICATION

Before starting the vehicle, verify that all the sensors are reading properly. Turn the key off and cycle it back on. At this time, you should hear the fuel pump come on and run for 5 seconds. Check for fuel leaks.

On the home Screen, With the key on and the engine off, these sensors should read as follows:

- **Engine RPM** – Will show "0" when not cranking. Will show RPM once the engine is cranking or running

- **MAP** (Manifold Air Pressure Sensor) – Should read from 95-102. At high elevations it could read as low as 75.

- **TPS** (Throttle Position Sensor) – Slowly depress the throttle to wide open. It should read 100 at wide open throttle. Cable operated throttle bodies should read 0 closed.

- **CTS** (Coolant Temperature Sensor) – reads engine temperature. If the engine is "cold," it should read close to ambient temperature.

- **Battery** – Will read battery voltage. Should be 12.0 volts minimum.

If ANY of these sensors are not reading properly DO NOT attempt to start the engine.

8.0 STARTUP ENGINE

At this point, you're ready to start the engine. Before attempting to start your vehicle with a newly installed Wild Card™ EFI system, ACES recommends running through the following check list to help ensure a safe and successful start.

- Double-check all wiring.

- Power and Ground are run directly to the battery.

- The small Red "**IGNSW**" wire from the Wild Card™ ECU will have power during both Key On and Cranking.

- The Wild Card™ ECU, fuel pump, fuel lines, and wires are securely mounted away from heat sources and pinch points.

- Wide Band Oxygen Sensor is installed in a proper location.

- No exhaust leaks.

- Throttle linkage is complete and operational from the pedal.

- Handheld powers up during Key On.

- Each step of the Initial Setup in the Handheld must be done.

- At Key On the fuel pump primes.

- There are No fuel leaks when system is under pressure.

- When ready to start engine, watch for Engine RPM on Handheld Dash to know that Wild Card™ ECU is getting

proper input RPM signal.

- Wiring connection is for No Timing Control (unless using timing feature, ACES recommend starting up your engine with no timing control at first start).

- Be prepared to adjust the throttle blades as shown above.

Crank the engine and look at the RPM parameter. It should indicate the numbers of RPM. The engine should fire and run and come to an idle. Cold engine will have high RPM around 12-1500RPM depend on engine temperature,

If you do not get an RPM signal, there is an error in the wiring or system setup. Call ACES fuel injection service for advice.

9.0 AFTER STARTUP

Once the vehicle has started, look for any fuel or coolant leaks. Let the vehicle warm up and look at some other parameters to make everything is operating properly.

- **Fuel Loop State1/2** – Indicates whether the engine is "Closed Loop" or "Open Loop". Closed Loop indicates that the ECU is adding or subtracting fuel to maintain the target air/fuel ratio. The Wild Card™ calibrations are such that the system should be operating closed loop almost all the time.

- **Inj Percent1/2** – This is the percentage compensation of fuel that the ECU is adding or subtracting to maintain the target air/fuel ratio at any specific moment. A value less-than 100% in front indicates the ECU is removing fuel. A value more than 100% indicates the ECU is adding fuel. When in open loop operation, this will always stay at 100%.

- **Inj PW** – Indicates the injector pulsewidth. This will vary depending on the engine speed and load

- **Target Air/Fuel Ratio** – This is the target AFR (air/fuel ratio) the ECU is trying to maintain. This will vary depending on the engine speed and load.

- **Actual AFR1/2** – This will show the air/fuel ratio the wideband oxygen sensor is reading. The Closed Loop Compensation should be adding or subtracting fuel all the time such that the AFR Left should always be close to the Target AFR value.

- **Fuel Learn State1/2** – This indicates the state of the Wild Card™ "Self-Tuning" operation (Learn Status). The system will automatically tune itself as you drive around. There are several conditions that must occur for the Self Tuning to occur. The engine temperature must exceed 160° F. The system must be operating in a closed loop mode, and the Self Tuning must be enabled. The base Wild Card™ setups have the Self Tuning enabled. Once the engine reaches 160° F, the Self Tuning should be active.

If any of these parameters are not showing a proper value, find out why before further driving the vehicle.

10.0 Timing Verification

Have a timing light handy as the first step will be positioning the distributor.

1. Switch the ignition key ON to power the Wild Card™ system up and go to Handheld **Tuning >>Spark>>Basic >> Static Timing**. This screen allows you to set the distributor exactly where the Wild Card™ ECU needs it to be positioned to operate the timing.

2. Start the engine, then set the static timing to 12-degree BTDC, then go to handheld **Tuning>>Spark>>Advanced>>Lock ignition Timing,** Click **Enter** button to select **Lock** then save, now ignition timing is locked at 12 degrees BTDC, Now using the

timing light, rotate the distributor until you see 12 degree BTDC on the balancer. Then tighten the hold down clamp.

3. Set **Lock Ignition Timing** to "unlock", set the static timing to 12 degrees BTDC. Back to the Home screen and the Wild Card™ ECU will now be controlling the ignition timing. Advancing or retarding ignition timing can make an engine want to speed up or slow down. Wild Card™ can use this principal as another way (in addition to the idle motor) to maintain the desired idle speed. Besides giving the ECU additional influence on engine speed, the Idle timing adjust feature can also react very quickly, what we call fast adjust by advancing or retarding ignition timing, slow adjust is maintain the desired idle speed by IAC. Wild Card™ ECU has both strategies of idling control. It is important to note that you will not see accurate timing at idle speed when viewing with a timing light. This is due to ECU calculations. If you rev the engine off idle, the timing will appear correctly.

4. Go to the Spark screen, **Tuning >>Spark>>Basic**, you can adjust the Idle, Cruise, WOT and Cranking timing settings. It is HIGHLY suggested that a timing map using the Wild Card™ EFI PC Software is built for the engine the Wild Card™ EFI is controlling timing on. The Timing map built using the handheld is very basic and each engine will perform much more optimally with a timing curve built for the specific engine combination.

★ **Timing Offset**

Use this value to retard or advance the timing or sync timing at higher RPMs. These values are sett to 0 in the base calibrations. Some ignition modules may need this number altered if the commanded timing does not match the commanded timing as engine speed increases. If the timing starts to retard as rpm increases, this number can be increased in order for the timing to match.

11.0 IDLE SETTING

Once the engine is warm up, the idle speed can be set to what is desired.

Select the Tuning tab. Find the target hot idle speed. Move the button left and right to adjust it. Click the button to save the new value or select CANCEL at the bottom to move out of this screen.

Whether you change the target idle or not, you need to set the throttle plates on the throttle body to an optimal position. To do so, with the engine running select the Monitor tab. You will see the Idle screen. Look at the "IAC Position" value. This value should be set between 6 and 20 with the engine in neutral and up to operating temperature. Also make sure the "TPS" value is showing a value of 0. If it is not, you need to perform a TPS Zero Learn.

If the "IAC Position" value is showing zero, you must close the throttle plates until it reads a value of 6-20. Slowly turn the throttle shaft adjustment screw on the throttle body out (counterclockwise). If the IAC position is "stuck" at 0, it is likely that the engine is idling at a higher speed than you have set the target idle speed for. You need to adjust the throttle plates to resolve this issue.

If the "IAC Position" value is greater than 20, it is a good idea to open (turn the throttle shaft adjustment screw in, clockwise) the throttle plates until the "IAC Position" value is between 6 and 20. Note that if you open the throttle plates such that the "TPS" position goes above a value of 0, you will need to shut the vehicle off and perform a TPS Zero Learn.

Then restart the vehicle and continue adjusting the throttle plates. Once the TPS goes above a value of 0, the ECU goes out of its "idle" mode and will lock the IAC Position to a fixed value.

When the adjustments are completed, make sure the TPS reads a value of 0 with the engine idling.

12.0 SELF-TUNING

At this point, it is time to just drive the vehicle and let the system perform its self-tuning process. The best way for this is to drive the vehicle under as many different operating conditions as possible. Different engine speeds and loads. Start by slowly revving

the engine up in neutral and holding it at different speeds up to 2500 RPM. This will help the system learn these points. Then drive the vehicle, possibly using different transmission gears to learn in different areas. If you have an automatic transmission you may want to put it in gear, and with your foot on the brake pedal, apply a SMALL amount of throttle so that the system learns in this area as well.

NOTE: There are several conditions where Learning will NOT occur. They are the following:

- lllIf the engine is below 160° F

- lllWhen the engine sees quick accelerator pedal movement

- lllCertain times when the accelerator pedal is lifted, and the vehicle is coasting

- lllIf the learn is disabled by the user

If you are interested in seeing if Self Tuning is completed in a certain area, you can look at the following:

- lllSelect Monitor from the Main Menu then select Monitors

- lllSelect the Fuel Inj FW icon

- lllThe Fuel Learn States and indicates if the learn feature is active.

At this point you can drive and enjoy your Wild Card™ EFI as it is. The full instruction and tuning manual can be found on the product pages of www.acesfuelinjection.com and describes in detail how you can adjust various parameters to further optimize fuel economy and overall performance, if desired.

DIAGNOSTIC LEDS

LED#	Function	Color	Definition
1	Power Indicator	Red	System power indicator
2	Engine Running Indicator	Blue	Engine running indicator, Blinking becomes faster with speed
3	Main Relay Indicator	Red	The main relay indicator, the ignition key is turned on, the main relay is turned on, and the key is turned off, the main relay is turned off after the system saves the learning data etc.
4	Fuel Pump Indicator	Blue	Fuel pump relay working indicator

Aces Handheld Controller Introduction

The handheld utilizes a 5.0" capacitive touch screen and six physical buttons. The LCD is with very delicate color display and large display size. There are navigation buttons on both sides. The external interface is CAN bus interface and a type-C USB interface. All operations are done by touching the screen or the physical buttons on both sides.

The handheld can be used for monitoring and calibrating the system (for example: idle speeds, AFR targets, Fuel pump, etc.) after connecting it with the ECU. It is very portable and very convenient for tuning at any time.

1.0 Connection

The handheld is connected to the ECU through the CAN bus. Operations such as program upgrading etc. Can be done through the Type-C USB interface.

2.0 Basic Operations

There are buttons on both sides of the display and handheld. They match with each other. The user can operate handheld by touching the screen or the buttons on both sides, such as switching the interface, adjusting the calibration data, uploading/downloading calibration data etc.

3.0 Operation Interfaces

3.1 Startup Screen

When the handheld is turned on, it will prompt the user to select the specific system, such as Jackpot, Killshot, High Roller, etc. The system can only work well if it is connected to the correct system. If the user selects "Don＊t show this again in next startup", then, when it is started next time, it will directly enter into the system selected last time. If the user wants to change the selection, change it in "Setting" -> "System Select".
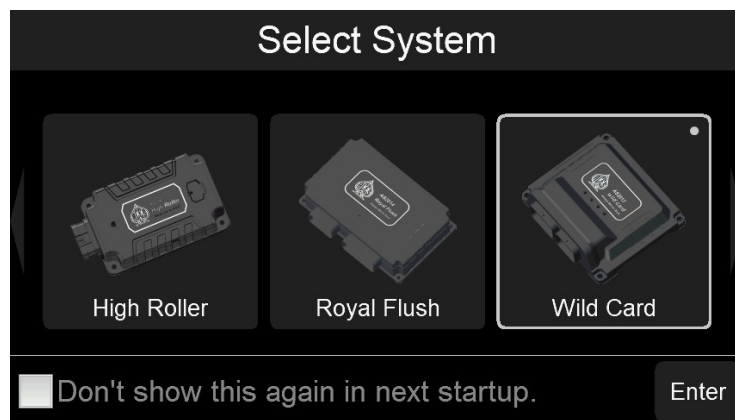
3.2 Home Screen

The Home Screen shows RPM and some other basic system parameters, and the user can also customize the parameters that need to be monitored (More details about how to customize the parameters will be explained below later). Click the ⚙ " icon in the upper left corner to enter the detailed configuration interface.

3
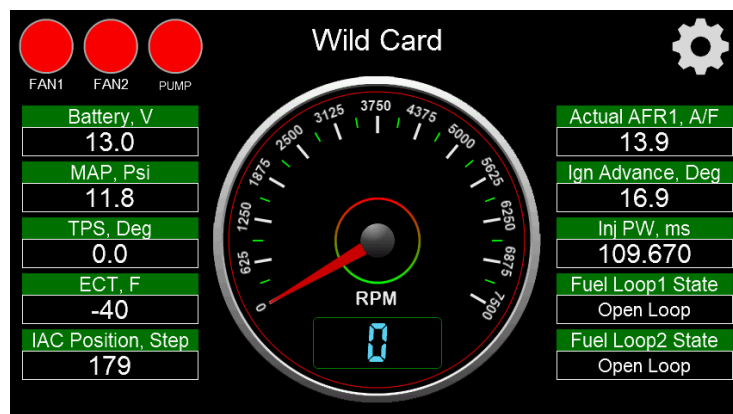
3.3 Main Menu

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.
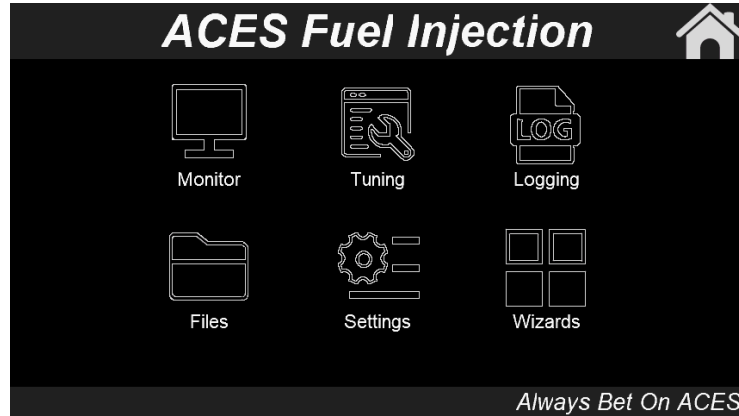
3.4 Wizards

At the first time of using ECU, the user needs to set up according to the engine type. Click the "Wizards" icon in the main menu to enter the Wizards interface. See following Fig.
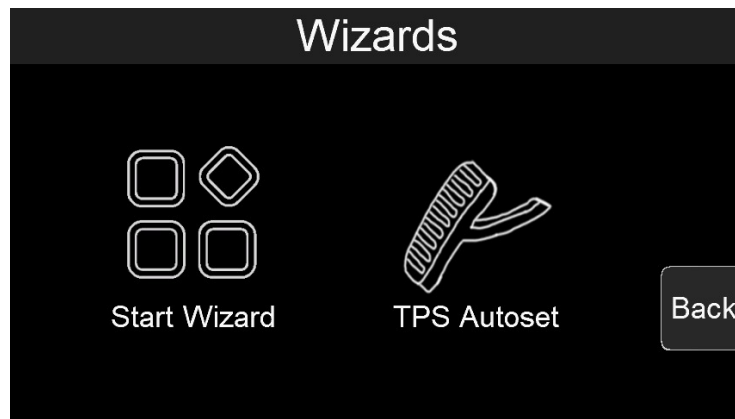
3.4.1 Start Wizard

Click the "Wizards" icon in the main menu to enter the Wizards interface and the user can set up the parameters of the product for the car. The user can click "Next" or "Back" to switch to the next or previous page and click "Exit" to exit the wizards. Click the "To Metric Units"/"To Imperial Units" button to switch between imperial or metric units.

Wizard - Camshaft Type	
Street/Strip — Exit Stock/Mild — Back Next	"Camshaft Type"

Wizard - Crankshaft Type
 	
Crankshaft 8x   Exit
 	
    Back
 	
    Next
	"Crankshaft Type"

Wizard - Dual WBOS
 	
Only WBOS1   Exit
Dual WBOS
 	
    Back
 	
    Next
	"Dual WBOS"

Wizard - Number Of Injector < 8 Number > Exit Back 4 8 Next	"Number Of Injector"
Wizard - Injector Flowrate < 35.71 lb/hr > Exit Back 0 238 Next To Metric Units	"Injector Flowrate"

Wizard - Engine Displacement `<` 348 CID `>` Exit Back 3 3661 Next To Metric Units	"Engine Displacement"
Firing Order (Need to reboot to take effect) Current:1-8-4-3-6-5-7-2 Select:1-8-4-3-6-5-7-2 Cyl #1 Cyl #8 Cyl #4 Cyl #3 Cyl #6 Cyl #5 Cyl #7 Cyl #2 1 2 3 4 Back 5 6 7 8 Next	"Firing Order" The "Firing Order" can be edited, the "Firing Order" is from left to right.
Wizard - Hot Idle Speed `<` 850 RPM `>` Exit Back 500 1500 Next	"Hot Idle Speed"
Wizard - details 1. Camshaft Type---Stock/Mild Home 2. Crankshaft Type---Crankshaft 8x 3. Dual WBOS---Dual WBOS Back 4. Number Of Injecters---8 Number 5. Injector Flowrate---35.71 lb/hr Save 6. Engine Displacement---348 CID	Click "Save" to save the configuration to the ECU, click "Back" to return to wizard for modifying configuration, click "Home" to return to the main menu.

3.4.2 TPS Autoset

Click "TPS Autoset" to enter TPS self-learning page. If you select "YES", make sure the throttle is closed and engine is not started.

Make sure the throttle is closed and engine is not started.
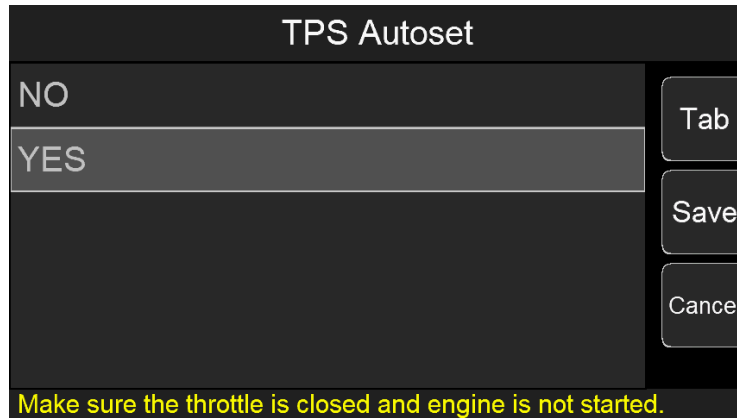
3.5 Monitor

Click "Monitor" Icon on the Main Menu and it has two selections: Monitors and Gauge. Click "Back" to return to the previous interface.
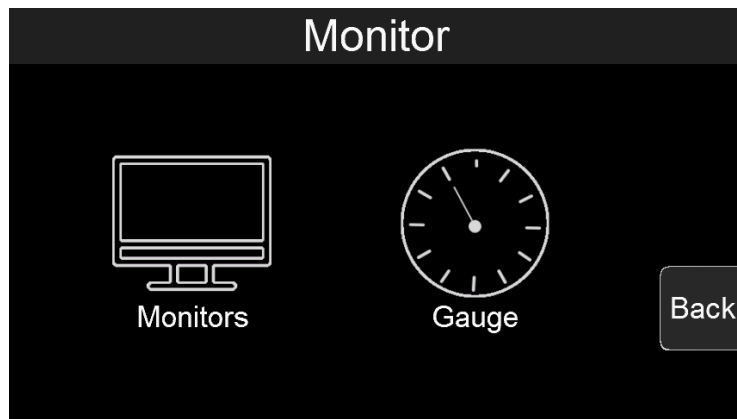
3.5.1 Monitors

(1) Click the "Monitors" icon to enter the Monitors interface, where all monitoring groups are displayed. Click the "Tab" button on the right to switch to the next page and click "Back" to return to the previous page.
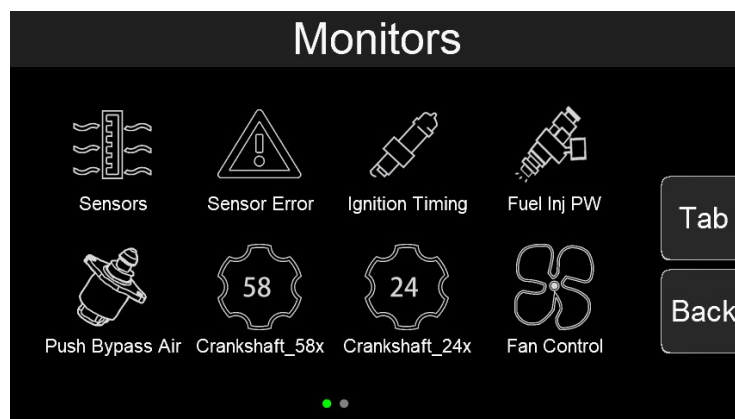
(2) Click the icon of monitored parameter to view the specific data of the system, as shown in the figure below, click "UP" or "Down" to switch pages up and down, and click "Back" to return to the previous interface.

Sensors			
Battery	13.0	V	Up
Run Time	0	Sec	
RPM	0	RPM	Down
MAP	11.8	Psi	
MAT	99	F	Back
ECT	-40	F	
1/4			

3.5.2 Gauge

(1) Click the "Gauge" icon to enter the Gauge interface. There are three Dashes and one "Home Setup". The three Dashes are customizable Dash. "Home Setup" can configure the items on the main menu.

Dash

(2) Click "Dash #1" or other Dash icons to enter the Dash interface
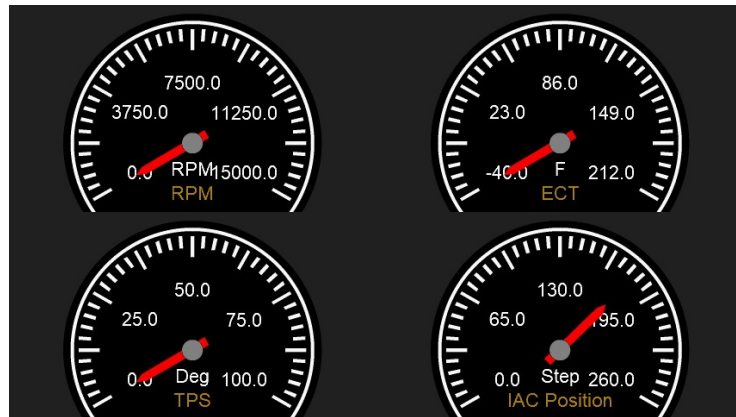
Dash #1
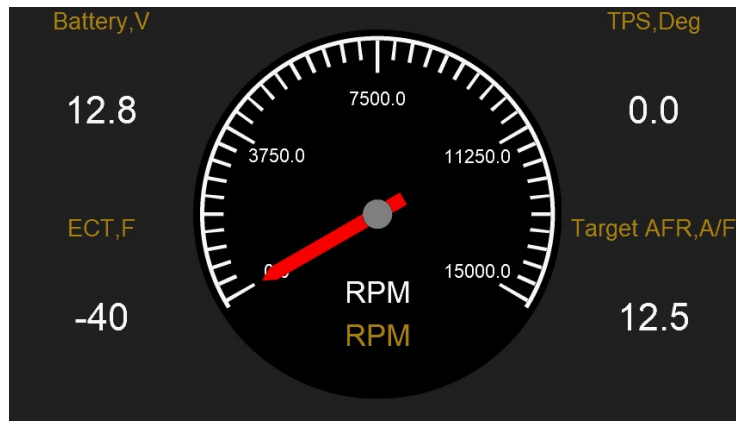
Dash #2
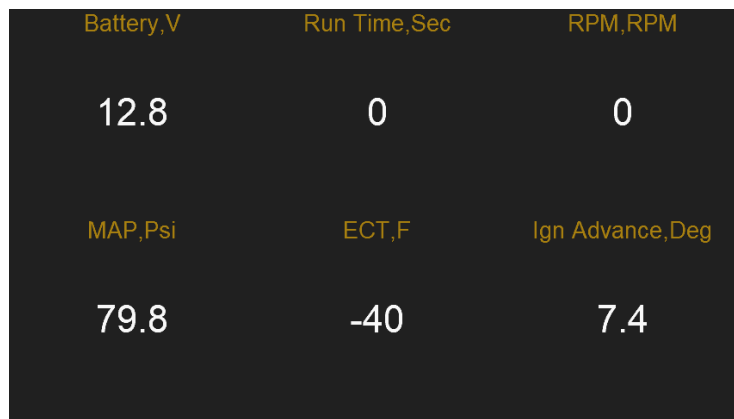
Dash #3

(3)　Click "Setup" in the lower left corner to customize the configuration of the three Dashes.

Select Dash Dash #1 Dash #2 Dash #3 Select　Cancel	Select the Dash that needs to be customized.
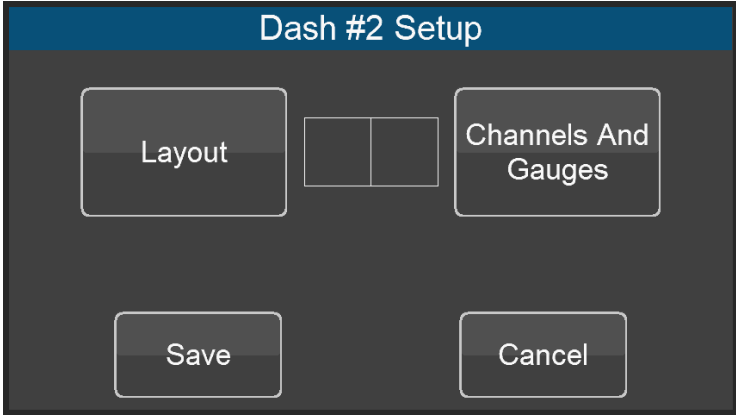
Dash #2 Setup Layout [ ] Channels And Gauges Save Cancel	Click "Layout" to configure the layout, click "Channels And Gauges" to configure the channels, click "Save" after the configuration is completed, and click "Cancel" to cancel the save.
Select Layout Layout #1 Layout #2 Layout #3 Layout #4 Select [ ] Cancel	Enter Layout interface to select Layout, click "Select" to select Layout, click "Cancel" to cancel the selection.
Select Gauge and Channel Select Gauge and Channel Select Gauge and Channel Select Gauge and Channel Select Gauge and Channel Select Gauge and Channel OK	Click "Channels And Gauges" to enter the channel selection interface, click "Select Gauge and Channel" to select a specific channel, and click "OK" after the configuration is completed.
Sensors RPM Sensor Error MAP 🟢 Ignition Timing MAT Fuel Inj PW ECT OK Push Bypass Air Displacement Cancel Crankshaft_58x Estimated Air Temp	Select the object to be monitored. The left side is the monitoring group, and the right side is each item of the group.
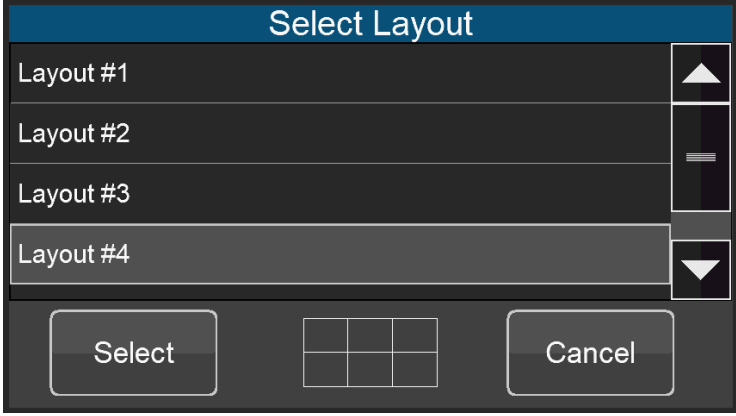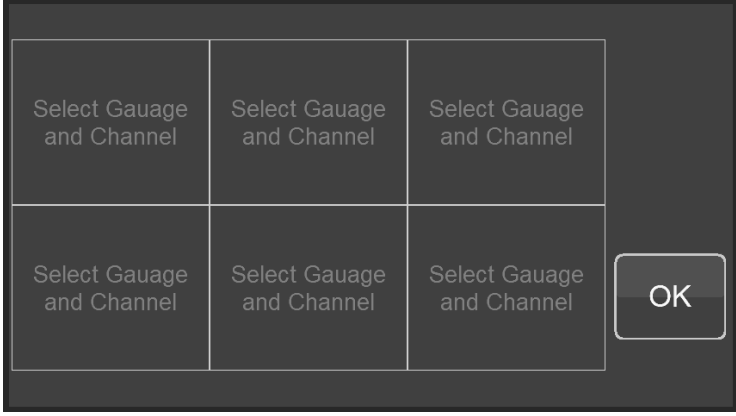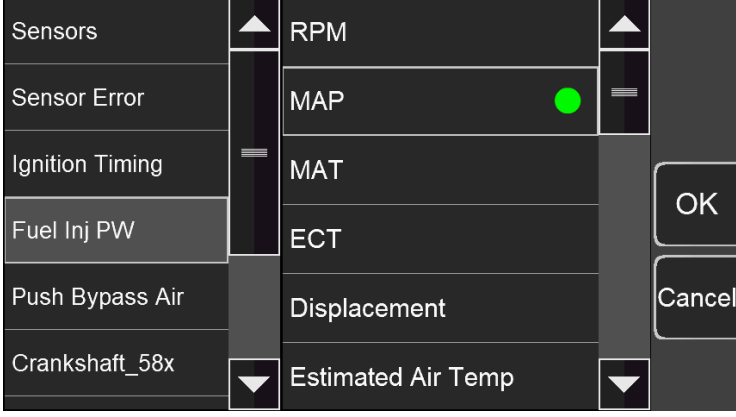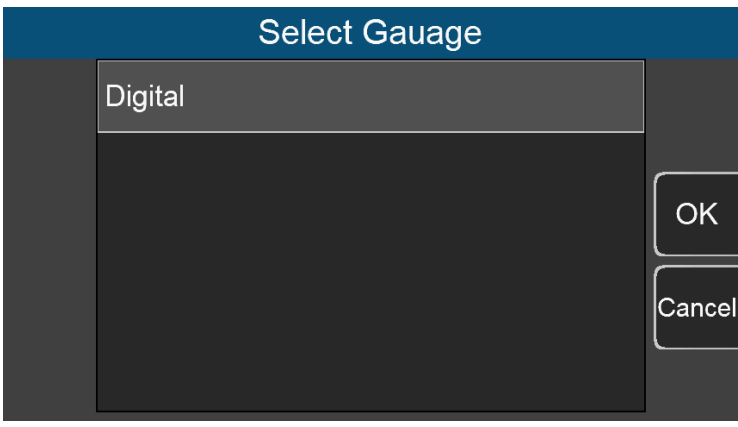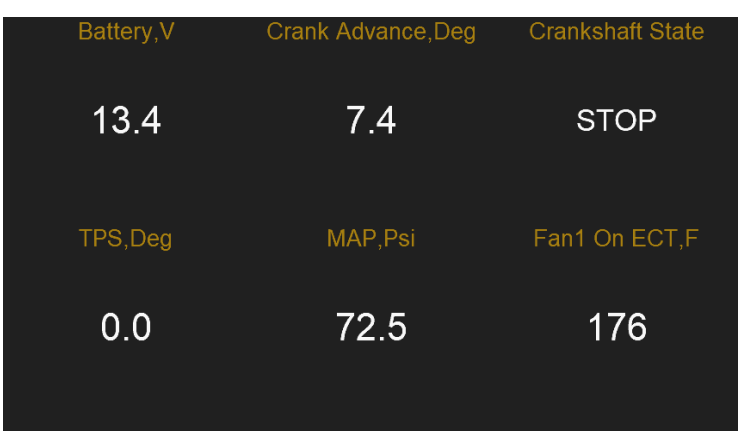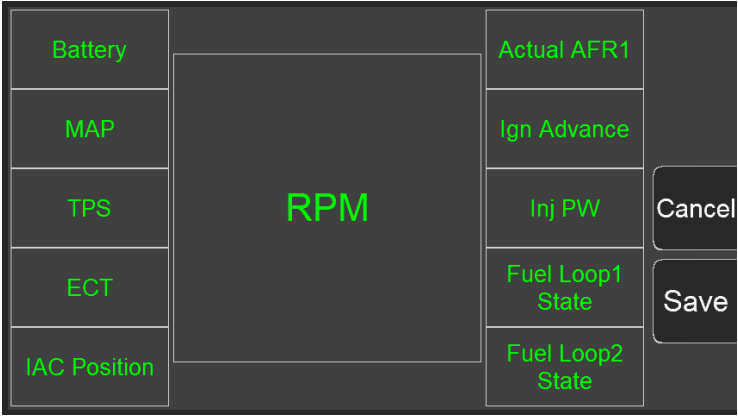
Select Gauage Digital OK Cancel	Choose the type of Dash. There are three types of Dash（Digital, State, and Round）for each monitor to choose.
Battery,V Crank Advance,Deg Crankshaft State 13.4 7.4 STOP TPS,Deg MAP,Psi Fan1 On ECT,F 0.0 72.5 176	After the configuration is completed, click Dash #1 to observe the configuration effect.

(4) Click "Home Setup" to enter the "Home Setup" interface. Click the item in the cells to modify the configuration, for example, click "Battery" to enter the channel selection interface. Click "Save" to save and click "Cancel" to cancel the modification.

Battery		Actual AFR1	
MAP		Ign Advance	
TPS	RPM	Inj PW	Cancel
ECT		Fuel Loop1 State	Save
IAC Position		Fuel Loop2 State	

Sensors	Battery ●	
Sensor Error	Run Time	
Ignition Timing	RPM	Cancel
Fuel Inj PW	MAP	
Push Bypass Air	MAT	OK
Crankshaft_58x	ECT	
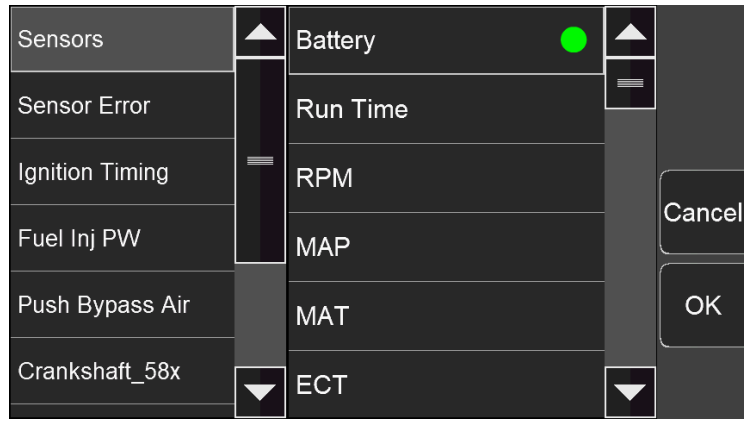
The left side is the monitoring group, and the right side is the monitoring object of the monitoring group.

3.6 Tuning

Click the "Tuning" icon on the Main Menu to enter the Tuning interface. The interface shows tuning groups. Click the icons to view the system calibration data. Click "Tab" to switch the selected tuning options, click "Enter" to calibrate the selected item, and click "Back" to return.

Tuning

Sensors Idle Spark Fuel

Fuel Pump System Setting System IO Back
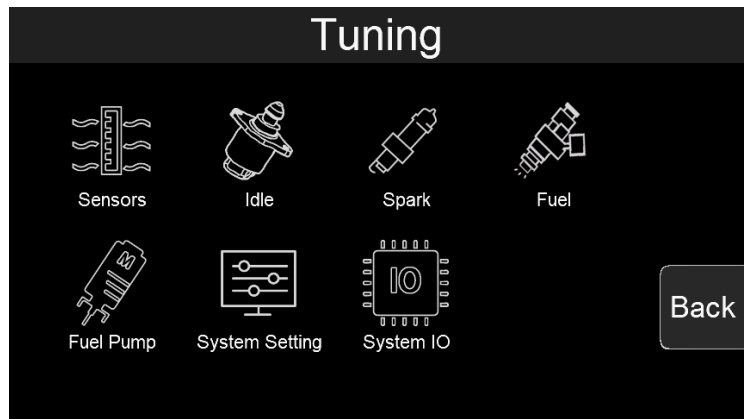
3.6.1 Tuning Groups

Click the "Fuel" icon to enter "Tunning>>Fuel", which is divided into basic calibration group and advanced calibration group. Click "Basic" to enter the basic calibration group and click "Advanced" to enter the advanced calibration group.

Tuning>>Fuel

Basic Advanced Back

"Tunning>>Fuel"

Tuning>>Fuel>>Basic			
Rated Injector Pressure	43.5	Psi	▲
Clear Flood TPS	65.0	Deg	≡
Fuel Prime Percent	100.0	%	
Idle AFR	13.7	A/F	
Cruise AFR	14.7	A/F	
WOT AFR	12.0	A/F	▼

Tab   Enter   Back

1/3

"Tunning>>Fuel>>Basic"

Tuning>>Fuel>>Advanced		
Fuel Loop	Enable	▲
Fuel Learn	Enable	≡
Target AFR Type	2D Table	
Fuel Pressure Sensor Used	NO	
Min Fuel PW	∿	
Injector Off Time	∿	▼

Tab   Enter   Back

1/3
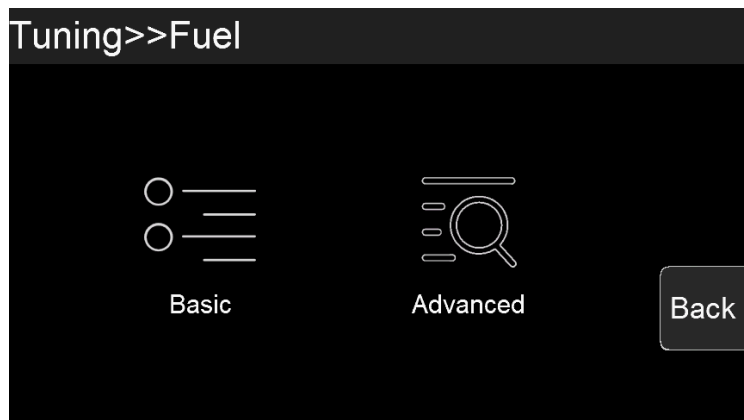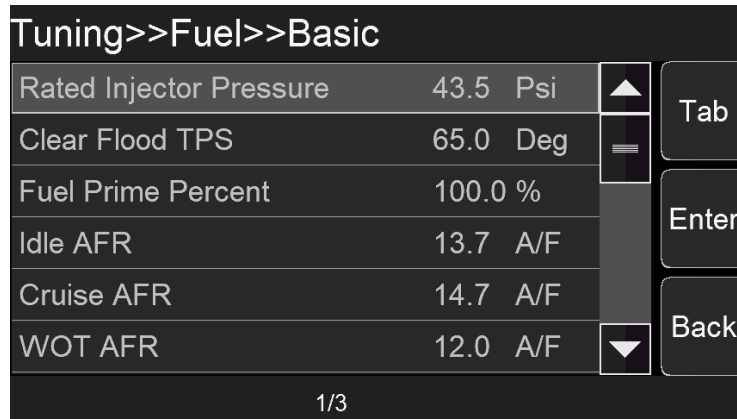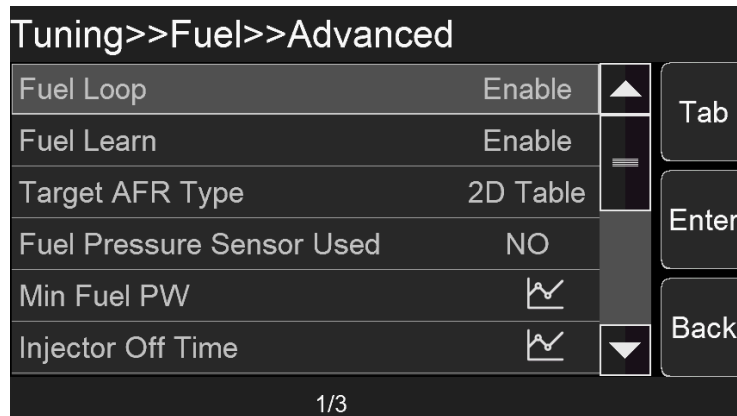
"Tunning>>Fuel>>Advanced"

3.6.2 Making Adjustments

(1) Slider Bar: Slide the bar or click "<" and ">" to adjust the parameters, click "Save" to save, and click "Cancel" to cancel saving.

Fuel Prime Percent

<   100.0 %   >

0.0   300.0

Cancel   Save

(2) Numeric keyboard: Click the edit box "100.0%" above the sliding bar to pop up the numeric keyboard.

100.0		%	Range:(0.0~300.0)	
7	8	9	-	Backspace
4	5	6	0	Cancel
1	2	3	.	OK

(3)2D Graph: The user can drag the red dot on the graph or click the mechanical button on the left to adjust the parameters. When adjusting the parameters, the upper right corner will display the Y-axis coordinate value of the currently adjusted parameter. The three buttons on the left side of the interface will disappear after a short display. Click the mechanical button on the lower left corner to switch the position of the small yellow dot, click the middle button on the left to lower the yellow dot, and click the mechanical button in the upper left corner to lower the yellow dot. Click the mechanical button in the upper left corner to raise the yellow dot. The Y-axis coordinate value of the yellow dot is displayed in the upper right corner of the interface.

After the configuration is complete, click "Save" to download the calibration data to the ECU; click "Cancel" to cancel the modification.

3.7 Logging

Click the "Logging" icon on the Main Menu to enter the logging interface. Click "start log" to start logging and click "stop

log" to stop logging. This interface also shows the current memory usage of the handheld.
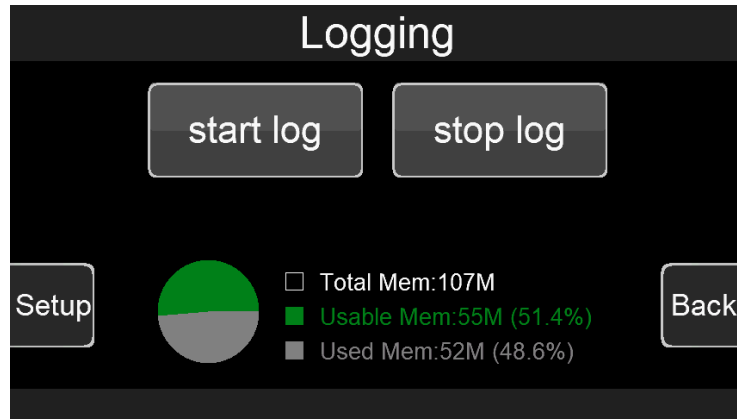
(1) Click the "Setup" button in the lower left corner to enter the log configuration interface.
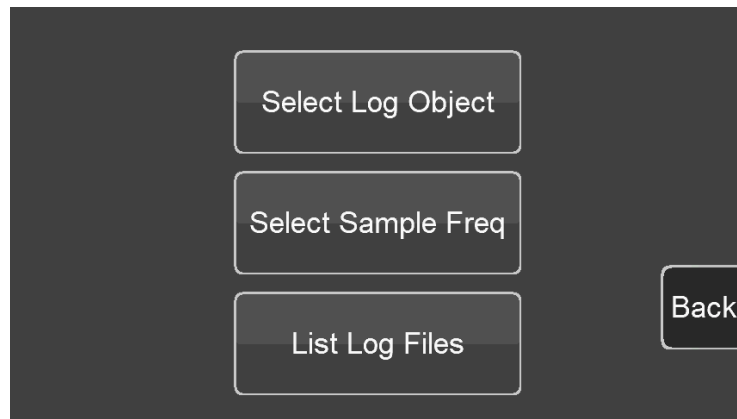
(2) Click "Select Log Object" to select the object to be logged, and only log one group at a time. Select the log group on the left and select multiple objects in this group to log at the same time on the right. Click "Sel All" to select all the objects in the group for recording and click "OK" to save.
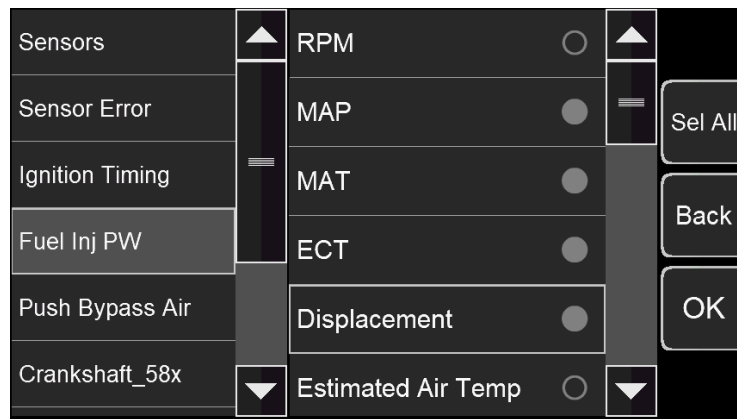
(3) Click "Select Sample Freq" to select the logging frequency, click "Save" to save, and click "Cancel" to cancel the modification.

Select Sample Frequency(FPS)

| - | 5 | + |

| cancel | save |

ck
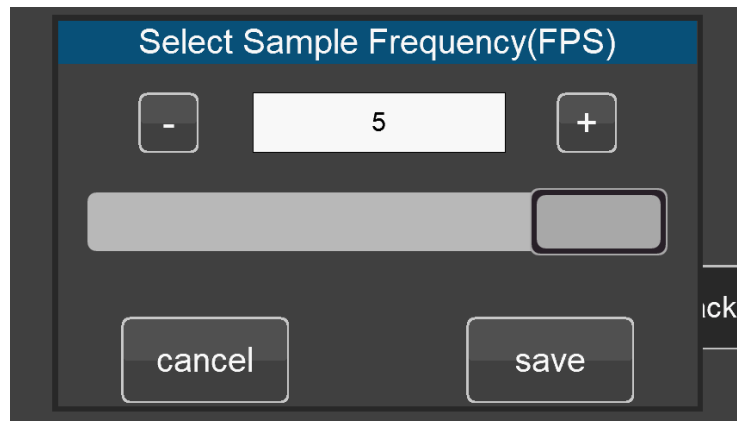
(4) Click "List Log Files" to view the log files or delete or empty the log files.

Log Files

1770001.csv
1770002.csv
1770003.csv
1770004.csv

ck

| Delect File | Clear Files | Back |
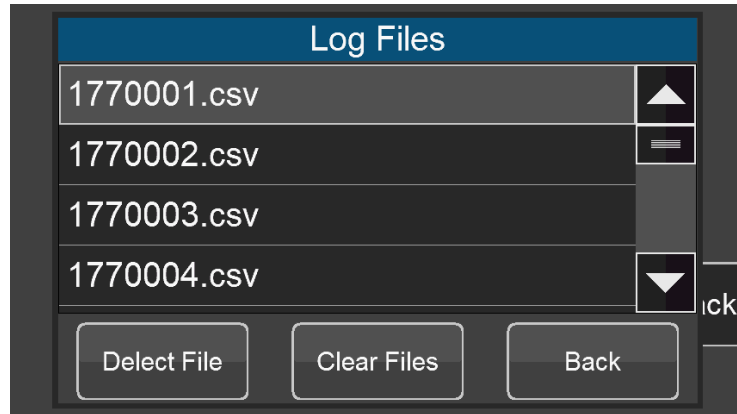
3.8 Files

Click the "Files" icon on the Main Menu to enter the file interface, where you can upload and download the calibration data, and manage the calibration data files.

Files

| Upload from Killshot | Manage Files | Download to Killshot | Back |
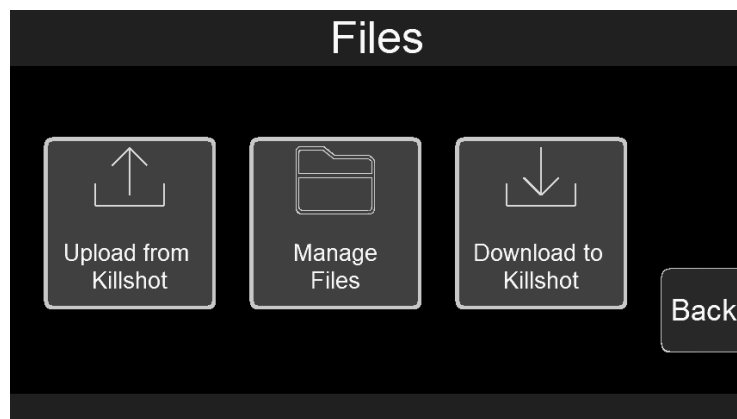
3.8.1 Uploading Calibration Data

(1) Click "Upload from Jackpot" to upload ECU calibration data and save it.
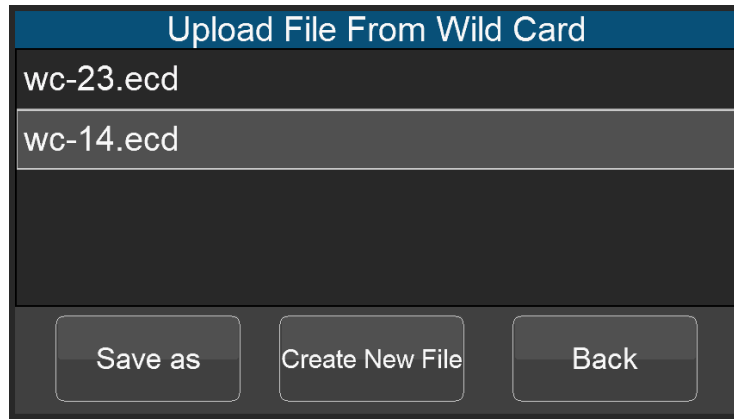
(2) Click "Save as" to save the uploaded data to the currently selected file. Note that the calibration data of the selected file will be replaced by the new calibration data.

(3) Click "Create New File" to create a new file to save the calibration data, and the user can customize file name.
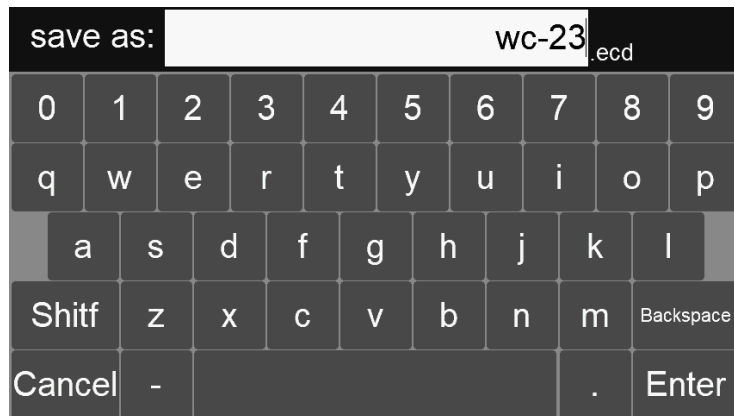
3.8.2 Downloading Calibration Data

Click "Download to wildcard" to download the calibration data to the ECU. Select the calibration data file to be downloaded and click "Download" to download it to the ECU.
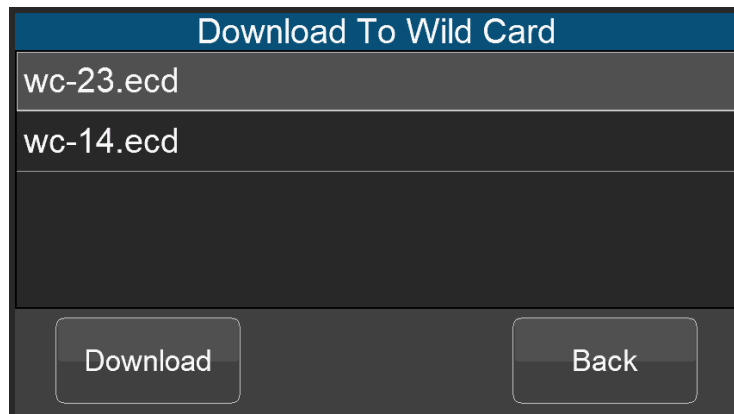
3.9 Settings

Click the "Settings" icon on the Main Menu to enter the settings interface, where you can set the display brightness, sound effects, display unit, Upgrade, etc.
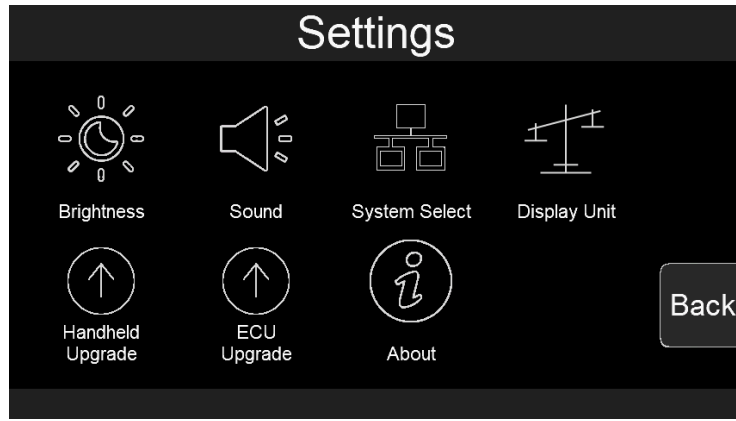
3.9.1 Screen Brightness Setting

Click the "Brightness" icon to enter the brightness setting interface. You can slide the bar or click the "-" and "+" to set the screen brightness. After the setting is completed, click "Save" to save the settings, and click "Cancel" to cancel saving the changes.
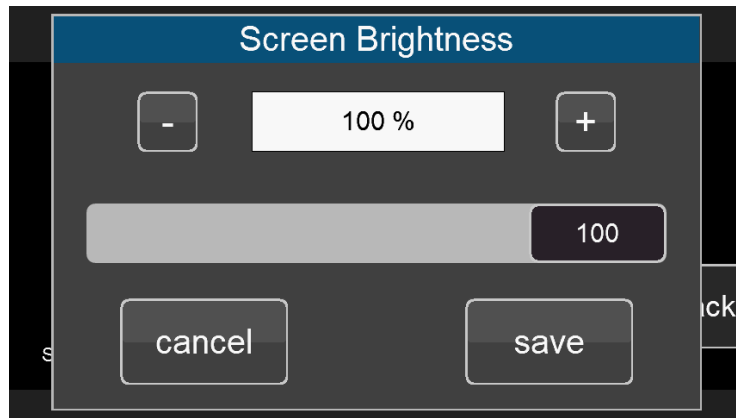
3.9.2 Sound Setting

Click the "Sound" icon to enter the sound effect setting interface and click the horn icon to switch the sound effect. "Button Sound" is the sound effect switch for mechanical buttons, and "Touch Sound" is the touch sound effect switch. After the setting is completed, click "Save" to save the setting, and click "Cancel" to cancel the saving and modification.
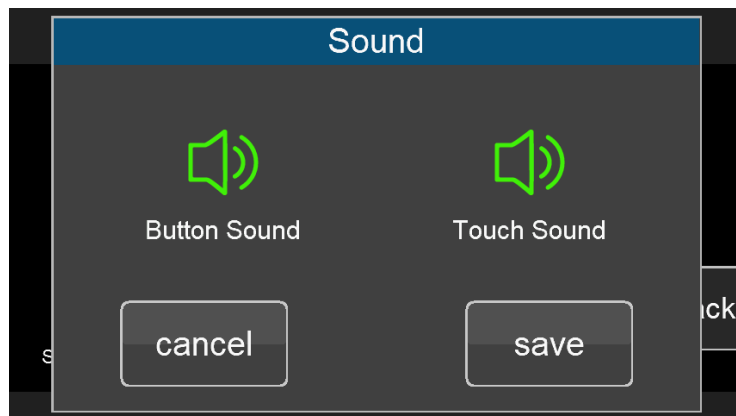
3.9.3 Select System

Click the "System Select" icon to enter the system selection interface. The user selects the corresponding system according to the product. If the correct product is not selected, the system will not work right.

3.9.4 Select Display Unit

Click the "Display Unit" icon to enter the display unit setting interface. The user can select the imperial units or the metric units. After the setting is completed, click "Save" to save the setting, and click "Cancel" to cancel the saving and modification.
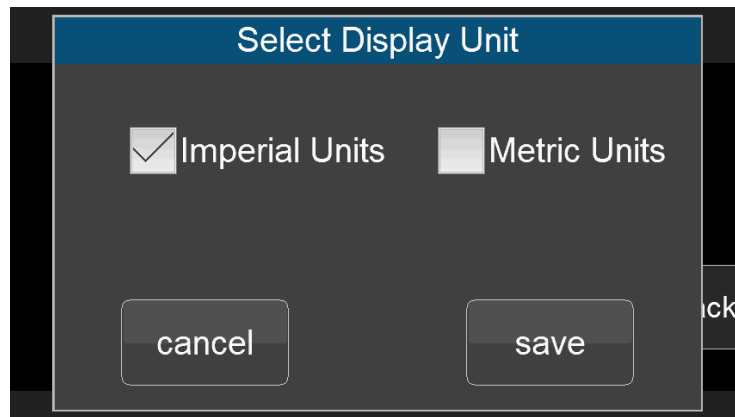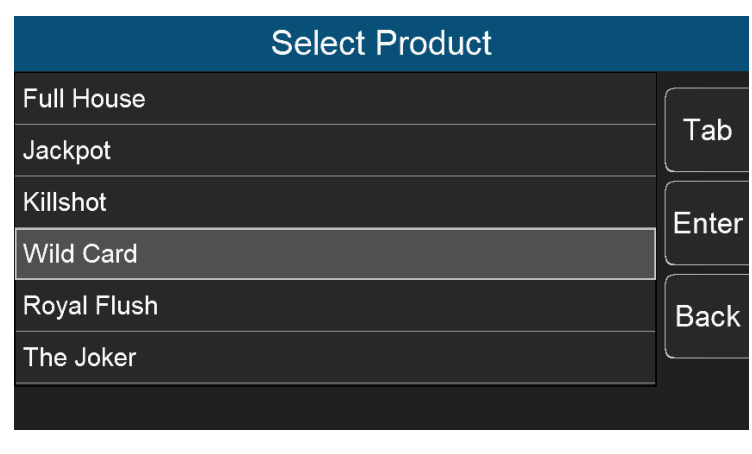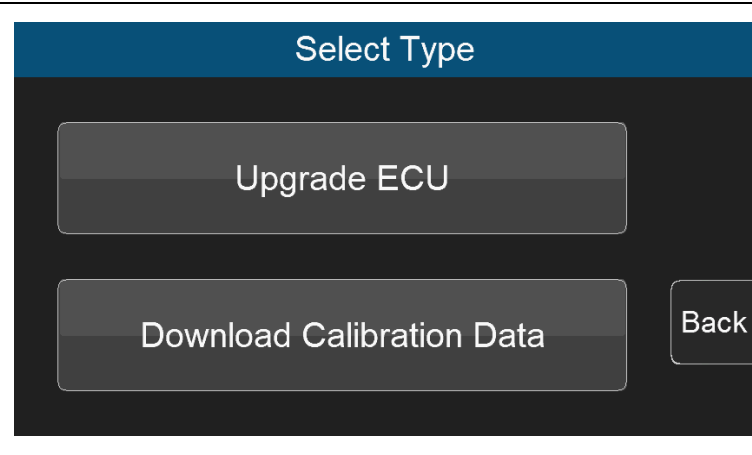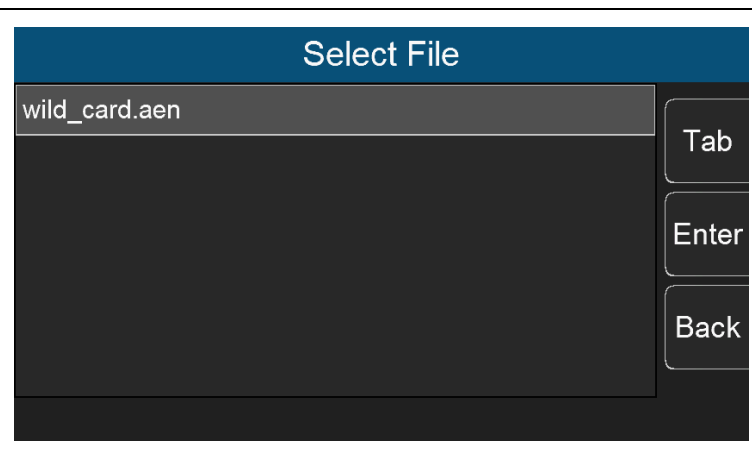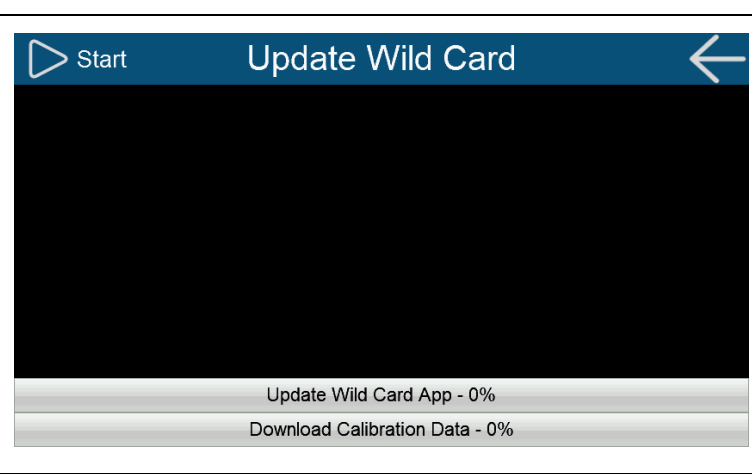
3.9.5 System Upgrade
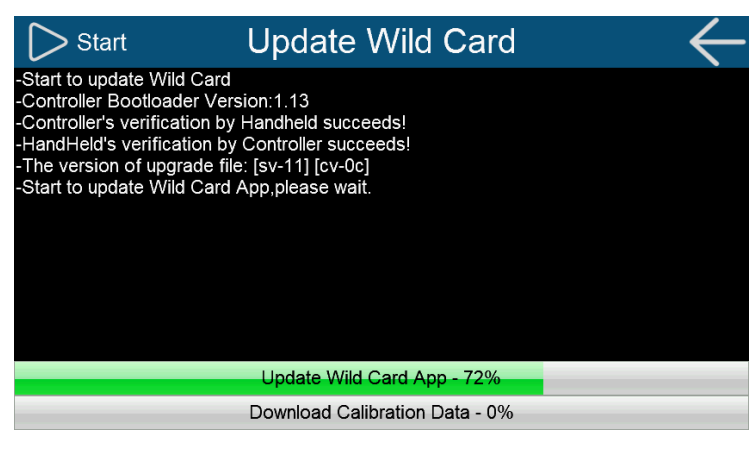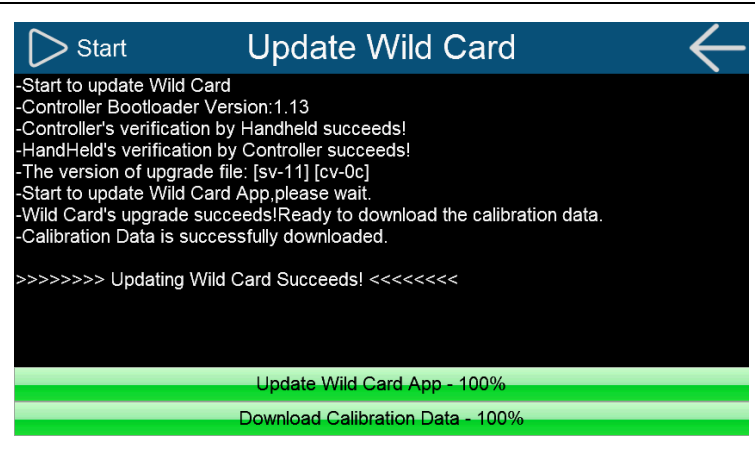
Click "Handheld Upgrade" and follow the prompts to upgrade the Handheld.
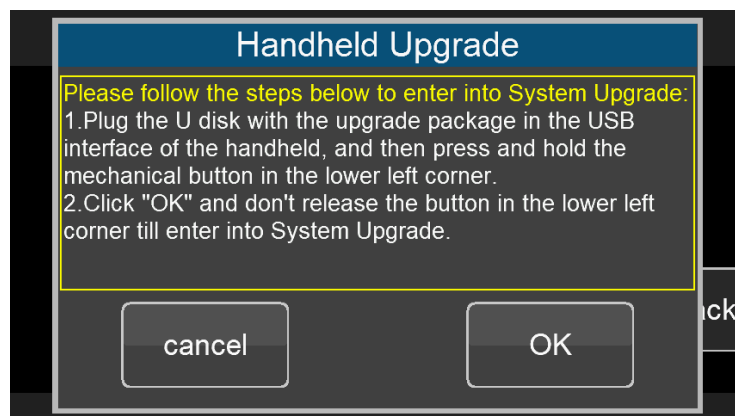
3.9.6 ECU Upgrade
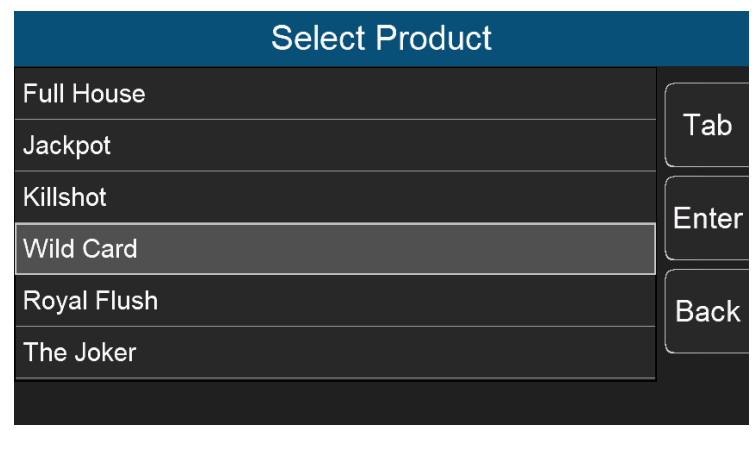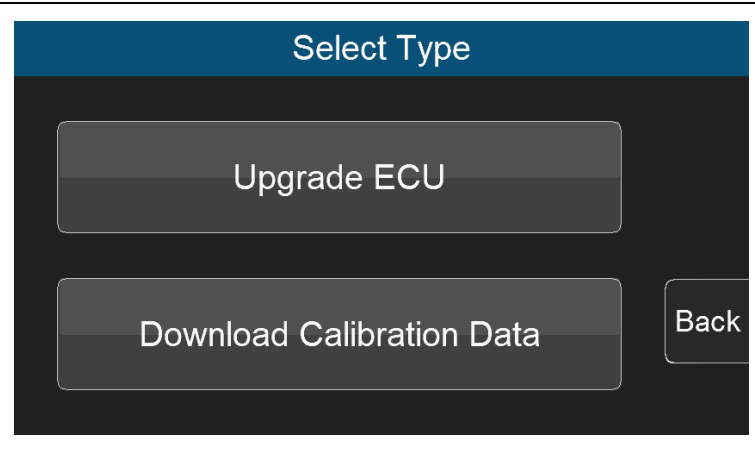
Click the "ECU Upgrade" icon to enter ECU upgrade interface, and the user can select the corresponding product and file to upgrade the system.

Select Product	
Full House	
Jackpot	Tab
Killshot	
Wild Card	Enter
Royal Flush	Back
The Joker	
	Select the Product to be Upgraded
Select Type	
Upgrade ECU	Click" Upgrade ECU"
Download Calibration Data	Back
Select File	
wild_card.aen	Tab
	Enter
	Back
	Select Upgrade File
▷ Start Update Wild Card ←	Click " ▷ "button in the upper left corner or click the mechanical button in the upper left corner to start the upgrade. After the upgrade completes, click" ← " in the upper right corner to return.
Update Wild Card App - 0%	
Download Calibration Data - 0%	
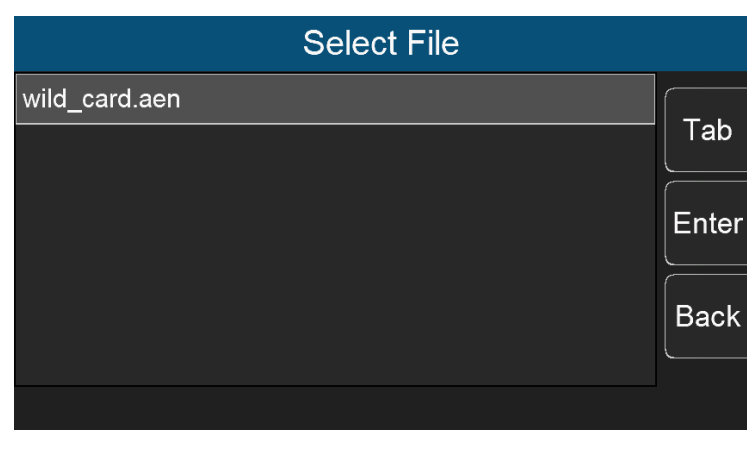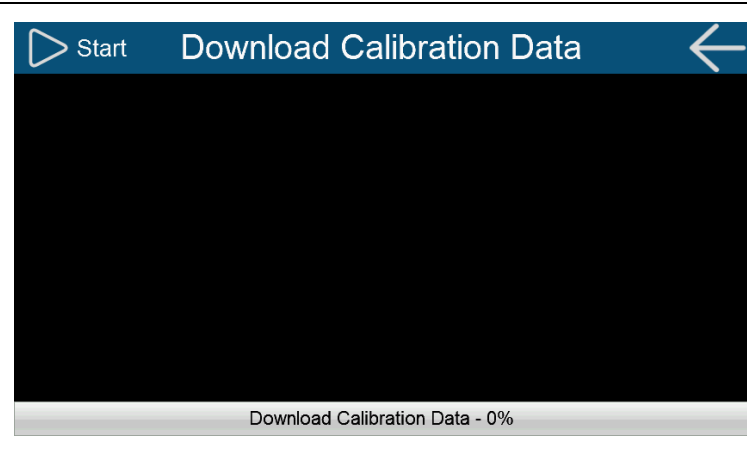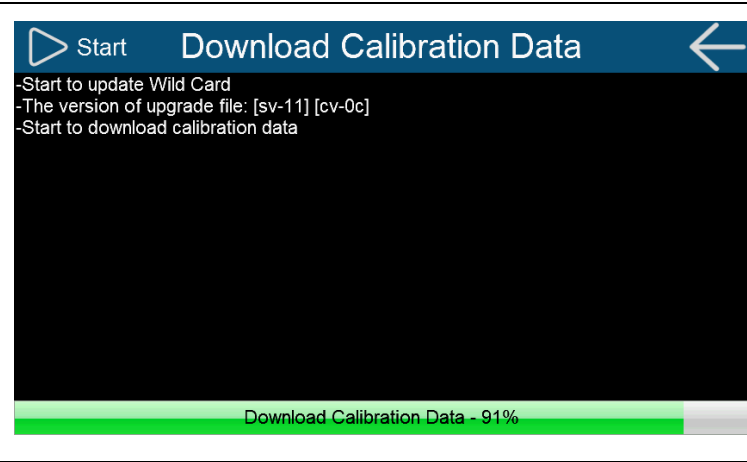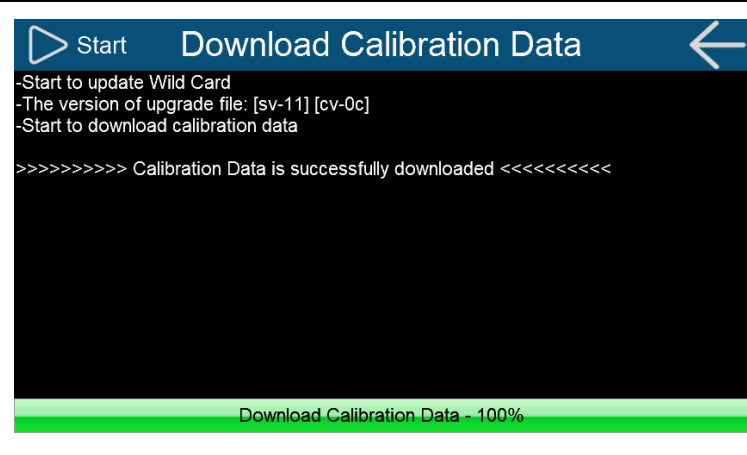
▷ Start **Update Wild Card** ← -Start to update Wild Card -Controller Bootloader Version:1.13 -Controller's verification by Handheld succeeds! -HandHeld's verification by Controller succeeds! -The version of upgrade file: [sv-11] [cv-0c] -Start to update Wild Card App,please wait. Update Wild Card App - 72% Download Calibration Data - 0%	Upgrading the system and downloading the calibration data.
▷ Start **Update Wild Card** ← -Start to update Wild Card -Controller Bootloader Version:1.13 -Controller's verification by Handheld succeeds! -HandHeld's verification by Controller succeeds! -The version of upgrade file: [sv-11] [cv-0c] -Start to update Wild Card App,please wait. -Wild Card's upgrade succeeds!Ready to download the calibration data. -Calibration Data is successfully downloaded. >>>>>>>> Updating Wild Card Succeeds! <<<<<<<< Update Wild Card App - 100% Download Calibration Data - 100%	Upgrade completes.

3.9.7 Download Calibration Data

Click the "ECU Upgrade" icon to enter ECU upgrade interface, and the user can select the corresponding product and file to download the calibration data.

Select Product Full House Jackpot Killshot Wild Card Royal Flush The Joker Tab / Enter / Back	Select the Product to be Upgraded
Select Type Upgrade ECU Download Calibration Data Back	Click "Download Calibration Data"

Select File wild_card.aen Tab Enter Back	Select calibration file for Jackpot
▷ Start **Download Calibration Data** ← Download Calibration Data - 0%	Click "▷"button in the upper left corner or click the mechanical button in the upper left corner to start to download. After downloading completes, click"←" in the upper right corner to return.
▷ Start **Download Calibration Data** ← -Start to update Wild Card -The version of upgrade file: [sv-11] [cv-0c] -Start to download calibration data Download Calibration Data - 91%	Downloading calibration data
▷ Start **Download Calibration Data** ← -Start to update Wild Card -The version of upgrade file: [sv-11] [cv-0c] -Start to download calibration data >>>>>>>>>> Calibration Data is successfully downloaded <<<<<<<<<< Download Calibration Data - 100%	Downloading completes

4.0 System Update

4.1 Handheld Update

There are two ways to update and/or upgrade the handheld:

(1) Copy the Handheld upgrade package into the USB flash drive. Before powering on, plug the USB flash drive into the USB interface of the handheld, press and hold the mechanical button in the lower left corner, and then power on. The system will pop up the upgrade interface when the system detects the upgrade package. At this time, release your hand, and the system will automatically upgrade.

(Note: Do not perform any operation on the handheld before it prompts to unplug the U disk)

(2) Enter the system setting interface, click the "Handheld Upgrade" icon, and follow the prompts to upgrade. First plug the U disk with the upgrade package into the USB interface of the handheld, then press and hold the mechanical button in the lower left corner, and then click "OK". When the system upgrade interface appears, you can release the mechanical button in the lower left corner.

4.2 Version Detection

After powering on the Handheld and entering the system, it will automatically detect and compare the version information of the handheld and the product. If the two versions do not match, the user will be prompted to update the system, otherwise it will not work right.

4.2.1 When ECU version is Low

When ECU version is too low, the user needs to update the ECU, otherwise it cannot work properly. Click "OK" to enter the ECU update interface and click "Cancel" to cancel the update. Users can also go to "Setting"->"ECU Upgrade" to update ECU by themselves.

4.2.2 When Handheld version is Low

When Handheld software Version is too low, the user needs to update the handheld, otherwise it cannot work properly. Click "OK" to enter the handheld update interface and click "Cancel" to cancel the update. Users can also go to the "Setting"->"Handheld Upgrade" interface by themselves and follow the prompts to update the Handheld.

Wild Card

FAN1 FAN2 PUMP

Battery, V	
13.0	

MAP, Psi	
0.0	

TPS, Deg	
0.0	

ECT, F	
0	

IAC Position, Ste	
0	

The software version of handheld is low. Please update it.

5

Cancel   OK

Actual AFR1, A/F	
0.0	

gn Advance, Deg	
0.0	

Inj PW, ms	
0.000	

Fuel Loop1 State	
Open Loop	

Fuel Loop2 State	
Open Loop	

Wild Card Wire Harness AH2013

CIRCUIT FUNCTION	COLOR	CONNECTS TO
AC_IN	ORANGE	PIA-30
TACH OUT	BROWN	PIA-23
FAN2	YELLOW	PIA-13
FAN1	GREEN	PIA-32
RBV	BLUE	PIA-24
	GREY	
VMAIN	RED	PIA-26/27
Nitrous_IN	PURPLE	PIA-21

C1 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	VMAIN	RED	PIA-26/27
B	COIL	BLACK	PIA-10/11

C22 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	AGND	BLACK	PIA-28/29
B	CRANK IN	GREY	PIA-17
C	VMAIN	RED	PIA-26/27

5V POWER   ORANGE   PIA-2

C5 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	5V POWER	ORANGE	PIA-2
B	AGND	BLACK	PIA-1
C	FPS	VIOLET	PIA-31

C6 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	CTS	BLUE	PIA-22
B	AGND	BLACK	PIA-1

PCS EXPANSION (C3)

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	BAT	RED	PIA-9
B	12V Battery+		

PCS EXPANSION (C2)

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	BAT	RED	PIA-9
B	MRD	BLACK	PIA-34
C	BAT	RED	PIA-9
D	VMAIN	RED	PIA-26/27

PCS EXPANSION (C4)

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	VMAIN	RED	PIA-26/27
B	RLY_PUMP	BLACK	PIA-6
C	VMAIN	RED	PIA-26/27
D	PUMP	ORANGE	

CIRCUIT FUNCTION	COLOR	CONNECTS TO
PUMP+	ORANGE	C4-A
12V Battery+	RED	C3-B

CIRCUIT FUNCTION	COLOR	CONNECTS TO
IGNKEY	RED	PIA-8
12V Battery-	BLACK	PIA-28/29

C12 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	APR	WHITE	PIB-20
B	IPN	YELLOW	PIB-9
C	H+	BROWN	PIB-8
D	H+	RED	PIB-4
E	RT	BLACK	PIB-26
F	RE+	ORANGE	PIB-19

C21 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	APR	WHITE	PIA-14
B	IPN	YELLOW	PIA-19
C	H+	BROWN	PIA-18
D	H+	RED	PIA-16
E	RT	BLACK	PIA-12
F	RE+	ORANGE	PIA-4

C8 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	IGNSW	RED	PIA-8
B	GND	BLACK	PIA-7
C	CAN HIGH	WHITE	PIA-5
D	CAN LOW	GREEN	PIA-15

C16 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ7	GREY	PIB-9
B	VMAIN	RED	PIB-11

C15 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ5	GREY	PIB-8
B	VMAIN	RED	PIB-11

C14 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ3	GREY	PIB-26
B	VMAIN	RED	PIB-11

C13 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ1	GREY	PIB-10
B	VMAIN	RED	PIB-11

C10 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	AGND	BLACK	PIB-18
B	IAT	WHITE	PIB-16
C	SSV	RED	PIB-24
D	MAP	BLUE	PIB-23

C11 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	AGND	BLACK	PIB-25
B	SSV	RED	PIB-24
C	TPS	BROWN	PIB-22

C9 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	OUTA	PURPLE	PIB-12
B	OUTB	GREEN	PIB-6
C	OUTC	BLUE	PIB-13
D	OUTD	YELLOW	PIB-7

C17 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ8	GREY	PIB-3
B	VMAIN	RED	PIB-17

C18 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ6	GREY	PIB-19
B	VMAIN	RED	PIB-17

C19 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ4	GREY	PIB-1
B	VMAIN	RED	PIB-17

C20 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ2	GREY	PIB-2
B	VMAIN	RED	PIB-17

Name	WILD CARD(AH2013)	NO.	AH2013	REV.	1.1
Design	Tom	Drawn	Kevin		
Check	Ike	Review	Tom	UNIT	IN
APR	Tom	Date	2022/1/14	Page	1/1

ACES Fuel Injection

C7

C12

SENSOR

A	B	C	D	E	F	G	H	J	K
B	B	B	B	B	B	B	B	B	B
12	6	13	7	18	16	23	25	22	24

WBO1

B	B	B	B	B	B
21	15	5	4	20	14
A	B	C	D	E	F
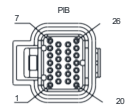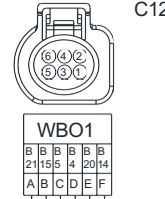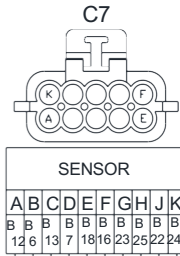
PIB/C PCS EXPANSION

QTY	DESCRIPTION	PIN	NOTES
1	CONNECTOR	DJ7262-1.2-21J	
2	PINS		20AWG

PIB 7 26 / 1 20

PIN	AWG	COLOUR	
1	20	GREY	INU6
2	20	GREY	INU8
3	20	GREY	INU2
4	20	RED	VMAIN
5	20	BROWN	HT1
6	20	GREEN	OUTB
7	20	YELLOW	OUTD
8	20	GREY	INU5
9	20	GREY	INU7
10	20	GREY	INU1
11	20	RED	VMAIN
12	20	PURPLE	OUTA
13	20	BLUE	OUTC
14	20	ORANGE	
15	20	YELLOW	
16	20	WHITE	IAT
17	20	RED	VMAIN
18	20	BLACK	AGND
19	20	GREY	INU4
20	20	BLACK	RT1
21	20	WHITE	APE1
22	20	WHITE	TPS
23	20	BROWN	MAP
24	20	BLUE	SSV
25	20	RED	AGND
26	20	GREY	INU3

A B10 IN/1 / B B11 — C13
A B26 IN/3 / B B11 — C14
A B8 IN/5 / B B11 — C15
A B9 IN/7 / B B11 — C16
A B3 IN/2 / B B17 — C17
A B19 IN/4 / B B17 — C18
A B1 IN/6 / B B17 — C19
A B2 IN/8 / B B17 — C20

C12 PCS EXPANSION

QTY	DESCRIPTION	PIN	NOTES
1	CONNECTOR	DJ7064B-1.5-21	
2	PINS		20AWG

C13-C20 PCS EXPANSION

QTY	DESCRIPTION	PIN	NOTES
1	CONNECTOR	DJ7028-1.5-21	
2	PINS		20AWG

PIA 9 34 / 1 26

PIN	AWG	COLOUR	
1	20	BLACK	AGND
2	20	ORANGE	SSV
3	20	WHITE	APE2
4	20	ORANGE	RE2>
5	20	ORANGE	HT2
6	20	BROWN	RLY_PUMP
7	20	BLACK	CANH
8	20	WHITE	IGNSW
9	20	RED	BAT
10	20	BLACK	COIL-
11	20	BLACK	COIL-
12	20	BLACK	RT2
13	20	YELLOW	FAN2
14	20	YELLOW	IPN2
15	20	GREEN	CANL
16	20		CANRK_IN
17	20	GREY	CANRK_IN
18	20	RED	VMAIN
19	20	BLACK	GND
20	20		
21	20	PURPLE	Nitrous_IN
22	20	BLUE	CTS
23	20	BROWN	TACHOUT
24	20	BLUE	ACFAN
25	20		
26	20	RED	VMAIN
27	20	RED	VMAIN
28	20	BLACK	GND
29	20	BLACK	GND
30	20	ORANGE	AC_IN
31	20	VIOLET	FPS
32	20	GREEN	FAN1
33	20		
34	20	BLACK	MRD

PIA PCS EXPANSION

QTY	DESCRIPTION	PIN	NOTES
1	CONNECTOR	DJ7342-1.2-21J	
2	PINS		20AWG

COIL
B A10/11 (25AWG)
A A20/27 (14AWG)

C1
A / B

TACH INPUT/COIL-

IGNKEY

VMAIN(14AWG)

12Vbattery-(14AWG)

12Vbattery+(14AWG) PUMP(16AWG)
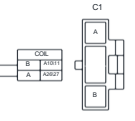
C1 PCS EXPANSION

QTY	DESCRIPTION	PIN	NOTES
1	CONNECTOR	DJ7033YA-3.5-21	
2	PINS		14AWG

C2/4 PCS EXPANSION

QTY	DESCRIPTION	PIN	NOTES
1	CONNECTOR	DJ7057Y-6.5-21J	
2	PINS		14AWG

C3 PCS EXPANSION

QTY	DESCRIPTION	PIN	NOTES
1	CONNECTOR	DJ70232Y-6.3-21J	
2	PINS		14AWG

C5 PCS EXPANSION

QTY	DESCRIPTION	PIN	NOTES
1	CONNECTOR	DJ7034YA-1.5-21J	
2	PINS		20AWG

C6 PCS EXPANSION

QTY	DESCRIPTION	PIN	NOTES
1	CONNECTOR	DJ7022YB-1.5-21J	
2	PINS		20AWG

C7 PCS EXPANSION

QTY	DESCRIPTION	PIN	NOTES
1	CONNECTOR	HD101Y-1.5-21	
2	PINS		14AWG

C8 PCS EXPANSION

QTY	DESCRIPTION	PIN	NOTES
1	CONNECTOR	JST04R-JWPF-VSLE	
2	PINS		20AWG

C22 PCS EXPANSION

QTY	DESCRIPTION	PIN	NOTES
1	CONNECTOR	DJ3031-2.5-21	
2	PINS		18AWG

AC_IN TACHOUT FAN2 REV FAN1 Nitrous_IN

DIST MAIN RELAY FUSE PUMP RELAY FUEL CTS WBO2 C21 C8

C22 C2 C3 C4 C5 C6

Name	WILD CARD(AH2013)		NO.	HK_WILD CARD_001	REV.	1.2
Design	Tom	Drawn	Kevin	UNIT	IN	Page	1/1
Check	Ike	Review	Tom			
APR	Tom	Date	2022/08/18			

ACES Fuel Injection

CIRCUIT FUNCTION	COLOR	CONNECTS TO
AC_IN	ORANGE	P1A-30
TACH OUT	BROWN	P1A-25
FAN2	YELLOW	P1A-13
FAN1	GREEN	P1A-32
REV	BLUE	P1A-26
Tach INPUT/COIL-	GREY	P1A-17
VMAIN	RED	P1A-26/27
Nitrous_IN	PURPLE	P1A-21

C1 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	VMAIN	RED	P1A-26/27
B	COIL-	BLACK	P1A-10/11

C22 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	AGND	BLACK	P1A-28/29
B	CRANK IN	GREY	P1A-17
C	VMAIN	RED	P1A-26/27

C16 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ7	GREY	P1B-9
B	VMAIN	RED	P1B-11

C15 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ5	GREY	P1B-8
B	VMAIN	RED	P1B-11

C14 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ3	GREY	P1B-26
B	VMAIN	RED	P1B-11

C13 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ1	GREY	P1B-10
B	VMAIN	RED	P1B-11

PCS EXPANSION (C3)

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	BAT	RED	P1A-9
B	12V Battery+	RED	P1A-9

PCS EXPANSION (C2)

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	BAT	RED	P1A-9
B	MRD	BLACK	P1A-34
C	BAT	RED	P1A-9
D	VMAIN	RED	P1A-26/27

PCS EXPANSION (C4)

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	VMAIN	RED	P1A-26/27
B	FLT_PUMP+	BLACK	P1A-6
C	VMAIN	RED	P1A-26/27
D	PUMP+	ORANGE	

C5 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	5V POWER	ORANGE	P1A-2
B	AGND	BLACK	P1A-1
C	FPS	VIOLET	P1A-31

C6 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	CTS	BLUE	P1A-22
B	AGND	BLACK	P1A-1

C12 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	APS	WHITE	P1B-20
B	IPN	YELLOW	P1B-19
C	H+	BROWN	P1B-5
D	H+	RED	P1B-4
E	RT	BLACK	P1B-35
F	RE+	ORANGE	P1B-16

C12 PCS EXPANSION (C21)

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	APS	WHITE	P1A-3
B	IPN	YELLOW	P1A-19
C	SL	BROWN	P1A-5
D	H+	RED	P1A-18
E	RT	BLACK	P1A-13
F	RE+	ORANGE	P1A-4

C17 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ2	GREY	P1B-3
B	VMAIN	RED	P1B-17

C18 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ4	GREY	P1B-19
B	VMAIN	RED	P1B-17

C19 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ6	GREY	P1B-1
B	VMAIN	RED	P1B-17

C20 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	INJ8	GREY	P1B-2
B	VMAIN	RED	P1B-17

C7 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	OUT3	PURPLE	P1B-8
B	OUT4	GREEN	P1B-6
C	OUT2	BLUE	P1B-15
D	OUT0	YELLOW	P1B-7
E	AGND	BLACK	P1B-16
F	IAT	WHITE	P1B-36
G	MAP	BLUE	P1B-25
H	AGND	BLACK	P1B-16
I	TPS	BROWN	P1B-35
J	5V	RED	P1B-34

CIRCUIT FUNCTION (PUMP+)

CIRCUIT FUNCTION	COLOR	CONNECTS TO
PUMP+	ORANGE	C4-4
12V Battery+	RED	C3-B

CIRCUIT FUNCTION (IGNKEY)

CIRCUIT FUNCTION	COLOR	CONNECTS TO
IGNKEY	RED	P1A-8
12V Battery-	BLACK	P1A-28/29

C8 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	IGNSW	RED	P1A-8
B	GND	BLACK	P1A-19
C	CAN HIGH	WHITE	P1A-7
D	CAN LOW	GREEN	P1A-16

Name	WILD CARD(AH2013)	
NO.	HK_WILD CARD_002	REV. 1.2
Design	Tom	Drawn	Kevin
UNIT	IN	Page	1/1
Check	Ike	Review	Tom
APR	Tom	Date	2022/08/18

ACES Fuel Injection

B1 PCS EXPANSION			
QTY	DESCRIPTION	PN	NOTES
1	CONNECTOR	HD044YB-1.5-21	
2	PINS		20AWG

B2 PCS EXPANSION			
QTY	DESCRIPTION	PN	NOTES
1	CONNECTOR	HD038Y-1.5-21	
2	PINS		20AWG

B3 PCS EXPANSION			
QTY	DESCRIPTION	PN	NOTES
1	CONNECTOR	HD023YA-1.5-21	
2	PINS		20AWG

B4 PCS EXPANSION			
QTY	DESCRIPTION	PN	NOTES
1	CONNECTOR	HD034YA-1.5-21	
2	PINS		20AWG

A1 PCS EXPANSION			
QTY	DESCRIPTION	PN	NOTES
1	CONNECTOR	HD101Y-1.5-11	
2	PINS		20AWG

B1

IAC

B12	B6	B13	B7
A	B	C	D

B3

IAT

B18	B16
A	B

B2

MAP

B18	B23	B24
A	B	C

B4

TPS

B24	B25	B22
A	B	C

A1
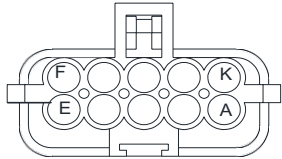
PIN	AWG	CLOUR	
K	20	RED	S5V
J	20	BROWN	TPS
H	20	BLACK	AGND
G	20	BLUE	MAP
F	20	WHITE	IAT
E	20	BLACK	AGND
D	20	YELLOW	OUTD
C	20	BLUE	OUTC
B	20	GREEN	OUTB
A	20	PURPLE	OUTA
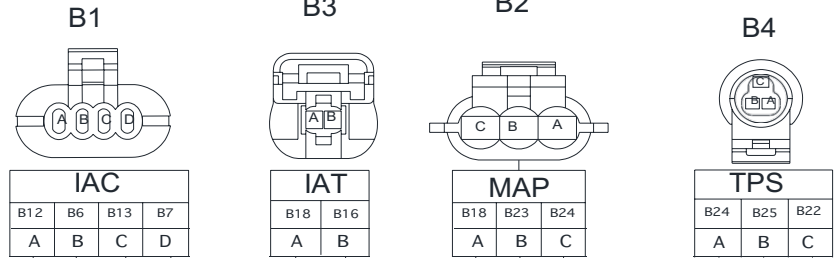
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Design	Tom	Drawn	Kevin	UNIT	IN	Page	1/1
Check	Ike	Review	Tom		ACES Fuel Injection		
APR	Tom	Date	2022/04/22				
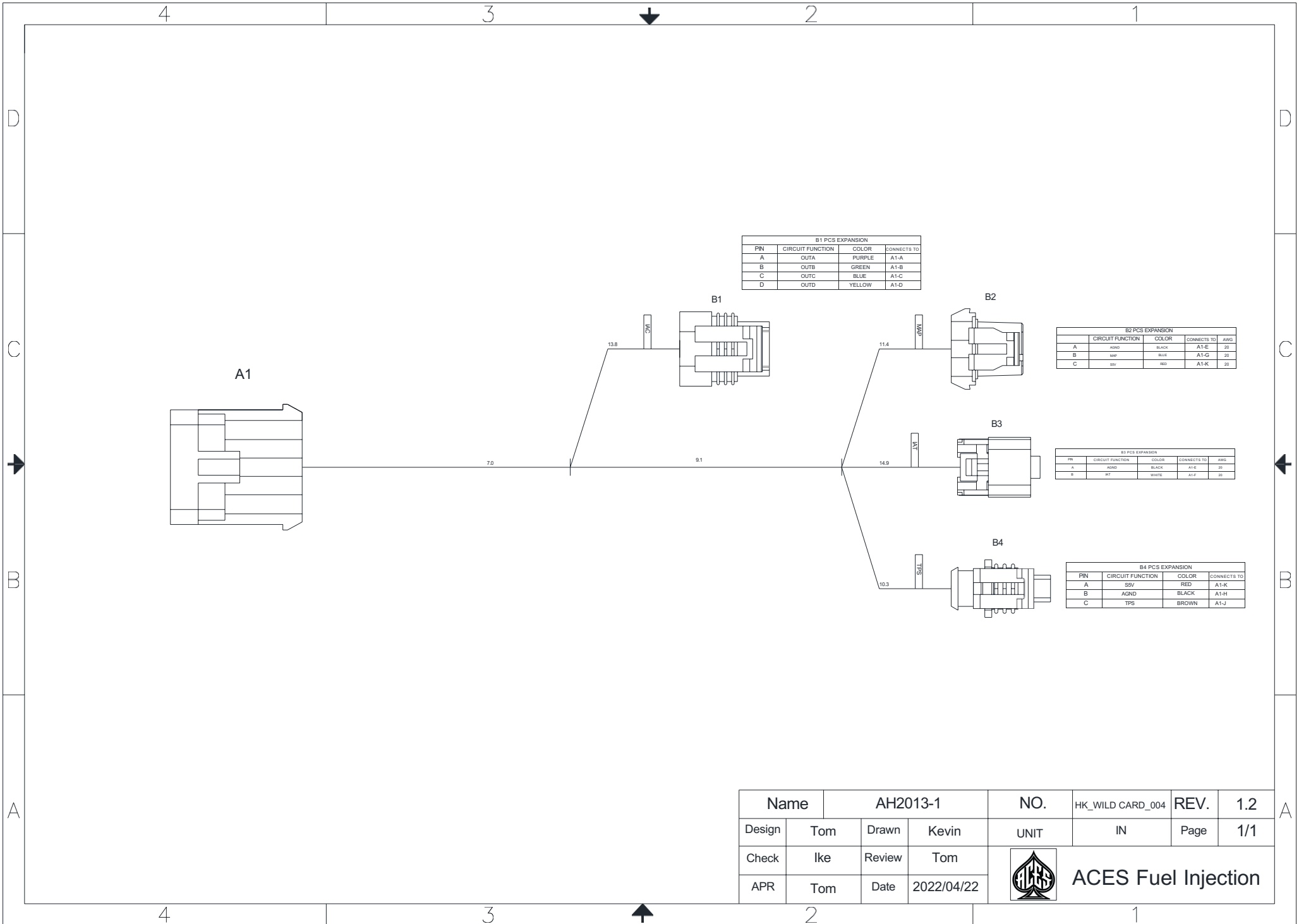
B1 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	OUTA	PURPLE	A1-A
B	OUTB	GREEN	A1-B
C	OUTC	BLUE	A1-C
D	OUTD	YELLOW	A1-D

B2 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO	AWG
A	AGND	BLACK	A1-E	20
B	MAP	BLUE	A1-G	20
C	SSV	RED	A1-K	20

B3 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO	AWG
A	AGND	BLACK	A1-E	20
B	IAT	WHITE	A1-F	20

B4 PCS EXPANSION

PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	SSV	RED	A1-K
B	AGND	BLACK	A1-H
C	TPS	BROWN	A1-J

A1

B1

B2

B3

B4

IAC

MAP

IAT

TPS

13.8

11.4

14.9

10.3

7.0

9.1

Name		AH2013-1		NO.	HK_WILD CARD_004	REV.	1.2
Design	Tom	Drawn	Kevin	UNIT	IN	Page	1/1
Check	Ike	Review	Tom				
APR	Tom	Date	2022/04/22		ACES Fuel Injection		

B1 PCS EXPANSION

QTY	DESCRIPTION	P\N	NOTES
1	CONNECTOR	HD044YB-1.5-21	
2	PINS		20AWG

B2 PCS EXPANSION

QTY	DESCRIPTION	P\N	NOTES
1	CONNECTOR	DJ7046A-3.5-21	
2	PINS		20AWG

B3 PCS EXPANSION

QTY	DESCRIPTION	P\N	NOTES
1	CONNECTOR	HD034YA-1.5-21	
2	PINS		20AWG

A2 PCS EXPANSION

QTY	DESCRIPTION	P\N	NOTES
1	CONNECTOR	HD101Y-1.5-11	
2	PINS		20AWG

B1 — IAC

B12	B6	B13	B7
A	B	C	D

B2 — TMAP

B18	B16	B24	B23
A	B	C	D

B3 — TPS

B25	B24	B22
A	B	C

A2

PIN	AWG	CLOUR	
K	18	RED	S5V
J	18	BROWN	TPS
H	20	BLACK	AGND
G	20	BLUE	MAP
F	20	WHITE	IAT
E	20	BLACK	AGND
D	20	YELLOW	OUTD
C	20	BLUE	OUTC
B	20	GREEN	OUTB
A	20	PURPLE	OUTA
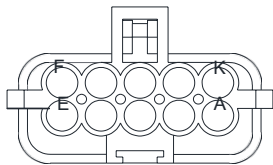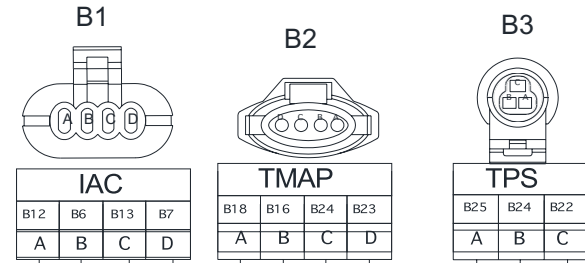
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Design	Tom	Drawn	Kevin	UNIT	IN	Page	1/1
Check	Ike	Review	Tom			
APR	Tom	Date	2022/04/22		ACES Fuel Injection	

A2

B2

B2 PCS EXPANSION			
PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	AGND	BLACK	A2-E
B	IAT	WHITE	A2-F
C	SSV	RED	A2-K
D	MAP	BLUE	A2-G

TMAP

15.7

B1

14.6

19.6

IAC

B1 PCS EXPANSION			
PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	OUTA	PURPLE	A2-A
B	OUTB	GREEN	A2-B
C	OUTC	BLUE	A2-C
D	OUTD	YELLOW	A2-D

B3

19.6

TPS

B3 PCS EXPANSION			
PIN	CIRCUIT FUNCTION	COLOR	CONNECTS TO
A	SSV	RED	A2-K
B	AGND	BLACK	A2-H
C	TPS	BROWN	A2-J

Name		AH2013-2		NO.	HK_WILD CARD_006	REV.	1.2
Design	Tom	Drawn	Kevin	UNIT	IN	Page	1/1
Check	Ike	Review	Tom				
APR	Tom	Date	2022/04/22		ACES Fuel Injection		

ACES FUEL INJECTION TECHNICAL SUPPORT

1441 Market Street

Dayton, TN 37321

(423)590-2237

www.acesefi.com

Wild Card™ MPFI FUEL INJECTION SYSTEM

TUNING REFERENCE MANUAL

The WILD CARD ™ 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.
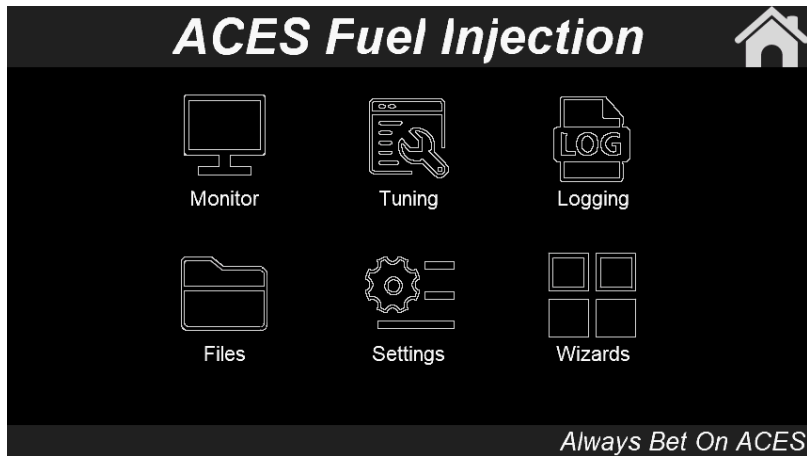
1.0 Sensor
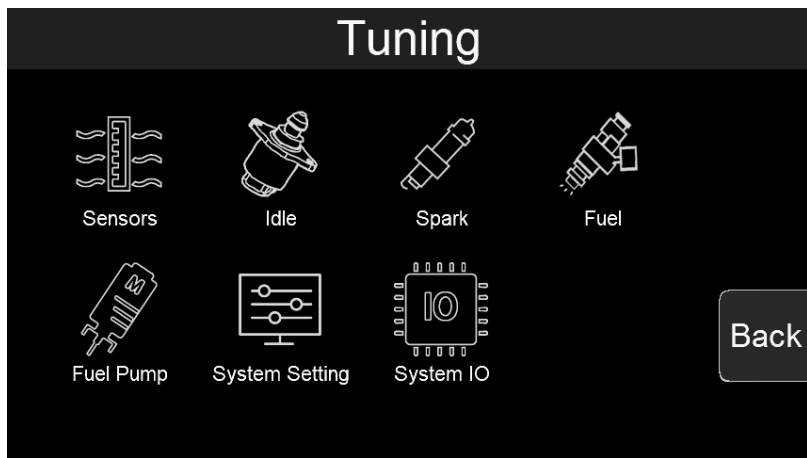
Tuning Screen

1.1 Basic Sensor Parameter

MAP Linearity Coef A

MAP Linearity Coef B

The MAP sensor sends a varying 0-5 volt signal to the ECU based on the vacuum/pressure the sensor is exposed to. The MAP Calibration table tells the ECU how to relate the voltage level with vacuum/pressure. MAP sensors typically have linear calibrations.
ACES Wild Card™ EFI system SBC kits include 4 barrel throttle body with a MAP sensor, the default setting of MAP sensor

is ACES TMAP sensor AE1032,MAP sensor calibration type allow you change custom MAP sensor, edit the value of pressure vs different voltage. Information on MAP sensor calibration should be available from the sensor's manufacturer.
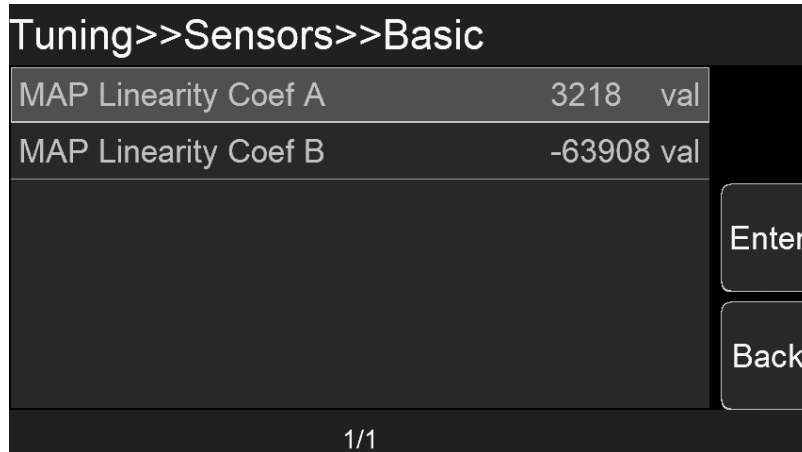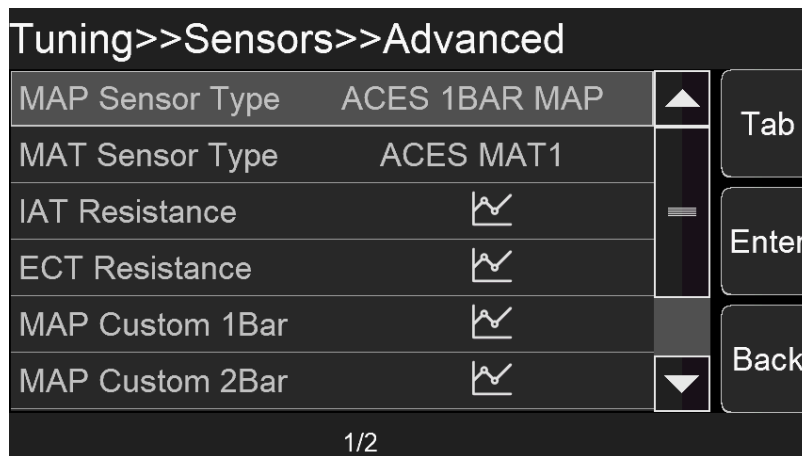

Basic Sensor Parameter

## 1.2 Advanced Sensor Parameter

MAP Sensor Type

ACES Wild Card™ EFI Provide several different MAP sensor setting for you choose, The default setting of system with 4 barrel throttle body system is GM1 bar MAP.

MAP sensor calibration type allow you change custom MAP sensor, edit the value of pressure vs different voltage. Information on MAP sensor calibration should be available from the sensor's manufacturer.

Temperature Sensors calibration

ACES Wild Card™ EFI Provide several different MAT sensor setting for you choose, The default setting of system with 4 barrel throttle body system is GM Delphi MAT.

MAT sensor calibration type allow you change custom MAT sensor, edit the value of temperature vs different resistance. Information on temperature sensor calibration should be available from the sensor's manufacturer.

2.0 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.
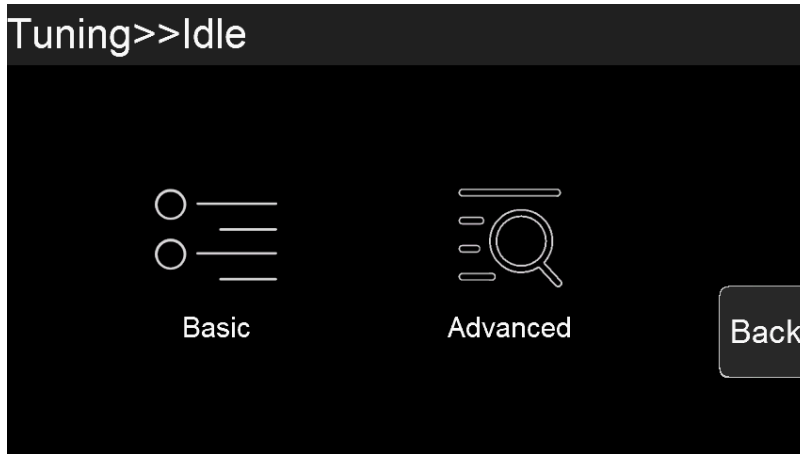
Idle Screen

2.1 Basic Idle Parameter

Basic Idle Screen

Hot Idle Speed
This is the target RPM that will be enable at coolant temperatures above 160℉

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.

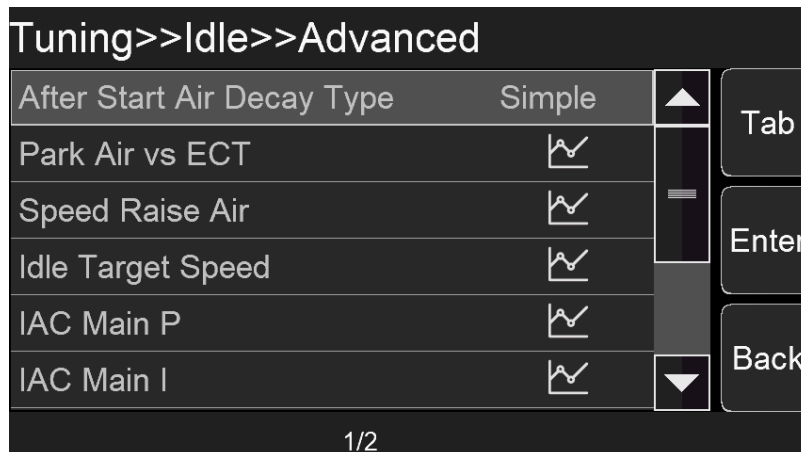**Push above idle Max RPM** -- Max threshold RPM to get in to push states

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.

2.2 Advanced Idle Parameter

Tuning>>Idle>>Advanced

After Start Air Decay Type	Simple
Park Air vs ECT	〰
Speed Raise Air	〰
Idle Target Speed	〰
IAC Main P	〰
IAC Main I	〰

Tab

Enter

Back

1/2

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

3.0 SPARK

3.1 Basic Spark Parameter

Tuning>>Spark>>Basic

Cranking Ignition Timing	15.0	Deg
Idle Ignition Timing	15.0	Deg
Cruise Ignition Timing	37.0	Deg
WOT Ignition Timing	32.0	Deg
Static Timing	14.0	Deg
Ign Advance Min	-43.0	Deg

Tab

Enter

Back

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 Wild Card   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 12 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.

Timing Offset
Use this value to retard or advance the timing or sync timing at higher RPMs. These values are sett to 0 in the base calibrations. Some ignition modules may need this number altered if the commanded timing does not match the commanded timing as engine speed increases. If the timing starts to retard as rpm increases, this number can be increased in order for the timing to match.

Engine Max RPM
Max RPM of engine, Rev limiter is spark control.

Il-**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 WILD CARD dwell ignition coil, Wild Card   drive the ACES high performance ignition coil AC2008 has 90mj spark energy with 3ms dwell time
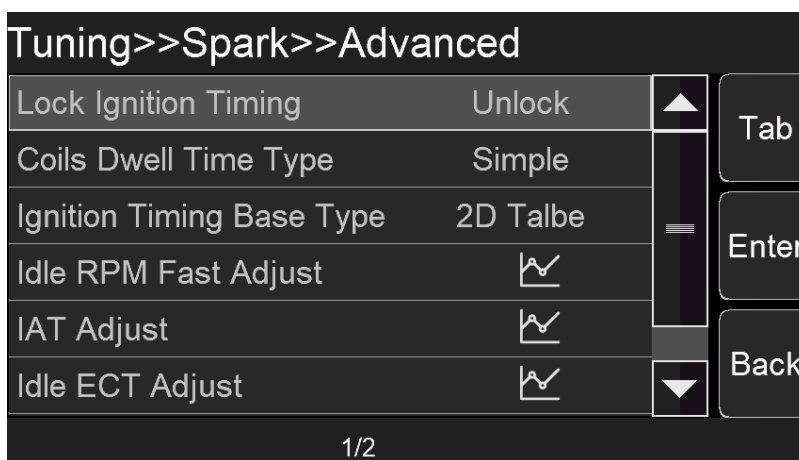
3.2 Advanced Spark Parameter

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 Wild Card control timing.

Coil Dwell Time Type

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

Tuning>>Spark>>Advanced		
Lock Ignition Timing	Unlock	Tab
Coils Dwell Time Type	Simple	
Ignition Timing Base Type	2D Talbe	Enter
Idle RPM Fast Adjust	〰	
IAT Adjust	〰	
Idle ECT Adjust	〰	Back
1/2		

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.

4.0 FUEL

4.1 Basic Fuel Parameter

Tuning>>Fuel>>Basic			
Idle AFR	13.7	A/F	▲
Cruise AFR	14.7	A/F	Tab
WOT AFR	12.0	A/F	
Fuel Loop Min ECT	86	F	Enter
Fuel Learn Min ECT	185	F	
Clear Flood TPS	65.0	Deg	▼ Back
1/3			

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.

Cylinder 1-8 Correction

Fuel correction of each cylinder is multiplying fuel PW. The Simple option is a value multiplying fuel PW for each cylinder at whole engine operation. Another option is 3D table for setting fuel percent vs MAP and RPM. This table should be adjusted on the engine dyno or chassic dyno, it is better to have a lambda meter installed into each exhaust runner to monitor lambda.

4.2 Advanced Fuel Parameter
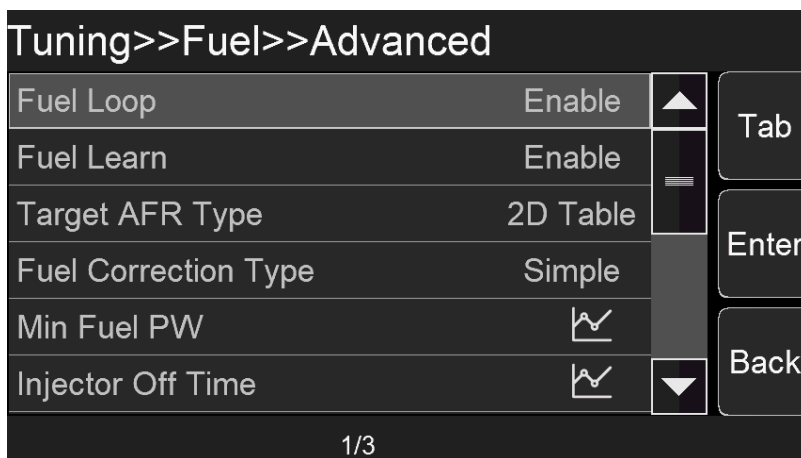
Advanced Fuel Screen

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 Correction Type

The Simple option is a value multiplying fuel PW for each cylinder at whole engine operation. Another option is 2D table for setting fuel percent vs MAP and RPM.

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

Ads 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 film 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 film 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.

5.0 Fuel Pump

5.1 Turn Off RPM

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

5.2 Key On Pump Hold Time

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

5.3 Turn Off After Lose RPM

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

6.0 System Setting

6.1 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 WILD CARD is 8 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.

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.
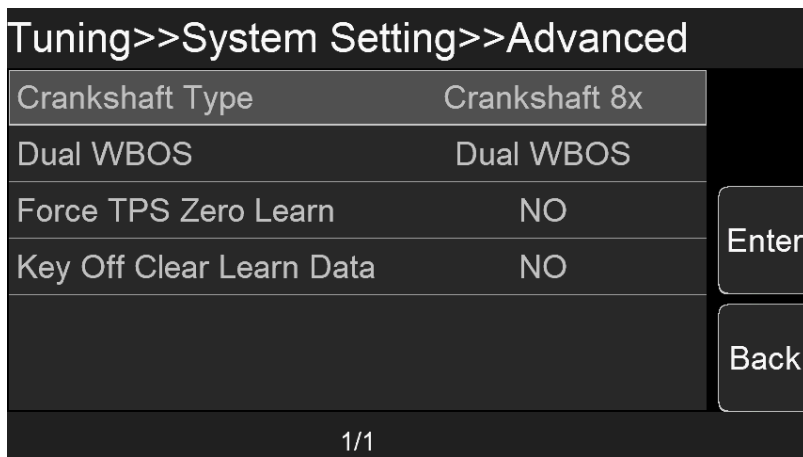
Firing Order

Set your engine firing order for Wild Card™ ECU, ECU needs firing order to make sequential injection to match each other, correct setting is important to let engine work well properly, otherwise poor performance or engine damaged.

The default setting of firing order is 1-8-4-3-6-5-7-2.

Hot Idle Speed

Set idle speed of warm engine.

6.2 Advanced System setting

Crankshaft Type	Crankshaft 8x	
Dual WBOS	Dual WBOS	
Force TPS Zero Learn	NO	Enter
Key Off Clear Learn Data	NO	
		Back

1/1

Advanced System Setting Screen

Crankshaft Type

Select your engine Crankshaft RPM signal type, The ACES Gambler distributor has 8x reluctor wheel which is 7 long teeth and one short tooth indicated cylinder1.

Dual WBOS

Select Dual WBOS for your WILD CARD 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.

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.

7.0 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).

Tuning>>System IO>>Basic		
Fan1 On ECT	194F	
Fan2 On ECT	199F	Tab
Fan1 Off ECT	192F	
Fan2 Off ECT	194F	Enter
Fan1 On Delay Time	0.3 s	
Fan2 On Delay Time	0.5 s	Back
1/2		

System IO Screen