Overview

- The eDist allows the use of multiple ignition coils with a spark management system designed to run only one coil.
- The eDist can be configured to operate on engines with one coil per cylinder or on engines with waste-spark ignitions (one coil for two cylinders).
- The eDist distributes pulses within conventional ignition control signals to multiple ignition coils, much as a mechanical distributor's rotor distributes spark from one ignition coil to multiple spark plugs.
- A cam sensor signal to the eDist is necessary for operation. This signal ensures that appropriate cylinders are fired at the proper time. The signal should consist of a single pulse every two rotations of the crankshaft. A hall-effect or inductive pickup cam sensor may be used. If you are already using a FAST ECU and a cam sensor is being used, the cam signal may be shared between the eDist and the ECU.
- eDist part number 30-5000 for use with OEM ignition coils*
- eDist part number 30-5001 for use with GM "Smart Coils" such as those used on the Chevrolet LS1
- In high horsepower applications, eDist part number 30-5000 can be used in conjunction with an aftermarket multi-channel ignition system.

**Compatible with ignition coils with a primary resistance of higher than 1 ohm. See "coil outputs" section for additional information.*

Installation

- Mount the eDist inside the car if possible. The enclosure and connector are not water resistant.
- The supplied wiring harness comes with 48 inches of unterminated wire for attachment to ignition coils, engine sensors, etc. It is advisable to select a mounting location that will allow all connections to be made with the supplied wiring.
- Mount the eDist so that the end panels are easily accessible. There are configuration switches and status LEDs behind the panel on the opposite end of the connector that you will need to access.

Wiring

EST/Points control signal (white)
Connect the ignition control signal wire to pin C2. It is advisable to connect pin D2 of the eDist to the same ground point used by the ignition system. This will help minimize problems due to electrical noise caused by poor grounds.

Cam Signal (1 red, 1 black)
If you are using an inductive pickup cam sensor: connect the positive lead of the sensor to pin C3 with the red wire, and connect the negative lead to D3 with the black wire.
If you are using a discrete-type / hall-effect cam sensor: connect the signal wire from the sensor to pin D4 with the red wire. Connect pin D4 of the eDist to the ground lead of the hall-effect cam sensor with the black wire. You must provide a switched +12 volt source to the power lead of this sensor.

Grounds
Connect pins C5, D9, and C10 directly to the negative battery terminal. You may need to extend the wiring on the supplied harness to make this connection. Connect pins D14, D15, and D16 to the chassis or engine block.

Tachometer output (light green)
Pin C15 can be connected to an aftermarket, electronically driven tachometer. This should work with most factory tachometers as well.

Switched ignition (pink)
Connect pin C16 to a switched +12V power source through a 2 amp fuse.

EST outputs (see pinout chart for wire colors)
The EST outputs are available on both eDist part numbers 30-5000 and 30-5001. The EST outputs are designed to be compatible with coils using built-in coil drivers, such as the GM “smart coils” (used on the Chevrolet LS1 engine, for example.) Compatibility with other types of smart coils is undetermined at this time but any other “smart coil” with a 0-5V logic (active high dwell) control signal should be compatible. The order in which these outputs are wired varies with an engine’s firing order and cam sensor timing. This is described in the “wiring the outputs” section of this manual.

Coil outputs (see pinout chart for wire colors)
The coil outputs are only available on eDist part number 30-5000 and are not available with eDist part number 30-5001. These outputs can fire a coil directly by connecting them to the negative side of an ignition coil. The order in which these outputs are wired varies with an engine’s firing order and cam sensor timing. This is described in the “wiring the outputs” section of this manual.

The drive capabilities of the coil outputs are not infinite and some ignition coils may present a challenge for heat dissipation and drive capacity. Generally, a coil with a primary resistance of 1 ohm or higher can be safely fired directly from the eDist. If you are using coils with a primary resistance of lower than 1 ohm, it is advisable to connect the eDist outputs to the inputs of a multi-channel ignition system and use that to fire the coils.

PINOUT

Pin #	Description	Connect to	Pin #	Description	Connect to
C1	N/A	Not used	D1	N/A	Not used
C2	EST/Points Input Signal (White)	Points control or EST signal wire from engine management system	D2	EST/Points Ground/Ref. Low	Ignition system ground
C3	Inductive+ Cam Input (Red)	Positive lead of inductive cam sensor (if used)	D3	Inductive- Cam Input (Black)	Negative lead of inductive cam sensor (if used)
C4	Discrete+ Cam Input (Brown)	Signal wire of hall-effect cam sensor (if used)	D4	Discrete- Cam Input	Ground wire of hall-effect cam sensor (if used)
C5	AGND (Analog Ground)	Negative battery terminal	D5	EST-A (LS1 Cyl. #2 – Red/White)	*See operation section*
C6	EST-B (LS1 Cyl. #6 – Blue/White)	*See operation section*	D6	EST-C (LS1 Cyl. #5 – Green)	*See operation section*
C7	EST-D (LS1 Cyl. #4 – Green/White)	*See operation section*	D7	EST-E (LS1 Cyl. #3 – Blue)	*See operation section*
C8	EST-F (LS1 Cyl. #1 – Violet)	*See operation section*	D8	EST-G (LS1 Cyl. #8 – Violet/White)	*See operation section*
C9	EST-H (LS1 Cyl. #7 – Red)	*See operation section*	D9	AGND (Analog Ground)	Negative battery terminal
C10	AGND (Analog Ground)	Negative battery terminal	D10	Coil- Output A (Red/White)	*See operation section*
C11	Coil- Output B (Red)	*See operation section*	D11	Coil- Output C (Blue/White)	*See operation section*
C12	Coil- Output D (Blue)	*See operation section*	D12	Coil- Output E (Green/White)	*See operation section*
C13	Coil- Output F (Green)	*See operation section*	D13	Coil- Output G (Purple/White)	*See operation section*
C14	Coil- Output H (Purple)	*See operation section*	D14	PGND (Power Ground) (Block)	Engine block or chassis
C15	Tach Output (Light Green)	Signal input on tachometer	D15	PGND (Power Ground) (Block)	Engine block or chassis
C16	Switched Ignition +12VDC (Pink)	Switched +12VDC source	D16	PGND (Power Ground) (Block)	Engine block or chassis

*Shaded areas denote typical connections for LS-1 applications

Cam sensor installation

- The purpose of the cam sensor is to tell the eDist where in the firing order to start counting. This helps to ensure that spark will occur in the appropriate cylinder at the appropriate time.
- The cam sensor used with the eDist may be an inductive pickup or discrete-type / hall-effect sensor. The eDist is compatible with either type.
- The cam signal should consist of a single pulse every 2 revolutions of the crankshaft.
- The normal range of ignition timing values is 10 to 45 degrees BTDC, typically. The cam signal should be timed so that the cam pulse does not occur within 10 degrees of this range. If the cam sensor signal is received within this range, the eDist may not be able to properly discern the correct cylinder in the firing order.

Crank reference signal

The eDist requires a spark signal that has been generated by an engine management system or other ignition control system as a spark dwell signal. The eDist cannot change the ignition timing, so the incoming dwell control signal must already be properly timed. The signal should consist of a single pulse per cylinder. The pulse may be a 0-12 volt pulse or a 0-5 volt pulse, and it may have either an active high or active low dwell state.

Wiring the outputs

Because firing orders and cam sensor trigger positions vary, the order in which the outputs of the eDist are wired to the engine will also vary. The following examples demonstrate how to determine the proper output wiring of the eDist in your application. All you need to know is your firing order and where the cam reference pulse occurs relative to TDC of cylinder #1.

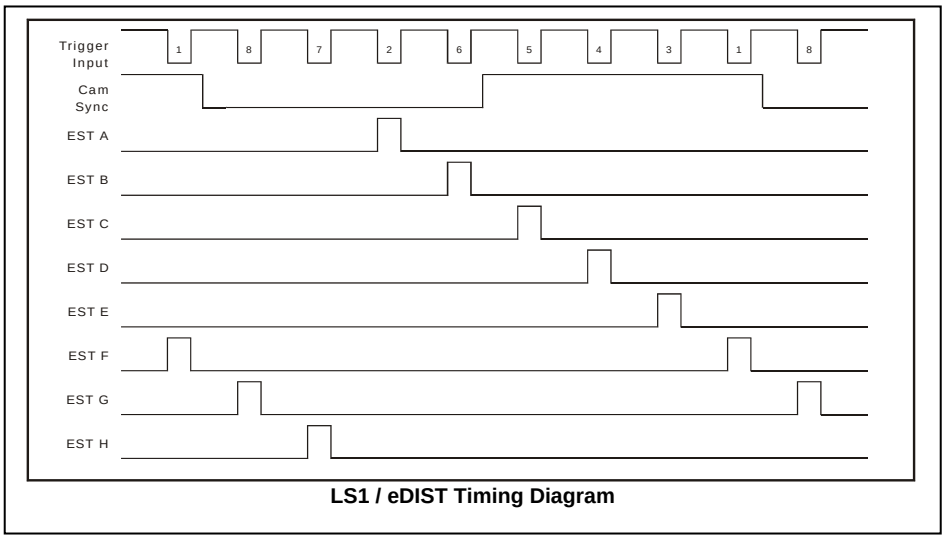
Output A will fire on the 3rd dwell pulse detected after the cam pulse.

LS-1 Example:

-Cam pulse (falling edge) is at TDC.

-Firing order is 18726543.

In this case, we know that the dwell signal for cylinder #1 was received prior to the cam pulse – the dwell signal occurs somewhere within 10-45 degrees before TDC, typically. After this, dwell pulses for cylinder #8, then #7, then #2 are received. Since cylinder #2 is the third dwell pulse after the cam, #2 is wired to output A on the eDist. From there, follow the firing order in your wiring. A=2, B=6, C=5, D=4, E=3, F=1, G=8, H=7.



LS1 / eDIST Timing Diagram

In this LS-1 application, dip switch positions 1-3 should be **OFF** and position 4 should be **ON** configuring the eDist as an 8 coil application. Dip switch position 6 will be set to **OFF** to configure the eDist for the LS-1's hall-effect cam sensor, position 7 will be set to **ON** to configure the eDist for an points type (dwell state low) spark input signal, and position 8 will be set to **OFF** to configure the eDist for the LS-1's falling edge cam sync signal.

Another example:

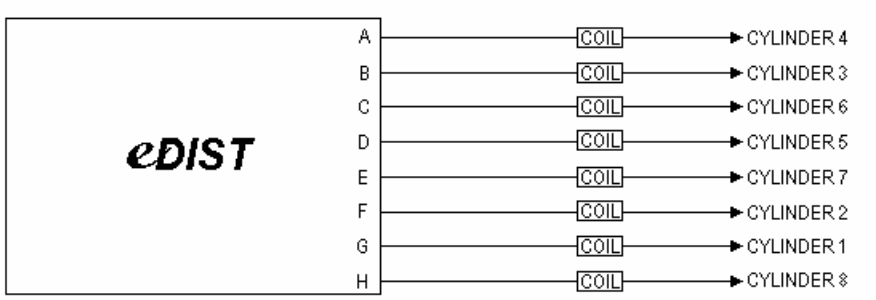
-Cam pulse is at 75 degrees before TDC.

-Firing order is 18436572.

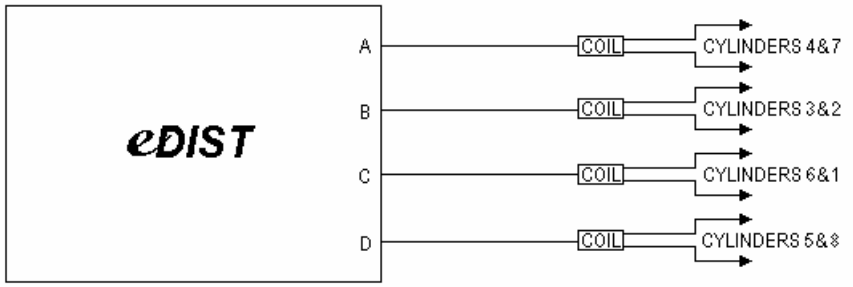
This time, the cam pulse has occurred before the #1 dwell pulse. After the cam pulse has occurred, dwell pulses for cylinder #1, then #8, then #4 are received. Since #4 is the third dwell pulse after the cam pulse is detected, output A goes to #4. A=4, B=3, C=6, D=5, E=7, F=2, G=1, H=8. The dip switches would be configured accordingly.

Coil-On-Plug vs. Waste-Spark Ignition systems

Coil-on-plug ignition (COP) systems use an individual ignition coil for each cylinder of an engine. A COP ignition system eliminates many problems that are frequently found in conventional single-coil ignition systems used with a mechanical distributor. Since each coil only operates a single cylinder, the amount of "work" the coil does is greatly reduced, minimizing the chances for coil failure. In the event a coil does fail, it will only affect a single cylinder rather than the entire engine. COP ignition systems eliminate the problems associated with rotor phasing, allowing for a wider potential range of ignition timing values while removing the possibility of misfires caused by improper rotor phase. The following diagram shows how the eDist outputs would be wired to the coils in a COP configuration, according to the firing order prescribed in the above example:

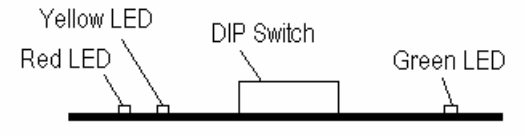


Waste-spark ignition systems work in a manner similar to COP systems. However, with a waste-spark system, ignition coils are used to fire two cylinders rather than one. Special coils that have two spark plug wire terminals on them are used. The two terminals on this coil are connected to a pair of cylinders that fire 360 degrees apart from each other in the firing order. Both cylinders will receive spark simultaneously in this configuration. While one cylinder is nearing TDC of the compression stroke, where the spark needs to happen, the other cylinder will be nearing TDC of the exhaust stroke, where an extra spark will have no impact on how the engine operates. A waste-spark system provides the same benefits as a COP system, but can do so with half as many ignition coils as a COP system and half of the control wiring. The following diagram shows how the eDist outputs would be wired to the coils in a waste-spark configuration, according to the same firing order used in the above diagram:



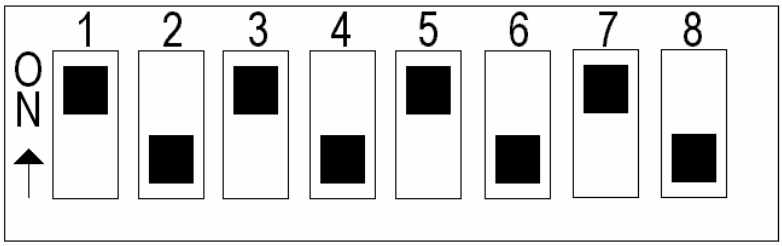
DIP Switch Settings

Remove the blank end panel on the eDist so that the DIP switches and LEDs are visible. When viewing the eDist with the end panel removed, the DIP switches and LEDs are located as per the following diagram:



- Switches 1-4 are used to determine the number of coil outputs to use. For coil-on-plug applications, set the switches as outlined in the following chart. For waste spark applications, set the switches for half the number of cylinders in the engine.
- Switch 5 is not used.
- Use switch 6 to determine what type of cam sensor you are using. If you are using an inductive cam sensor, set switch 6 on. If you are using a hall effect cam sensor, set switch 6 off.
- Switch 7 should be turned on if you are triggering the eDist with a points-type control signal. If you are triggering the eDist with an EST-type signal (such as that from an ignition module on a Buick DIS or GM HEI-equipped engine) switch 7 should be turned off.
- Switch 8 is only used if switch 6 is off. If you are referencing from the rising edge (the point where the signal goes from 0 volts to 12 volts) of a hall effect cam signal, switch 8 should be on. If you are referencing from the falling edge (the point where the signal goes from 12 volts to 0 volts) of a hall effect cam signal, switch 8 should be off.

Dip Switch Diagram And Chart



1-4	**Select Number of coils to fire.** 8 coils: 1=Off, 2=Off, 3=Off, 4=On * 7 coils: 1=On, 2=Off, 3=Off, 4=On 6 coils: 1=Off, 2=On, 3=Off, 4=On 5 coils: 1=On, 2=On, 3=Off, 4=On 4 coils: 1=Off, 2=Off, 3=On, 4=On 3 coils: 1=On, 2=Off, 3=On, 4=On 2 coils: 1=Off, 2=On, 3=On, 4=On	**5**	N/A
		6	On - Use Inductive Cam Sync Input Off - Use Hall Effect (0-12V) Cam Signal *
		7	On - Use Points-type input signal * Off - Use EST-type input signal
		8	On - Use Cam Signal Rising Edge for Reference Off - Use Cam Signal Falling Edge for Reference *

*denotes typical LS-1 settings

LED and Output Operation

- When power is applied to the eDist, the green LED behind the blank end panel will illuminate.
- When a compatible dwell signal is received, the red LED behind the blank end panel will illuminate.
- When a compatible cam signal is received, the yellow LED behind the blank end panel will illuminate.
- There will be no output from the eDist until all three LEDs are on. In other words, you must have the eDist powered up and receiving compatible dwell AND cam reference signals before the outputs will fire.
- Once the eDist has met the above conditions, it fires the outputs in order, A through H (depending on how many coils you have selected), and starts over.