



Opti-Direct Ignition System

**Valve Cover Mount Kit – PN 102-9012, 102-9032
1993-97 Camaro/Firebird
1994-96 Impala SS/Caprice/Roadmaster/Fleetwood**

Universal Kit – PN 102-9013, 102-9033

READ THIS FIRST!

For a quick, trouble-free installation, just follow these steps in order:

- 1: Read the Installation and Safety Tips
- 2: Review the parts in your kit.
- 3: Connect the Opti-Box to verify proper operation on your vehicle's Opti-Spark sensors before removing the stock ignition system.
- 4: Install the coilpack bracket.
- 5: Install the coilpack and wiring harness.
- 6: Test the coilpack for proper firing.
- 7: Remove the factory ignition coil and module assembly.
- 8: Install the Opti-Box and retest.
- 9: Install the Delteq spark plug wires.
- 10: 1993 Camaro/Firebird Vehicles ONLY: Remove the factory tachometer filter.

Step 1: Installation and Safety Tips

1. Ignition systems produce high voltage that can result in serious injury or death.
2. The best installation tip is to read the directions completely before you start. Since there are minor variations between model years, you may find things that affect your particular installation.
3. If your SES light is on, scan for trouble codes. The Opti-Direct system will not function if Opti-Spark-related trouble codes are present.
4. The Delteq Opti-Direct Ignition should be used only with a 12-volt electrical system.
5. Always disconnect the battery before working on any ignition.
6. Do not turn on the ignition or crank the engine without the plug wires connected to the spark plugs and the coils (except for diagnostic purposes specifically outlined in this manual).



Step 2: Parts List

Inspect the package to make sure that you received all the parts below. If any parts are missing, contact Delteq for a replacement.



Harness #1
("Straight Harness")



Ignition Module



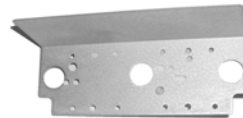
Harness #2
("Y" Harness)



Coilpack Bracket



Harness #3
("T" Harness)



Coilpack Heat Shield



'92-'95 Coil Jumper



Ignition Coil
(4 per kit)



Spark Plug Wires



Opti-Box



Star Washers



Flat Washers



Locknuts for Opti-Box Mounting



Coil Bolts
(8 10-32 x 1.5"L)
Optional Sheetmetal Screws also Provided



Coil Labels



Optional Composite Valve Cover Bolts

Step 3: Connect Opti-Box and Check Operation

1. The factory Opti-Spark diagnostic connection is located on the passenger side of the intake manifold (Fig. 1). The connectors are black and gray. Split this connection and install the “T” Harness (Delteq Harness #3) as shown.



Figure 1: Opti-Spark Diagnostic Connectors – Before (left) and After (right) T-Harness Installation



Figure 2: Opti Box Connector Labeling

2. Plug the other end of the T-Harness into the 6-pin connector on the Delteq Opti-Box (connector A in Fig. 2).
3. The Opti-Box has a diagnostic LED under the right side of the label. Place the Opti-Box in a spot where the LED can be seen from inside the car. Make sure the wiring harness is away from the throttle linkage and exhaust manifolds.
4. When the ignition key is turned on, the LED should blink once briefly. If it doesn't, go to the Diagnostics section at the end of the manual.
5. Crank the engine over with the starter and observe the LED on the Opti-Box. The LED should quickly turn steady red. If not, go to the Diagnostics section at the end of the manual.

Step 4: Install the Coilpack Mounting Bracket

Notes:

In some vehicles, the AIR fitting in the driver side exhaust manifold may be oriented such that it interferes with the coilpack and/or its bracket. If so, loosen the AIR fitting at the exhaust manifold and rotate it slightly.

To avoid stripping a coil screw, do not install the coils until the bracket is installed on the engine.

• All Stock-Style (Stamped Steel) Valve Cover Cars

1. Using a 3/8" wrench, remove the three rearmost bolts on the driver side valve cover.
2. Hold the coilpack bracket so that the bumps are on the bottom and the widest part is closest to you. Install the Coilpack Bracket onto the valve cover with the three bolts that were just removed, and torque to 8 lb-ft. After tightening the bolts, make sure the bracket is flat and not warped or bowed.

• All Corvette-Style (Plastic) Valve Cover Cars

Follow these directions if you are using the '93-'96 Corvette Plastic Valve Covers. These valve covers attach to the engine with an upper bolt and a lower stud. The stud screws into the head and the bolt screws into the stud.

1. Remove the three rear-most bolts on the driver's side valve cover using a T-50 Torx wrench. Be careful to remove just the upper bolt, not the lower stud. If a stud comes off with the bolt, reinstall it into the cylinder head with a 1/4" Allen wrench.
2. Make sure that the factory bolt gaskets are in good shape. If not, replace them.
3. Hold the coilpack bracket so that the bumps are on the bottom and the widest part is closest to you. Install the Coilpack Bracket onto the valve cover using the three supplied M6 x 1 bolts and torque to 8 lb-ft. After tightening the bolts, make sure the bracket is flat and not warped or bowed.

Step 5: Install the Coilpack and Wiring Harnesses

Tool Required: 5/16" (or 8mm) Nut Driver

1. If you purchased your own ignition module, place the Ignition Module Sticker exactly as shown in Figure 3.
2. Place the four Delteq cylinder identification stickers on the ignition coils as shown in Figure 4. Place the coils onto the ignition module as indicated on the Ignition Module Sticker.
3. Lay the coilpack heat shield on top of the coilpack bracket, then, with the spark terminals on the intake manifold side, place the coilpack onto the mounting bracket. The coilpack has locating pins on the bottom and will sit flat on the bracket when in the correct position. The heat shield should be sandwiched between the bracket and the coilpack, and the undrilled face of the heat shield should face the exhaust side (not the intake side).
4. Install the coilpack assembly onto the bracket with eight #10 x 1½" self-threading screws. Install the screws for the center two coils first, then install the screws for the outer two coils. If a screw strips out the aluminum bracket, replace it with one of the supplied sheet metal screws.

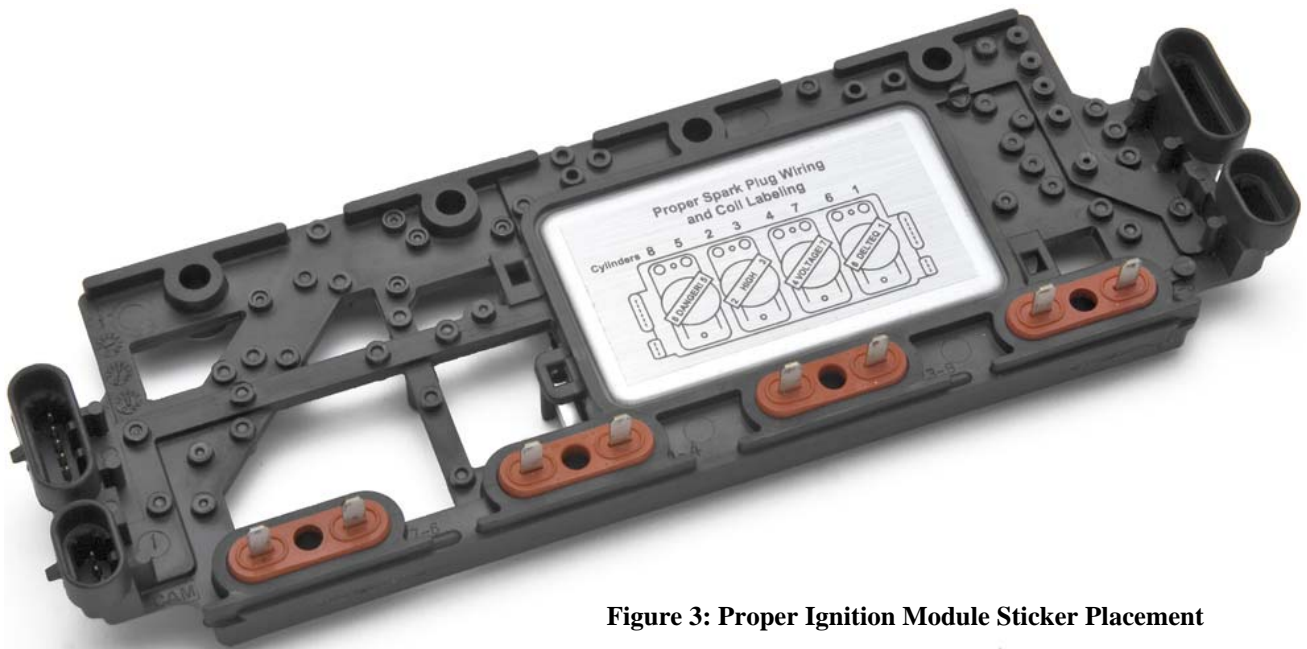


Figure 3: Proper Ignition Module Sticker Placement



Figure 4: Install Coil Labels in Correct Order

5. The 6-pin connector from the “T” Harness should already be plugged into connector A on the Opti-Box (see Figure 2).
6. Take the “Y” Harness (Delteq Harness #2) and plug the “Y” end (one 3-pin and one 6-pin connector) into the connectors at the rear of the coilpack. Plug the other end into connector C (5-pin) on the Opti-Box.
7. Both of the remaining connectors on the Opti-Box are 4-pin, but each is uniquely keyed. The right connector will slide easily into its mate, but can be forced into the incorrect one. **Take care to select the correct one.**
8. Install the 4-pin connector end of the “Straight” Harness (Harness #1) into Opti-Box connector D. Insert the other connector on this harness into its mate on the front end of the coilpack. This harness should route alongside the “Y” Harness.
9. Unplug the 4-pin connector that is plugged into the stock ignition module and plug it into the remaining receptacle on the Opti-Box.
10. One connector on the coilpack is not used. If the block-off plug is not already in place, install it now. The seal may push itself out after you push the connector in. If so, remove one of the blue plugs in the seal, install the connector, then reinstall the blue plug.

Make sure the harnesses do not interfere with throttle operation!

Step 6: Coilpack Test

In this test, the coilpack is run without the spark plug wires attached. The coil towers will strike a powerful high-voltage arc to verify that the installation has been successful. **Use extreme caution, as high-voltage can cause injury or death to person and circuit.** Do not attempt this test if fuel or fuel vapor is present.

1. Make sure there are no wires, harnesses or other engine components that may come within 2-3” of the coil terminals, even while the engine is cranking.
2. Reconnect the battery.
3. Remove the fuel injector fuse(s) from the factory fuse block to prevent the engine from flooding when it is cranked over.
4. Make sure no one is near the coilpack, then turn the ignition key and crank the engine with the starter. Each coil should produce an arc between its towers. The arcs should occur evenly (and loudly) while cranking the engine.
5. If the coils are firing correctly, **re-install the fuel injector fuse(s)** and proceed to Step 7. If the coils are not arcing consistently, refer to the Diagnostics section.

If There is a Problem:

To ensure your success, all Delteq coilpacks and Opti-Boxes are tested before shipping. If your test indicates a coilpack or Opti-Box problem, please contact us so that we may find the source of the problem and correct it. If you purchased a Barebones kit and the coilpack appears to be bad, contact your supplier.

Step 7: Remove the Factory Ignition Module and Coil

The Opti-Box mounts in place of the factory ignition module and coil assembly on the front of the driver side cylinder head.

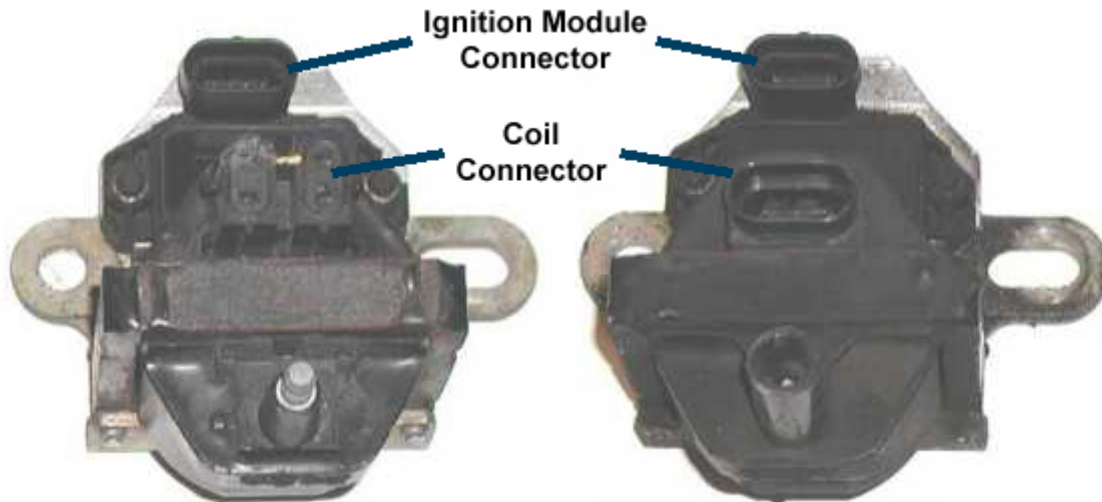


Figure 5: 1993-1995 Coil/Module Assembly (left) and 1996-1997 Coil/Module Assembly (right)

1. Unplug the coil and ignition module connectors. On 1993-95 vehicles, plug the Delteq coil jumper into the connectors that were removed from the coil. 1996-1997 models do NOT need the coil jumper and the factory coil connector won't be used (tape up this connector to keep it from shorting out).
2. **Read this entire paragraph before unbolting the coil/module assembly.** There are two fasteners that hold the coil and module in place. One side uses a stud, and the other side uses a nut and a stud. Some vehicles have ground wires attached with the studs. To prevent damage to these wires, the stud must be kept from spinning while the outer nut is being loosened. To do this, place a 9/16" (14mm) wrench on the back part of the stud while removing the outer nut with another 9/16" wrench.
3. With the coil/module assembly removed, inspect ALL the wiring harnesses that connect to the coil and ignition module for any damage. If there are ground wires that were attached to the cylinder head by the coil/module bolts, make sure all of their terminals are in good condition. Years of corrosion can damage these wires and terminals. If a ground wire was cut from its terminal during the coil/module removal process, you must crimp on a new terminal.
4. Re-install the studs and ground wires onto the engine. Use the two included star washers to "sandwich" the ground wires. This will keep them from spinning when they are tightened to the cylinder head using the stud.

Step 8: Install the Opti-Box

Note: Do not bundle or loom the harnesses with the spark plug wires.

1. Install the Opti-Box onto the factory coil/module studs with the supplied locknuts. The Opti-Box will install in only one way and the label will be upright when installed correctly. Do not tighten the nuts more than is needed to secure the Opti-Box – the nylon lock will keep them from loosening. If you are not using the factory studs to mount the Opti-Box to the cylinder head, place washers behind the Opti-Box to create an air gap from the cylinder head.
2. If any connectors were unplugged from the Opti-Box during installation, re-install them now.
3. Re-test the system for proper operation by going back to Step 6 and repeating the coilpack test procedure. If the system passes the test, go on to Step 9.

Step 9: Install the Delteq Spark Plug Wires

Refer to Table 1 for proper ignition wire lengths for each cylinder. Label the ignition wires on both ends using the enclosed stickers.

Table 1. Delteq Ignition Wire Lengths

Cyl 1	Cyl 2	Cyl 3	Cyl 4	Cyl 5	Cyl 6	Cyl 7	Cyl 8
42.5"	44.5"	43"	52"	43" (HS)	58.5"	59" (HS)	55.5" (HS)

HS – Heat Shield on these plug ends

Driver Side:

1. Raise vehicle on jack stands. All operations on the driver side will be done UNDER the vehicle.
2. Unclip the stock ignition wires from the spark plugs.
3. Remove the plastic steering shaft u-joint shield to better access the wires.
4. Open the two wire clamps that hold the spark plug wires (See Figure 6 and “Clip A” in Figure 7 for locations). To open the wire clamps without damaging them, it is best to use a flathead screwdriver to pry them open. See Figure 8.
5. Open the wire loom clip (“Clip B” in Figure 7) that holds the wires for the numbers 3, 5, and 7 cylinders.
6. Open the wire loom clip holding the wire for the cylinder head temperature sensor harness (item “C” in Figure 7).
7. Unplug the cylinder head temperature sensor.
8. Open the wire clip holding the cylinder head temperature sensor harness to one of the ignition wires.
9. Remove the heat shield on the #7 spark plug boot.
10. Locate the metal ignition wire router. This is the metal piece to which the ignition wire retainer clips are attached. Using a 3/8” socket and a long extension, remove the front bolt of the Wire Router.
11. Using a 3/8” box wrench, loosen (but do not remove) the rear bolt holding the ignition wire router. This can be tricky, but the easiest way to access this bolt is to slip your left hand in front of the cross member and up to the area of the bolt. Use your right hand to slip the box wrench onto the bolt head. Remember, just loosen this bolt; the Wire Router is slotted around the bolt, so there is no need to unscrew it completely.
12. Pull the four driver side ignition wires off the Opti-Spark Distributor, and remove the wires from the car.
13. Install the new spark plug wires into the metal heat shield assembly so that the wires have the same amount of “slack” as they originally did in the factory heat shield assembly (see Fig. 7).
14. Install the heat shield assembly back onto the engine, and plug the 1, 3, 5, and 7 wires into the spark plugs.
15. Install the wires into the factory wire clip as shown in Figure 7. Route the wires up the front of the head, and back to the coil pack. Connect the wires to the

- proper coils by referencing the coil labels. Make sure to keep the wires away from the throttle!
16. Re-install the heat shields on wires 5 and 7.



Figure 6: Ignition Wire Clamp located near Air Pump – F Body

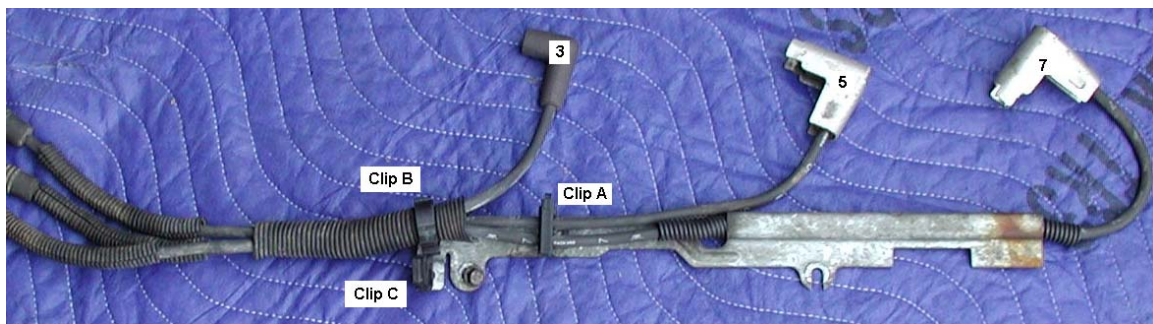


Figure 7: Ignition Wire Router

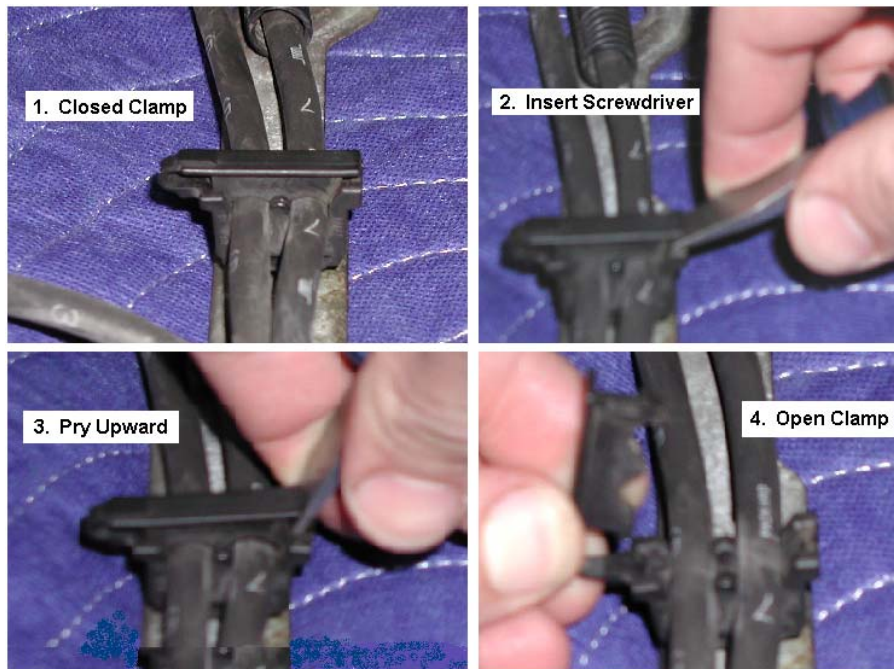


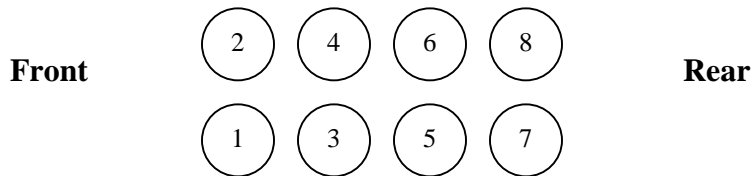
Figure 8: Proper Clamp Opening Technique – F Body

Passenger Side:

Note that all passenger side operations can be performed from the top.

1. From the top, open the two ignition wire clamps with a screwdriver. These clamps are located on the side of the engine block. You can feel them and access them fairly easily, but you really cannot easily see them. Refer to Figure 8 to open these clamps.
2. Unclip the ignition wires from the spark plugs. These can all be reached from the top, as long as your arms fit between the exhaust manifold and the chassis (this is tight on the F-Bodies, but not the B-Bodies).
3. Pull the four passenger side wires off the Opti-Spark Distributor, and remove the wires from the car.
4. Install the spark plug wires onto the coil pack on the valve cover, and route them toward the front of the valve cover.
5. Route the wires across the front of the engine by placing them under the throttle. In the small gap that exists between the alternator bracket and the water pump, run the wires down and back, as if you were going to install them on the Opti-Spark, but instead going toward the rear of the engine.
6. Under the car, clip the four wires into the factory retainer.
7. From this point, install the wires as you would the factory wires. Be sure to use all the factory retainers.
8. Re-install the heat shield for the #8 cylinder.

Please note...Cylinders are numbered as follows:



Step 10: 1993 Only: Remove the Tachometer Filter

On 1993 models, a tachometer filter is installed between the factory tachometer and the ignition coil. The tachometer filter turns the high-voltage signal from the coil into the low voltage signal required by the factory tachometer. Because the new Delteq coilpack generates a low-voltage tach signal directly, the filter is no longer required and must be bypassed or removed.

Figure 9: 1993 Camaro/Firebird Tach Filter



1. The tach filter is a small rectangular device near the factory ignition coil. There should be two white wires and one black ground wire entering the filter.
2. Method 1 (tach filter removal): Cut the two white wires entering the tach filter and connect them to each other. If complete removal of the filter is desired, cut the black ground wire and remove the tach filter from the vehicle. The black wire is a ground that does not need to be reconnected.
3. Method 2 (tach filter bypassed): It is also permissible to leave the tach filter in place and install a wire splice on both white wires to bypass the filter with a short piece of 20 gauge wire. The filter can then be left in place on the vehicle.

Finish: Installation Complete – Start the Engine

At this point, the Delteq Opti-Direct System installation is complete. The engine should start promptly and idle smoothly.

If the engine turns over but does not fire, make sure that the fuel injector fuse(s) has been re-installed.

If the engine still will not start, please refer to the Diagnostics section of this manual.

Diagnosics

Note: If the SES (Service Engine Soon) light is on, a trouble code is present that may interfere with proper operation. Fix any trouble codes before starting Diagnostics.

• Opti-Box Diagnostic LED (right side of front label)

Key On: The LED will flash only once, briefly, then turn off.

Cranking: The LED will pulse on and off until it synchronizes with the Opti-Spark sensors. Once the Opti-Box has synchronized, the LED will stay on.

Running: The LED should remain on at all times. If the LED blinks at all while the engine is running, it indicates that the signals from the Opti-Spark are out-of-sync and the Opti may be failing. **Note:** Opti-Box S/N 213 and below do not have this feature and will blink continuously during running or cranking. The Opti-Box serial number is on the top of the Opti-Box and on the end of the shipping box.

• LED Fails to Flash Briefly at Key-on (No power at Opti-Box)

1. Verify that the ECM fuse is OK and all the harness connectors are fully seated.
2. Unplug the 6-pin connector on the Opti-Box (Connector A in Figure 3) and measure terminals C and D. With the ignition key ON, pin D should be Ground and pin C should be battery voltage. If not, there is a wiring harness or ignition switch problem.
3. If the voltage level on Pin C and D are appropriate, but the light still does not briefly flash when the key is turned on, you may have a bad Opti-Box. Please contact Delteq.

• LED Fails to Flash/Turn Solid while Cranking (No Opti Signal)

1. If the LED flashes on when the unit is powered up, but there is no flashing during cranking, the proper signals are not reaching the Opti-Box from the Opti-Spark. Use the wiring schematic to check for continuity between the three connectors on the "T" harness.
 - a. If any wire fails a continuity check, contact Delteq for a new harness.
 - b. If the harness checks OK, the Opti-Spark sensors may not be functioning.
2. If the LED flashes on and off while cranking, but does not turn fully on after cranking for more than 2 seconds, your Opti-Spark may be functioning improperly. A bad bearing in the Opti-Spark or a severely worn timing chain can cause this. Please contact Delteq.

• LED Working Properly, but Not All Coils are Firing

If the LED flashes properly during key on and cranking, but the car won't start, the coils should be checked for proper firing. Refer to Step 8 of this manual to conduct the coil test.

If some but not all the coils fired, the coilpack has a bad driver(s) or coil(s). Please contact Delteq. If you bought a Barebones system, contact your coilpack supplier for a replacement.

• LED Working Properly, but None of the Coils are Firing

If the LED flashes properly during key on and cranking, but no coils fire, there is most likely a power problem or a module problem.

1. Check the Ignition (IGN) fuse. If it is blown, there may be a short circuit inside the coilpack or the harness. Disconnect the 3-pin connector (Pink/White/Black) at the coilpack and retest with a new fuse. If the fuse blows, the problem is in the wiring harness. If the fuse is OK, reconnect the 3-pin connector and repeat the test. If the fuse blows now, there is a short circuit in the coilpack.
2. At the coilpack, disconnect the 6-pin connector that has two wires going into it (not the 6-pin with 4 wires). Crank the engine and check for spark. If there is now spark, you likely have a bad EST (engine spark timing) connection. This is pin E (white wire) on the 6-pin coilpack connector. Check continuity on this circuit. If continuity is good, check that the TAN/BLK wire on pin D of the same connector has over +5V with key on, engine off. If it does not, please contact Delteq.

• Cranking Concerns

Your vehicle may take ½ of an engine revolution longer to start after the installation of the Delteq Opti-Direct System. The Opti-Box has to sync with the Opti-Spark signals, then the coilpack must sync to the Opti-Box signals. In most cases, the increase in starting time is minimal.

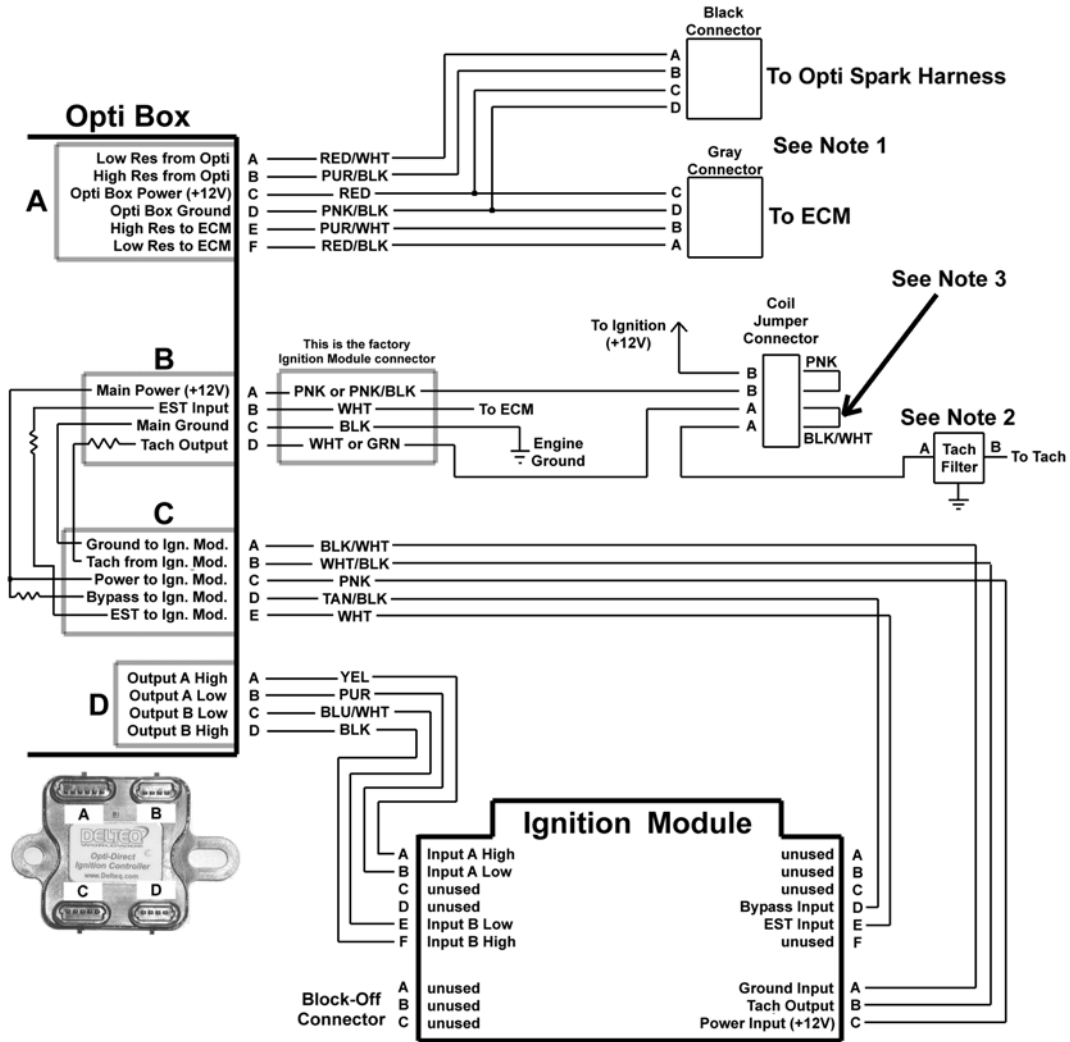
If your vehicle takes much longer than normal to start, please contact Delteq for support.

• Other Common Problems

A dead miss in a single cylinder is a bad injector, cracked park plug, bad ignition wire or intake manifold leak.

A miss at a certain RPM is usually a tuning problem or an aftermarket or modified airflow meter.

Delteq Opti-Direct Wiring Harness Schematic



Notes:

- 1992 Corvette has 6 pin connectors in place of the 4 pin connectors. Pinout is the same (pins E and F are not used).
- Tachometer Filter is installed on 1992-1994 Corvette and 1993 Camaro/Firebird. The filter must be removed to maintain tachometer functionality after the installation of the Opti-Direct System. Cut the wires labelled A and B going into the filter, then connect them to each other (bypassing the filter).
- Install aftermarket tach by splicing into the Black/White wire.

Figure 10: 1993-1995 Wiring Schematic

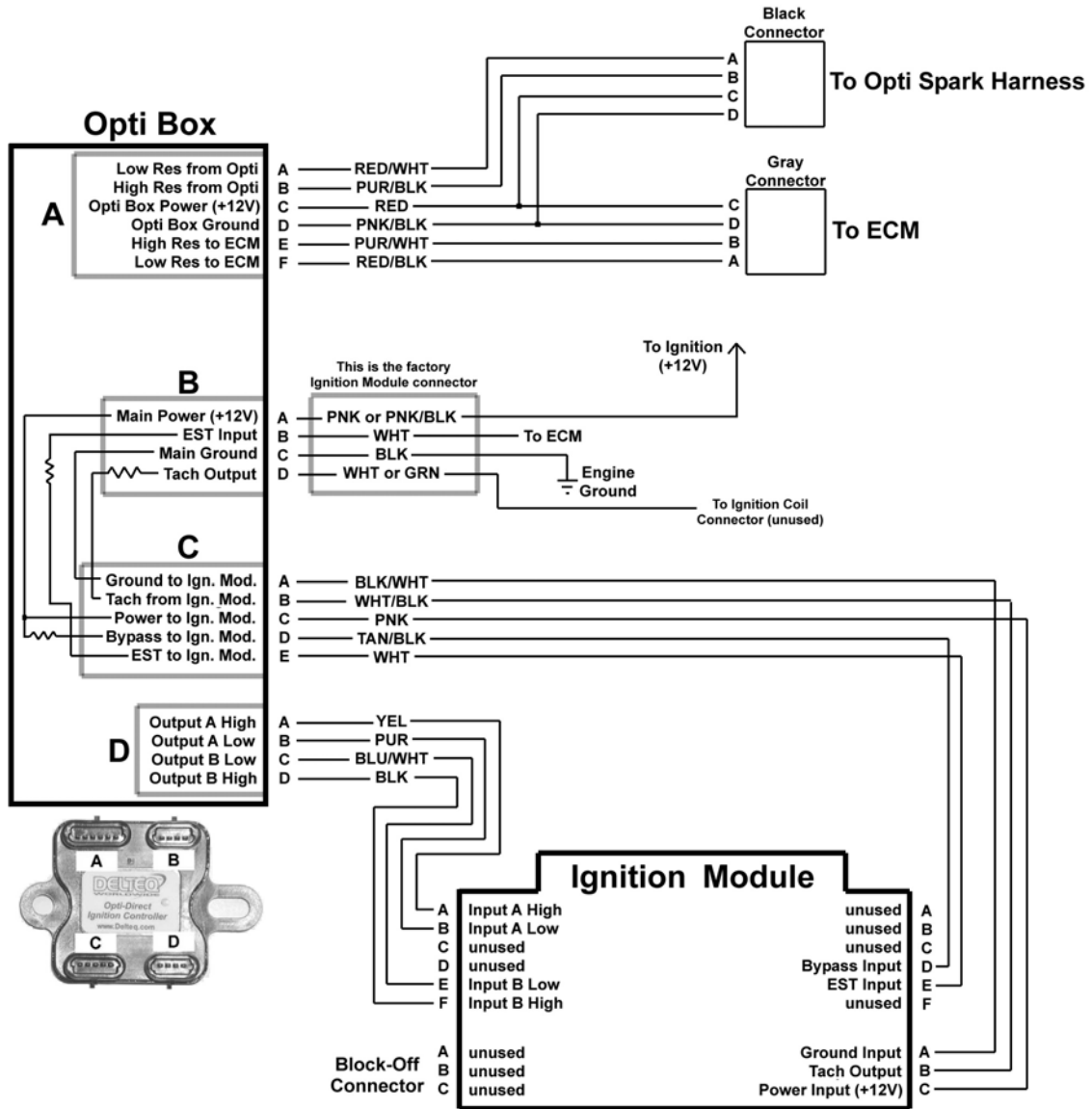


Figure 11: 1996-1997 Wiring Schematic

Contact Information

Address: Delteq Worldwide, Division of DI Development, LLC
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USA

Phone: (703) 476-3566

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E-Mail: support@delteq.com

Internet: <http://www.delteq.com>

Limited Warranty

DI Development, LLC, warrants Delteq products to be free of defects in material and workmanship under normal use and properly installed for one (1) year from the date of purchase. This Limited Warranty is void if the defect has resulted from accident, abuse, or misapplication.

If found to be defective as mentioned above, it will be replaced or repaired if returned prepaid along with proof of date of purchase. This is the sole remedy of the purchaser and the sole liability of DI Development, LLC. To the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representations, whether express or implied, including any implied warranty of merchantability or fitness. In no event shall DI Development, LLC be liable for special or consequential damages.

In the event applicable law imposes any implied warranties, the implied warranty period is limited to ninety (90) days from the date of receipt. Some jurisdictions do not allow such limitations on duration of an implied warranty, so the above limitation may not apply to you.

If you must return an item, call Customer Service first (or email support@delteq.com).

PN 102-9012 Opti-Direct for Valve Cover Mount Systems

Item	Qty	Description	PN
1	<input type="checkbox"/>	1 Coil Jumper (needed for 92-95 only)	302-1031
2	<input type="checkbox"/>	1 "T" Wiring Harness - Opti Signal	302-1032
3	<input type="checkbox"/>	1 "Y" Wiring Harness - Power / EST	302-1033
4	<input type="checkbox"/>	1 Wiring Harness - N* Signals	302-1034
5	<input type="checkbox"/>	1 Ignition Wire Kit	302-1010
6	<input type="checkbox"/>	1 Ignition Module	302-1008
7	<input type="checkbox"/>	4 Ignition Coil	302-1009
8	<input type="checkbox"/>	1 Coilpack Blockoff Connector	302-1036
9	<input type="checkbox"/>	1 Ignition Module Sticker (Installed)	302-1007
10	<input type="checkbox"/>	1 Coil & Ignition Wire Stickers	302-1005
11	<input type="checkbox"/>	1 Opti-Box	302-1020
12	<input type="checkbox"/>	1 Valve Cover-Mount Coilpack Bracket	302-1000
13	<input type="checkbox"/>	1 Coilpack Heat Shield	302-1001
14	<input type="checkbox"/>	1 Fastener Kit	302-1013
15	<input checked="" type="checkbox"/>	1 Instruction Manual	100-1200-V

PN 102-9032 Opti-Direct "Barebones" for Valve Cover Mount Systems

Item	Qty	Description	PN
1	<input type="checkbox"/>	1 Coil Jumper (needed for 92-95 only)	302-1031
2	<input type="checkbox"/>	1 "T" Wiring Harness - Opti Signal	302-1032
3	<input type="checkbox"/>	1 "Y" Wiring Harness - Power / EST	302-1033
4	<input type="checkbox"/>	1 Wiring Harness - N* Signals	302-1034
5	<input type="checkbox"/>	1 Ignition Module Sticker	302-1007
6	<input type="checkbox"/>	1 Coilpack Blockoff Connector	302-1036
7	<input type="checkbox"/>	1 Coil & Ignition Wire Stickers	302-1005
8	<input type="checkbox"/>	1 Opti-Box	302-1020
9	<input type="checkbox"/>	1 Valve Cover-Mount Coilpack Bracket	302-1000
10	<input type="checkbox"/>	1 Coilpack Heat Shield	302-1000
11	<input type="checkbox"/>	1 Fastener Kit	302-1013
12	<input checked="" type="checkbox"/>	1 Instruction Manual	100-1200-V
		Optional	
13	<input type="checkbox"/>	1 Ignition Wire Kit	302-1010