



Opti-Direct Ignition System

1992 Corvette – PN 102-9010A, 102-9030A
1993-96 Corvette – PN 102-9010B, 102-9030B

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: 1992-1994 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).



Eric C.'s LT4

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.



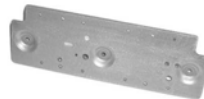
Harness #1
("Straight Harness")



Ignition Module



Harness #2
("Y" Harness)



Coilpack Bracket



Harness #3
("T" Harness)



Ignition Coil
(4 per kit)



'92-'95 Coil Jumper



Opti-Box



Spark Plug Wires



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



Star Washers



'93-'96 Valve Cover Bolts
(3 M6 x 1)



Flat Washers



Locknuts for Opti-Box Mounting



Coil Labels



'92-only Bolts & Spacers for Coilpack Bracket
(3 1/4-20 x 4.5"L)

Step 3: Connect Opti-Box and Check Operation

1. Remove the passenger side engine cover. The factory Opti-Spark diagnostic connection is located on the side of the intake manifold (Fig. 1). The 1993-1996 connectors are black and gray, while the 1992 connectors are both black. Split this connection and install the “T” Harness (Delteq Harness #3) as in Fig. 2.



Figure 1: Opti-Spark Diagnostic Connectors - 1992 (left) and 1993-1996 (right)



Figure 2: T-Harness Installed (1993-1996 Shown)



Figure 3: 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. 3).
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 or exhaust manifolds.
4. When the ignition key is turned on, the LED should blink once briefly. If it doesn't go on, 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 Mounting Bracket

Note: 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.

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

• 1992-Only Corvette (with stock finned valve covers)

1. Remove the three rear-most bolts on the driver's side valve cover using a T-30 Torx wrench.
2. The 1992 Corvette kit includes three 4½" x ¼-20 Allen head bolts to replace the stock valve cover bolts and three 1" aluminum spacers.
3. Hold the coilpack bracket so that the bumps are on the bottom and the widest part is closest to you. Drop the three bolts into the holes and slide the spacers onto the bolts.
4. Install the bracket onto the valve cover and torque the bolts to 8 lb-ft.

• 1993-1996 Corvette (with stock composite 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 ¼" 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.

Step 5: Install the Coilpack & Wiring Harnesses

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

1. Place the four Delteq cylinder identification stickers on the ignition coils as shown in Figure 5. This information is also on a sticker on the ignition module (Fig. 4).
2. Place the coils onto the ignition module as indicated on the label.
3. 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.
4. Install the coilpack assembly onto the bracket with eight #10 x 1½" self-tapping 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.

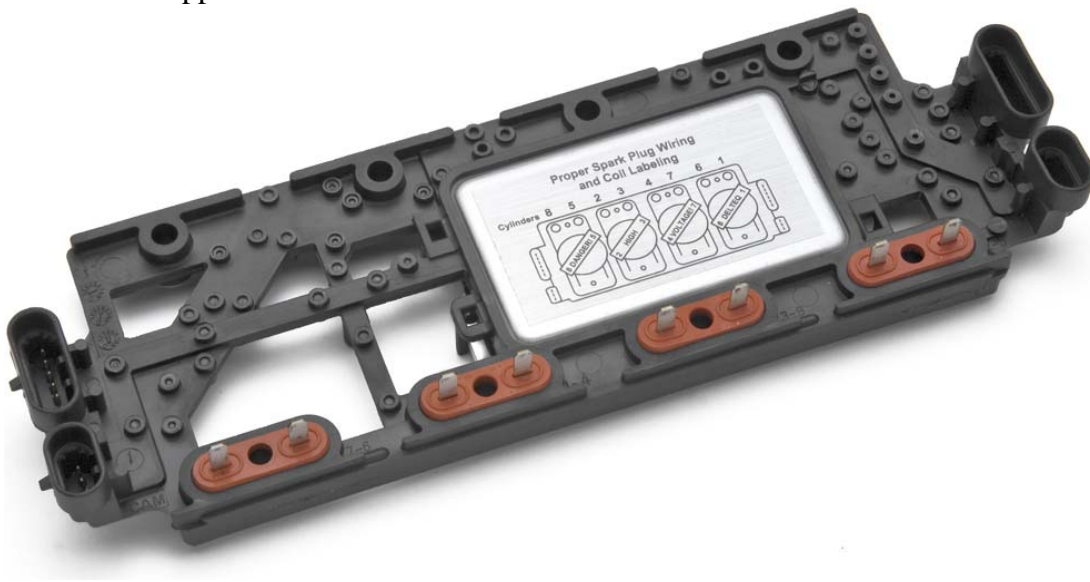


Figure 4: Proper Ignition Module Sticker Placement

5. The 6-pin connector from the “T” Harness should already be plugged into connector A on the Opti-Box (see Figure 3). This harness is designed for all LT1/LT4 applications, so there may be some slack in the harness on Corvette applications. It is easiest to store the extra wire toward the rear of the engine so that it does not get caught in the drive belt system. Once the injector cover is re-installed, it will be unnoticeable.
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. The harness should be routed

across the engine under the throttle body, then under the driver side injector cover and back to the coilpack.



Figure 5: Coilpack Assembly - Proper Coil Labeling

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

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. **Make sure you 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 Harness #2.
9. Locate the 4-pin ignition module connector that was unplugged in Step 6 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 that 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 Bare-Bones 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 passenger side cylinder head.

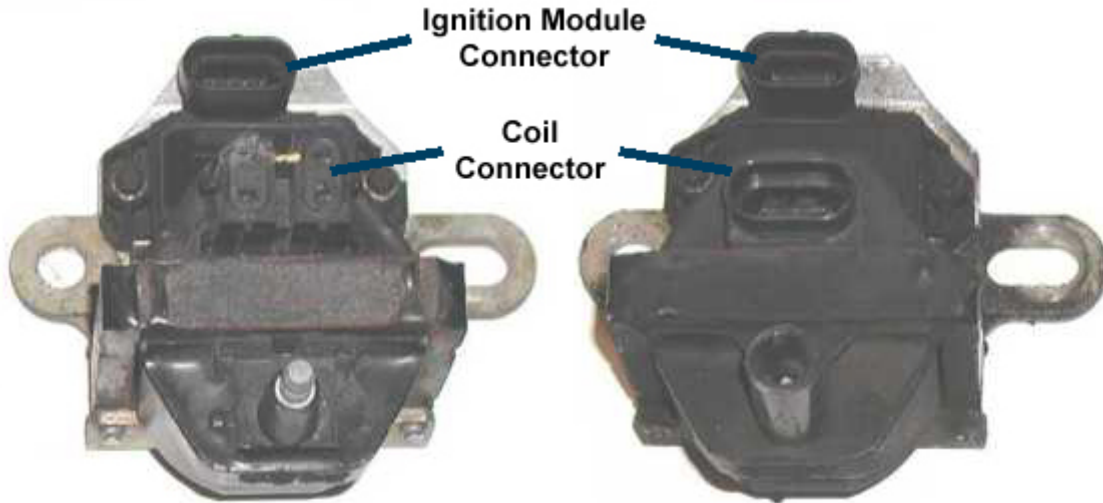


Figure 6: 1992-1995 Coil/Module Assembly (left) and 1996 Coil/Module Assembly (right)

1. Unplug the coil and ignition module connectors. On 1992-95 vehicles, plug the Delteq coil jumper into the connectors that were removed from the coil. 1996 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. There are two fasteners that hold the coil and module in place. One side uses a stud (which also holds the power steering reservoir bracket) and the other side uses a bolt. Some vehicles have ground wires attached with the studs. Remove the stud and bolt (be careful not to damage the wires, if any are present) and remove the coil/module assembly from the engine.
3. Use the stud and bolt to fasten the Opti-Box to the cylinder head. Install the washers included in this kit between the cylinder head and the Opti-Box to allow air to pass behind the Opti-Box.
4. Re-install the power steering reservoir.

Step 8: Install the Opti-Box

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. Note: some Corvettes do not use studs to attach the coil to the cylinder head. On these cars, use washers to create an air gap between the cylinder head and Opti-Box, then install the Opti-Box using the factory bolts.
2. If any connectors were unplugged from the Opti-Box during installation, re-install them now.
3. Retest 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

1. Remove the factory spark plug wires from the engine.
2. Lay the Delteq plug wires out on a flat surface and arrange them by length. Table 1 shows the wire lengths for each cylinder. Label the wires on both ends using the enclosed stickers.
3. Start with the driver side wires. Connect the 1, 3, 5, and 7 ignition wires to the appropriate coils on the Delteq coilpack and run them toward the front of the engine, then down to the appropriate cylinders.
4. Plug the ignition wires onto the spark plugs and clip them into the factory wire retainers.
5. Moving to the passenger side, connect the 2, 4, 6, and 8 ignition wires to the appropriate coils on the Delteq coilpack. Run them toward the rear of the engine, then down to the appropriate cylinders.
6. Plug the ignition wires onto the spark plugs and clip them into the factory wire retainers. See Figure 7 for proper ignition wire orientation on the coils.
7. For '92-'94 vehicles, proceed to **Step 10**. '95-'96 vehicles are ready to start.

Table 1. 1992-1996 Corvette Ignition Wire Lengths

Cyl 1	Cyl 2	Cyl 3	Cyl 4	Cyl 5	Cyl 6	Cyl 7	Cyl 8
26.5"	52"	23.5"	49.5"	25.5"	47" *	30"	52" *

* - Cylinders 6 & 8 have straight ends at the spark plugs to clear the coolant temperature sensor.

Please note...Cylinders are labeled as follows:

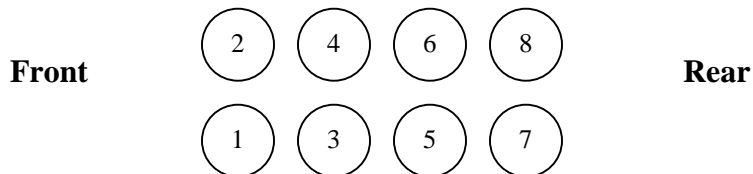


Figure 7: Proper Orientation of Ignition Wires

Step 10: 1992-1994 Only: Remove the Tachometer Filter

On 1992-1994 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 8: 1992-1994 Tach Filter

1. The tach filter is a small rectangular device (see Fig. 8) located in the factory wiring harness near the factory ignition coil. There should be two white wires and one black 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 (on 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 back 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 Bare-Bones 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.

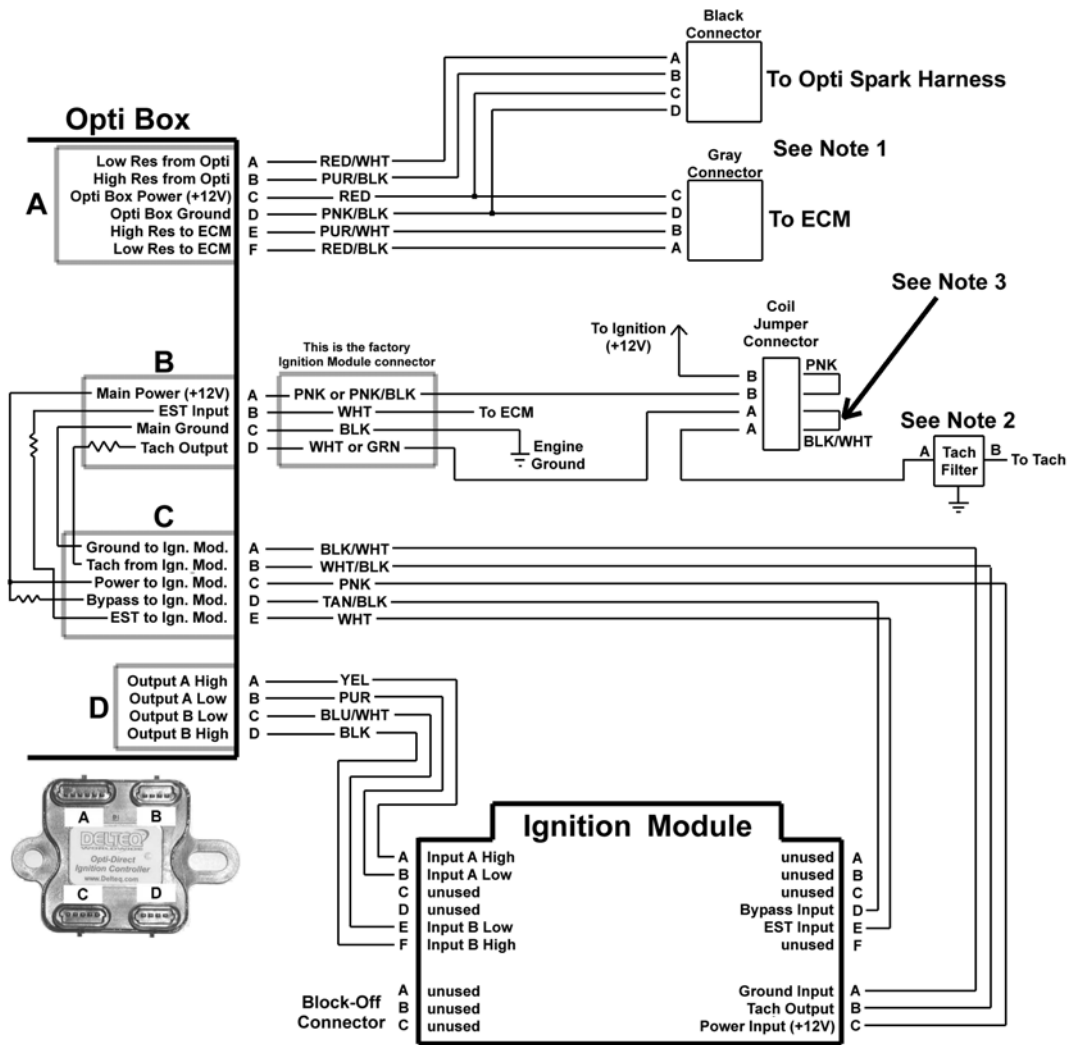
If your vehicle takes much longer than normal to start, please contact Delteq for support.

• 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 9: 1992-1995 Wiring Schematic

Contact Information

Address: Delteq Worldwide, Division of DI Development, LLC
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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 102-9030A & B Opti-Direct
for 1992 & 1993-1996 Corvette**

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 Signals (1992 Kits use "A", 1993-1996 Kits use "B")	302-1032A or B
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	302-1012
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 (3 Pin)	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 Coil Pack Bracket	302-1000
13	<input type="checkbox"/>	3 1992 Only: Valve Cover Spacers & Bolts	399-1016 & -1017
14	<input type="checkbox"/>	1 Fastener Kit	302-1013
15	<input checked="" type="checkbox"/>	1 Instruction Manual	100-1200-Y

**PN 102-9030A&B Opti-Direct "Barebones"
for 1992-1996 Corvette**

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	302-1032A or B
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 Coil Pack Bracket	302-1000
10	<input type="checkbox"/>	3 1992-Only: Bolt/Spacer Kit	399-1016 & -1017
11	<input type="checkbox"/>	1 Fastener Kit	302-1013
12	<input checked="" type="checkbox"/>	1 Instruction Manual	100-1200-Y