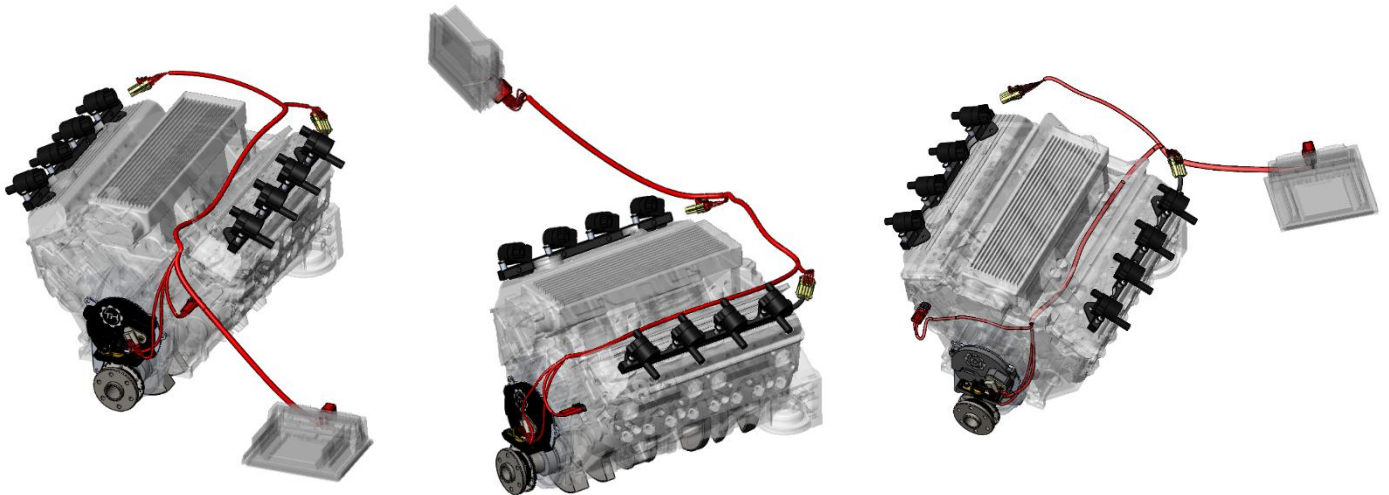




# Installation Instructions

24xLink – PCM + C3 Wiring Harness + (OBD2 Port + KS Sensor)

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## **Safety:**

Before rushing in with excitement to upgrade your LT engine with TORQHEAD 24x components, take the time to ensure your safety is not jeopardized. This instruction is a guide only and the steps within are a suggestion only. It is up to you, the customer, to ensure during each step you use every precaution applicable to keep yourself safe. During the installation you will be in contact with tools, engine fluids, and other elements that must be treated with caution. It is assumed that you will have all the appropriate tools, knowledge and safety equipment to perform the job correctly. Never use a tool for a purpose it was not intended. If you do not feel capable of performing the installation or you do not have the basic tools to perform the installation, it is recommended that you seek help from a qualified person.

TORQHEAD LTD. will not be held liable for any injuries or damage.





## Introduction

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**For best results it is recommended that you read and understand these instructions completely prior to commencing installation. For best results this instruction manual should always be supplemented with a factory service manual or repair manual. Improper installation can result in damage to the components or yourself.**

This instruction covers the installation of the TORQHEAD 24XLink PCM, C3 (Coils, Crank sensor and Cam sensor) Harness, as well as (where applicable) an OBD2 ALDL connector and knock sensor(s).

Prerequisite: It is assumed your vehicle has a stock 94-97 LT1 engine harness and wiring configuration based on your platform. It is also assumed that your harness is in good working order. Any changes to a stock harness will need to be discussed with TORQHEAD prior to installation and any damage to your harness will need to be addressed.

This kit comes with the following components:

- TH 24xLink PCM (Gen 3 LS Series)
- C3 Harness (configured for B, F or Y-Body)
- OBD2 ALDL Cabin Port (if required)
- Knock Sensor (1 for F-Body, 2 for B-Body, 2 for Y-Body) (1995 and older engines only)

This kit will provide the necessary electronic and wiring components necessary to upgrade to Gen 3 LS Series PCM and Ignition system. These components will replace your current LTx PCM and also permanently remove the Opti-spark Ignition system. This kit requires that your LTx engine is already outfitted with the TORQHEAD 24xLink signal unit kit or an equivalent 24x1x reluctor mechanical kit. It is also assumed that you have either TH coil brackets and coil harness installed or a suitable alternative.

Note this upgrade is for Off-Road use only. It is important to understand some of the systems on the LT engine will be incompatible. These systems are the EVAP, Air Pump, and EGR. If you install these components on a corvette (Y-Body) you will also lose functionality with the onboard CCM and some dash functions as well as other serial communication issues. TORQHEAD is continuously improving their products to improve compatibility of systems, so please keep an eye out for updates!!

**NOTE ON ENGINE TUNE:** TORQHEAD does not supply the included PCM with an accurate tune for every customer's engine combination. The 24xLink PCM ships with a base, stock style LT1 tune. The generic parameters, like fuel injector constants and bank assignments are already updated for this conversion. It is up to you, the customer, to complete the proper tuning technique to ensure the car runs and drives as it should. TORQHEAD is not responsible for any damage that may occur to your vehicle from an improper setup or tune.

## Installation – PCM & C<sub>3</sub> Harness

### Disassembly:

**Warning:** Wait until the engine is completely cool before starting this procedure.

1. Disconnect the negative battery terminal.
2. Gain access, disconnect and remove the stock LT PCM. (Fig 1)



Figure 1 - Stock LT PCM Removed. (B-Body Example)

3. Locate and remove the stock LT1 ignition coil and ignition module. (Fig 2)

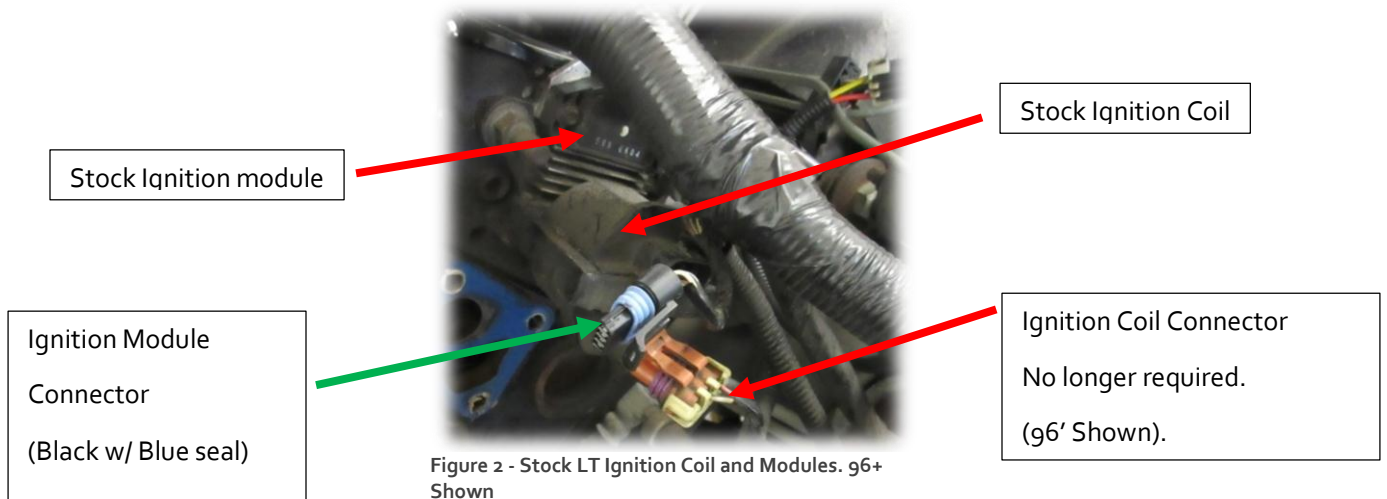


Figure 2 - Stock LT Ignition Coil and Modules. 96+ Shown

4. The ignition coil connector ('96+) can be taped up and tied back as it is no longer needed. If you wish you can remove this connector from the harness entirely. **DO NOT** remove the ignition module connector (4 pin black connector with blue seal), it will still be used. Also for 1992-1995 vehicles **do not** remove your Black and Gray ignition coil connectors.

## Assembly:

1. Lay in and route the C3 harness according to your platform. See Fig 3 thru Fig 5. Some adjustment may be required for harness to fit appropriately and ensure it doesn't come close to hot components.

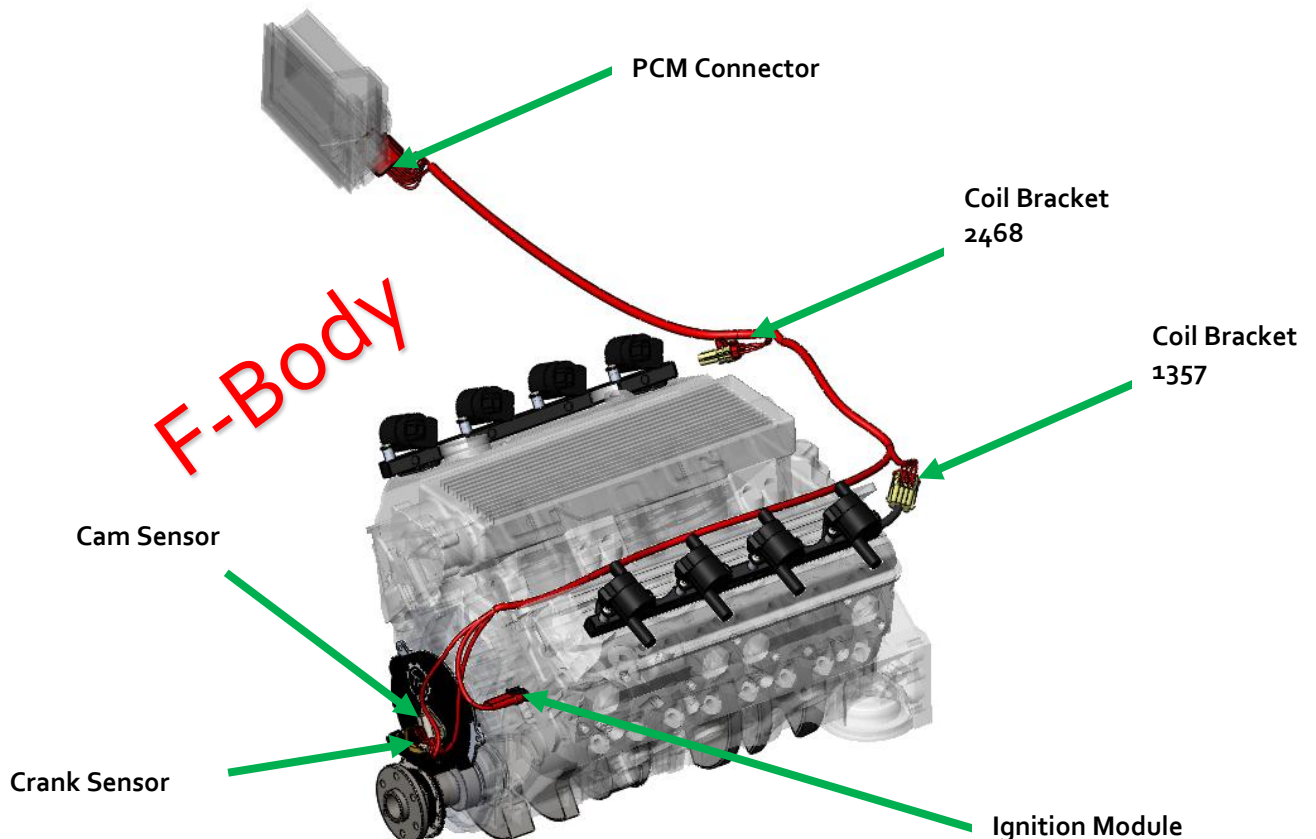


Figure 3 - F-Body C3 Harness Routing and Connection Points

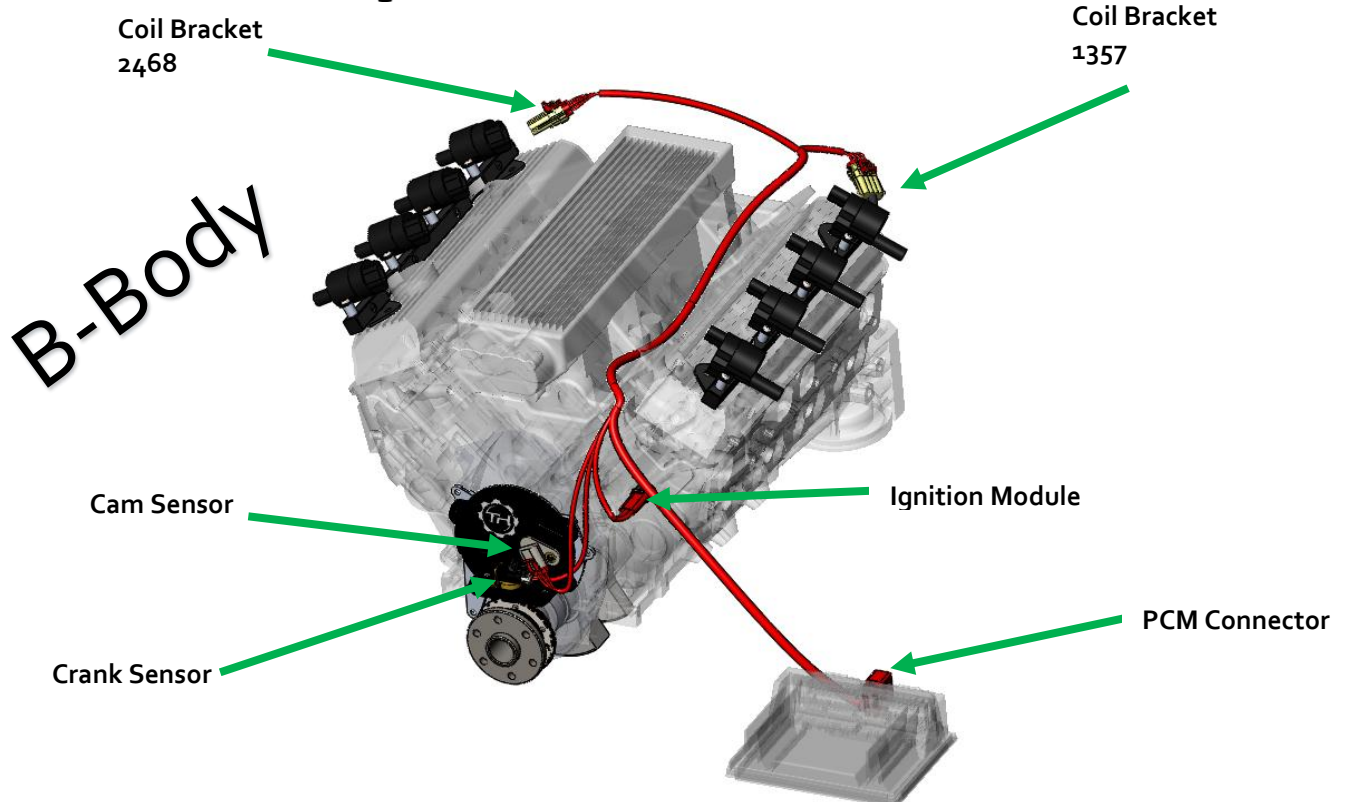


Figure 4 - B-Body C3 Harness Routing and Connection Points

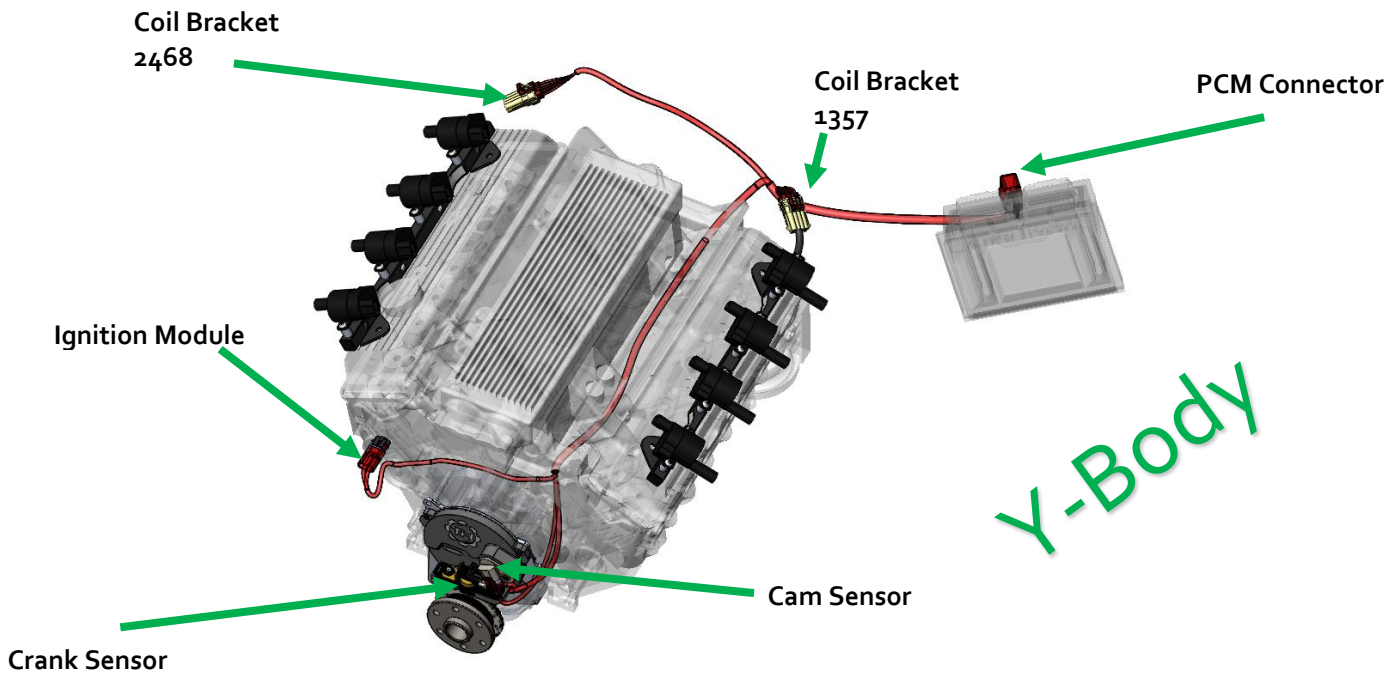


Figure 5 - Y-Body C3 Harness Routing and Connection Points

2. Connect the C3 Crank sensor and camshaft sensor connectors to their appropriate sensors.
3. a) Connector the C3 Ignition Coil PWR and GND connector to the original LT1 Ignition module connector (4 pin Black connector w/ Blue seal).  
 b) **1992-1995 LT1 Only:** Connect your original LT1 ignition coil connectors (Black and Grey) to the provided ignition coil jumper connector as seen in Figure 6.

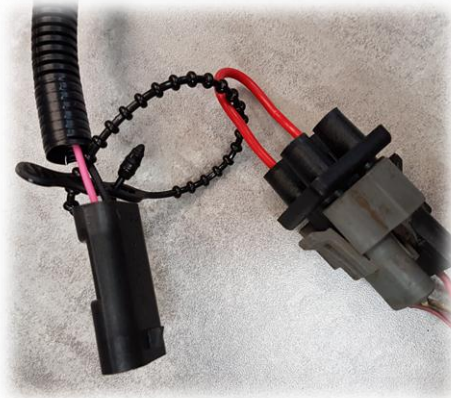


Figure 6 – Black and Gray Ignition Coil connectors connected to coil jumper connector

4. Connect the C3 Harness Coil connectors, 1357 & 2468, to the appropriate coil harnesses.
5. Install the TH 24xLink PCM in the original LT1 PCM location. F-Body cars can use the PCM bracket from 98+ LS F-Bodies....These can be found from your local wrecking yard.
6. Connect the C3 Harness 16 pin PCM Connector to the middle port of the TH 24xLink PCM.
7. Connect the original Red, Blue, Black, and Clear/Gray LT1 engine harness connectors to the TH 24xLink PCM.
8. Apply zip ties or other securing methods to attach new C3 Harness to existing LT1 harness where applicable.

Congratulations! Your LT engine is now connected to the TH 24xLink Gen 3 LS PCM. The Coils, crank sensor and camshaft sensor are connected as well as all the original LT1 sensors and actuators.

#### **Knock Sensor(s):**

If your vehicle is a 1992-1995 LT1 vehicle it is recommended that you replace your knock sensor with the OBD2 compatible knock sensor provided in this kit. The knock sensor(s) are located at the sides of the engine block and also perform the task of coolant drain plugs. F-Body vehicles have a single sensor and B-Body vehicles have two sensors (one on each side of engine block). It is recommended that you replace these before re-filling the coolant system. The new sensors provided in this kit are a direct replacement for the original sensor and the wiring connector will also work with the new sensor.

If your vehicles requires an upgrade to the OBD ALDL connector to OBD2 standard, please refer to the next section.



## Installation – OBD2 ALDL Port

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If your vehicle is currently outfitted with an OBD1 or OBD1.5 connector from factory it is necessary to upgrade your port to the standard OBD2 port. Your kit supplied from TH should include this port if you required it. This supplied port comes with pigtail wiring ready to be installed. It is recommended that you install with best practices for electrical installations. This means, unless otherwise noted you should solder and shrink wrap all connections. Before finishing the installation of the port ensure it is securely mounted and the wires are properly secured.

### **94/95 B-Body/94' F-Body/ Some 95' F-Body (OBD1)**

These vehicles came from factory as OBD1 and as such the ALDL connector is a 12 pin OBD1 style port. You will need to remove this OBD1 port and replace with the one supplied with this kit. Refer to below steps for the wiring instructions. For best results work one step or wire at a time instead of removing all wires at once. This will reduce the risk of errors.

Step 1: Remove White/Black<sub>(Stripe)</sub> wire with terminal from Pin 'B' of OBD1 Port. Cut OBD1 terminal off end of this wire. Connect/Solder this wire to the White/Black<sub>(Stripe)</sub> wire @ Pin 2 of new OBD2 Connector.

Step 2: Remove Black/White<sub>(Stripe)</sub> wire with terminal from Pin 'A' of OBD1 Port. Cut OBD1 terminal off end of this wire. Connect/Solder this wire to the Black/White<sub>(Stripe)</sub> wire @ Pin 5 of new OBD2 Connector.

Step 3: (**F-Body Only**) Remove Black/White<sub>(Stripe)</sub> wire with terminal from Pin 'G' of OBD1 Port. Cut OBD1 terminal off end of this wire. Connect/Solder this wire to the Black/White<sub>(Stripe)</sub> wire @ Pin 8 of new OBD2 Connector.

Step 4: Remove Tan wire with terminal from Pin 'M' of OBD1 Port. Cut OBD1 terminal off end of this wire. Connect/Solder this wire to the Tan wire @ Pin 9 of new OBD2 Connector.

Step 5: Connect/Solder the Orange wire @ Pin 16 of the new OBD2 Connector to a + Battery Voltage (Hot at all times) located under the dash.

Step 6: Connect/Solder the Black wire @ Pin 4 of the new OBD2 Connector to an appropriate Ground (GND) location.

### **Some 95' F-Body (OBD1 PCM w/ OBD2 port -> 'AKA' OBD1.5)**

These vehicles came from factory with OBD1 PCM, however the ALDL connector was an OBD2 style 16pin Port. A connector is not supplied with this kit for these vehicles, however some changes are required to the wiring at the port. Refer to below steps for the wiring instructions. For best results work one step at a time instead of removing all wires at once.

Step 1: Move the White/Black wire @ Pin 6 to Pin 2. If Pin 2 already has a wire (purple), take no action your port is already setup to communicate with the PCM. If it doesn't, remove the purple wire from Pin 2 and replace with the White/Black wire from Pin 6.

**94-97' Y-Body/96' B-Body/96-97' F-Body:** NO CHANGES REQUIRED. NO CONNECTOR SUPPLIED WITH THIS KIT. YOUR ALREADY OBD2 PORT COMPLIANT AND GOOD TO GO!!!



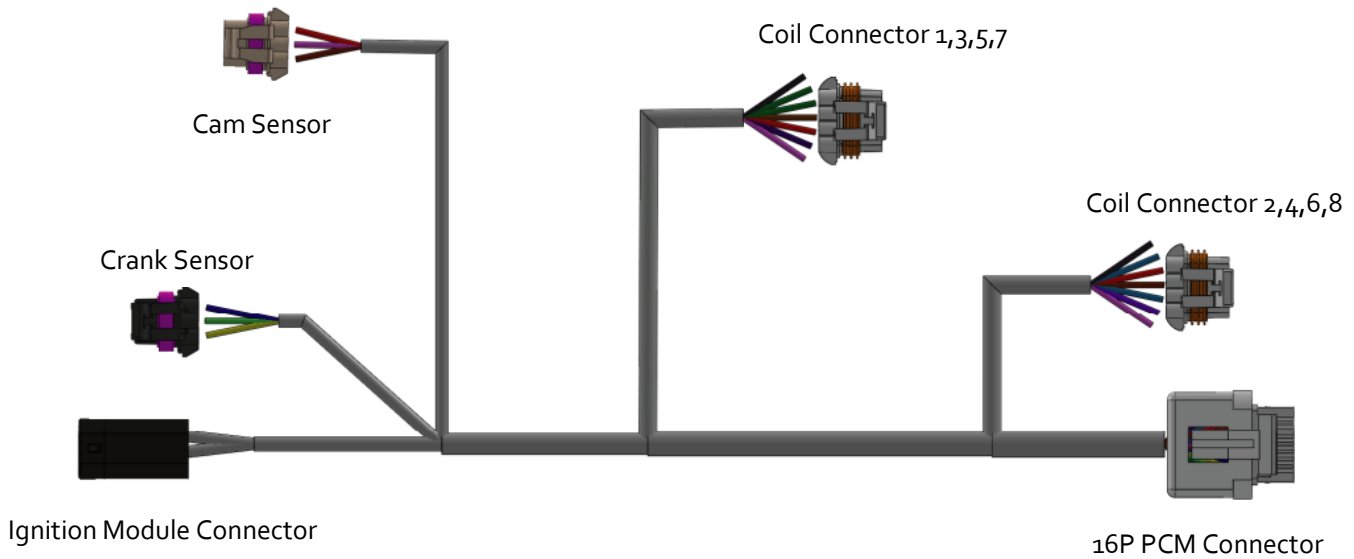
**Troubleshooting:**

Symptom	Cause	Action
<b>Car cranks but does not start</b>	Connector(s) Loose	Check all connectors on the engine and PCM to ensure they are fully seated with no interference.
	PCM has low or no battery voltage	Check for battery voltage at the PCM Connector(s) Black Pin 15 and Black Pin 31.
	PCM has low or no Ignition Voltage	With the key in the ON position, check for ignition voltage at LT1 PCM Connector(s) Blue Pin 3, and Black Pin 30.
	Blown Fuse	Check fuel injector and Ignition fuses.
	Improper or no crank signal	See "No or Improper Crank signal" section
	Coils are not firing	See "coils not firing" section.
	Fuel injectors not firing	See "fuel injectors not firing" section.
	Bad PCM Grounds	Check for ground continuity at LT1 PCM Connector(s) Red Pin 2, Blue Pin 1, Red Pin 18, and Gray Pin 32
	Incorrect PCM engine tune	Ensure your engine tune is correct for your engine. If you engine is modified and has larger injectors than stock the tune supplied with the PCM from TH will most likely not be correct to start and run your vehicle. Seek tuning support locally.
<b>Fuel Injectors not Firing</b>	Blown fuel injector Fuse	Check fuel injector Fuse.
	Bad Connection	Check fuel injector wiring to ensure it is proper working order.
	No Fuel injector Signal from PCM	Use of injector Noid light can help diagnose if fuel injectors are getting signal from PCM. If no signal check continuity between injector signal wire and PCM connector Pin.
	Improper or no crank signal	See "No or Improper Crank signal" section

<b>Coils not firing (no spark)</b>	Blown Fuse	Check fuel injector and Ignition fuses.
	Low or No Ignition Voltage @ Coils	With key in the ON position, check for ignition voltage at each coil connector on the Pink wire (Pin D).
	Bad Ground @ Coils	Check the black (Pin A) and brown (Pin B) wires at each coil for proper signal to ground.
	Low or No Ignition voltage to coil harnesses	With Key in the ON position check for ignition voltage at Pin A of the LT1 ignition module connector (Black connector with blue seal). If your vehicle is a 1992-1995 ensure that you have installed the ignition coil jump connector as per step 3b of these instructions.
	Bad ground at ignition coil harness	Check for a good ground at Pin C of the LT1 ignition coil module connector (black connector with blue seal).
	No Coil Signal from PCM	Check continuity between coil signal wires (color wires @ Pin C of each coil connector) and PCM 16 Pin Connector. Match wire colors to test terminals at both ends.
	Bad spark plug wire	Check resistance of spark plug wire from terminal to terminal. It should be within the manufactures spec. Also check the plug wire for any damage.
	Bad Coil	Replace as necessary.
	Bad or fouled spark plugs	Check spark plug condition and replace as necessary.
	Improper or no crank signal	See "No or Improper Crank signal" section
<b>No or Improper Crank (RPM) signal</b>	Crank sensor air gap not set properly.	Double check crank sensor air gap. If using TH mechanical components refer to TH Signal unit Instructions.
	Crank sensor not centered over 24x crank reluctor	If using TH mechanical components re-adjust the crank sensor by following the

		steps in the TH signal kit instructions.
	Bad crankshaft position sensor	Replace with new or known working crank sensor.
	Crank sensor connector not connected	Connect crank sensor.
	Bad wiring connection	Check for continuity of crank sensor connector terminals to 16 Pin PCM Connector (Center Connector). Do this by matching the wire colors at each connector. Check continuity using multimeter.
	The best way to diagnose the crank sensor signal is using an automotive or other appropriate oscilloscope. Tap into the blue/white wire at the crank sensor and monitor the signal on the oscilloscope while cranking. If it looks as it should, then the signal is good.	
<b>No Communication with PCM via OBD2 ALDL Port</b>	Bad connection	Ensure the OBD tools connector is fully seated. Ensure the PCM connectors are full seated.
	OBD Port Wiring incorrect	Check to ensure the wiring of the OBD port in the vehicle is proper to what is written in this instruction.
	Bad terminal	Check to ensure the OBD port terminals are properly seated and not broken

## ADD-ON HARNESS CONNECTORS, PIN OUT AND WIRE COLORING



### 16P PCM Connector Pin-out:

Pin	Wire Color	CKT	Function	Voltage	
				Key "ON"	Eng "RUN"
1	BRN/WHT	633	CAMSHAFT SIGNAL		
2	PNK/BLK	632	CAMSHAFT LOW REF (GND)	o	o
3	RED	631	CAMSHAFT IGN VOLTAGE	B+	B+
4	DKBLU/WHT	1869	CRANKSHAFT SIGNAL		
5	YEL/BLK	1868	CRANKSHAFT LOW REF (GND)	o	o
6	LT GRN	1867	CRANKSHAFT IGN VOLTAGE	B+	B+
7	DK GRN/WHT	2124	COIL SIGNAL CTRL - CYL 7		
8	DK GRN	2125	COIL SIGNAL CTRL- CYL 5		
9	BRN	2129	LOW REF 1,3,5,7	o	o
10	RED/WHT	2122	COIL SIGNAL CTRL - CYL 3		
11	PPL	2121	COIL SIGNAL CTRL - CYL 1		
12	LT BLU	2123	COIL SIGNAL CTRL - CYL 2		
13	RED	2127	COIL SIGNAL CTRL - CYL 4		
14	BRN/WHT	2130	LOW REF 2,4,6,8	o	o
15	LT BLU/WHT	2126	COIL SIGNAL CTRL - CYL 6		
16	PPL/WHT	2128	COIL SIGNAL CTRL - CYL 8		

### Ignition Module Connector Pin-out

Pin	Wire Color	CKT	Function	Voltage	
				Key "ON"	Eng "RUN"
A	Pink	239	MAIN COIL SWITCHED IGN VOLTAGE	B+	B+
B	Not Used				
C	Black	450	MAIN COIL GROUND	o	o
D	Not Used				

**Crankshaft Sensor Connector Pin-Out**

Pin	Wire Color	CKT	Function
A	DK BLU/WHT	1869	CRANKSHAFT SIGNAL
B	YEL/BLK	1868	CRANKSHAFT LOW REF (GND)
C	LT GRN	1867	CRANKSHAFT IGN VOLTAGE

**Camshaft Sensor Connector Pin-Out**

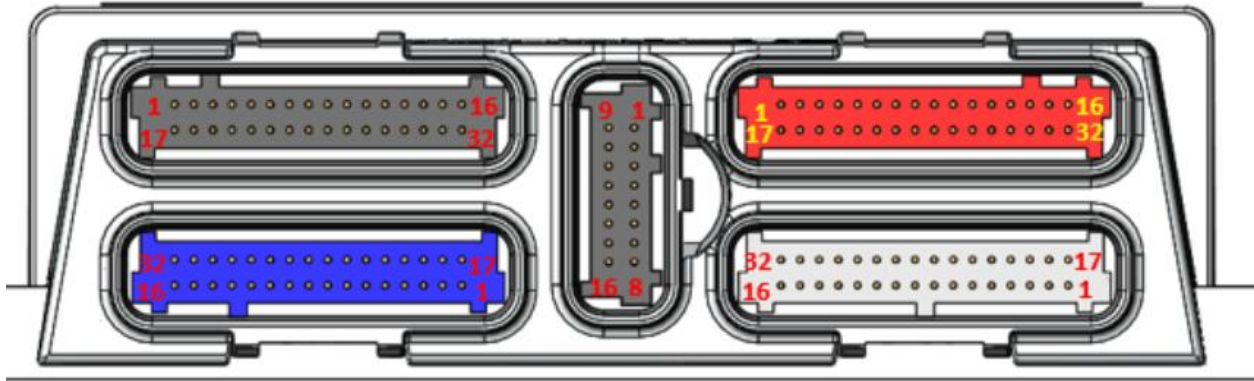
Pin	Wire Color	CKT	Function
A	RED	631	CAMSHAFT IGN VOLTAGE
B	PNK/BLK	632	CAMSHAFT LOW REF (GND)
C	BRN/WHT	633	CAMSHAFT SIGNAL

**Coil Connector Cylinders 1,3,5,& 7**

Pin	Wire Color	CKT	Function	Voltage	
				Key "ON"	Eng "RUN"
A	BLK	450	MAIN COIL GROUND	0	0
B	DK GRN/WHT	2124	COIL SIGNAL CTRL – CYL 7		
C	DK GRN	2125	COIL SIGNAL CTRL – CYL 5		
E	BRN	2129	LOW REF 1,3,5,7	0	0
F	RED/WHT	2122	COIL SIGNAL CTRL – CYL 3		
G	PPL	2121	COIL SIGNAL CTRL – CYL 1		
H	PNK	239	MAIN COIL SWITCH IGN VOLTAGE	B+	B+

**Coil Connector Cylinders 2,4,6,& 8**

Pin	Wire Color	CKT	Function	Voltage	
				Key "ON"	Eng "RUN"
A	BLK	450	MAIN COIL GROUND	0	0
B	LT BLU	2123	COIL SIGNAL CTRL – CYL 2		
C	RED	2127	COIL SIGNAL CTRL – CYL 4		
E	BRN/WHT	2130	LOW REF 2,4,6,8	0	0
F	LT BLU/WHT	2126	COIL SIGNAL CTRL – CYL 6		
G	PPL/WHT	2128	COIL SIGNAL CTRL – CYL 8		
H	PNK	239	MAIN COIL SWITCH IGN VOLTAGE	B+	B+



Pin outs of PCM Connectors Black, Red, Blue and Gray (clear) are identical to 1994-1997 OEM LT<sub>1</sub>/LT<sub>4</sub> PCM. Refer to factory manual or online references for pin outs.

Nitrous Retard/EFI Live Custom operating system COS<sub>5</sub>: Trigger pin is PCM Connector Black – Pin 9. This is a ground trigger (ground the pin = activate).

### Warranty:

This product is warranted against defects in material and workmanship for five years from the date of purchase. If, within five years, you find this product to be defective then please return the product to us and we will – at our discretion – either repair or replace it at no cost to you. This warranty is your sole remedy in the event that the product fails in any way. We hereby also disclaim all liability for incidental or consequential damages arising from the use of this product. Misuse, abuse, or any failure to follow the instructions provided with the product, will result in voiding this warranty. **Call 226-289-3369 for any warranty or technical related issues.**