



## Ford Coyote Main Harness and Harness Kit PN 558-110, 550-619, and 550-625

This wiring harness interfaces a Holley EFI ECU to a Ford Coyote engine that has either had the cam VVT hardware locked out or will utilize the Holley Ti-VCT cam controller (554-145). It is meant to be used in conjunction with an injector harness, a coil harness, and ignition modules. Most stock sensors are used with this harness. There are two optional connectors for interfacing with CAN based Holley modules. There are some loose leads for grounds and power connections.

### INSTALLATION:

1. The main harness was designed to have a main junction point behind the engine where the harness branches to reach the engine sensors. Since many of the sensors are on the back of the engine, it makes sense to drape the harness in place and start plugging things in at the back of the engine.
2. There is a single black wire with a ring terminal that comes from the main junction point. This must be grounded to one of the heads. There are drilled and tapped holes on the back of the heads. Make sure the ring terminal on the black wire is grounded at one of these places. It is best if this ground uses a dedicated bolt or stud.
3. There is a group of three sensors at the back of the engine toward the passenger's side and connectors on the harness with matching labels. There is no connector for the B1 exhaust cam sensor (grey connector) or either cam sensor on B2 since the ECU only needs the B1 intake cam signal for the non-VVT applications.

**Note:** Ti-VCT applications will have an additional harness that plugs into the other three cam sensors.

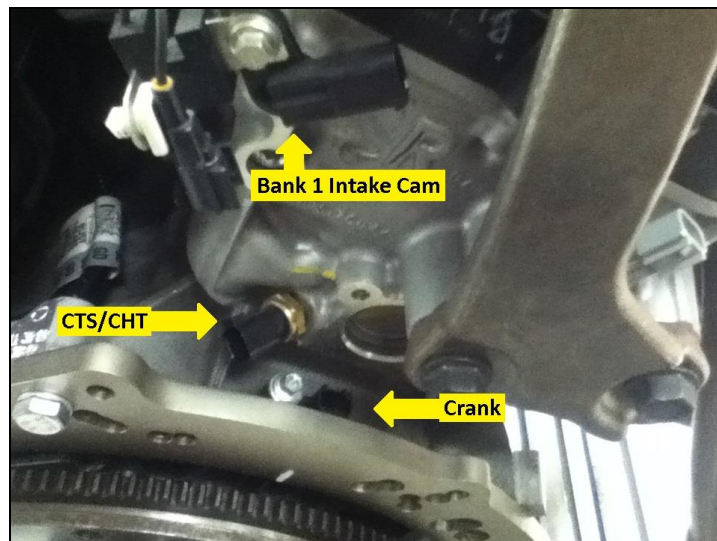
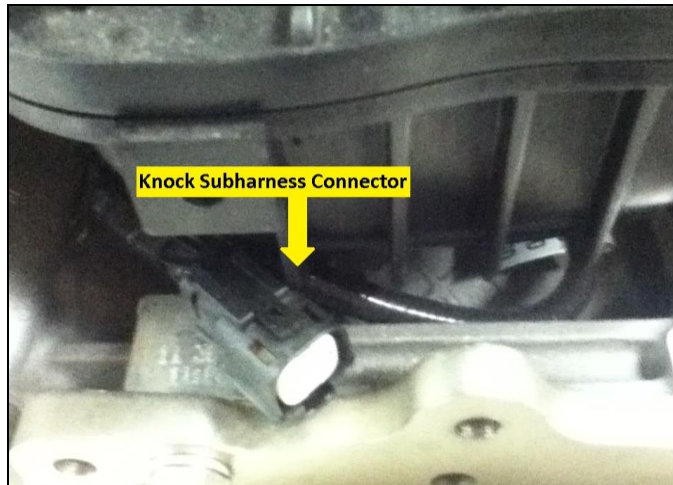


Figure 1

4. There is a 6-cavity connector used to connect the factory knock subharness to the main harness. After making this connection, it can be tucked under the intake manifold.



**Figure 2**

5. The wires to the oil pressure sensor split off at the main junction behind the engine. This can simply be taken over the passenger's side of the intake manifold around the front of the engine, or it can be routed under the manifold. The connector is made to mate to a Holley 554-102 100psig stainless steel pressure sensor or equivalent.
6. There is also a fuel pressure connector that can use the same Holley 554-102 100psig stainless steel pressure sensor. This branch can reach about two feet from the main junction in the back.
7. Although Coyote engines are drive-by-wire from the factory, accommodations have been made for a Ford style TPS and IAC if a manual throttle body is used. These connectors are common to the manual throttle body Ford modular engines of the 99-04 vintage. If you aren't using a manual throttle body, loop, tie, and tuck these branches under the intake manifold. If you do use a two-wire IAC, it needs to be assigned to pin J1B12 (Output #1) on the pinmap. Obviously, Output #1 cannot be used for other functions if it is used for IAC control, so do not pin anything else to pin E of the IO connector. If you are using a DBW throttle body or a manual throttle body without a functional IAC, Output #1 can be utilized for other purposes.

**NOTE:** The IAC signal is connected to Output #1 in the harness whether or not an IAC is selected in the software. Likewise, the sensor 5V goes to the TPS connector whether or not a DBW ICF is used. If you want to permanently remove any branch of the harness, be sure to electrically insulate and environmentally seal any severed connections.

8. The MAP sensor is key to load sensing with the Holley ECU. Even though the original applications did not have MAP sensors, the installation is quite easy. The branch for the MAP sensor splits off about 8" behind the main junction at the rear of the engine. A firewall sensor mounting with a down-facing port is recommended. This simply connects to the plenum via a hose after the throttle body or blower. The MAP sensor should sense the pressure the intake ports "see."
9. The air temperature sensing in the stock applications was primarily done in conjunction with the MAF sensor, but there are accommodations to run a dedicated air temperature sensor. The connector will mate with commonly available Ford air temp sensors. A Motorcraft DY735 (F57F12A697AA, SMP AX31, Wells 5S1039) is an exposed tip, push-in style sensor. There are also some screw-in versions that will mate to the same connector like a Motorcraft DY1159 or SMP AX232, for instance.
10. The MAF sensor connector included in the harness can be used for either IAT and/or air flow monitoring. If using the MAF connector to sense air temperature then do not plug anything into the air temperature sensor connector on the harness.

**NOTE:** The MAF signal is connected to Input #4 in the harness whether or not a MAF sensor is setup in the software. If you want to permanently remove any branch of the harness, be sure to electrically insulate and environmentally seal any severed connections.

11. There are two 10 pin connectors to connect to the injector and coil harnesses. Although they look similar, they are keyed differently so they will not plug into the wrong connector. The injector connector is grey while the connector for the coils is black. There are multiple types of coil harnesses available depending on engine configuration and multiple injector harnesses depending on injector type. They should be plug-and-play.
12. The oxygen sensor uses a shielded jacketed cable that emerges a little further down on the harness. This will correspond to the "AFR Left" reading in the software, so it would make sense to connect this to the left oxygen sensor. If you are running a Dominator and want to run two oxygen sensors, then you need to get the 558-401 J2A adapter harness.
13. There are three more connectors a little further down that are optional and should be left capped when not in use.

The "VVT" connector is included for use with the Holley Ti-VCT cam controller (554-145). Simply plug this in to the "bulkhead" connector on the Ti-VCT controller harness (558-124 or 558-125). Leave capped if you are running your Coyote as a "non-VVT" engine with cams locked.

The "Power Tap" connector is a convenient place to connect to power and grounds when adding additional sensors or actuators.

- Power Tap Pin A – Chassis ground
- Power Tap Pin B – Sensor ground
- Power Tap Pin C – Sensor 5V
- Power Tap Pin D – Output from fuel pump relay (battery voltage when engine is running)

The "Inputs/Outputs" connector is used to access the first four inputs and the first four outputs.

- Inputs/Outputs Pin A – Input 1 (ECU pin J1A12) F 5 2 T H G
- Inputs/Outputs Pin B – Input 2 (ECU pin J1A03) F 5 2 T H G
- Inputs/Outputs Pin C – Input 3 (ECU pin J1A13) F 5 G
- Inputs/Outputs Pin D – Input 4 (ECU pin J1A04) F 5 G (shared with MAF)
- Inputs/Outputs Pin E – Output 1 (ECU pin J1B12) H P+ (shared with IAC)
- Inputs/Outputs Pin F – Output 2 (ECU pin J1B11) H P+
- Inputs/Outputs Pin G – Output 3 (ECU pin J1B10) G P-
- Inputs/Outputs Pin H – Output 4 (ECU pin J1B03) G P-

The harness is prewired so the IAC and MAF are connected to Output 1 and Input 4 respectively. If you do not use the 2-wire IAC connector or the MAF connector you may use that Output or Input for another purpose.

14. Further down the harness, there are four connectors for two ignition modules (554-112). Each ignition module has four drivers. COP applications will need two modules. One module controls the coils on the Cyl 1-4 bank, and the other module controls the Cyl 5-8 bank. The modules are interchangeable, but you need to make sure the connectors marked "1234" go to the same module and the connectors marked "5678" go to the same module.
15. There are two CAN connectors which are only used if you have a CAN based accessory.
16. There are four loose leads that emerge close to the fuse and relay.
  - Red/White wire – Low current signal to turn on the ECU. Must be energized in start and run position.
  - Red wire – Provides power for relay. Must be energized in start and run position. OK to be powered continuously.
  - Green wire – Relay output for fuel pump (also powers ignition and injectors)
  - Blue/White wire – Tachometer output (12V square wave 4 pulses/rev)
17. There is approximately 20" from the ECU connectors to the next set of connectors to facilitate mounting the ECU in the passenger compartment, if so desired.

**NOTE:** The coil and injector harnesses are fairly self-explanatory; however the coil harnesses have connectors that might seem unnecessary. There are two single-pass rectangular connectors that are made to plug into the factory ignition capacitors. The capacitors serve to make the ignition system function well while reducing the amount of RF that is generated by the ignition system. Most stock or take out engines should have the capacitors already

installed on the engine. If they are missing or the engine you purchased did not include the capacitors, they can be purchased at any Ford dealer or from various on-line suppliers. The capacitors are Ford part #6E5T-18801-AB or BL3Z-18801-A. They bolt to the heads to complete the circuit through the mounting tab. The engine will probably run OK without them, however they are recommended as a part of a robust installation.



**Figure 3**

## **SOFTWARE SETUP:**

To setup the ECU, you need to select the proper ignition type so the ECU properly interprets the crank and cam signals and fires the coils with the right dwell. You can find this in the system ICF under Ignition Parameters. The Ignition type should be set as “Ford Coyote locked cams (Non-Ti-VCT)” or “Ford Coyote W/ Ti-VCT” depending on if you plan to lock out the cams or utilize the Holley Ti-VCT cam controller.

There are calibrations built into the Holley software for many of the common factory sensors, but they need to be selected as well. These built in calibrations cover most of the Ford Modular applications and can be selected in the Sensors ICF:

- Coolant Temperature Sensor - Ford Modular CTS
- Air Temperature Sensor - Ford Modular MAT

There are many other sensors that use the same connectors and have the same calibration as the previously referenced part numbers.

**NOTE:** It is highly recommended to use ECUs that have a hardware revision level of L2 or higher with Ford modular applications. All new ECUs purchased from Holley in Ford kits are revision L2 or later and incorporate the latest design updates.

The Rev L2 and newer ECUs have updates to the thermistor inputs (coolant and air temperature sensors) for increased accuracy at low temperatures when using Ford sensors. Earlier ECUs have less than ideal temperature sensor accuracy under cold ambient conditions (less than about 50° F) when using Ford sensors.

Rev J and higher ECUs have improvements to the crank and cam input circuitry that are very important for the Ford applications and are considered to be the earliest rev level that you can use with a stock modular cam sensor if you can live with reduced accuracy at cold temperatures.

The ECU rev level is denoted under the barcode on the back of the ECU. If there is no alphanumeric designation under the barcode, it is a version earlier than a revision level J unit. It is usually followed by the firmware loaded at the time of ECU manufacture. For instance “L2-1588” would mean that the ECU hardware is Rev L2 and it had firmware 1588 loaded in it at the factory. “L-1587” would mean the ECU hardware is Rev L and it had firmware 1587 loaded at the factory. The firmware can be upgraded but the hardware revision cannot. As always we recommend keeping firmware up to date whatever your ECU rev level.

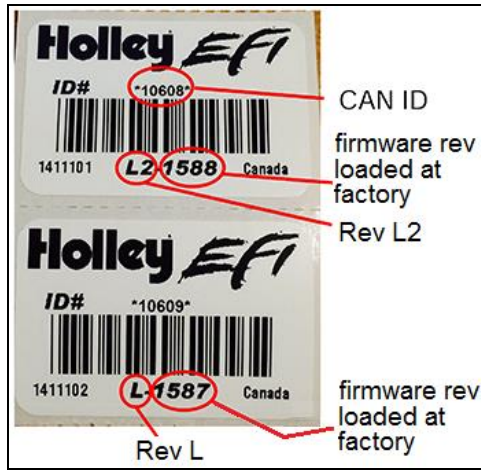


Figure 5

