GEN4 PRO XTREME Installation Instructions

www.**BigStuff3**.com

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The GEN4 PRO XTREME ECU Upgrade Kit (EUK) allows an existing GEN3 PRO SEFI system to be upgraded/converted to a new GEN4 PRO XTREME system by replacing the existing GEN3 PRO SEFI ECU with a new GEN4 PRO XTREME ECU with the option to reuse the existing GEN3 PRO SEFI ECU 60-way “primary side” Main Wire and Injector Wire Harnesses, as well as some of the GEN3 PRO SEFI ECU 60-way “secondary side” “upgrade kit” harnesses. The GEN3 PRO SEFI ECU 60-way “secondary side” “upgrade kit” harnesses can be reused to a certain extent by relocating the wires in the 30-way Cinch ECU connectors to maintain compatibility with the GEN4 ECU.

The GEN4 PRO XTREME ECU Upgrade Kit (EUK) contains the necessary components to upgrade an existing GEN3 PRO SEFI system to a GEN4 PRO XTREME system. The GEN4 PRO XTREME ECU Upgrade Kit (EUK) includes the following items;

- **GEN4 PRO XTREME ECU** includes all 120 ECU pins e.g. (2) 60 pin header connectors. This will allow subsequent optional feature upgrades to be ordered online and downloaded to the GEN4 ECU via the Micro SD card without having to return the ECU to BS3.

- **New Bosch LSU4.9 sensor and 6-way replacement connector kit** (The GEN4 ECU is not compatible with the GEN3 system’s “old” Bosch LSU4.2 WBO2 sensor. The GEN3 MWH’s LSU4.2 WBO2 6-way connector must be removed and replaced with the included LSU4.9 WBO2 6-way connector kit. Instructions on how to replace the LSU4.2 connector with the LSU4.9 connector can be found on the BS3 website under the GEN4 PRO XTREME section).

- **GEN4 PRO XTREME BigComm Pro software license** which can be downloaded directly from the **www.bigcommpro.com** website.

- **8 GB Micro SD Card with USB Drive Adapter** (Micro SD card is used to obtain subsequent optional feature upgrades online and provides 4 GB external data log RAM storage).

- **5’ CAT6a Shielded Ethernet cable** (Connects between GEN4 PRO XTREME ECU’s RJ45 Ethernet port and PC’s RJ45 Ethernet port. If your PC is not equipped with an integrated RJ45 Ethernet port, a USB-to-RJ45 Ethernet Dongle is required. A USB-to-RJ45 Ethernet dongle can be ordered from BS3. The part number is BS4-003-007.

The GEN4 PRO XTREME ECU Upgrade Kit (EUK) not only contains the necessary components to upgrade an existing GEN3 PRO SEFI system to a GEN4 PRO XTREME system but is also the basis for an all new GEN4 PRO XTREME system. The balance of components for a “new” GEN4 PRO XTREME system i.e. upgrade kits with harnesses, main wire harnesses with injector harnesses, coil-on-plug harnesses, etc, can be ordered separately and will be discussed later in these instructions.

These instructions will first discuss how to upgrade a GEN3 PRO SEFI system to a GEN4 PRO XTREME system using the GEN4 PRO XTREME ECU Upgrade Kit (EUK). It will then discuss how the GEN4 PRO XTREME ECU Upgrade Kit (EUK) is used as the basis for an all new GEN4 PRO XTREME System.

4. GEN3 PRO SEFI to GEN4 PRO XTREME ECU Upgrade Kit (EUK) installation

The GEN4 PRO XTREME ECU Upgrade Kit (EUK) allows an existing GEN3 PRO SEFI system to be upgraded/converted to a new GEN4 PRO XTREME System by;

1. Replacing the existing GEN3 PRO SEFI ECU with a new GEN4 PRO XTREME ECU.
2. Reusing the existing GEN3 PRO SEFI systems “primary side” Main Wire and Injector Wire Harnesses as well as some of the GEN3 PRO SEFI ECU 60-way “secondary side” “upgrade kit” harnesses. The GEN3 PRO SEFI ECU 60-way “secondary side” “upgrade kit” harnesses can be reused to a certain extent by relocating the wires in the 30-way Cinch ECU connectors to maintain compatibility with the GEN4 ECU.
3. Removing the existing GEN3 PRO SEFI System’s Bosch LSU4.2 WBO2 6-way connector and replacing it with the GEN4 PRO XTREME ECU Upgrade Kit’s Bosch LSU4.9 WBO2 6-way

connector. The Bosch LSU4.2 WBO2 sensor is not compatible with the GEN4 PRO XTREME system and must be replaced by the Bosch LSU4.9 WBO2 sensor.

The GEN4 PRO XTREME ECU and GEN3 PRO SEFI ECU are the same physical size and have the same mounting provisions. The only difference between the two ECU's may be the existing GEN3 PRO SEFI ECU may only have one 60-way ECU connector, whereas the GEN4 PRO XTREME ECU has two 60-way ECU connectors. Therefore, be sure to mount the GEN4 PRO XTREME ECU in the same location and orientation as the GEN3 PRO SEFI ECU. Please note the GEN4 PRO XTREME ECU "ENGINE (A-K)" and "ENGINE (L-Y)" labels identify the two primary side 30-way Cinch ECU connectors. The existing GEN3 PRO SEFI system main wire harness' two 30-way Cinch connectors need to be connected to the GEN4 PRO XTREME ECU's two primary side 30-way Cinch connectors labeled "ENGINE (A-K)" and "ENGINE (L-Y)".

On the following page, a spreadsheet is shown to compare the GEN3 PRO SEFI ECU to GEN4 PRO XTREME ECU Inputs/Outputs (I/O) relative to the Cinch 30-way primary and secondary ECU connectors. The GEN3 PRO SEFI and GEN4 PRO XTREME ECU I/O relative to the Cinch 30-way primary "ENGINE (A-K)" and "ENGINE (L-Y)" connectors, for the most part, are the same. Therefore, none of these wires need to be relocated. However, some of the GEN3 PRO SEFI wires located in the Cinch 30-way connectors, of the existing GEN3 PRO SEFI upgrade kit harnesses, need to be relocated to be compatible with the GEN4 PRO XTREME ECU I/O for the Cinch 30-way "SECONDARY (A-K)" and "SECONDARY (L-Y)" connectors. The wires can be relocated using the GEN4 Cinch Terminal Removal Kit (P/N: BS4-CIN-001). The **GEN4 PRO XTREME Cinch connector-harness-assembly manual** located on the Bigstuff3 website (www.bigstuff3.com) details how to remove and relocate the wires into the Cinch 30-way connectors using the Cinch Terminal Removal kit. The **GEN3 vs GEN4 PRO XTREME Upgrade Harness Pin Out Comparison** sheet located on the Bigstuff3 website is another good reference to help identify how the wires may need to be relocated into the Cinch 30-way connectors.

GEN3 vs GEN4 ECU I/O Comparison

ECU HEADER 1 30-WAY - ENGINE (A-K)		
ECU Pin	**GEN3 PRO SEFI**	**GEN4 PRO XTREME**
A1	MAP SIGNAL	MAP SIGNAL
A2		TPS2 SGNL / FORD IAC OUT
A3	IPU CRANK (+)	IPU CRANK (+)
B1	TPS1 SIGNAL	TPS1 SIGNAL
B2	2-STEP / STARTING LINE TIMING	2-STEP / STARTING LINE TIMING
B3	IPU CRANK (-)	IPU CRANK (-)
C1	COOLANT TEMP SIGNAL	COOLANT TEMP SIGNAL
C2	COIL 6	COIL 6
C3	IPU CAM (+)	IPU CAM (+)
D1	AIR TEMP SIGNAL	AIR TEMP SIGNAL
D2	TACH OUT	TACH OUT
D3	IPU CAM (-)	IPU CAM (-)
E1	MAP & TPS 5VR	MAP & TPS 5VR
E2	MAP, TPS, AIR & COOLANT RTN	MAP, TPS, AIR & COOLANT RTN
E3	CAM HED SIGNAL	CAM HED SIGNAL
F1	NOS STAGE_3	8-TO-16 INJECTOR BIG DRIVE ENABLE
F2	RUEGOIP (LSU4.2)	RUEGOIP (LSU4.9) / RUEGOIP+ (NTK)
F3	RUEGOIA (LSU4.2)	RUEGOIA (LSU4.9) / RUEGOVS- (NTK)
G1	RUEGOH- (LSU4.2)	RUEGOH- (LSU4.9) / RUEGOH- (NTK)
G2	RUEGOUN (LSU4.2)	RUEGOUN (LSU4.9)
G3	RUEGOVM (LSU4.2)	RUEGOVM (LSU4.9) / RUEGOVS+ (NTK)
H1	H.S. FUEL PUMP ENABLE	H.S. FUEL PUMP ENABLE
H2	COIL 7	COIL 7
H3	COIL 2	COIL 2
J1	COIL 3	COIL 3
J2	HEI GND / LOW CURRENT GND	HEI GND / LOW CURRENT GND
J3	HEI REF. / CRANK HED SGNL	HEI REF. / CRANK HED SGNL
K1	COIL 1	COIL 1
K2	HEI BYPASS	HEI BYPASS
K3	HEI / TFI EST	HEI / TFI EST

ECU HEADER 2 30-WAY - SECONDARY (A-K)		
ECU Pin	**GEN3 PRO SEFI**	**GEN4 PRO XTREME**
A1	INJ 17 / ACCEL SGNL / DUMB COIL1	SPARE A/D_1
A2		SPARE INJECTOR DRIVER
A3		A/C CLUTCH OVERRIDE
B1	INJECTOR 24 / DUMB COIL 8	A/C BUMP INPUT
B2	INJ 18 / TLP & BOOST SGNL / DUMB COIL 2	WG PRESSURE SGNL (BOOST)
B3		TRANS LINE PRESSURE SGNL
C1		RIGHT FRONT SHOCK SGNL
C2	PWRGND1	WHEELIE CONTROL SGNL
C3	INJECTOR 19 / DUMB COIL 3	SHIFT LIGHT
D1		LEFT FRONT SHOCK SGNL
D2	INJECTOR 20 / DUMB COIL 4	DAE2 SENSOR RTN
D3		DBW PEDAL1 SIGNAL
E1	INJECTOR 21 / DUMB COIL 5	DBW PEDAL2 SIGNAL
E2	INJECTOR 22 / DUMB COIL 6	SPARE A/D_2 / DIGISET_6
E3	INJECTOR 23 / DUMB COIL 7	DAE2 SENSOR 5VR
F1		SPARE A/D_3 / DIGISET_5
F2	LUEGOIP (LSU4.2) / LUEGOIP+ (NTK)	LUEGOIP (LSU4.9) / LUEGOIP+ (NTK)
F3	LUEGOIA (LSU4.2) / LUEGOVS- (NTK)	LUEGOIA (LSU4.9) / LUEGOVS- (NTK)
G1	LUEGOH- (LSU4.2) / LUEGOH- (NTK)	LUEGOH- (LSU4.9) / LUEGOH- (NTK)
G2	LUEGOUN (LSU4.2)	LUEGOUN (LSU4.9)
G3	LUEGOVM (LSU4.2) / LUEGOVS+ (NTK)	LUEGOVM (LSU4.9) / LUEGOVS+ (NTK)
H1		LEFT REAR SHOCK SGNL
H2	PWRGND2	SPARE A/D_4 / DIGISET_4
H3		RIGHT REAR SHOCK SIGNAL
J1	TRANS LP / ACCEL/BOOST 5VR	DAE3 SENSOR 5VR
J2		KNOCK RIGHT BANK (+)
J3		KNOCK RIGHT BANK (-)
K1		KNOCK LEFT BANK (+)
K2	TRANS LP / ACCEL/BOOST RTN	DAE3 SENSOR RTN
K3		KNOCK LEFT BANK (-)

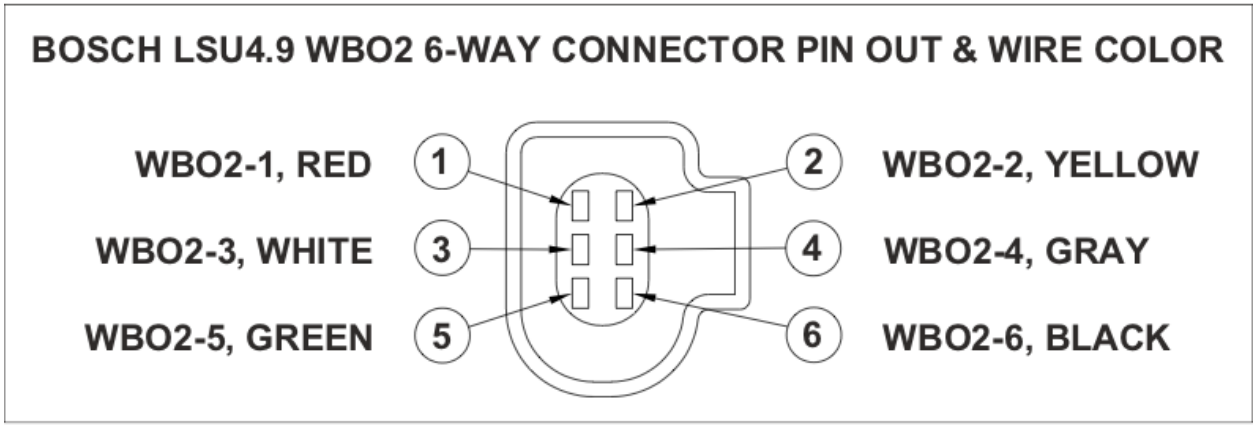
ECU HEADER 1 30-WAY - ENGINE (L-Y)		
ECU Pin	**GEN3 PRO SEFI**	**GEN4 PRO XTREME**
L1	COIL 4	COIL 4
L2	BOOST ENABLE / TIMER ENABLE	TIMER ENABLE
L3	+12V SWITCH	+12V SWITCH
M1	ECU VBATT	ECU VBATT
M2	COIL 5	COIL 5
M3	COIL 8	COIL 8
N1	RS232 TxD	CAN HIGH
N2	RS232 RxD	CAN LOW
N3	RS232 RTN	FAN2 ENABLE
P1	IAC A-LOW	IAC A-LOW
P2	IAC A-HIGH	IAC A-HIGH
P3	PWRGND1	PWRGND1
R1	IAC B-LOW	IAC B-LOW / FORD IAC
R2	IAC B-HIGH	IAC B-HIGH
R3	FAN1 ENABLE	FAN1 ENABLE
S1	INJECTOR 8	INJECTOR 8
S2	INJECTOR 4	INJECTOR 4
S3	L.S. FUEL PUMP ENABLE	L.S. FUEL PUMP ENABLE
T1	INJECTOR 7	INJECTOR 7
T2	INJECTOR 3	INJECTOR 3
T3	BOOST INCREMENT / NOS STAGE_1	BOOST INCREMENT
W1	INJECTOR 6	INJECTOR 6
W2	INJECTOR 2	INJECTOR 2
W3	BOOST DECREMENT / NOS STAGE 2	BOOST DECREMENT
X1	INJECTOR 5	INJECTOR 5
X2	INJECTOR 1	INJECTOR 1
X3	POINTS OUTPUT	POINTS OUTPUT
Y1	ECU VBATT	ECU VBATT
Y2	ECU VBATT	ECU VBATT
Y3	PWRGND2	PWRGND2

ECU HEADER 2 30-WAY - SECONDARY (L-Y)		
ECU Pin	**GEN3 PRO SEFI**	**GEN4 PRO XTREME**
L1	INJECTOR 16	PWM SOLENOID (NOS)
L2	ECU VBATT	NOS BOTTLE PRESSURE
L3	INJECTOR 14	STAGE_5 NOS
M1	INJECTOR 12	STAGE_3 NOS
M2	SHIFT SOLENOID B	SHIFT SOLENOID B / GPIO_1
M3		TRANS MODE A / DIGISET_1 / GPIO_2
N1	INJECTOR 13	STAGE_4 NOS
N2	TCC PWM	TCC PWM / GPIO_3
N3	FORCE MOTOR HIGH	FORCE MOTOR HIGH / GPIO_4
P1	INJECTOR 11	STAGE_2 NOS
P2	SHIFT SOLENOID A / NOS STAGE 4	SHIFT SOLENOID A / GPIO_5
P3		TRANS MODE B / DIGISET_2 / GPIO_6
R1	INJECTOR 15	STAGE_6 NOS
R2	INJECTOR 9	TURBO SHAFT SPEED_1 SGNL
R3	INJECTOR 10	STAGE_1 NOS
S1	TOSS (+) / DRIVE SHAFT HED SGNL	TOSS (+) / DRI VE SHAFT HED SGNL
S2		TRANS MODE C / DIGISET_3 / GPIO_7
S3	TOSS (-) / DRIVE SHAFT (-)	TURBO SHAFT SPEED_2 SGNL
T1	TISS (+) / INPUT SHAFT HED SGNL	TISS (+) / INPUT SHAFT HED SGNL
T2	FUEL PRESSURE SIGNAL	FUEL PRESSURE SIGNAL
T3	TISS (-) / INPUT & TURBO SHAFT (-)	TRANS SENSOR RTN
W1	TURBO SHAFT (+) / 3-STEP ENABLE	3-STEP ENABLE
W2	ECU VBATT	GM FLEX FUEL SENSOR SGNL
W3	FORCE MOTOR LOW / SENSOR RTN	DAE SENSOR RTN
X1	TRANS MD A, TBP SGNL, NOS STG2 DS	TURBO BACK PRESSURE SGNL
X2	TRANS MD B, OP SGNL, NOS STG3 DS	OIL PRESSURE SIGNAL
X3	TRANS MD C, OP VAC SGNL, NOS STG4 DS	OIL PAN VACUUM SIGNAL
Y1	TRANS TEMP SIGNAL	TRANS TEMP SIGNAL
Y2	DATA LOG TRIGGER	DATA LOG TRIGGER
Y3	PAN VAC, OIL, TBB, FP 5VR	DAE SENSOR 5VR

The only remaining installation step to upgrade the GEN3 PRO SEFI system to a GEN4 PRO XTREME system is to remove and replace the Bosch LSU4.2 WBO2 6-way connector from the existing GEN3 PRO SEFI system's main harness with the included GEN4 PRO XTREME ECU Upgrade Kit's Bosch LSU4.9 WBO2 6-way connector kit.

NOTE: The GEN3 PRO SEFI system's Bosch LSU4.2 WBO2 sensor **is not** compatible with the GEN4 PRO XTREME system. The GEN4 PRO XTREME system is only compatible with the Bosch LSU4.9 WBO2 sensor. Therefore, the GEN3 Main Wire Harness' existing Bosch LSU4.2 WBO2 6-way connector must be removed and replaced with the enclosed Bosch LSU4.9 WBO2 6-way connector kit as follows;

1. Cut off Bosch LSU4.2 WBO2 6-way connector from the GEN3 PRO SEFI system's main wire harness. Be sure to cut as close to the 6-way connector as possible.
2. Strip the wire sleeving back ~1/4" to exposed wires on all six wire leads.
3. Slip enclosed wire seals onto sleeving of all six wire leads leaving only the wire exposed.
4. Carefully place terminal onto wire sleeving/seal/exposed wire lead ensuring proper position. Once properly positioned, crimp terminal onto wire and seal. Make sure the terminal is properly crimped onto wire by pulling terminal to make sure it does not come off.
5. Repeat Step 4 for the remaining wire leads.
6. Insert the (6) crimped terminal/wire assemblies into the enclosed Bosch LSU4.9 WBO2 6-way connector as shown below. Please note the numbers shown in the diagram below correspond to the numbers molded into the backside edge of the Bosch LSU4.9 6-way connector where the wires are inserted into the connector. Be sure the terminals are properly positioned and orientated when inserting them into the connector. Once inserted, be sure they are properly seated into the connector by pulling on the wires to ensure they do not pull out of the connector.
7. Complete the installation by pushing the pink plastic terminal retaining clip through the side of the Bosch LSU4.9 6-way connector. Make sure the clip is properly positioned into the connector to ensure secondary terminal retention. The pink terminal retaining clip is properly seated once the two pink tabs are centered between the two center terminal positions.



Once the GEN3 PRO SEFI to GEN4 PRO XTREME system installation is completed, please proceed to section 6 of these instructions.

5. New GEN4 PRO XTREME System installation

The instructions will now focus on the installation steps associated with a new GEN4 PRO XTREME system. They will explain how to install, a new GEN4 PRO XTREME system, which at a minimum, includes a GEN4 PRO XTREME ECU Upgrade Kit (EUK) along with a new GEN4 PRO XTREME main wire harness (MWH) with injector wire harness (IWH). As mentioned previously, the GEN4 PRO XTREME ECU Upgrade Kit (EUK) not only contains the necessary components to upgrade an existing GEN3 PRO SEFI system to a GEN4 PRO XTREME system but is also the basis for an all new GEN4 PRO XTREME system. All of the GEN4 PRO XTREME system components, i.e. GEN4 PRO XTREME ECU Upgrade Kits, main wire harnesses with injector harnesses, coil-on-plug harnesses, etc, can be ordered separately using the GEN4 online order form found on the Bigstuff3 website.

After detailing how to install a “minimally” configured GEN4 PRO XTREME system, the instructions will then elaborate on the numerous standard feature upgrades, optional feature upgrades as well as the all new GEN4 BIG BAND 4-Channel and 8-Channel WBO2 and Thermocouple modules. Below, is an example of a full featured GEN4 PRO XTREME system configuration.

6. GEN4 PRO XTREME Main Wire Harness Installation

To improve the overall wire harness installation process, the GEN4 PRO XTREME main wire harness has identification labels at the end of each wire or connector to ensure proper connections. The main wire harness has two halves; one half is intended to be located inside the vehicle to connect to the ECU, the other half connects to the sensors in the engine compartment. The two halves of the harness are separated by a firewall grommet designed to fit into a 2-1/8" hole in the firewall.

The best location for the hole in the firewall is in an unobstructed location, on either side of the engine closest to where the ECU will be mounted in the passenger compartment. Care should be taken to keep the harness as close to the center of the vehicle as possible. Locating the hole too far away from the vehicle center may affect wire lengths that connect to sensors on the engine. Once the main harness grommet is installed into the firewall, the connections need to be made to sensors, the ECU, etc.

The instructions below are specific to the GEN4 PRO XTREME systems. Hyperlinks (underlined, blue wording) in the column titled "Further Details" are included to further assist with the main wire harness installation. Left clicking the PC's mouse on the hyperlink will immediately link to a photo of the connector along with additional installation information. To return to the same location in the table, simply left click on the "Return-to" hyperlink at the end of the text.

Note: Additional components such as relays and special connectors may be required to complete your specific installation. Contact your dealer or BigStuff3 for further details.

Important System Wiring/Grounding Notes:

BigStuff3 cannot stress the importance of properly grounding the GEN4 PRO XTREME system!! The GEN4 PRO XTREME **main wire harness ground cables, and the ignition system ground cable(s), MUST BOTH be grounded to the same negative post, of the same battery!!** Failure to run the ground cables from **both** of these systems **directly to the battery** will cause performance issues and potentially damage one or both of the electronic systems. No other ground paths/solutions are acceptable!

A common practice is to run a AWG 1 through AWG 4 isolated ground from the battery to a firewall ground lug, and then run every other electrical system ground to it. This grounding solution will create ground loop issues!! If the isolated ground lug is only going to be used for the GEN4 and ignition system, then it will work. The problem with this approach is that with time other systems also end up being grounded to this lug, which will then cause ground loop issues. To avoid ground loop issues, and the hours of frustration that come with them, ground the BS3 and MSD systems directly to the battery!!

Also, do not splice any other ground wires (from other systems/components) into either the MSD or BS3 ground cables.

The GEN4 system 12V power cables can be connected to the vehicle cut-off switch. Power for the GEN4 system and the ignition system should also be from the same source (the battery or the cutoff switch). To avoid the potential of severely damaging the ECU, make the positive and negative connections to the **battery first,** and then connect the header connectors to the ECU.

For coil-on-plug systems, the main wire harness "coil ground" wire (eyelet) must also be grounded to the **cylinder head/engine**. No other ground locations are adequate.

If a 16V charging system is being used, **do not charge the battery with the ignition switch on**. The 16V battery charger can reach peak voltages above the maximum rated voltage of some of the electronic circuitry. These over-voltage conditions can completely damage the ECU. This type of damage is easy to identify and is not covered under the factory warranty! Also, when running a 16V charging system with a GEN4 coil-on-plug system, the maximum coil dwell cannot exceed 4 milliseconds. If running a 12V system, the maximum coil dwell cannot exceed 6 milliseconds.

The GEN4 PRO System has two main wire harness types. The first is a "Base" main wire harness intended for distributor based systems and the other is a "Universal" main harness for distributor and/ or Coil on Plug (COP) systems. These instructions will focus on the Universal main wire harness. The primary difference between the two main harnesses is that the Universal main wire harness has provisions for COP connections, whereas the Base main wire harness does not have COP provisions.

Harness Label	Wire Color/Connector Type	Label Definition	Connect To	Further Details
CAN PORT (formerly **Calport** for GEN3 PRO SEFI system)	Black, 3-way Packard connector with a purple seal	The CAN PORT allows the GEN4 ECU to interface with external BS3 Touch Screen dash or 3rd party CAN modules.	Connect to the BS3 Touch Screen Dash or 3rd party CAN modules.	CAN PORT for further information.
PRIMARY FUEL PUMP (LS) Must be wired as the **Primary** fuel pump!	Black, 1-way Male Packard connector with a single black/white striped wire.	Primary Fuel Pump Relay Low Side connection	Connect to the **negative** side of the fuel pump **relay**.	Do not connect this wire directly to the fuel pump. A relay must be used. PRIMARY FUEL PUMP (LS)

SECONDARY FUEL PUMP (HS) Must be wired as the **Secondary** fuel pump!	Black, 1-way Female Packard connector with a single red/white striped wire	Secondary Fuel Pump Relay High Side connection	Connect to the **positive** side of the fuel pump **relay**.	Do not connect this wire directly to the fuel pump. A relay must be used. SECONDARY FUEL PUMP (LS)
Harness Label	**Wire Color/Connector Type**	**Label Definition**	**Connect To**	**Further Details**
FAN (LS)	Black, 1-way Male Packard connector with a single black/red striped wire.	Engine Cooling Fan Relay Low Side connection	Connect to the **negative** side of a cooling fan relay.	Do not connect this wire directly to the fan or positive side of the relay. A relay must be used. FAN (LS)
POINTS	Single white wire	Connection for inductive pickup ignition	**Only** to the MSD system white points input wire	POINTS
+12V SWITCH	Single pink wire	Switched 12V supply input	Connect to a 12V source that is "live" when the ignition key is in the "start" position	See +12V SWITCH paragraph below for further information. +12V SWITCH
BATTERY (+) & **BATTERY (-)**	Four (4) red wires with (2) 3/8" ring terminals and three (3) black wires with (2) 3/8" ring terminals)	Positive and Negative Battery Connections	**Connect directly to the vehicle battery only!**	See paragraph below titled "Battery Connections" for further important information. Battery Connections
HEI (GEN4 PRO XTREME Base MWH only)	Black, 4-way Male Packard connector	High Energy Ignition [Original Equipment (OE) ignition]	Connect to GM factory installed ignition system.	**Inductive pickup ignitions will not use this connection!** See paragraph below titled "HEI" for further relevant information. HEI
CAM IPU	Gray, 2-way Female Packard connector with a separate ground wire (3/8" ring terminal)	Camshaft Position Sensor Input for **Inductive Pickup** Cam sensor	Connect to the engine's camshaft position sensor	Used only for injector phase angle and individual cylinder spark control. System includes mating 2-way Packard connector & terminals. CAM (IPU)

CAM HED	Black, 4-way Female Packard connector	Camshaft Position Sensor Input for +5V or +12V **Hall Effect** Cam sensor	Connect to the engine's camshaft position sensor	Used only for injector phase angle and individual cylinder spark control. System includes mating 4-way Packard connector & terminals. CAM HED
Harness Label	**Wire Color/Connector Type**	**Label Definition**	**Connect To**	**Further Details**
CRANK IPU	Black, 2-way Male Packard connector with a separate ground wire (3/8" ring terminal)	Crankshaft Position Sensor Input for **Inductive Pickup** Cam sensor	Connect to engine's crankshaft position sensor	System includes a mating 2-way Packard connector & terminals. CRANK IPU
CRANK HED	Black, 4-way Male Packard connector	Crankshaft Position Sensor Input for +5V or +12V **Hall Effect** Crank sensor	Connect to engine's crankshaft position sensor	System includes a mating 4-way Packard connector & terminals. CRANK HED
H2O	Black, 2-way Packard connector	Engine Cooling Fluid Temperature Input	Connect to the engine's GM (only) coolant temp. sensor, typically located on the intake manifold	Used to measure engine coolant temperature for the purpose of calibrating cranking fuel and warm up enrichment. H20
AIR	Gray, 2-way Packard connector.	Engine Intake Air Temperature Input	Connect to the engines' GM (only) air temp. sensor typically located in the air intake duct between the air cleaner and the throttle body	Used to measure the manifold air temperature for the purpose of several fuel and spark related compensations. AIR
IAC	Black, 4-way Packard connector	Idle Air Speed	Connect to the IAC motor assy located on or	Used to meter and controls intake air around the throttle

		Control (IAC) input	near the throttle body.	blades at idle and during cold starts. IAC
TPS	Black, 3-way Packard connector	Throttle Position Sensor	Connect to the TPS located at the end of the throttle shaft on the throttle body	Used to measure the position of the throttle blades [0% (throttle closed) to 100% (throttle wide open). TPS
Harness Label	**Wire Color/Connector Type**	**Label Definition**	**Connect To**	**Further Details**
MAP	Green, 3-way Packard connector	Manifold Absolute Pressure Sensor	Connect to the MAP sensor	Used to measure the engines Manifold Absolute Pressure, which is a key parameter for fuel, spark and lambda control. MAP
CHEVY COILS-ODD	White, 7-way Packard connector	Coil on Plug – Chevy 1, 3, 5 & 7 coils	Connect to mating GEN4 PRO XTREME "Smart" High Output & High Current Output COP harnesses	Used for Chevy COP applications using the GEN4 PRO XTREME Smart Coils. CHEVY COILS-ODD
CHEVY COILS-EVEN	White, 7-way Packard connector	Coil on Plug – Chevy 2, 4, 6 & 8 coils	Connect to mating GEN4 PRO XTREME "Smart" High Output & High Current Output COP harnesses	Used for Chevy COP applications using the GEN4 PRO XTREME Smart Coils. CHEVY COILS-EVEN
FORD COILS-1234	White, 7-way Packard connector	Coil on Plug – Ford 1, 2, 3 & 4 coils	Connect to mating GEN4 PRO XTREME "Smart" High Output & High Current Output COP harnesses	Used for Ford COP applications using the GEN4 PRO XTREME Smart Coils. FORD COILS-1234
FORD COILS-5678	White, 7-way Packard connector	Coil on Plug – Ford 5, 6, 7 & 8 coils	Connect to mating GEN4 PRO XTREME "Smart" High Output & High Current Output COP harnesses	Used for Ford COP applications using the GEN4 PRO XTREME Smart Coils. FORD COILS-5678

COILS GND TO HEAD	⅜" RING TERMINAL	A separate Coil on Plug ground wire is required for COP applications	Fasten the COILS GND TO HEAD ⅜" Ring Terminal to the backside of the cylinder head	Required for all COP applications. COILS GND TO HEAD
BOOST / BD2	Black 4-way Packard connector with an orange seal	Boost Control, Secondary BIG DRIVE (BD) enable for 16 Injector systems, and Timer/ Boost enable	Connect to BOOST /BD2 4-way connector A: Trigger Timer/Boost Enable wire, B: Increment Boost valve C: Decrement boost valve D: Secondary BIG DRIVE enable wire	BOOST / BD2
2-STEP	Single yellow wire	2-Step trigger function	Clutch or trans brake switch	2-STEP
Main Fuse & Relay	N/A	N/A	N/A	Main Fuse & Relay
ECU Battery Fuse	N/A	N/A	N/A	ECU Battery Fuse
MAIN WIRE HARNESS (2) CINCH 30-WAY ENGINE (A-K) & ENGINE (L-Y) ECU Connectors	(2) Cinch 30-way connectors	ENGINE (A-K) & ENGINE (L-Y)	Connect to GEN4 PRO XTREME ECU'S (2) CINCH 30-way Header connectors	GEN4 PRO XTREME ECU ENGINE (A-K) & ENGINE (L-Y) Connection
INJECTOR	Black, 10-way Packard connector	Injector harness connector	Connect to Injector wire harness	INJECTOR
WIDEBAND 02	Black, 6-way Tyco connector	Wideband 02 Sensor connector	Connect to Bosch LSU4.9 Wideband O2 Sensor	WIDEBAND O2

The following section of the instructions provide additional details for the information outlined in the table above.

CANPORT ***(Black, 3-way Packard connector with a purple seal)***

The GEN4 PRO XTREME main wire harness' **CAN PORT** black, 3-way

Packard connector connects to the BS3 Touch Screen Dash or 3rd Party CAN Modules.

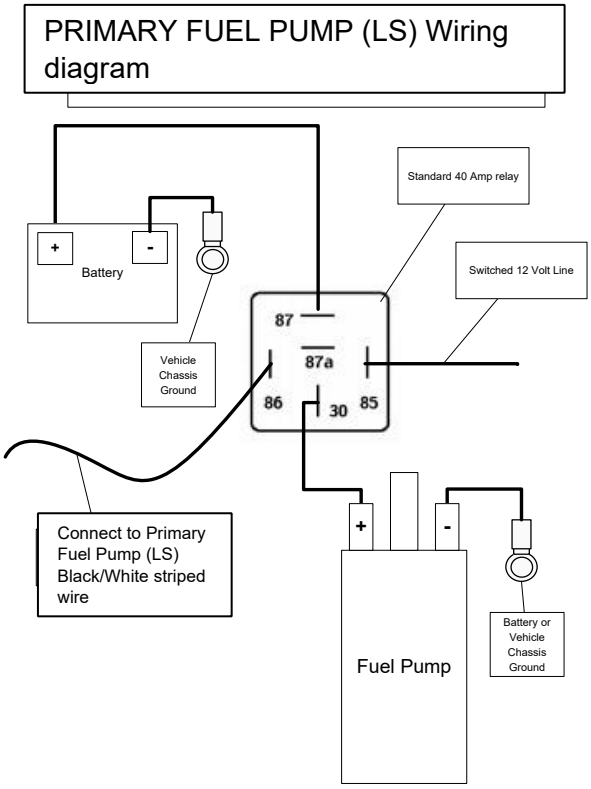
Do not connect the GEN4 PRO XTREME 3-way CAN PORT connector to the GEN3 PRO SEFI systems 3-way BIGCOM serial cable.

Back to CAN PORT

PRIMARY FUEL PUMP (LS) – (Black, 1-way Male Packard connector with a single BLACK/WHITE striped wire)

This is the PRIMARY pump connection. If only one fuel pump is being used, it must be wired to this low side connection!

The PRIMARY FUEL PUMP lead **must** connect to the negative side of a fuel pump relay, not directly to the fuel pump. **Connecting directly to a fuel pump will damage the GEN4 PRO XTREME ECU and will void the warranty!** The primary fan wire is black with a red stripe, but the connector is identical to the fuel pump connector(s); so make sure to read the wire label to ensure the connector is terminated correctly. Wire the primary (low side) fuel pump relay per the diagram below.



This diagram is also available on the Bigstuff3 website via this link:

http://bigstuff3.com/pdf/LS%20Fuel%20Pump%20Wiring%20Diagram.pdf. The fuel pump relay is **not** supplied with the system. A standard 40 Amp, four post relay, available at most part stores, will work. Back_to_PRIMARY FUEL PUMP (LS)

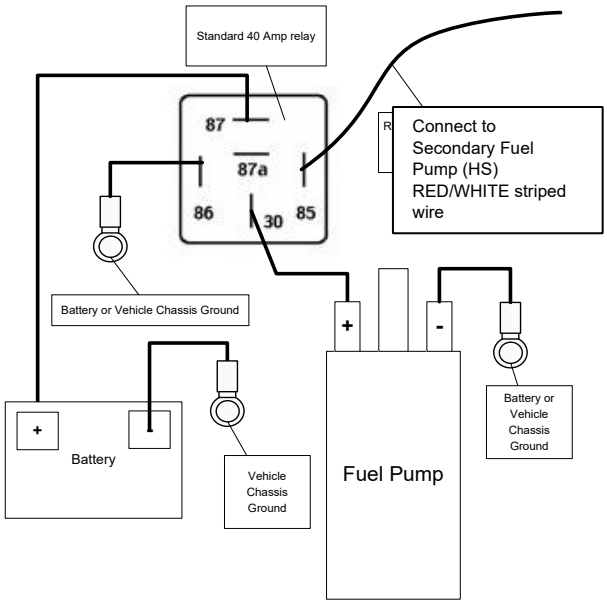
SECONDARY FUEL PUMP (HS) – (Black, 1-way Female Packard connector with a single RED/WHITE striped wire)

This is the SECONDARY pump connection. If only one fuel pump is being used, it must be the Primary Fuel Pump (LS) shown above! The secondary fuel pump turns on as a function of throttle position and is configurable!

The SECONDARY FUEL PUMP lead **must** connect to the positive side of a fuel pump relay, not directly to the fuel pump. **Connecting directly to a fuel pump will damage the GEN4 PRO XTREME ECU and will void the warranty!** The fan connector is identical to the fuel pump connector(s); so make sure to read the wire label to ensure the connector is terminated correctly.

Wire the secondary (high side) fuel pump relay per the diagram below.

SECONDARY FUEL PUMP (HS) Wiring diagram



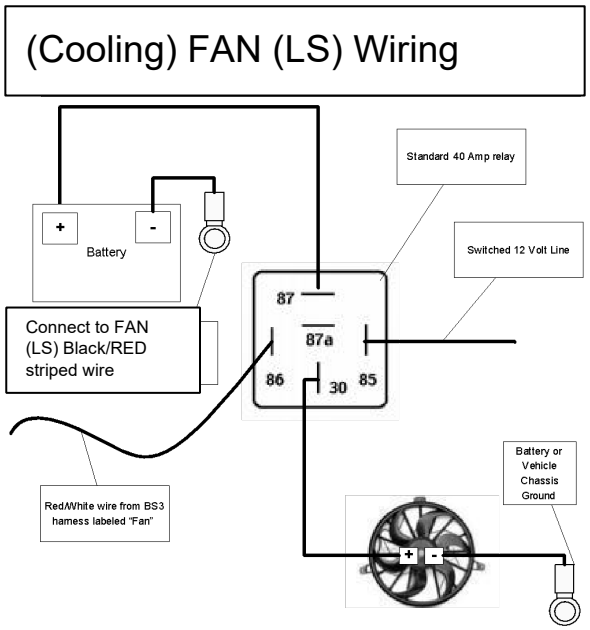
This diagram is also available on the Bigstuff3 website via this link: http://bigstuff3.com/pdf/HS%20Fuel%20Pump%20Wiring%20Diagram.pdf. The fuel pump relay is not supplied with the system. A standard 40 Amp, four post relay, available at most part stores will work.

Back to SECONDARY FUEL PUMP (HS)

FAN (LS) – (Black, 1-way Male Packard connector with a single BLACK/RED striped wire)

The FAN (LS) lead **must** connect to the negative side of a cooling fan relay, not directly to the cooling fan. **Connecting directly to a cooling fan will damage the GEN4 PRO XTREME ECU and will void the warranty!** The fan connector is identical to the fuel pump connectors; so make sure to read the label to ensure the connector is terminated correctly.

Wire the cooling fan relay per the diagram below.



This diagram is also available on the Bigstuff3 website via this link: http://bigstuff3.com/pdf/Cooling%20Fan%20Wiring%20Diagram.pdf. The fan pump relay is not supplied with the system. A standard 40 Amp, four post relay, available at most part stores will work.
Back to FAN (LS)

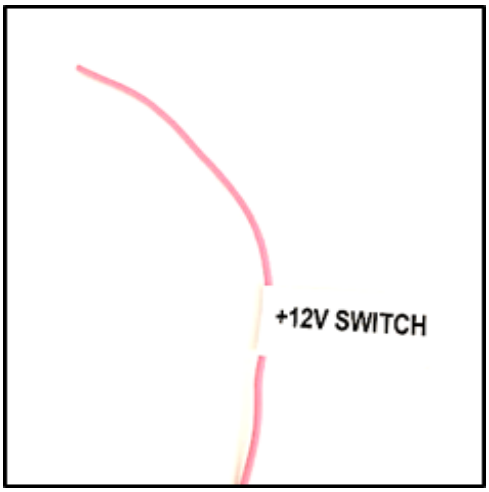
POINTS – ***(Single, White wire)***

The GEN4 PRO XTREME "POINTS" output wire connects to an aftermarket ignition module, e.g. MSD 6A box when used with a distributor based system. It does not need to be connected if a factory ignition or Coil-on-Plug ignition system is being used.

- Note : Applying 12V to the BS3 points wire will immediately damage the GEN4 PRO XTREME ECU!

Back to POINTS

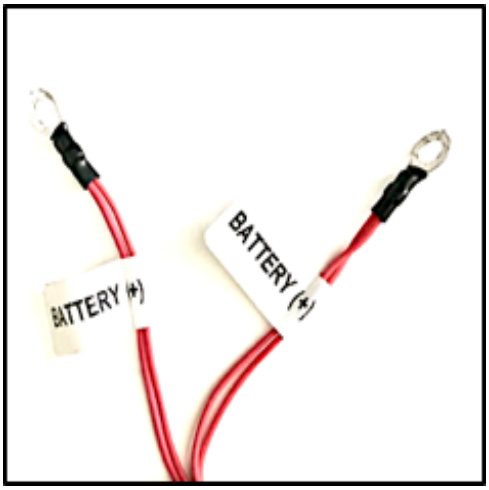
+12V SWITCH – ***(Single, Pink wire)***



The GEN4 PRO XTREME "+12V SWITCH wire must connect to a **secure** +12V switched supply. The best source is a switched 12V supply at the vehicle fuse block. Twelve volts (12V) must be present on this wire during and after cranking. If the 12V supply does not remain during and after cranking, the ECU will not power up and the engine will not start and/or remain running. A simple way to determine if a live 12V supply exists during cranking is to check it with a voltmeter. Securely fasten the voltmeter's red (+ positive) wire to the ignition input on the fuse block. Secure the voltmeter's black wire (- negative) to a adequate ground location. Crank the engine and the voltage meter should indicate an output of between 12 to 14 volts. If the output voltage is below 12 volts, check to make sure the battery is fully charged and all the cells of the battery are functioning properly.

NOTE: If the engine cranks, but does not start make sure the battery voltage is at or above 12V during cranking. Low battery voltage conditions must be fixed prior to starting the engine. Battery voltage (especially during cranking) is even more important with coil-on-plug applications. Back_to_+12V SWITCH

POSITIVE (BATTERY (+) & NEGATIVE BATTERY (-) – (Four (4) red wires with (2) 3/8" ring terminals and three (3) black wires with (2) 3/8" ring terminals)



The GEN4 PRO XTREME **main wire harness ground cables and the ignition system must BOTH be grounded to the same negative post of the same battery!!** Failure to run the ground cables from both these systems directly to the battery will cause performance issues and potentially damage one or both of the electronic systems. No other ground paths/solutions are acceptable!

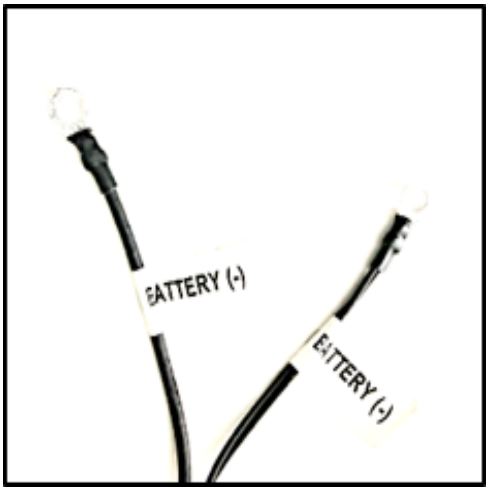
To avoid ground loop issues, and the hours of frustration that come with them, ground the BS3 and MSD systems directly to the battery!!

Also, do not splice any other ground wires (from other systems/components) into either the ignition or BS3 ground cables.

The GEN4 PRO XTREME system 12V power cables can be connected to the vehicle cut-off switch.

Power for the GEN4 PRO XTREME system and the ignition system must be from the same source (the battery or the cutoff switch).

The positive and negative battery cable lengths have been designed (are long enough) to accommodate a trunk-mounted battery. If the cable lengths are not long enough, splice, solder and shrink wrap AWG 8 wire the remaining distance to the battery. Make sure the two clearly



marked black **BATTERY (-)** wires with 3/8" ring terminals are **securely fastened to the negative battery post (NO EXCEPTIONS).** The red **BATTERY (+)** wires with 3/8" ring terminals must be securely fastened to the positive (+) battery post. Connecting the positive and negative cables to the wrong battery post **will damage the GEN4 PRO XTREME ECU**. This type of damage is easy to identify and is not covered under the factory warranty. To avoid the potential of severely damaging the ECU, connect the (2) 30-WAY Main Wire Harness connectors to the ECU **only after the battery connections are properly made**. Back to Battery Connections

Ignition Systems Setup

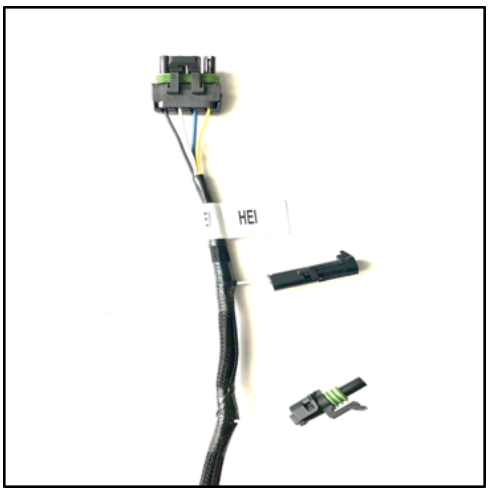
For additional information on ignition system setups, go to the BigStuff3 website, and then the document titled Ignition System Setup Tutorial. The link is: http://bigstuff3.com/pdf/Ignition%20Guide%20rev%201.2.pdf. The Ignition System Setup Tutorial document covers the following nine (9) ignition system setups:

1. Stand-alone IPU Distributor Only
2. Modified IPU Distributor (serving as the cam sync) with a Crank Trigger Setup
3. MSD Distributor Used to Only Distribute Spark from an MSD 6A/7A/8A ignition box, with a Crank Trigger.
4. MSD 2340 Cam Sync Distributor with a Crank Trigger Setup
5. MSD All-in-One, Crank and Cam Sync Distributor
6. GM's CAM Sync Drive with BigStuff3's 24 Tooth Crank Wheel.
7. MSD Mag44 Magneto
8. GM LS1/2/7 COP System
9. Ford Mod Motor COP System

Also in the "How-to/Help" section of the website there is additional information on the setting up the Ford TFI, GM HEI, GM Opti-spark & MSD8 ignition systems. More information, along with the appropriate links to the website, is provided below.

HEI – ***(Black, 4-way Packard connector)***

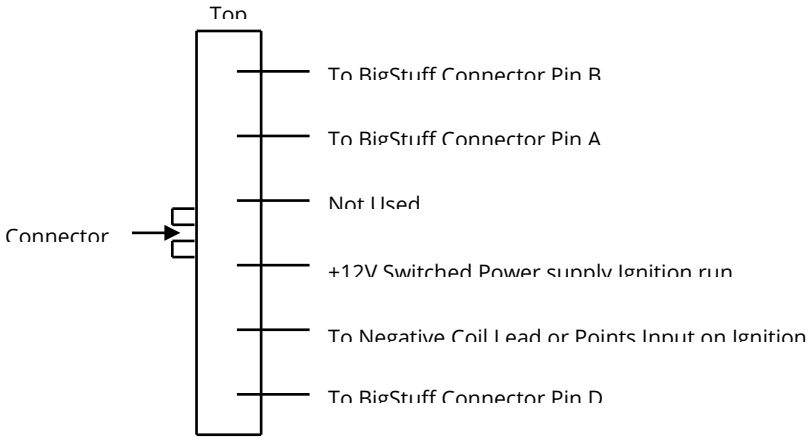
The main harness HEI connection is designed to work with a GM Y-car (Corvette) distributor. The HEI connection also includes a “bypass” connector for setting the timing.



Re-configuring the A, B, C and D pins of the main harness HEI connector allows for other types of types of ignition systems to be used. The diagrams below outline connector configurations that can be made to interface with Ford TFI, Buick DIS, GM Optispark and GM Northstar ignition systems. Back to HEI

HEI Connector on Main Wire Harness	A	B	C	D
Ford TFI	Spout	PIP	Not Used	Ground
GM HEI	EST	REF HI	Bypass	DIST RTN
Buick DIS	EST	REF HI	Bypass	DIST RTN
GM Optispark	EST	LOW RES	Not Used	DIST RTN
GM Northstar DIS	EST	Crank Ref	Bypass	DIST RTN

Ford Thick Film Ignition (TFI) Pin-out Detail

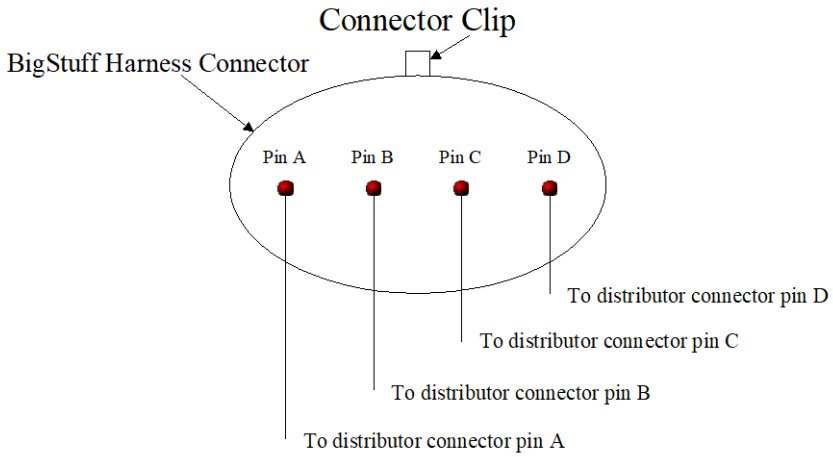


Note: BigStuff Connector Pin C is not used with the Ford TFI

More Ford TFI ignition wiring information is available on the Bigstuff3 website via this link: http://bigstuff3.com/pdf/Ford%20TFI.pdf.

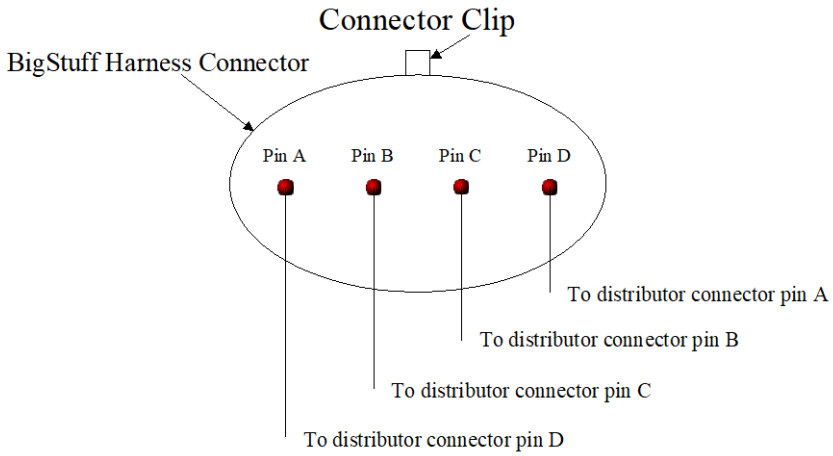
GM High Energy Ignition (HEI) Pin-out Detail

(For Distributors with Ignition Coil in the Distributor Cap)



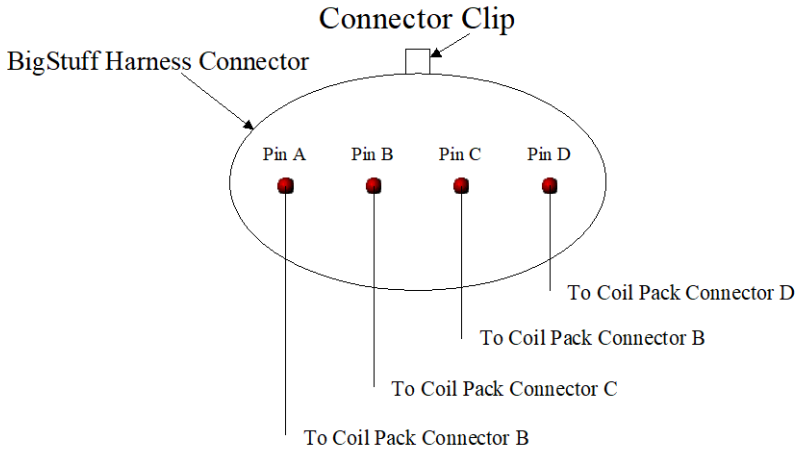
GM High Energy Ignition (HEI) Pin-out Detail

(For Distributors with External Ignition Coil)

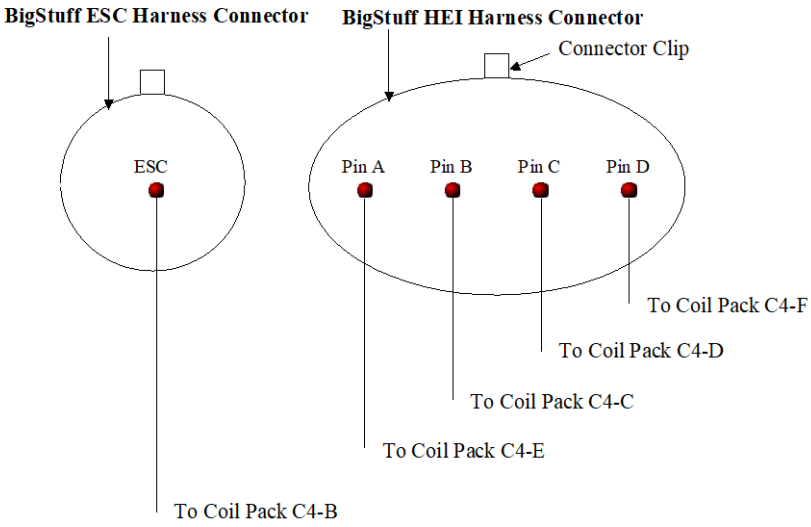


More GM HEI ignition wiring information is available on the Bigstuff3 website via this link: http://bigstuff3.com/pdf/Visio-Small%20Cap%20HEI%20Drawing.pdf.

Buick Direct Ignition System (DIS) Pin-out Detail

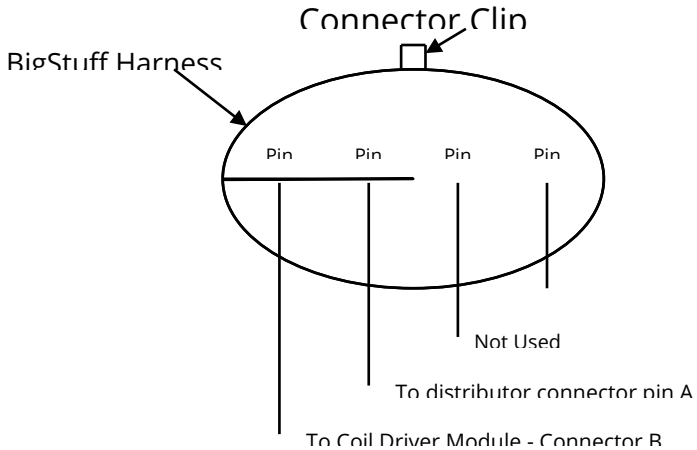


GM Northstar Direct Ignition System (DIS) Pin-out Detail



More GM Opti-spark ignition wiring information is available on the Bigstuff3 website via this link:

GM Opti-spark Ignition Pin-out Detail

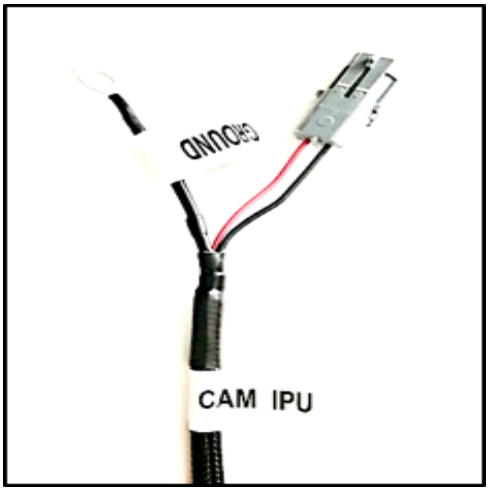


http://bigstuff3.com/pdf/OPtiSpark%20to%20BS3%20HEI%20Wiring.pdf.

Back to Ignitions

CAM IPU ***– (Gray, 2-way Female Packard connector with a separate ground wire with a 3/8" ring terminal)***

For GEN4 PRO XTREME distributor based applications, BigStuff3 recommends using the CAM (IPU) sync input. The CAM (IPU) sync input is required for all coil-on-plug applications. The GEN4 PRO XTREME system will operate sequentially without the cam sync hooked up, but the point of injection (the number of degrees BTDC where the fuel is injected) will vary every time the engine is started. Individual spark control per cylinder will also not function without the CAM (IPU) sync hooked up.



The GEN4 PRO XTREME main wire harness' **CAM IPU** gray 2-way Packard connector must be connected to the engine's inductive pickup Cam sensor or distributor (not supplied). The 3/8" ring terminal must be fastened to a secure ground location, preferably on the engine block near the Cam sensor. The system is supplied with the CAM IPU sensor side 2-way Male mating connector, terminal and seals, which needs to be configured per the table below. Back to CAM IPU

Gray, 2-way Male Packard CAM IPU mating Connector	MSD Synch Pulse
A – Red (+)	A – Green (+)
B – Black (-)	B – Purple (-)

CAM HED – (Black, 4-way Female Packard connector)

GEN4 PRO XTREME Coil-On-Plug based applications using the stock CAM HED sensor require the CAM (HED) sync input. Non GEN4 PRO XTREME Coil-on-Plug applications system will operate sequentially without the CAM (HED) sync hooked up, but the point of injection (the number of degrees BTDC where the fuel is injected) will vary every time the engine is started. Individual cylinder fuel and spark control will not function properly without the CAM (HED) sync hooked up.

The GEN4 PRO XTREME main wire harness' **CAM HED** black 4-way Female Packard connector must be connected to the engine's Cam HED sensor. The system is supplied with the CAM HED sensor side 4-way Male mating connector, terminal and seals, which needs to be configured per the table below.

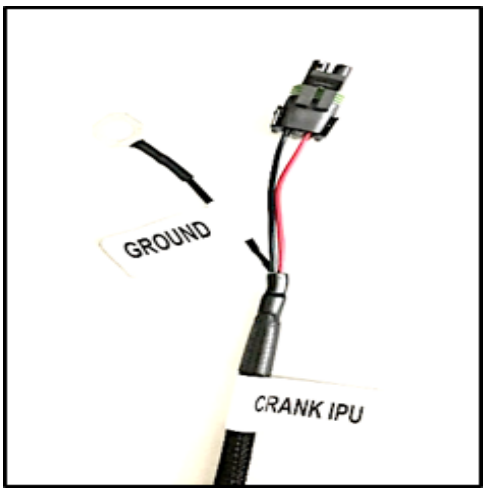
Back to CAM HED

Black, 4-way Male Packard CAM HED mating connector
A: CAM HED Signal, Brown/White wire
B: CAM HED Ground, Black / Pink wire
C: CAM HED +12V Switch, Red wire
D: CAM HED 5 Volt, Red/Brown wire

CRANK IPU – ***(Black, 2-way Male Packard connector with a separate ground wire with a 3/8" ring terminal)***

The GEN4 PRO XTREME main wire harness' **CRANK IPU** black 2-way Male Packard connector must be connected to the engine's inductive pickup crankshaft sensor or distributor (not supplied). The 3/8" ring terminal must be fastened to a secure ground location, preferably on the engine block near the Crank sensor. The system is supplied with the Crank sensor side black, 2-way female mating connector, terminal and seals, which needs to be configured per the table below. Other crank trigger systems can be used, assuming the connections are properly made.

Back to CRANK IPU



Crank Trigger Reference	CRANK IPU Black, 2-way Female mating connector: A (Red wire)	CRANK IPU Black, 2-way Female mating connector: B (Black wire)
MSD Distributor	Violet/Black	Orange/Black
MSD Crank Trigger	Green	Purple
Accel 44000 Series	Black	White
Accel Crank Trigger	Black	White

CRANK HED – ***(Black, 4-way Male Packard connector)***

GEN4 PRO XTREME Coil-On-Plug based applications using the stock Crank HED sensor require the CRANK HED sync input.

The GEN4 PRO XTREME main wire harness' **CRANK HED** black 4-way Male Packard connector must be connected to the engine's Crank HED sensor. The system is supplied with the Crank sensor side black, 4-way female mating connector, terminal and seals, which needs to be configured per the table below.

Back to CRANK HED

CRANK HED Black, 4-way Female Packard mating connector
A: CRANK HED Signal, Blue/White wire

B: CRANK HED Ground, Black /Yellow wire
C: CRANK HED +12V Switch, Red wire
D: CRANK HED 5 Volt, Red/Brown wire

H20 ***(Coolant temperature) – (Black, 2-way Packard connector)***

The GEN4 PRO XTREME main wire harness' **H20** (black, 2-way Packard connector) must be connected to the engine's (GM only) coolant temperature sensor. Back to H20

AIR ***(Air Temperature) – (Gray, 2-way Packard connector)***

The GEN4 PRO XTREME main wire harness' **AIR** (gray, 2-way Packard connector) must be connected to the engine's (GM only) air temperature sensor. Back to AIR

IAC (Idle/Air Control) – (Black, 4-way Packard connector)

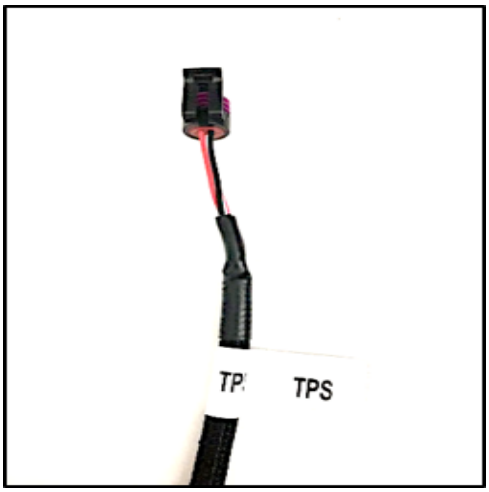
The GEN4 PRO XTREME main wire harness' **IAC** (black, 4-way Packard connector) must be connected to the engine's (GM only) Idle Air Control Motor. The GEN4 Universal COP Main Wire Harness' IAC connector is compatible with a GM style IAC motor and valve assembly with a 1 x 4 connector. The GEN4 Base Main Wire Harness' IAC connector is compatible with a GM style IAC motor and valve assembly with a 2 x 2 connector. The IAC pinouts for the 1 x 4 and 2 x 2 IAC connectors is shown below. These connector components are available from BigStuff3 in the event they need to be changed. The LS1/LS7/Ford Mod Motor systems main harness IAC connector is a 1x4 GM style IAC motor connector.

2X2 IAC CONNECTOR PIN-OUT IDENTIFIER	1x4 In-line IAC Connector Pin-out Identifier
A	D
B	C
C	B
D	A

More IAC wiring information is available on the Bigstuff3 website via this link: http://bigstuff3.com/pdf/IAC.pdf. Back to IAC

TPS (Throttle Position Sensor) – (Black, 3-way Packard connector)

The GEN4 PRO XTREME main wire harness' **TPS** (black, 3-way Packard connector) must be connected to the engine's (GM only) Throttle Position Sensor. The GEN4 Universal COP Main Wire Harness' TPS connector is compatible with a GM style TPS with a "round" 1 x 2 connector. The GEN4 Base Main Wire Harness' TPS connector is compatible with a GM style TPS with a 1 x 3 connector. The TPS pinouts for the "round" 1 x 2 and 1 x 3 IAC connectors are shown below. These connector components are available from BigStuff3 in the event they need to be changed. The GEN4 PRO XTREME LS1/LS7/Ford Mod Motor systems main harness TPS connector are compatible with the "round" GM style 1 x 2 TPS connectors.



GM Late Model TPS

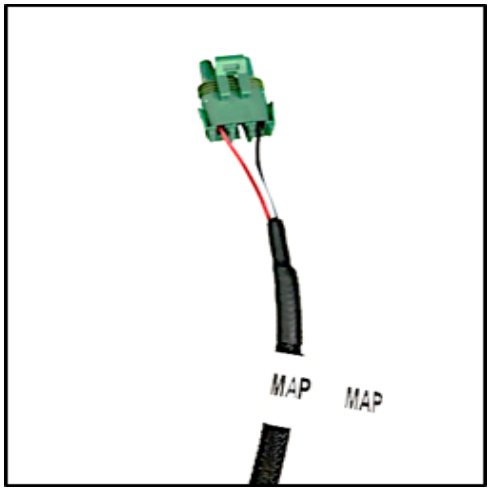
GM 3 X 1 TPS CONNECTOR PIN-OUT IDENTIFIER	GM Late Model "Round" 1 x 2, TPS Connector Pin-out Identifier
A	B
B	C
C	A

FORD TPS

BS3 3-BY-1 TPS CONNECTOR PIN-OUT IDENTIFIER	Ford TPS Connector Pin-out Identifier
A	C
B	B
C	A

More TPS wiring information is available on the Bigstuff3 website via this link: http://bigstuff3.com/pdf/TPS.pdf. Back to TPS

MAP (Manifold Absolute Pressure) – (Green, 3-way Packard connector)



The GEN4 PRO XTREME main wire harness' **MAP** (green, 3-way Packard connector) must be connected to the engine's (GM only) Manifold Absolute Pressure (MAP) Sensor. The GEN4 PRO XTREME main wire harness uses a green 3-way Packard connector, which is compatible with and connects directly to a GM style 0-1 Bar Manifold Absolute Pressure (MAP) sensor. For normally aspirated engines, a 0-1 Bar MAP sensor is required. For blown or turbocharged applications, a 0-2 BAR MAP sensor must be used for boost pressures up to 15 PSI. For boost pressures up to 30 PSI a 0-3 BAR MAP sensor must be used. If 0-2 or 0-3 BAR MAP sensors are used, the harness side MAP sensor connector can be easily modified (or replaced). The modification involves cutting a new key-way in the connector or replacing the "green" 3-way MAP connector with an "orange" 3-way MAP connector. Contact a BigStuff dealer if questions come up related to the MAP sensor supplied with your system, and to procure the necessary connectors.

The GEN4 PRO XTREME system is also compatible with 0-4 Bar (45 PSI), 0-5 (60 PSI) Bar and 0-7 Bar (60 PSI) MAP sensors. A new 3-way MAP connector (available from BigStuff3) must be used with these MAP sensors.

For speed/density applications the MAP sensor must be connected to an intake manifold port.

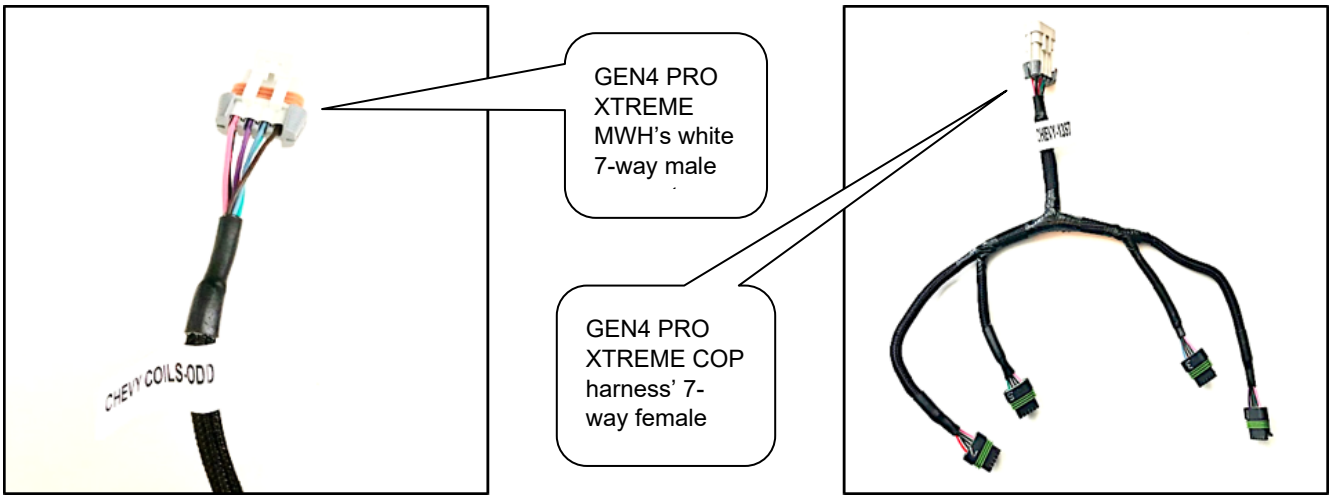
For Alpha/N systems, a 0-1 BAR MAP sensor can be used to sense ambient air pressure in the hood scoop or air cleaner. **Do not attach the sensor pressure port to the manifold**.

More MAP sensor wiring information is available on the Bigstuff3 website via this link: http://bigstuff3.com/pdf/MAP-Pressure.pdf. Back to MAP

CHEVY COILS-ODD ***(White, 7-way Packard Connector)***

The GEN4 PRO XTREME Universal COP Chevy Main Wire Harness' **CHEVY COILS-ODD** (white, 7-way Packard connector) must be connected to the GEN4 PRO XTREME "Smart" High Output COP or GEN4 PRO XTREME "Smart" High Current Output COP **CHEVY-1357** harnesses' mating white, 7-way female connector.

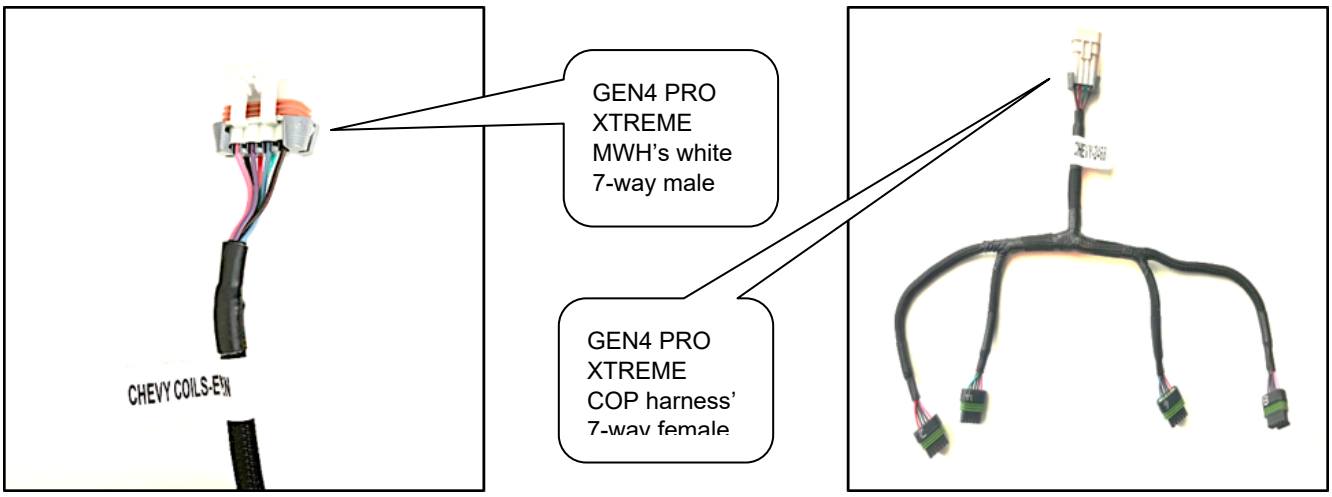
Back to CHEVY COILS - ODD



CHEVY COILS-EVEN ***(White, 7-way Packard Connector)***

The GEN4 PRO XTREME Universal COP Chevy Main Wire Harness' **CHEVY COILS-EVEN** (white, 7-way Packard connector) must be connected to the GEN4 PRO XTREME "Smart" High Output COP or GEN4 PRO XTREME "Smart" High Current Output COP **CHEVY-2468** harnesses' mating white, 7-way female connector.

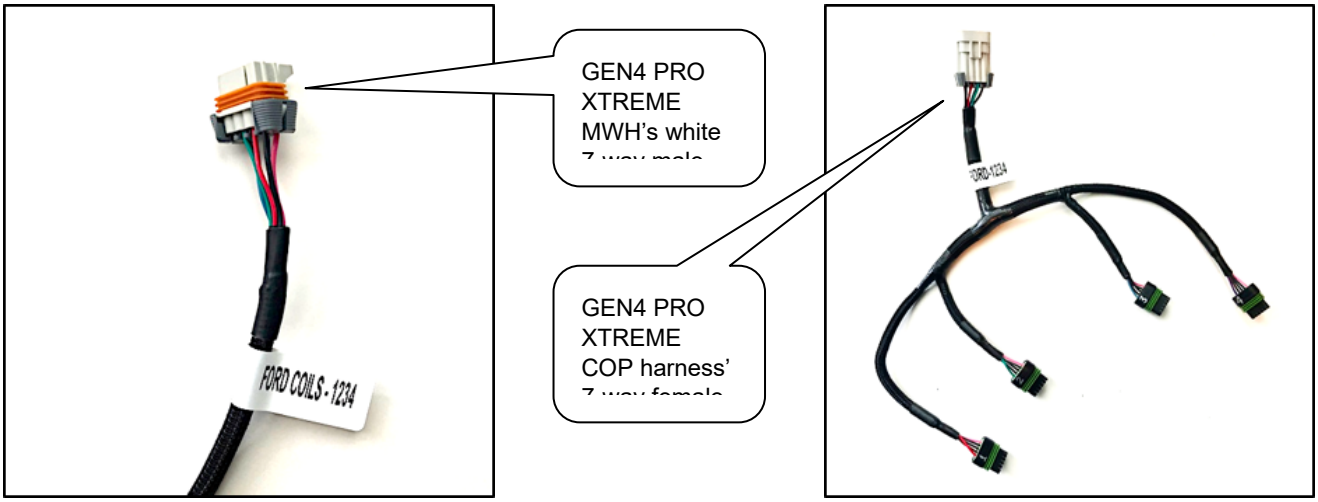
Back to CHEVY COILS - EVEN



FORD COILS-1234 ***(White, 7-way Packard Connector)***

The GEN4 PRO XTREME Universal COP Ford Main Wire Harness' **FORD COILS-1234** (white, 7-way Packard connector) must be connected to the GEN4 PRO XTREME "Smart" High Output COP or GEN4 PRO XTREME "Smart" High Current Output COP **FORD-1234** harnesses' mating white, 7-way female connector.

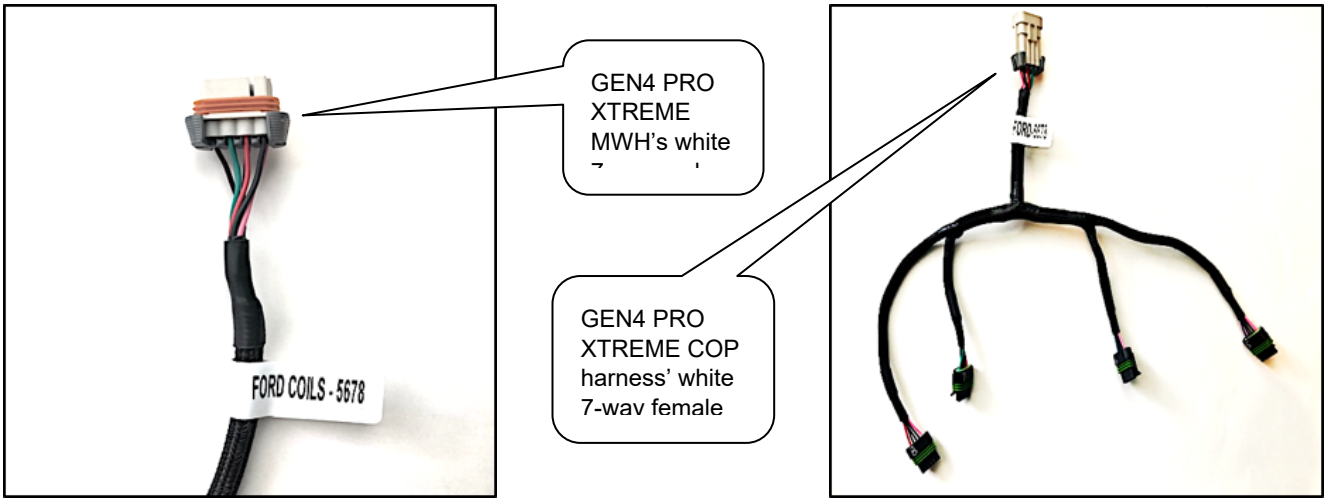
Back to FORD COILS-1234



FORD COILS - 5678 ***(White, 7-way Packard Connector)***

The GEN4 PRO XTREME Universal COP Ford Main Wire Harness' **FORD COILS-5678** (white, 7-way Packard connector) must be connected to the GEN4 PRO XTREME "Smart" High Output COP or GEN4 PRO XTREME "Smart" High Current Output COP **FORD-5678** harnesses' mating white, 7-way female connector.

Back to FORD COILS-5678



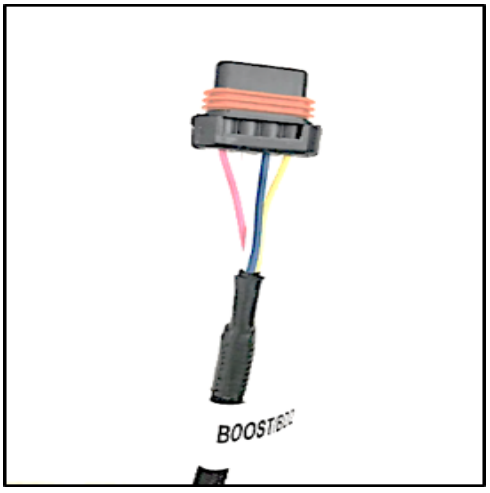
*COILS GND TO HEAD (⅜" **Ring Terminal)***

The GEN4 PRO XTREME Universal COP Main Wire Harness' **COILS GND TO HEAD** (⅜" Ring Terminal) must be grounded to the back side of the cylinder head.

*BOOST / BD2 **(Black, 4-way Packard Connector)***

The GEN4 PRO XTREME main wire harness' **BOOST / BD2** (Black, 4-way Packard connector) is used to;

- Trigger the internal timer, known as the "Boost" or "Timer Enable" (connector location A).
- Increment and Decrement boost control valves (connector locations B & C).
- Enable the Secondary Big Drive injector module for 16 Injector systems (connector location D).



All GEN4 PRO XTREME systems include the mating **Boost / BD2** Black, female 4-way Packard mating connector, terminals and rubber seals.

For all GEN4 PRO XTREME systems, connector location “A” of the BOOST / BD2 connector;

1. Enables the internal timer trigger, referred to as the “Timer Enable”. Location “A” of the BOOST / BD2 connector which needs to have 12V applied to it for the boost controller/SR2/NOS features to work. This is typically a switch installed that passes 12v to this pin input. When the three step wire input Pin (H2 W1) has 12v applied to it and all of the BC/SR2/NOS enable criteria are met, the RELEASE of the 3 step will start all of the timer sequences for all of the features.

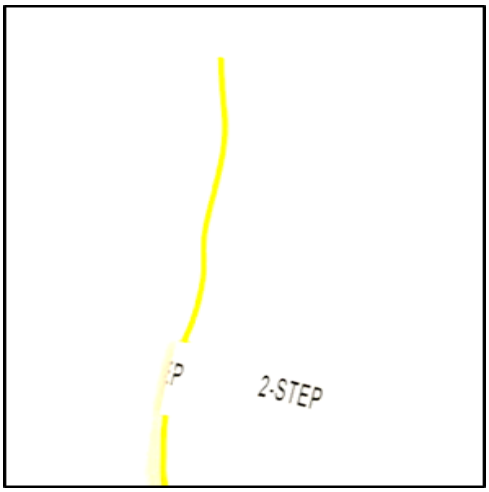
When the GEN4 PRO XTREME system is upgraded to include Standard and Optional Features Upgrades (OFU) i.e. DAE, DAE2, DAE3, Boost, SR2.3 traction control, NOS and secondary Bosch LSU4.9 or secondary NTK methanol, the wire used to trigger the internal data logger is moved from the CINCH 30-way ENGINE (L-Y) connector, pin location L2, to the CINCH 30-way SECONDARY (L-Y) connector, pin location Y2. No matter how the GEN4 PRO XTREME system is configured, or what options the system has, Pin A of the BOOST/BD2 connector will always act as the Timer Enable trigger wire (used for boost control, nitrous control, traction control, and other optional features).

Note: The “Timer” sequence will be reactivated, every time the throttle is closed and then opened again, since the “Minimum RPM and Minimum TPS criteria are re-satisfied.

The other three terminal locations in the BOOST/BD2 connector are used to;

- Increment and Decrement boost control valves (connector locations B & C) for the GEN4 PRO XTREME CO2 Boost upgrade. See the GEN4 PRO XTREME Boost upgrade instructions for further details.
- Enable the Secondary Big Drive injector module for 16 Injector systems (connector location D). See the GEN4 PRO XTREME 16 Injector upgrade instructions for further details.

2 and 3 STEP Rev Limiters



The 2-Step wire is an RPM limiter based on a 12V input to pin H1 B2. The 3-Step wire an RPM limiter based on a 12V input to H2 W1 which will also start any timer sequences in your BC/SR2/NOS features. The 2-step wire is yellow and the 3-step is a yellow/red wire. The 2-Step is typically used as a burnout rev limiter or as an rpm rev limiter to help build boost in a turbo car. The RELEASE of the 2-Step will not enable the BC/SR2/NOS features if your ECU is enabled with them. ONLY upon the release of the 3-Step and when the user defined parameters are true is when the BC/SR2/NOS features will start their sequence. If the user has both the 2-Step and 3-Step enabled the 3-Step will override the 2-Step and will go to that higher RPM. If the 3-step is released and the 2-Step still has 12v applied on the input the ECU will go back to that rev limiting RPM.

The GEN4 ECU will maintain the engine RPM at the user defined 2-Step RPM limit if the following criteria are met:

- 12V is applied to the yellow 2-step wire (via a clutch, foot-brake, trans-brake switch, or any 12v input source.
- In the System Section under Rev Limiters the TPS% enable/disable thresholds are met.
  

- The 2-Step Rev limiter RPM setpoints are configured in the System Section under Rev Limiters.
  

The GEN4 ECU will maintain the engine RPM at the user defined 3-Step RPM limit if the following criteria are met:

- 12V is applied to the yellow/red 3-step wire (via a clutch, foot-brake, trans-brake switch, or any 12v input source.
- In the System Section under Rev Limiters the TPS% enable/disable thresholds are met.
  

- The 3-Step Rev limiter RPM setpoints are configured in the System Section under Rev Limiters.
  

Main Fuse & Relay

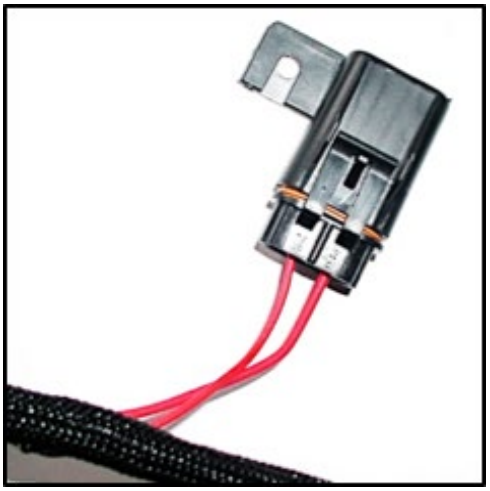
The GEN4 PRO XTREME Main Wire Harnesses include a 30-Amp fuse and relay to provide a fused 12V battery supply to the GEN4 ECU, WBO2 sensor and High Output coils.

NOTE: The stand-alone GEN4 PRO XTREME “Smart” High Current Output COP harnesses include a separate 40-Amp relay and a fused 12V battery supply. The GEN4 PRO XTREME “Smart” High Current Output COP harnesses are recommended for applications above 1500 HP.

Back to Main Fuse & Relay

GEN4 PRO XTREME ECU 3-Amp Fuse

The GEN4 PRO XTREME Main Wire Harnesses incorporate a 3-Amp fuse to protect the ECU electronics. Back to ECU Battery Fuse



GEN4 PRO XTREME ENGINE (A-K) & ENGINE (L-Y) ECU Connection

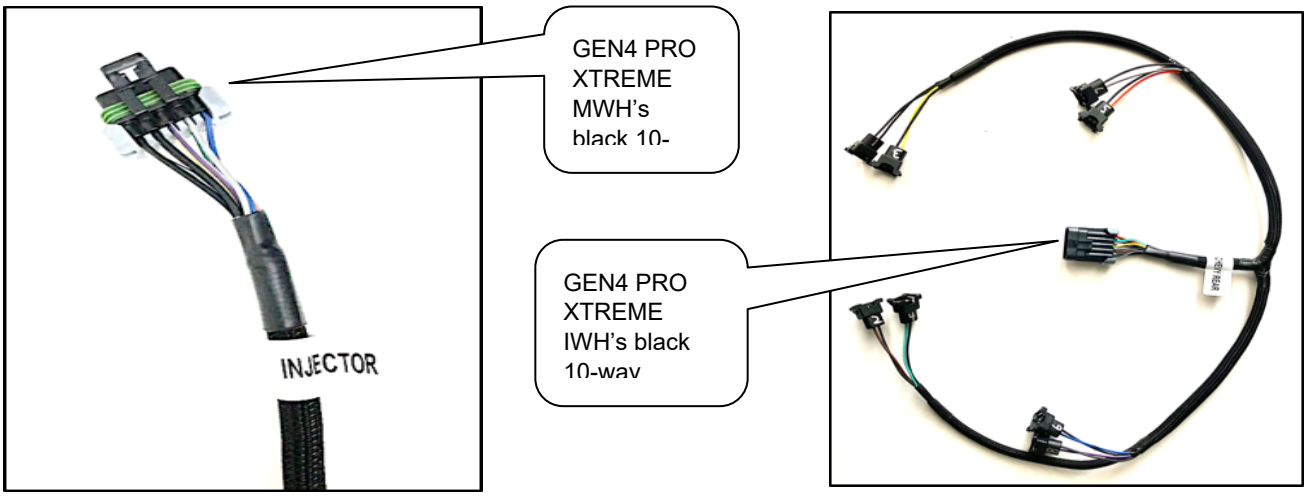
To avoid the potential of severely damaging the ECU, connect the head connectors to the ECU **only after the battery connections are made**. The two Cinch 30-way MWH header connectors are labeled **ENGINE (A-K)** & **ENGINE (L-Y)** and are keyed such that they will only fit in only one (1) of the two (2) ECU mating-half connectors. Connect the MWH’s Cinch 30-way connector labeled **ENGINE (A-K)** into the GEN4 PRO XTREME ECU’s 30-way connector labeled **ENGINE (A-K)**. And, then connect the MWH’s Cinch 30-way connector labeled **ENGINE (L-Y)** into the GEN4 PRO XTREME ECU’s 30-way connector labeled **ENGINE (L-Y)**. To fasten the MWH connectors to the ECU, use a 1/4-nut driver. Make sure the header connectors, are tightened to 15 – 20 in lbs. Do not over-tighten the header connectors!! Be sure to connect ENGINE (A-K) first, then Engine (L-Y). Back to GEN4 PRO XTREME ENGINE (A-K) & ENGINE (L-Y) ECU Connection

6. Injector Harness Installation

INJECTOR (Black, 10-way Packard Connector)

Once the GEN4 PRO XTREME main wire harness is installed the injector wire harness can be installed. Each 2-way injector connector on the GEN4 PRO XTREME Injector Wire Harness (IWH) is marked with a number for the cylinder it needs to be attached to. There are specific injector wire harnesses for Chevy (Chrysler), Ford and Buick V6 engines. The firing order is configured **within the GEN4 PRO XTREME ECU!**

Once the GEN4 PRO XTREME Injector Wire Harness' 2-way injector connectors are installed onto the engine's individual injectors, connect the IWH's 10-way black female connector to the GEN4 PRO XTREME Main Wire Harness' black, 10-way male Packard connector.



NOTE: The main wire harness-to-injector wire harness 10-way connection should be made at the back-side of the engine.

Injector Wire Harness diagrams, and pin out information, for Chevy (Chrysler), Ford and Buick V6 applications, are available on the BigStuff3 website via the following links:

- Chevy (and Chrysler) - http://bigstuff3.com/pdf/Visio-chevy%20Injector%20Harness.pdf.
- Ford - http://bigstuff3.com/pdf/Visio-Ford%20Injector%20Harness.pdf.
- Buick V6 - http://bigstuff3.com/pdf/Visio-Buick%20Injector%20Harness.pdf.

Back to INJECTOR

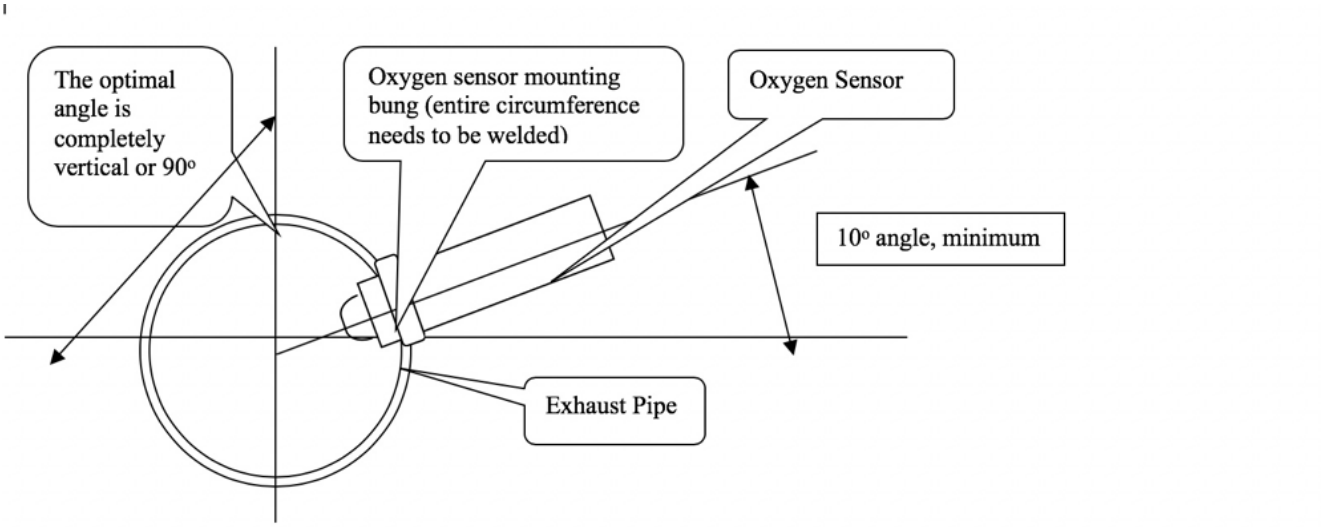
8. Wide Band Oxygen Sensor Installation

WIDEBAND 02 (Black, 6-way TYCO Connector)

Once the main and injector harnesses are installed, the Wide Band Oxygen (WBO2) sensor needs to be installed and connected to the main harness. First, install the wide band sensor.

The WBO2 sensor threads into the sensor mounting bung [(optional) (see picture below)], which needs to be drilled and welded into the exhaust pipe. Before drilling and welding read the design guidelines below.

- Install mounting bung approximately 8” – 12” from where the primary pipes enter the exhaust collector.
- Make sure the mounting location selected does not allow condensation to collect directly in front of the sensor. Make sure there are no depressions, projections, edges, etc. in the exhaust pipe near the sensor tip.
- The mounting angle of the sensor should be tilted a minimum of 10° to the horizontal tip of the sensor. The tip of the sensor must be tilted down. See the diagram below. The optimum sensor angle is 90°.



- Make sure sensor cabling is routed and secured away from the exhaust system.

Stainless steel mounting bungs are also available for turbocharged applications.

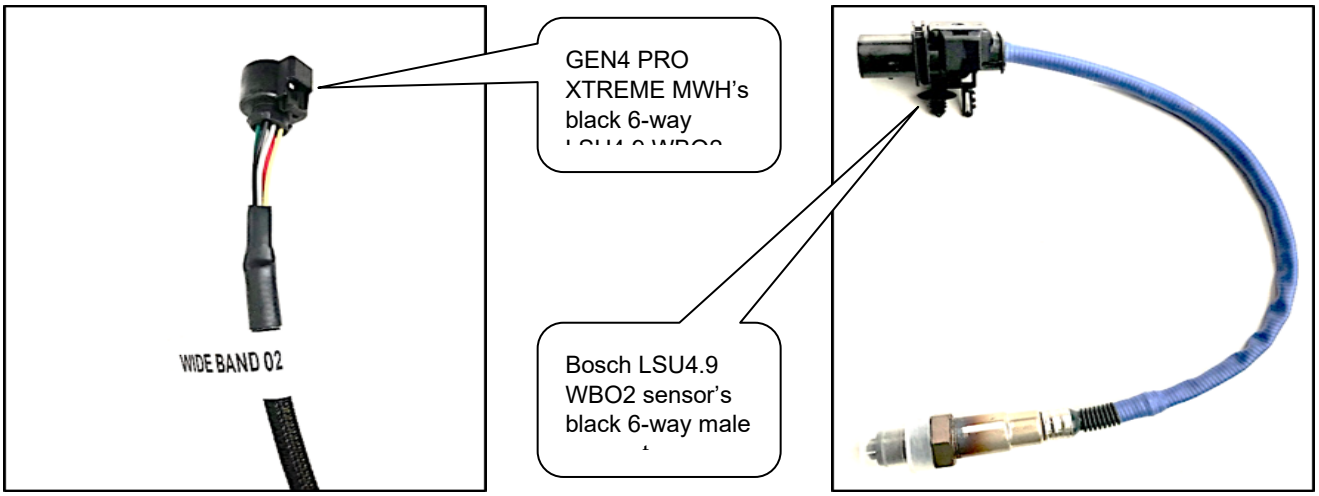
Drill a 7/8” – 15/16” hole in the exhaust pipe. Weld a WBO2 sensor-mounting bung into the exhaust pipe. The mounting bung was manufactured with a lip to help locate it prior to welding it to the exhaust pipe. **The entire circumference of the mounting bung must be**

welded and free of exhaust leaks! Exhaust leaks around the bung will affect sensor readings! Carbon and stainless steel bungs are available from BigStuff3.

Once the sensor-mounting bung is welded into place, thread the sensor into the bung. Installation torque is about 10 – 15 ft/lbs.

Once the BOSCH LSU4.9 WBO2 sensor is installed, connect the LSU4.9's 6-way black male connector to the GEN4 PRO XTREME Main Wire Harness' black, 6-way female Tyco connector (with gold plated terminals).

Back to WIDEBAND O2



9. GEN4 PRO XTREME ECU Installation

The GEN4 PRO XTREME ECU must be installed in the passenger compartment! If a GEN3 PRO SEFI ECU is being replaced with a GEN4 PRO XTREME ECU, the GEN4 PRO XTREME ECU can be installed in the same location as the GEN3 PRO SEFI ECU. Be sure the GEN4 ECU's 30-way Cinch header connectors are orientated the same as the GEN3 ECU being replaced to ensure the Main Wire Harness' Cinch 30-way connectors (ENGINE & SECONDARY) are correctly mated to the GEN4 PRO XTREME's 30-way Cinch header connectors (ENGINE & SECONDARY).

NOTE: If the GEN3 PRO SEFI Main Wire Harness is being reused, be sure to connect the GEN3 PRO SEFI's (2) Cinch 30-way MWH connectors to the GEN4 PRO XTREME ECU's (ENGINE A-K) & ENGINE (L-Y) connectors.

The GEN4 PRO XTREME ECU can be mounted using the four ¼-20 x 5/16 x ½" threaded isolation grommets threaded into the bottom of the ECU housing. To avoid the potential of severely damaging the ECU, connect the main wire harness Cinch 30-way connectors to the ECU **only after the battery connections have been made**.

Note: If the factory installed isolation grommets are not used to mount the ECU, the bolts used must not extend beyond the ECU's ¼" factory installed depth. Using bolts or threaded rods that are longer than ¼" will contact and damage the ECU, and void the warranty! The isolators are not used for any type of electrical grounding.

The GEN4 PRO XTREME system hardware installation process is now completed. The next step is to install the BigComm PRO software, which allows the sensor interfaces to be checked, and ultimately start and operate the engine.

The remainder of the manual will describe how to install and use the BigComm Pro software to monitor and calibrate the GEN4 PRO XTREME ECU parameters and variables.

10. BigComm Pro Software and Connection Overview

The GEN4 PRO XTREME system can be configured to operate on almost any engine configuration, normally aspirated; nitrous oxide injected, supercharged and turbocharged applications! The BigComm Pro software was designed to control the engine and act as the interface between the GEN4 PRO XTREME ECU and the engine it is installed on. View it as the screwdrivers once used to make crude adjustments to a carburetor. The BigComm Pro software allows the user extraordinary fuel and ignition system tunability for improved performance and drivability.

The BigComm Pro software allows full user access to all of the tables needed to calibrate the GEN4 PRO XTREME system. Calibrations can be modified both "on-line" and "off-line".

The engine control tables in the GEN4 PRO XTREME ECU are stored in non-volatile memory, allowing for the stored information not to be lost when power to the ECU is removed.

There are two sections here that list how to establish a hard wired ethernet based connection with the ECU or a WiFi connection. Either choice will work fine as the connection choice is up to you. Click on each link below to configure a hard wired or WiFi connection.

GEN4 PRO XTREME Initial Setup Instructions for Wired Ethernet

GEN4 PRO XTREME Initial Setup Instructions for Wireless Ethernet

The GEN4 PRO XTREME Initial Setup Instructions for "Wired Ethernet" explain how to;

(1) Download the GEN4 PRO XTREME BigComm Pro (BCP) software onto a PC
(2) Establish a wired Ethernet connection between PC running the BCP software and GEN4 PRO XTREME ECU
(3) Activate the BCP and GEN4 PRO XTREME ECU interface to enable BCP software to create an initial Project
(4) Connect to the GEN4 PRO XTREME ECU to establish online wired Ethernet communication
(5) Save the calibration file, included with the GEN4 PRO XTREME ECU, into the initial Project

Once these 5 steps are completed you will be communicating online via a direct wired Ethernet connection between the PC running the BCP software and GEN4 PRO XTREME ECU with the initial Project loaded and calibration saved into the GEN4 ECU.

Below are key considerations for each of the GEN4 PRO XTREME Initial Setup Instruction steps.

STEP 1.0 - Download the GEN4 PRO XTREME (BCP) software from www.bigcommpro.com website onto a PC

- An internet connection needs to be established with the PC that the BCP software will be downloaded onto.
- **Step 1 assumes "offline" communication i.e. PC is not connected to the GEN4 PRO XTREME wired Ethernet network.**
- The BCP software download package includes an example Project containing a demo calibration and preconfigured Dashboards and Tuning Tabs to help get you acquainted with the PCB software offline.

STEP 2.0 - Establish a wired Ethernet connection between PC running BCP software & GEN4 PRO XTREME ECU

- **The GEN4 PRO XTREME ECU can be connected directly to a PC by Wired Ethernet Networks OR by optional Wireless Ethernet Networks using Wireless Routers. The Wired Ethernet Networks are the default configurations and are covered in these instructions. The optional Wireless Ethernet Network configurations are covered in a separate GEN4 PRO XTREME Initial Setup Instructions for "Wireless Ethernet".**
- There are (2) GEN4 Wired Ethernet Network options to choose from:
    - The GEN4 PRO XTREME "In-Vehicle" Wired Ethernet Network provides a flexible, portable solution and is intended for "non-Race Car" GEN4 PRO XTREME applications. It only requires a 5' CAT6a shielded Ethernet cable to be connected between the PC's RJ45 Ethernet port and GEN4 ECU's RJ45 port. If the PC is not equipped with a RJ45 Ethernet port a USB-to-RJ45 Ethernet dongle is required. (See Wired Ethernet Network 1 configuration for "In-Vehicle" applications on page 3).
    - The GEN4 PRO XTREME "**Race Car**" Wired Ethernet Network provides a flexible, permanently installed solution and is intended for Race Car and Dyno GEN4 PRO XTREME applications. The Race Car Wired Ethernet Network converts the GEN4 PRO XTREME Race Car Wireless Ethernet Network to a Wired Ethernet Network by connecting a 5' CAT6a shielded Ethernet cable between one of the NETGEAR's RJ45 Ethernet LAN ports and PC's RJ45 port. If the PC is not equipped with a RJ45 Ethernet port a USB-to-RJ45 Ethernet dongle is required. (See Wired Ethernet Network 2 configuration for "Race Car" & Dyno applications on page 4).
- Once a wired Ethernet connection has been established between the PC running the BCP software and either of the above Wired Ethernet Network options, the GEN4 ECU needs to be powered on (VBATT & +12V switched Ignition) in order to establish online communication.

STEP 3.0 - Activate BCP and GEN4 PRO XTREME ECU interface to enable the BCP software to create an initial Project

- Step 3 assumes Steps 1 & 2 have been completed.
- The first step of Step 3 is to open the BCP software from the PC's desktop.
- The BCP software & GEN4 PRO XTREME ECU interface is activated by entering the end user name and contact information.
- The BCP software creates an initial Project* using the Serial Number (MAC ID) of the GEN4 PRO XTREME ECU connected to the PC running the BCP software and activation information.
- **STEP 3.0 only occurs when connecting between a PC running the BCP software and GEN4 PRO XTREME ECU for the first time.**

* A Project is a universal BCP file that contains all pertinent calibration data & files as well as preconfigured Dashboards, Tuner Tabs and Datalog Tabs associated with a particle GEN4 PRO XTREME ECU application.

STEP 4.0 - Connect to the GEN4 PRO XTREME ECU to establish online wired Ethernet communication

- Online wired Ethernet communication is established between the BCP software running on the PC and GEN4 PRO XTREME ECU.
- The calibration file included with the GEN4 PRO XTREME ECU is uploaded into the BCP software.

STEP 5.0 - ***Save the calibration file, also known as "Tune", included with the GEN4 PRO XTREME ECU, into the initial Project***

- **It is necessary to save the calibration file, also known as "Tune", included with the GEN4 PRO XTREME ECU, into the initial Project.**

Wired Ethernet Network 1 configuration for "In-Vehicle" applications

Step 1:

Step 1.0 thru 1.18 - Download GEN4 PRO XTREME BigComm Pro (BCP) software from the www.bigcommpro.com website onto a PC. (Step 1 Assumes offline communication)

Step 2:

Step 2.0 - Establish wired Ethernet connection between PC running BCP software & GEN4 PRO XTREME ECU with 5' CAT6a shielded Ethernet cable. The 5' CAT6a Ethernet cable can be connected directly to the PC's RJ45 Ethernet port OR if the PC is not equipped with a RJ45 Ethernet port a USB-to-RJ45 Ethernet Dongle is required.

Note: **See detailed GEN4 PRO XTREME Wired Ethernet Network 1 configuration for "In-Vehicle" applications on page 15.**

Step 3:

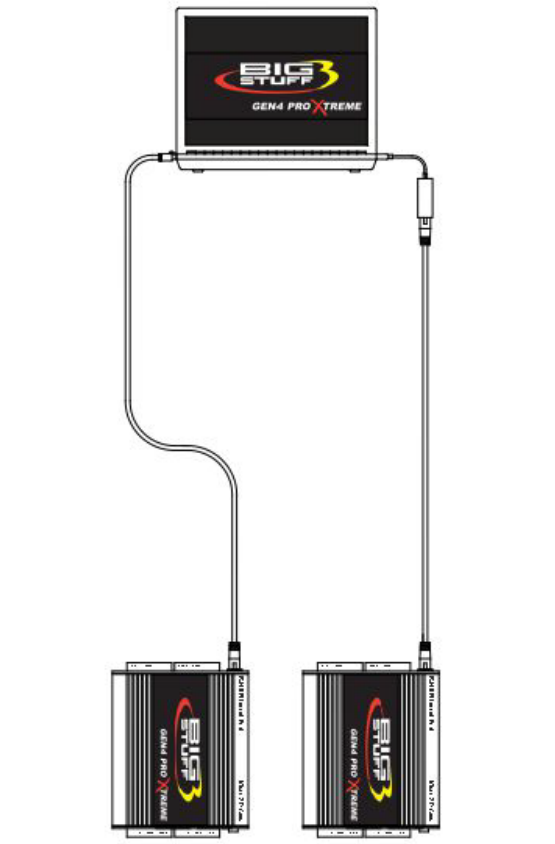
Step 3.0 thru 3.6 - Activate BCP and GEN4 PRO XTREME ECU interface to enable BCP software to create an initial Project.

Step 4:

Step 4.0 thru 4.2 - Connect to the GEN4 PRO XTREME ECU to establish online wired Ethernet communication.

Step 5:

Step 5.0 thru 5.5 - Save calibration, aka "Tune", included with the GEN4 PRO XTREME ECU into the initial Project.



Ethernet connection using 5' CAT6a shielded Ethernet cable only

OR

Ethernet connection using USB-to-RJ45 Ethernet Dongle & 5' CAT6a shielded Ethernet cable

Wired Ethernet Network 2 configuration for "Race Car" and Dyno applications

Step 1:

Step 1.0 thru 1.18 - Download GEN4 PRO XTREME BigComm Pro (BCP) software from the www.bigcommpro.com website onto a PC. (Step 1 Assumes offline communication)

Step 2:

Step 2.0 - Establish wired Ethernet connection between PC running BCP software & GEN4 PRO XTREME ECU using a NETGEAR N600 Router and 5' CAT6a shielded Ethernet cables. One of the 5' CAT6a Ethernet cables can be connected directly to the PC's RJ45 Ethernet port OR if the PC is not equipped with a RJ45 Ethernet port a USB-to-RJ45 Ethernet Dongle is required.

Note: **See detailed GEN4 PRO XTREME Wired Ethernet Network 2 configuration for "Race Car" and Dyno applications on page 16.**

Step 3:

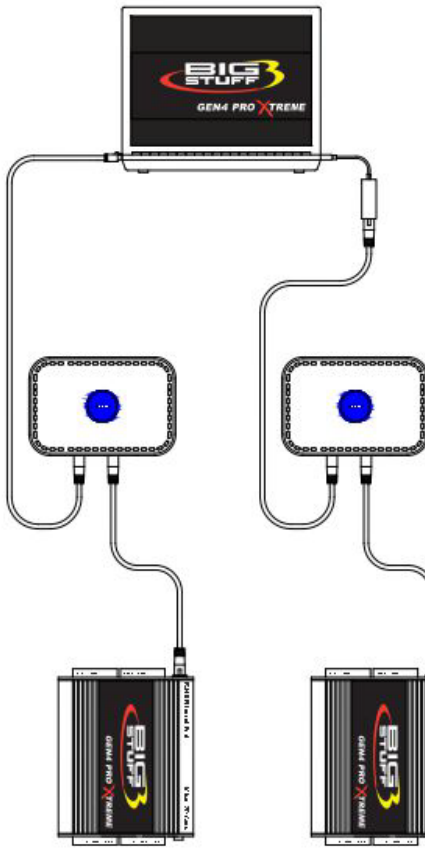
Step 3.0 thru 3.6 - Activate BCP and GEN4 PRO XTREME ECU interface to enable BCP software to create an initial Project.

Step 4:

Step 4.0 thru 4.2 - Connect to the GEN4 PRO XTREME ECU to establish online wired Ethernet communication.

Step 5:

Step 5.0 thru 5.5 - Save calibration, aka "Tune", included with the GEN4 PRO XTREME ECU into the initial Project.



Wired Ethernet connection using NETGEAR N600 Router and 5' CAT6a Ethernet cables

OR

Wired Ethernet Connection using NETGEAR N600 Router with USB-to-RJ45 Ethernet Dongle & 5' CAT6a Ethernet cables

FREQUENTLY ASKED QUESTIONS

• What does working "On line" vs. "Off line" mean?

-Working "Off-line" = The BigStuff3 ECU is not powered up (PC Only). Working "On-line" = The BigStuff3 ECU is powered on, the communication is connected between the GEN4 ECU and a PC, and the two are communicating with each other

• Should I use the camshaft position input (cam sync) with my distributor based GEN4 system?

-Without the camshaft position input (cam input connector in the main wire harness) hooked up, the GEN4 system still provides sequential fuel injection and individual fuel control per cylinder, but injector phasing (where the fuel is injected) and individual spark control will not function.

• How can the GEN4 system provide sequential fuel injection and individual fuel control per cylinder without the cam camshaft position input hooked up?

-When the engine starts cranking over, the GEN4 ECU begins firing the injector drivers, assigned to each injector, in the firing order inputted into the software. What the GEN3 system cannot do without the cam camshaft position input hooked up is to determine where to inject fuel (the position in crankshaft degrees, relative to TDC, for each cylinder).

The Base Spark Table('s) are edited as soon in the Bigstuff3 GEN4 ECU Full Software Manual located on our website. Click on this link to navigate and download.

• At what injector duty cycle % are my injectors considered out of control, or static?

-Loss of injector control does not occur at 100% duty cycle, but at approximately 85% duty cycle. At 85% duty cycle the injectors are most likely not opening and closing in a controlled fashion.

-This condition is termed "static" (vs. dynamic) control. An example why this condition is undesirable is if the GEN4 ECU demands more fuel (demanding a larger pulse width) and the injector is already static. The only way to move more fuel through the injector would be to increase the fuel pressure. Increasing the fuel pressure at the 1/8th mile marker is not possible, so things go bad quickly.

-Also, teetering on and off at the static point is also undesirable. Lastly, running the injectors drivers static for long periods of time can damage them.

• How do I set up my ignition system with the GEN4 system?

-For more information on ignition system setups, beyond what is available in this manual, go to the How To/Help section on the BigStuff3 website, and then Ignition System Setup Tutorial. The link is: http://bigstuff3.com/pdf/Ignition%20Guide%20rev%201.2.pdf. There are nine (9) ignition system setups outlined. There is also information on the setting up the Ford TFI, GM HEI, GM Opti-spark & MSD8 ignition systems in the How To/Help section of the website.

• Where can I find wiring harness information on the BS3 power-train system and optional systems?

-Information on most of our wiring harnesses is available on our website at www.bigstuff3.com.
-Go to the GEN4 section on the website and under the GEN4 PRO XTREME menu will be more information. The link is: http://bigstuff3.com/gen4/

• My engine will not start. What should I check?

-Make sure the harness side header connectors, interfacing with the GEN4 ECU, are attached and tightened to no more than 15 – 20 inch lbs.
-Make sure the battery voltage is at, or above, 12V during cranking. Low battery voltage conditions must be fixed before trying to start the engine. Battery voltage (especially during cranking) is even more important with coil-on-plug applications.

-Make sure you can see an RPM signal in the software or dash. While turning the engine over, you should see at least 100 – 150 RPM. If no RPM signal is present, check that the crank input (crank trigger or distributor) signal wire is connected to the red wire in the BS3 "Crank" connector. Swap the 2 wires and try again.

-For distributor ignition based applications, make sure the BS3 points wire is connected to the ignition system points input terminal/wire. Applying 12V directly to the BS3 points wire will immediately damage the GEN4 ECU!!
-For COP engines (LSx and other standalone COP engine) the cam input cannot occur at the same time as the crank input!!! If this is the case, the engine will not start. The cam synch pulse must occur before a crank pulse. Ideally, 10* before the crank pulse.
-For more information on ignition system setups, go to the How To/Help section on the BS3 website, then to Ignition System Setup Tutorial.
-With all coil-on-plug engines, make sure the coil ground eyelet is securely fastened to the cylinder head or engine block. No other grounds locations should be used.
-The ECU may be in Clear flood Mode. Make sure the TPS sensor reads near 1-2% when the throttle is closed and near 100% when fully opened. If it reads near 100% when closed, the ECU is in clear flood mode and is not injecting fuel. Swap TPS pins A & C in the TPS connector.
Make sure the crank sensor is connected.
-The LS1 Cam sensor connections are: **• A – Signal • B – Ground • C – 12V •**
The LS2 cam sensor connections must be (terminals A & C are swapped): **• A – 12V • B – Ground • C – Signal**

• My engine timing does seem right, what should I check.

-Make sure the firing order is correct.
-Both the BS3 GEN4 main wiring harness and the MSD ignition system must be connected directly to the battery!! If not, ground loop issues are likely to occur.
-Make sure your pulses per rev in the Operating Configuration table is correct for your application. For example, a four (4) magnet MSD crank trigger setup should have a value of 4.

• I can't get my LSx engine started.
-I'm using an LS2 sensor in the front of the engine.
-Swap pins A & C in the cam input connector around. My TPS sensor reads 100% when the throttle is closed and 0% when the throttle is fully opened. Swap the wires A & C in the TPS connector. The engine may not start since the ECU senses that the Clear flood Mode has been invoked

• If I am tuning in Alpha/N mode (Hardware Configuration, then Control Algorithm) can I use my 1 Bar MAP sensor for barometric compensation?
-Yes, the automatic barometric compensation is hard-coded in the ECU. Leave the MAP sensor vacuum port exposed to the atmosphere. Do not plug the MAP vacuum port to the intake manifold.

• What do I need to do to make sure my 3 step works correctly?
-A clean 12VDC must be applied to Header 2 W1 meaning a relay with only 12vdc. Do not use the same 12VDC feeding the transbrake solenoid as flyback voltage from the transbrake releasing can damage the ECU!
-Confirm the 3 Step settings in the System Menu / RevLimiters are configured correctly. The TPS% On threshold must be higher than the Off threshold.

• I do not think my injectors are pulsing. What can I check?
-Make sure the BS3 and MSD systems are grounded directly to the battery.
-Plug a "noid" light into each injector position in the injector wire harness. Turn the engine over and see if the light pulses for each injector location.

• I do not think my COP coils are firing. What can I check?
-Make sure the BS3 main wire harness ground is wired directly to the battery.
-Make sure the coil ground wire is grounded to the engine block or cylinder head. No other ground location will work!

• Can I use a 5 Bar MAP sensor?
-Yes, choose 5 Bar MAP sensor in the System Menu / Pressure and Sensor Configuration section.
-Be sure to cycle the 12VDC ignition on the ECU and you will need to recalibrate the fuel/afr/spark tables on this or any MAP sensor change.
- Note: The 4 BAR MAP sensor sold by BigStuff3 is good to 52 PSI.

• How do I know if my Bosch LSU4.9 WBO2 sensor is bad?
-First make sure the sensor to main wire harness connection is good.

• How can I check if my NTK WBO2 Methanol sensor is working?
-First check the control circuitry by disconnecting the sensor from the harness. Turn the ignition to the BS3 ECU on. With the engine off its best to move the O2 sensor out of the exhaust and have it hang in the air. Go online with the ECU and navigate to the Gauge Cluster tab and go to

the NTKWBO2 tab on the bottom the screen. In the upper right hand corner of the page will be LB%O2 and RB%O2 readings. Go to the AFR Menu and click on the O2 and EGT Parameters section. In the lower right hand corner turn the “Perform NTKO2 WBO2 Air Cal” to “Yes”. **WARNING**! Do not hold the O2 sensor as it will start to heat up and you can get severely burned. You will see the O2% readings start to update and after about 5 minutes you should be reading about 18%-22% on either sensor. If you do not read that more than likely the sensor is defective and needs to be replaced. Contact Bigstuff3 for more details at this point. If the sensor reads fine turn the Air Cal to “Off” and turn the ignition off. Wait for the sensor to cool down and reinstall in the exhaust and you are ready to go.

- **What caused my O2 sensor to fail?**

-Being dropped
-Running leaded fuel
-Running rich at idle

- **Does the GEN4 ECU offer an auto-shift feature?**

Yes, BigStuff3 offers an optional transmission auto-shift feature. The system will shift up to five (5) speeds with independent shift RPM and Hysteresis points. Once the system is configured for the auto-shift feature, a wire from ECU Header 2 location, P2 must be run to the ground side of the relay.

- **What dwell times should be used with the LS1 coils sold with my system?**

With a 12V charging system from idle to approximately 4,000 RPM use about 3.0 milliseconds near idle and no more than about 4.0 milliseconds at approximately 4,000 RPM. From approximately 4,100 - Max RPM use no more than about 6 milliseconds of total dwell time at max RPM. With a 16V charging system from idle to approximately 4,000 RPM use about 2.0 milliseconds near idle and no more than about 3.0 milliseconds at approximately 4,000 RPM. From approximately 4,100 - Max RPM use no more than about 4.5 milliseconds of total dwell time at max RPM.

Datalogger acronyms

Point Definitions are displayed in alphabetical order and are the same for either laptop based datalogging or pulling the data from the on board SD card.

A

AC_BUMP_ON – Air Conditioning Engine RPM increase active condition
ACCEL_X – Accelerometer X Axis
ACCEL_Y – Accelerometer Y Axis
ACCEL_Z – Accelerometer Z Axis
ACCEL_ENG – Acceleration Engine value
ACT_IAC_POS – Current Idle Air Control Motor Position

AFR_TARGET – Air Fuel Ratio Target
AFR_L_BANK – Air Fuel Ratio Left Bank
AFR_R_BANK – Air Fuel Ratio Right Bank
AFR_CYL_1 – Air Fuel Ratio Cylinder 1
AFR_CYL_2 – Air Fuel Ratio Cylinder 2
AFR_CYL_3 – Air Fuel Ratio Cylinder 3
AFR_CYL_4 – Air Fuel Ratio Cylinder 4
AFR_CYL_5 – Air Fuel Ratio Cylinder 5
AFR_CYL_6 – Air Fuel Ratio Cylinder 6
AFR_CYL_7 – Air Fuel Ratio Cylinder 7
AFR_CYL_8 – Air Fuel Ratio Cylinder 8

B

BARO – Outside Barometric Pressure
BATTERY_VOLTAGE – Battery voltage
BC_SENSOR_ERROR – Boost Controller Sensor Input Error
BOOST_PSI – Intake Manifold Pressure
BOOST_CL_DC – GN Boost Controller Duty Cycle Output %
Boost_Inc PIDTerm – GN Boost Controller PID Increase %

C

CLT – Coolant Temperature
CORR_AIR – Fuel Percentage Air Temperature Correction
CORR_AFTST – Afterstart Fuel Percentage Correction
CORR_BARO – Barometric Fuel Percentage Correction
CORR_CLT – Coolant Warm Up Temperature Fuel Percentage Correction
CORR_E85 – E85 Fuel Percentage Correction
CORR_ES_PVFC – Extended Source Power Valve Fuel Correction Percentage
CORR_FP_COMP – Fuel Pressure Correction
CORR_PVF – Power Valve Fuel Correction
CORR_SLT – Start Line Fuel Percentage Correction

D

DAE_INPUT – DAE 12vdc Input true or false
DSRD_BOOST_MAP – Desired Boost Map
DSRD_SR2_MAP – Desired SR2 Map
DUTY_CYCLE_BOOST_INC – Boost Controller Duty Cycle Output Increase %
DUTY_CYCLE_BOOST_DEC – Boost Controller Duty Cycle Output Decrease %
DUTY_CYCLE_PWM07 – Duty Cycle Output Pulse Width Modulation 07
DUTY_CYCLE_PWM08 – Duty Cycle Output Pulse Width Modulation 08

DUTY_CYCLE_PWM09 – Duty Cycle Output Pulse Width Modulation 09
DUTY_CYCLE_NOS_PRG – Progressive Nitrous Duty Cycle Control Output Percentage
DUTY_CYCLE_CYL1 – Fuel Injector Duty Cycle Percentage Cylinder 1
DUTY_CYCLE_CYL2 – Fuel Injector Duty Cycle Percentage Cylinder 2
DUTY_CYCLE_CYL3 – Fuel Injector Duty Cycle Percentage Cylinder 3
DUTY_CYCLE_CYL4 – Fuel Injector Duty Cycle Percentage Cylinder 4
DUTY_CYCLE_CYL5 – Fuel Injector Duty Cycle Percentage Cylinder 5
DUTY_CYCLE_CYL6 – Fuel Injector Duty Cycle Percentage Cylinder 6
DUTY_CYCLE_CYL7 – Fuel Injector Duty Cycle Percentage Cylinder 7
DUTY_CYCLE_CYL8 – Fuel Injector Duty Cycle Percentage Cylinder 8
DUTY_CYCLE_FRCMTR – Duty Cycle Force Motor Output Percentage (Used with 4L60E/80E)
DUTY_CYCLE_TCC – Duty Cycle Torque Converter Clutch Output (Used with 4L60E/80E)
DWELL_TIME – Ignition Coil Dwell Time

E

E85_SPARK_OFFSET – E85 Spark Offset
ECM_RB_EC – NTK O2 Sensor Right Bank Error Code
ECU_SYNC – Current ECU Synchronization Status
EGT_CYL1 – Exhaust Gas Temperature Cylinder 1
EGT_CYL2 – Exhaust Gas Temperature Cylinder 2
EGT_CYL3 – Exhaust Gas Temperature Cylinder 3
EGT_CYL4 – Exhaust Gas Temperature Cylinder 4
EGT_CYL5 – Exhaust Gas Temperature Cylinder 5
EGT_CYL6 – Exhaust Gas Temperature Cylinder 6
EGT_CYL7 – Exhaust Gas Temperature Cylinder 7
EGT_CYL8 – Exhaust Gas Temperature Cylinder 8
ENG_STATE – Engine State (1-Engine Cranking, 4-Engine Running Steady, 5-Engine Accelerating, 6-Engine Decelerating, 7-Deceleration Fuel Cutoff)
EGT_SHUTDOWN_ACTIVE – Exhaust Gas Temperature Shutdown Active Condition
ETM_TORQ_STG – Engine Torque Management Torque Stage Current Value
ETM_DS_ENG_ERROR – ETM Driveshaft or Engine RPM Error
ETM_DS_ENG_DSRD – ETM Driveshaft or Engine RPM Desired

F

FP_SENSOR_ERROR – Fuel Pressure Sensor Input Error
FP_WARNING_ACTIVE – Fuel Pressure Warning Active Condition
FSL_TBL_INDEX – Fuel Spark Lambda current map enabled
FUEL_FLOW_CYL1 – Calculated Fuel flow in lbs/hr for Cylinder 1
FUEL_FLOW_CYL2 – Calculated Fuel flow in lbs/hr for Cylinder 2
FUEL_FLOW_CYL3 – Calculated Fuel flow in lbs/hr for Cylinder 3
FUEL_FLOW_CYL4 – Calculated Fuel flow in lbs/hr for Cylinder 4

FUEL_FLOW_CYL5 – Calculated Fuel flow in lbs/hr for Cylinder 5
FUEL_FLOW_CYL6 – Calculated Fuel flow in lbs/hr for Cylinder 6
FUEL_FLOW_CYL7 – Calculated Fuel flow in lbs/hr for Cylinder 7
FUEL_FLOW_CYL8 – Calculated Fuel flow in lbs/hr for Cylinder 8
FUEL_FLOW_TOTAL – Total Calculated Fuel Flow of cylinders 1-8 in lbs/hr

G

GEAR – Current Gear position calculated by engine rpm drop
GEN_BOOST_ADD – Generic Boost Tables Additional Boost Pressure
GEN_FUEL_LBSHR_ADD – Generic Fuel Lbs/hr adder
GEN_FUEL_MULT – Generic Fuel Multiplier Percentage Adder
GEN_LAMBDA_ADD – Generic Lambda Fuel Adder
GEN_LAMBDA_MULT – Generic Lambda Fuel Multiplier
GEN_SPK_ADV_ADD – Generic Spark Advance Adder
GS_ACCEL – Gear Speed Acceleration
GYRO_X – Gyrometer X Axis
GYRO_Y – Gyrometer Y Axis
GYRO_Z – Gyrometer Z Axis

H

HEAD_TEMP_RB – Head Temperature Right Bank. When in Pro Mod Mode located in the System->Hardware Configuration section this sensor is enabled for use. Pro Mod Mode sets the water and air sensors to 100* in the software so that they have no bearing on the overall VE fuel calculation. This is the GM Water Temperature Sensor.
HEAD_TEMP_LB – Head Temperature Left Bank. When in Pro Mod Mode located in the System->Hardware Configuration section this sensor is enabled for use. Pro Mod Mode sets the water and air sensors to 100* in the software so that they have no bearing on the overall VE fuel calculation. This is the GM Air Temperature Sensor.

I

IAT – Intake Air Temperature
ICF_CORR_CYL1 – Individual Cylinder Fuel Percentage Correction Cylinder 1
ICF_CORR_CYL2 – Individual Cylinder Fuel Percentage Correction Cylinder 2
ICF_CORR_CYL3 – Individual Cylinder Fuel Percentage Correction Cylinder 3
ICF_CORR_CYL4 – Individual Cylinder Fuel Percentage Correction Cylinder 4
ICF_CORR_CYL5 – Individual Cylinder Fuel Percentage Correction Cylinder 5
ICF_CORR_CYL6 – Individual Cylinder Fuel Percentage Correction Cylinder 6
ICF_CORR_CYL7 – Individual Cylinder Fuel Percentage Correction Cylinder 7
ICF_CORR_CYL8 – Individual Cylinder Fuel Percentage Correction Cylinder 8
ICS_CORR_CYL1 – Individual Cylinder Spark Correction Cylinder 1

ICS_CORR_CYL2 – Individual Cylinder Spark Correction Cylinder 2
ICS_CORR_CYL3 – Individual Cylinder Spark Correction Cylinder 3
ICS_CORR_CYL4 – Individual Cylinder Spark Correction Cylinder 4
ICS_CORR_CYL5 – Individual Cylinder Spark Correction Cylinder 5
ICS_CORR_CYL6 – Individual Cylinder Spark Correction Cylinder 6
ICS_CORR_CYL7 – Individual Cylinder Spark Correction Cylinder 7
ICS_CORR_CYL8 – Individual Cylinder Spark Correction Cylinder 8
INJ_GPW_AVE – Fuel Injector Gross Pulse Width Average
INJ_PHASE_ANGLE – Fuel Injector Injection Event Phase Angle
IOT – Fuel Injector Opening Tim

L

LAMBDA_CYL1 – Lambda Value Cylinder 1
LAMBDA_CYL2 – Lambda Value Cylinder 2
LAMBDA_CYL3 – Lambda Value Cylinder 3
LAMBDA_CYL4 – Lambda Value Cylinder 4
LAMBDA_CYL5 – Lambda Value Cylinder 5
LAMBDA_CYL6 – Lambda Value Cylinder 6
LAMBDA_CYL7 – Lambda Value Cylinder 7
LAMBDA_CYL8 – Lambda Value Cylinder 8
LAMBDA_L_BANK – Lambda Reading Left Bank
LAMBDA_R_BANK – Lambda Reading Right Bank
LAMBDA_TARGET – Lambda Reading Left Bank
LAMBDA_RB_UA – Lambda Right Bank NTK O2 Error Code
LASER_HEIGHT__AD5 – Laser Height Sensor Reading

M

MAP – Engine Intake Manifold Pressure
MPH – Miles Per Hour

N

NERNST_CYL1 – Resistance value of the Cylinder 1 Bosch O2 sensor. Normal value is around 300. **NERNST_CYL2** – Resistance value of the Cylinder 2 Bosch O2 sensor. Normal value is around 300.
NERNST_CYL3 – Resistance value of the Cylinder 3 Bosch O2 sensor. Normal value is around 300.
NERNST_CYL4 – Resistance value of the Cylinder 4 Bosch O2 sensor. Normal value is around 300.
NERNST_CYL5 – Resistance value of the Cylinder 5 Bosch O2 sensor. Normal value is around 300.

NERNST_CYL6 – Resistance value of the Cylinder 6 Bosch O2 sensor. Normal value is around 300.
NERNST_CYL7 – Resistance value of the Cylinder 7 Bosch O2 sensor. Normal value is around 300.
NERNST_CYL8 – Resistance value of the Cylinder 8 Bosch O2 sensor. Normal value is around 300.
NOS_STAGE – Current NOS Stage
NOS_BOOST_ENABLE – Nitrous or Boost Enable Arm Switch
NOS_TIMER – When activated is the Nitrous Run Time
NOS_ICS_CORR_CYL1 – Nitrous Individual Cylinder Spark Correction Cylinder 1
NOS_ICS_CORR_CYL2 – Nitrous Individual Cylinder Spark Correction Cylinder 2
NOS_ICS_CORR_CYL3 – Nitrous Individual Cylinder Spark Correction Cylinder 3
NOS_ICS_CORR_CYL4 – Nitrous Individual Cylinder Spark Correction Cylinder 4
NOS_ICS_CORR_CYL5 – Nitrous Individual Cylinder Spark Correction Cylinder 5
NOS_ICS_CORR_CYL6 – Nitrous Individual Cylinder Spark Correction Cylinder 6
NOS_ICS_CORR_CYL7 – Nitrous Individual Cylinder Spark Correction Cylinder 7
NOS_ICS_CORR_CYL8 – Nitrous Individual Cylinder Spark Correction Cylinder 8

O

O2_CORR_CYL1 – Closed Loop O2 AFR Fuel Correction Cylinder 1
O2_CORR_CYL2 – Closed Loop O2 AFR Fuel Correction Cylinder 2
O2_CORR_CYL3 – Closed Loop O2 AFR Fuel Correction Cylinder 3
O2_CORR_CYL4 – Closed Loop O2 AFR Fuel Correction Cylinder 4
O2_CORR_CYL5 – Closed Loop O2 AFR Fuel Correction Cylinder 5
O2_CORR_CYL6 – Closed Loop O2 AFR Fuel Correction Cylinder 6
O2_CORR_CYL7 – Closed Loop O2 AFR Fuel Correction Cylinder 7
O2_CORR_CYL8 – Closed Loop O2 AFR Fuel Correction Cylinder 8
O2_CORR_L_BANK – Closed Loop O2 AFR Fuel Correction Left Bank
O2_CORR_R_BANK – Closed Loop O2 AFR Fuel Correction Right Bank

P

PCT_ETHANOL – Percentage of Ethanol in fuel (Need sensor to read properly)
PEDAL_BIT_MODE – Pedal Bit Mode Current Condition
PCT_TCC_SLIP – Percentage of Torque Converter Clutch Slippage (Used with 4L60E/80E)
PRESS_FUEL – Fuel Pressure Reading
PRESS_OIL – Oil Pressure Reading
PRESS_TURBO – Turbocharger Pressure Reading
PRESS_WG – Wastegate Pressure Reading
PRESS_NOS – Nitrous Pressure Reading
PRESS_PV – Pan Vacuum Reading
PRESS_TL – Transmission Line Pressure Reading

PRESS_DSRD_WG – CO2 Desired Wastegate
PRNDL – Park / Reverse / Neutral / Drive / Low (Used with 4L60E/80E)

R

RACE_FUEL_LBS_HR – NOS Mode Race Fuel Lbs/hr fuel adder
REV_LIMITER – Current condition of any active rev limiters
RPM_ENGINE – Engine RPM
RPM_TSS1_LB – Turbocharger Shaft Speed RPM Left Bank
RPM_TSS2_RB – Turbocharger Shaft Speed RPM Right Bank
RPM_ABS_FW – RPM Front Wheel Speed Sensor
RPM_ABS_RW – RPM Rear Wheel Speed Sensor
RPM_TOSS – RPM Transmission Output Speed Sensor or Driveshaft Sensor
RPM_TISS – RPM Transmission Input Speed Sensor

S

SLT_MODE – Start Line Timing Mode Current Condition
SHOCK_RF__AD7 – Right Front Shock Reading
SHOCK_LF__AD8 – Left Front Shock Reading
SHOCK_RR__AD9 – Right Rear Shock Reading
SHOCK_LR__AD10 – Left Rear Shock Reading
SPK_ADV_BCP – Base Spark Advance
SPK_ADV_CYL1 – Spark Advance Cylinder 1
SPK_ADV_CYL2 – Spark Advance Cylinder 2
SPK_ADV_CYL3 – Spark Advance Cylinder 3
SPK_ADV_CYL4 – Spark Advance Cylinder 4
SPK_ADV_CYL5 – Spark Advance Cylinder 5
SPK_ADV_CYL6 – Spark Advance Cylinder 6
SPK_ADV_CYL7 – Spark Advance Cylinder 7
SPK_ADV_CYL8 – Spark Advance Cylinder 8
SR2_TIMER – Current Race time after the release of the three step
SR2_GEAR1_SPK_OFFSET – SR2 Gear 1 Spark Offset
SR2_DS_SPK_OFFSET – SR2 Driveshaft or Engine Spark Offset
SR2_DS_ERROR – SR2 Driveshaft or Engine RPM Error
SR2_DS_DSRD – SR2 Driveshaft or Engine RPM Desired
SS_SPK_NOS_RTD – Street Strip Nitrous Spark Retard
SS_NOS_FUEL_ADD – Street Strip Nitrous Fuel Adder
SS_NOS_LAMBDA_OFFSET – Street Strip Nitrous Lambda Target Offset

T

TPS – Throttle Position Sensor Percentage

TOT – Transmission Oil Temperature Reading
THREE_STEP_INPUT – Three Step Input 12vdc true or false
THREE_STEP_MODE – Three Step Active Condition
TRANS_GEAR_RATIO – Current Transmission Gear Ratio (Used with 4L60E/80E)
TSD_GEAR1_OFFSET – Touch Screen Dash Gear 1 Offset
TSD_SR2_DS_OFFSET – Touchscreen Dash SR2 Driveshaft or Engine RPM Offset
TSD_ETM_DS_OFFSET – Touchscreen Dash ETM Driveshaft or Engine RPM Offset
TWO_STEP_INPUT – Two Step Input 12vdc true or false
TWO_STEP_ACTIVE – Two Step Active Condition
TWO_STEP_MODE – Two Step Active Condition

V

VE -Volumetric Efficiency number calculated from the base fuel map

W

WHEEL SPIN – Calculated wheel speed based off differential from either the rear wheel speed sensor or driveshaft sensor compared to the front wheel speed sensor.