

with Installation Instructions

Owner's Manual

Banks Six-Gun®/ EconoMind® & SpeedBrake®

Compatible with optional Banks iDash

**2003-07 Ford Power Stroke
6.0L Turbo-Diesel**

THIS MANUAL IS FOR USE WITH SYSTEMS 55455-55458 & 63749

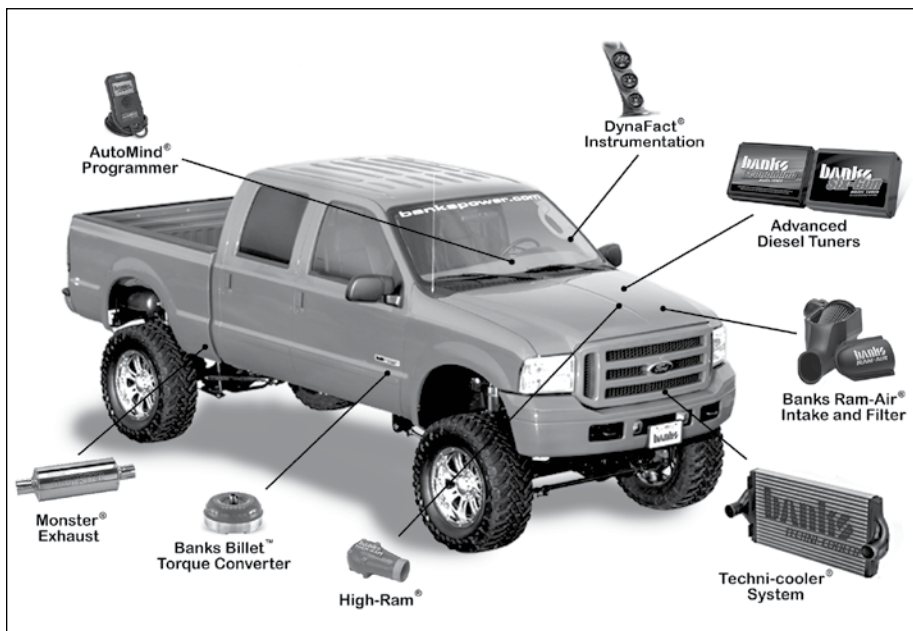
For iDash 1.8 instructions, see iDash 1.8 manual 97654 & 97674

Gale Banks Engineering
546 Duggan Avenue • Azusa, CA 91702
(626) 969-9600 • Fax (626) 334-1743

Product Information & Sales: (888) 635-4565
Customer Support: (888) 839-5600
Installation Support: (888) 839-2700

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Products available from Banks Power for the 2003-2007 Ford 6.0L



Banks Monster® Exhaust System Sport (P/N 48790-48793) Single and Dual (P/N 47285-47292, 47606-47609, 48783-48788)

- Increases exhaust flow, cuts backpressure, lowers exhaust gas temperatures (EGTs) and increases power.

Banks Ram-Air Intake System (P/N 42155)

- Increases your airflow over stock.
- Adds power, improves fuel economy, lowers EGTs and reduces smoke.

High-Ram Intake (P/N 42750-42751)

- Increases flow and provides more uniform air distribution to the engine for more available power at a given boost level.

Banks Techni-Cooler® System (P/N 25974-25975)

- Provides increased air flow to the engine by increasing air density for more increased power, lower EGTs and improved fuel economy.

Banks Brake (P/N 55467-55468)

- Increases the stopping power of your truck and extends the service life of your brakes

Boost and Pyro Gauges (P/N 64507)

- Keep your engine safe by monitoring vital engine parameters

Banks Billet Torque Converter (P/N 72522)

- Higher torque capacity over stock
- Lockup clutch is slip-resistant so transmission fluids stay cooler and transmission life is prolonged.

Banks SpeedBrake

iQ Compatible (P/N 55455-55456)

PDA Compatible (P/N 55457-55458)

- Allows for controlled hill decent at a user defined vehicle speed.

Banks Diesel Tuner

Six-Gun w/ switch (P/N 61023)

Six Gun w/ iDash (P/N 61424)

EconoMind w/ switch (P/N 63743-63745)

Economind w/ iDash (P/N 61421)

- Adds power safely to your vehicle
- Engine and transmission safeguards
- Change power levels on-the-fly

Thermocouple

- Add a temperature limiting function to your Diesel Tuner

AutoMind Programmer

(P/N 66100)

- Contains Banks tunes that boost your vehicles HP, Torque and MPG.
- Displays a host of critical engine functions
- Provides "service technician" diagnostic capabilities
- Has upgradeable functionality, so it will never be out of date

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THIS IS A HIGH PERFORMANCE PRODUCT. USE AT YOUR OWN RISK.

Do not use this product until you have carefully read the following agreement.

This sets forth the terms and conditions for the use of this product. The installation of this product indicates that the BUYER has read and understands this agreement and accepts its terms and conditions.

Disclaimer of Liability

Gale Banks Engineering Inc., and its distributors, employees, and dealers (hereafter "**SELLER**") shall in no way be responsible for the product's proper use and service. The **BUYER** hereby waives all liability claims.

The **BUYER** acknowledges that he/she is not relying on the **SELLER's** skill or judgment to select or furnish goods suitable for any particular purpose and that there are no liabilities which extended beyond the description on the face hereof and the **BUYER** hereby waives all remedies or liabilities, expressed or implied, arising by law or otherwise, (including without any obligations of the **SELLER** with respect to fitness, merchantability, and consequential damages) whether or not occasioned by the **SELLER's** negligence.

The **BUYER** is responsible to fully understand the capability and limitations of his/her vehicle according to manufacturer specifications and agrees to hold the **SELLER** harmless from any damage resulting from the failure to adhere to such specifications.

The **SELLER** disclaims any warranty and expressly disclaims any liability for personal injury or damages. The **BUYER** acknowledges and agrees

that the disclaimer of any liability for personal injury is a material term for this agreement and the **BUYER** agrees to indemnify the **SELLER** and to hold the **SELLER** harmless from any claim related to the item of the equipment purchased. Under no circumstances will the **SELLER** be liable for any damages or expenses by reason of the use or sale of any such equipment.

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The **BUYER** is solely responsible for all warranty issues from the automotive manufacturer.

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Please see enclosed warranty information card, or go to **www.bankspower.com/warranty**, for warranty information regarding your product.. All products that are in question of Warranty must be returned shipping prepaid to the **SELLER** and

must be accompanied by a dated proof of purchase receipt. All Warranty claims are subject to approval by Gale Banks Engineering Inc.

Under no circumstance shall the **SELLER** be liable for any labor charged or travel time incurred in diagnosis for defects, removal, or reinstallation of this product, or any other contingent expense.

Under no circumstances will the **SELLER** be liable for any damage or expenses incurred by reason of the use or sale of any such equipment.

In the event that the buyer does not agree with this agreement:

The buyer may promptly return this product, in a new and unused condition, with a dated proof-of-purchase, to the place-of-purchase within thirty (30) days from date-of-purchase for a full refund, less shipping and/or restocking fee.

The installation of this product indicates that the buyer has read and understands this agreement and accepts its terms and conditions.

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Dear Customer,

If you have any questions concerning the installation of your Banks Six-Gun/EconoMind Diesel Tuner, please call our Technical Service Hotline at (888) 839-2700 between 7:00am and 5:00pm (PST). If you have any questions relating to shipping or billing, please contact our Customer Service Department at (888) 839-5600.

Thank you.

Level 1 is stock. Each additional higher level adds approximately 20% of the available power increase. To prevent damage to the factory transmission, Banks recommends that both automatic and manual transmission vehicles do not exceed Level 4 while the vehicle is experiencing load (towing, climbing a steep grade, carrying a load, etc.).

To use the higher levels of the Six-Gun/EconoMind Diesel Tuner while towing or climbing, airflow improvements must be made to lower the exhaust gas temperature (EGT) entering the turbo. The EGT should not exceed 1400° F for more than a few seconds. Elevated EGT can damage the turbocharger and the engine.

ATTENTION!

Before proceeding with these instructions, please carefully read the DISCLAIMER OF LIABILITY and LIMITATION OF WARRANTY statement located on page 4 of this manual.

WARNING: Banks iQ may be susceptible to damage as a result of extended exposure to sunlight, heat or extreme cold. It is highly recommended that Banks iQ be removed from its mounting location if the vehicle will be subjected to high concentrations of sunlight, heat or cold for an extended period of time. Gale Banks Engineering is not responsible for damage to Banks iQ resulting from exposure conditions.

General Installation Practices

TOOLS REQUIRED:

- Inch and metric sockets
- Inch and metric combination and open-end wrenches
- Pliers
- Ford stereo removal tool ('03-04 model year vehicles only)
- Wire cutters
- Scissors
- Drill motor
- 1/8" drill bit
- 13/32" drill bit
- 7/16" drill bit
- Tap handle
- 1/4" NPT tap
- Foot-pound torque wrenches
- Penetrating oil or light lubricant spray
- Anti-seize compound
- Heat gun

1. Before starting work, familiarize yourself with the installation procedure by reading all of the instructions.

2. The exploded views provide only general guidance. Refer to each step and section diagram in this manual for proper instruction.

3. Throughout this manual, the left side of the vehicle refers to the driver side, and the right side to the passenger side.

4. Disconnect the negative (ground) cable from the battery (or batteries, if there are two) before beginning work.

5. Route and tie wires and hoses a minimum of 6" away from exhaust heat, moving parts and sharp edges. Clearance of 8" or more is recommended where possible.

6. When raising the vehicle, support it on properly weight-rated safety stands, ramps or a commercial hoist.

Follow the manufacturer's safety precautions. Take care to balance the vehicle to prevent it from slipping or falling. When using ramps, be sure the front wheels are centered squarely on the topsides. When raising the front of the vehicle, put the transmission in park (automatic) or reverse (manual), set the parking brake, and block the rear wheels. When raising the back of the vehicle, be sure the vehicle is on level ground and the front wheels are blocked securely.

CAUTION: Do not use floor jacks to support the vehicle while working under it. Do not raise the vehicle onto concrete blocks, masonry or any other item not intended specifically for this use.

7. During installation, keep the work area clean. Do not allow anything to be dropped into intake, exhaust, or lubrication system components while performing the installation, as foreign objects will cause immediate engine damage upon start-up.

8. Save this Owner's Manual as a reference for system maintenance and service.

9. Banks recommends either a Banks iDash or a Pyrometer (EGT) gauge and Boost gauge be installed with the Six-Gun/EconoMind Diesel Tuner to help monitor performance and exhaust gas temperature of the vehicle (see part numbers next page). To further increase engine life by lower EGT's, Banks also recommends installing a Monster Exhaust® system (see **next page**).

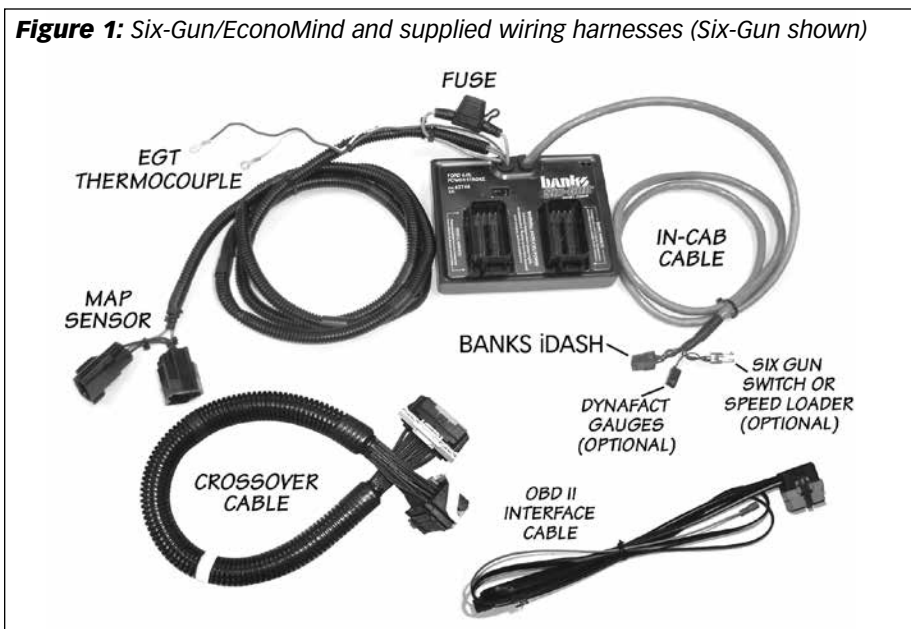
Banks Monster® Exhaust:

'03 F-250/350 Pickup Ext cab, short bed.....	48764
'04-07 F-250/350 Pickup Ext cab, short bed.....	48784
'03 F-250/350 Pickup Ext cab, long bed	48766
'04-07 F-250/350 Pickup Ext cab, long bed	48786
'03 F-250/350 Pickup Crew cab, short bed	48765
'04-07 F-250/350 Pickup Crew cab, short bed	48785
'03 F-250/350 Pickup Crew cab, long bed.....	48767
'04-07 F-250/350 Pickup Crew cab, long bed	48787
'03 Excursion.....	48768
'04-07 Excursion	48788

TechniCooler® ('03-04).....	25974
TechniCooler® ('05-07).....	25975
Gauge Assembly, Boost and Pyro	64507
Thermocouple	63055

Additional Equipment:

Figure 1: Six-Gun/EconoMind and supplied wiring harnesses (Six-Gun shown)



Section 1

INSTALLATION OF WIRING HARNESS AND CONNECTIONS FOR BANKS SIX-GUN/ECONOMIND DIESEL TUNER

If Banks Six-Gun/EconoMind has been previously installed, skip to Section 2.

If installing Banks Six-Gun/EconoMind for the first time, proceed to step 1

1. Disconnect the battery ground cables from each of the batteries. Secure the cables so that they do not come in contact with the battery posts during the installation.

2. Remove the (+) battery cable from the driver side battery.

3. Remove the driver side plastic battery cover, as shown in **Figure 2**. This is accomplished by depressing a tab at the front and rear of the cover. Be careful not to damage the cover, as it will be re-installed.

4. Remove the driver side battery hold down clamp (8mm socket). Remove the driver side battery.

WARNING: When lifting a battery, excessive pressure on the end

walls could cause acid to spew through the vent caps, resulting in personal injury. Lift with a battery carrier or with hands on opposite corners. Failure to follow these instructions may result in personal injury.

5. Place the Six-Gun/EconoMind Diesel Tuner in close proximity as shown in **Figure 3** for 2003-04 and **Figure 4** for 2005-07. The 'In-Cab Cable' with the three small connectors will be routed into the cabin via the grommet on the firewall. The MAP sensor harness with the two connectors will be routed via the firewall to its prospective location listed in the following steps.

NOTE: (The Six-Gun/EconoMind Diesel Tuner will be affixed to its permanent location in **step 20**.)

6. Locate the Powertrain Control Module (PCM) on the driver side of the vehicle engine compartment (see **Figure 5**).

Figure 2: Removal of the battery box cover

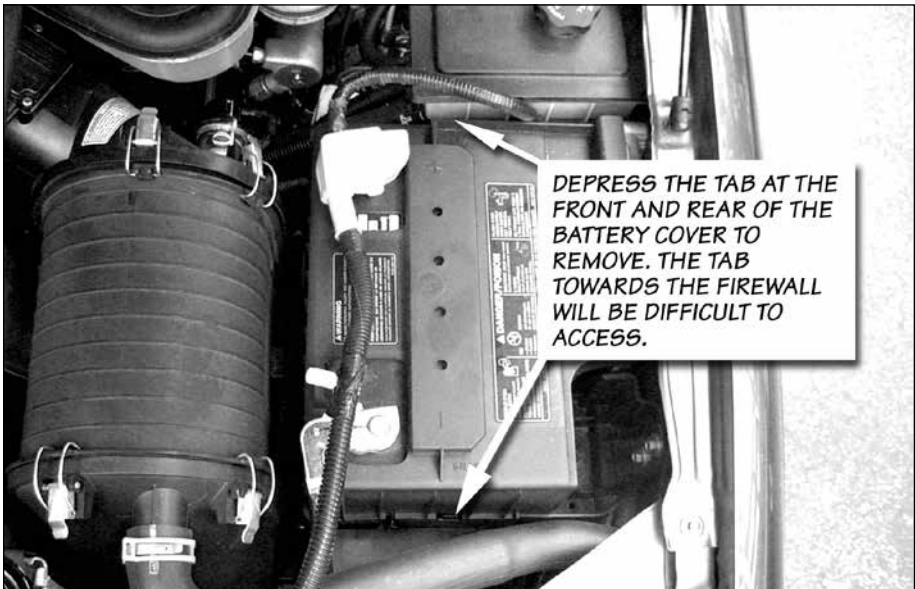


Figure 3: Six-Gun/EconoMind Tuner installed on 2003-04 vehicles only

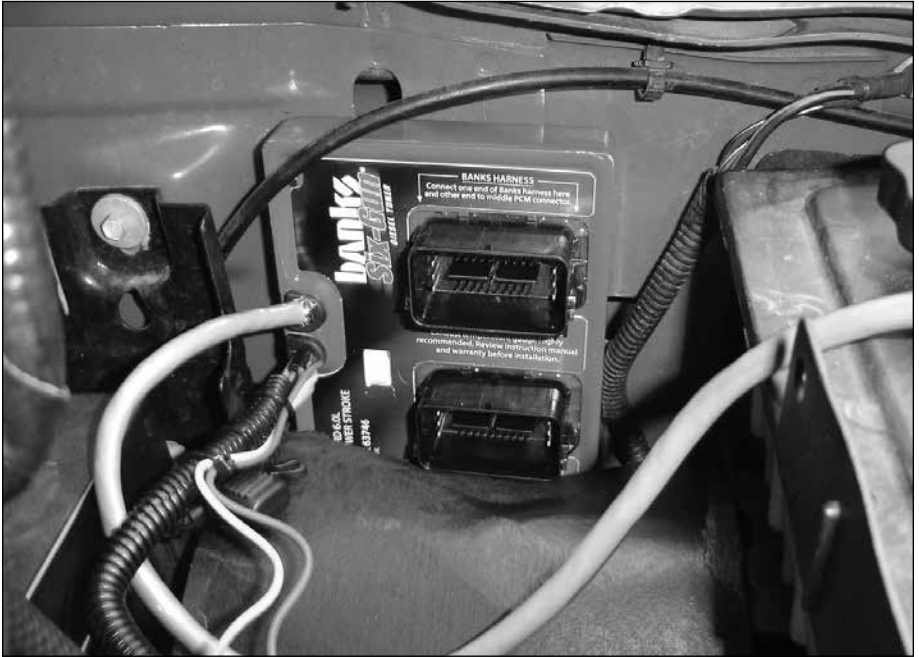


Figure 4: Six-Gun/EconoMind installed on the fuse box on 2005-07 model-year vehicles

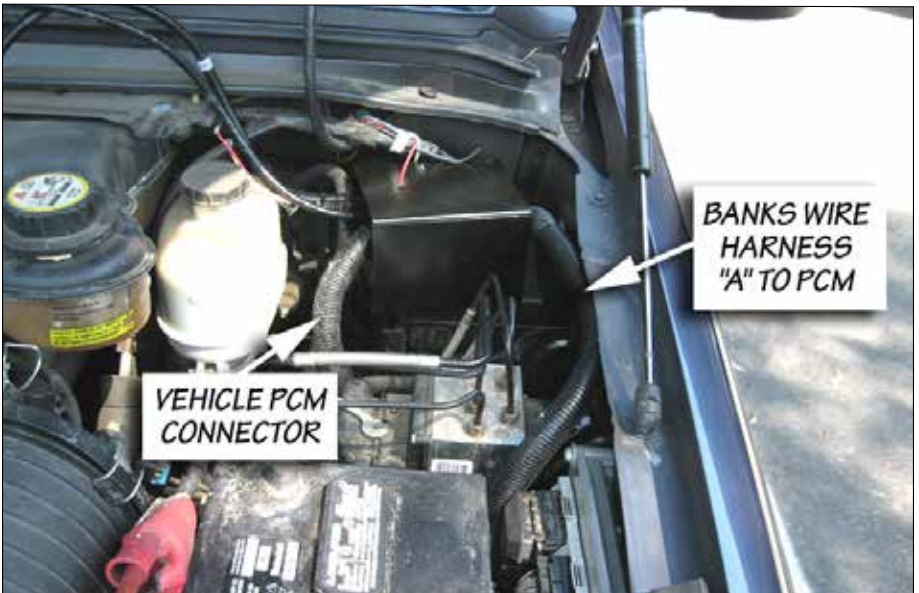
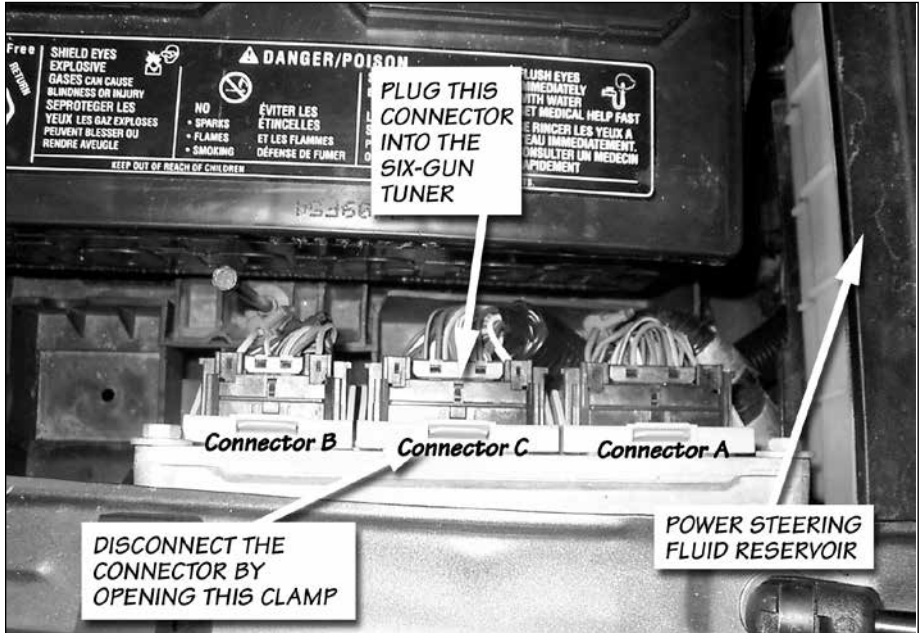


Figure 5: View of the PCM after the battery cover has been removed



7. Disconnect the middle connector from the PCM by opening the overcenter retaining clamp as shown in **Figure 5**. Route the disconnected PCM connector to the Six-Gun/EconoMind Diesel Tuner as directed below:

2003-04 model year vehicles: Route the previously disconnected middle connector under the power steering fluid reservoir towards the Six-Gun/EconoMind Diesel Tuner.

2005-07 model year vehicles: Route the previously disconnected middle connector in the most direct path towards the Six-Gun/EconoMind Diesel Tuner.

8. All Years: Plug the PCM connector into the connector on the Six-Gun/EconoMind Diesel Tuner labeled, "VEHICLE HARNESS".

9. Locate the supplied 'Crossover Cable' wiring harness in your Six-Gun/EconoMind tuner kit.

10. Plug the supplied 'Crossover Cable' wiring harness into the Six-Gun/EconoMind Diesel Tuner connector labeled, "BANKS HARNESS."

For 2005-2007 Model vehicles: Slide Six-Gun/EconoMind Shield onto crossover cable.

NOTE: Be sure that the seam on the top of the shield is facing away from the cabin (see **Figure 6**).

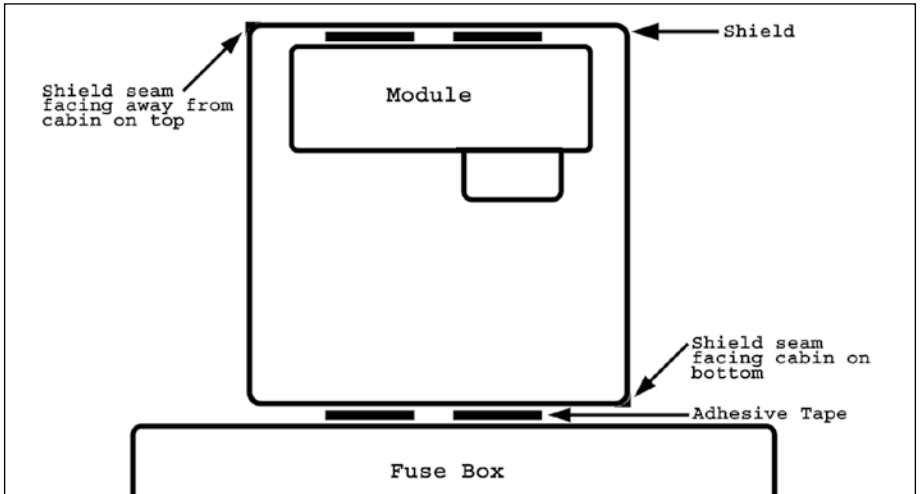
For all models, route the other end of the 'Crossover Cable' to the vehicle's PCM middle connector labeled "C". Route the 'Crossover Cable' as directed below:

2003-04 model year vehicles: Route the 'Crossover Cable' under the power steering fluid reservoir.

2005-07 model year vehicles: Route the 'Crossover Cable' to the PCM in the most direct path possible.

11. All Years: Plug the 'Crossover Cable' into the vehicle's PCM middle connector labeled "C".

Figure 6: (2005-07 model year vehicles only) Tuner Mounting



12. Unplug the Manifold Absolute Pressure (MAP) sensor connector shown in **Figure 7**. The MAP connector can be unplugged by sliding the red safety slide down, pressing the locking button, then pulling on the connector.

13. Plug the Six-Gun/EconoMind MAP connector into the MAP sensor. Plug the factory MAP connector into the Six-Gun/EconoMind MAP wiring harness. Route the harness from the Six-Gun/EconoMind to the MAP sensor as shown in **Figure 8**. Use the supplied zip ties to secure the MAP harness to the factory harness.

Failure to follow the recommended harness routing may result in a melted harness.

14. Route the Six-Gun/EconoMind 'In-Cab Cable' through the firewall to the passenger compartment. When passing through the firewall, either make a hole in a factory grommet or drill a hole and use a new grommet. If drilling, check the backside to make sure there are no components that may be damaged by drilling.

15. Remove the lower driver side interior panel that allows access to the fuse box.

16. From inside the vehicle, continue to pull the cable through the firewall until it is approximately 22" inside the cab. Secure the cable to the lower access panel area. Take precaution to leave the three connectors accessible for usage further in the installation process.

If Banks SpeedBrake is being installed, ignore steps 17-19 and proceed to step 20.

17. Locate the 'OBDII Interface Cable' in your kit. Connect the 'OBDII Interface Cable' to the vehicle OBDII connector. Use the large cable tie in your kit as shown in **Figure 9** to secure the 'OBDII Interface Cable' to the vehicle OBDII connector.

Now, connect the 8-pin connector from the 'OBDII Interface Cable' to the 8-pin connector on the Six-Gun/EconoMind 'In-Cab Cable.'

NOTE: If you are not installing the optional Banks iQ then coil up and secure cable with the RJ12 (telephone style) connector end.

18. Remove the fuse box cover, located in the cabin compartment. Locate the **mini-fuse #22** and remove. Install the mini-auto blade fuse tap

Figure 7: MAP sensor location

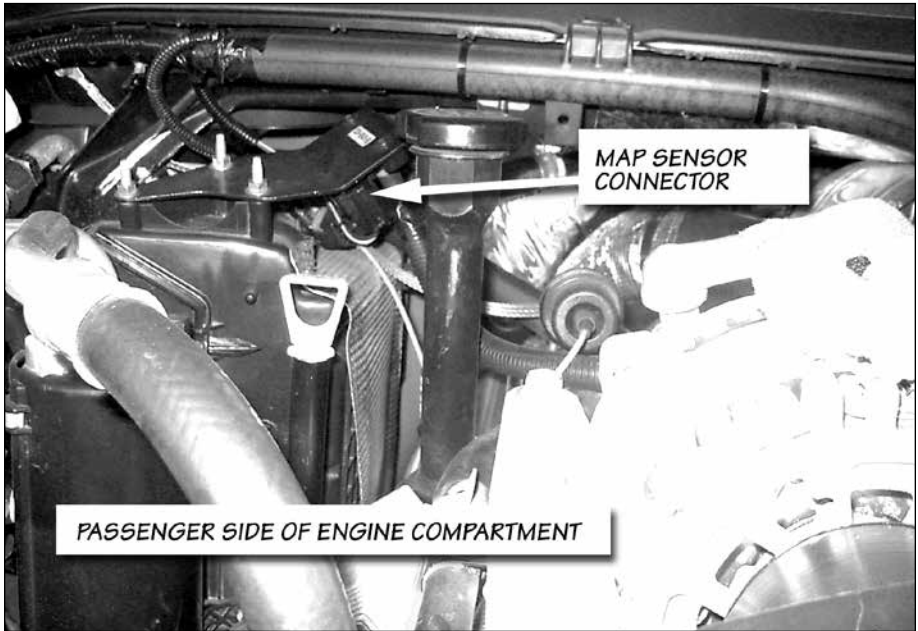


Figure 8: MAP sensor harness routing

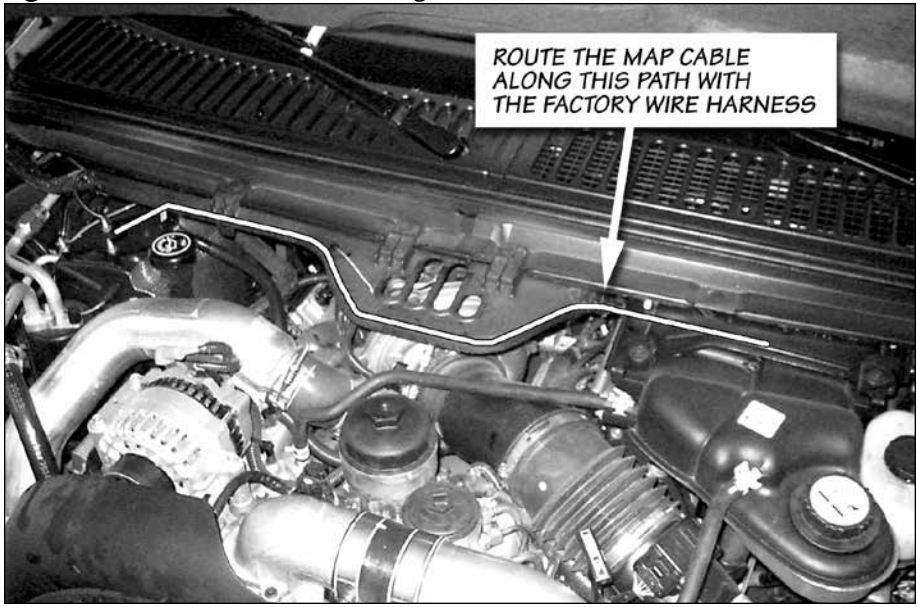


Figure 9: OBDII interface cable



onto the removed mini fuse as shown in **Figure 10**. Re-install the mini fuse with the attached blade tap into location #22 as shown in **Figure 11**.

19. Locate the RED single terminal connector on the 'OBDII Interface Cable' and connect it to the mini-fuse blade tap location #22. Replace the fuse cover and make sure not to pinch the RED single terminal wire.

Mounting The Six-Gun/EconoMind Diesel Tuner

20. *2003-04 model year vehicles only:* Remove the clip shown in **Figure 12** to create adequate room to mount the Six-Gun/EconoMind Diesel Tuner to the driver side inner fender.

21. *2003-04 four-wheel drive vehicles:* The module shown in **Figure 13** will appear only in four-wheel-drive vehicles. This may need to be relocated to make room for the Six-Gun/EconoMind Diesel Tuner. The mounting location of this module by the factory has not been consistent on early vehicles.

NOTE: Make sure all mounting surfaces are entirely clean and free of dirt

and oil before mounting the Six-Gun/EconoMind Diesel Tuner. Clean and dry as required using a cloth dampened in rubbing alcohol or similar cleaning solution.

21. *2005-07 model year vehicles only:* Remove the adhesive backing from two (2) dual-lock fasteners and attach them to the Six-Gun/EconoMind shield and the top of the fuse box.

22. Remove the adhesive backing from the (2) dual-lock fasteners on the back of the Six-Gun/EconoMind Diesel Tuner and affix the tuner to:

2003-04 model year vehicles: The inner driver side fender as shown in **Figure 3**

NOTE: Shield will not be used for installations on 03-04 models. Shield will only be used on 05-07 models.

2005-07 model year vehicles: The inside roof of the Six-Gun/EconoMind shield, that is mounted on the fuse box cover as shown in **Figure 4 & 6**.

-END, SECTION 1-

Figure 10: Mini-auto blade fuse tap

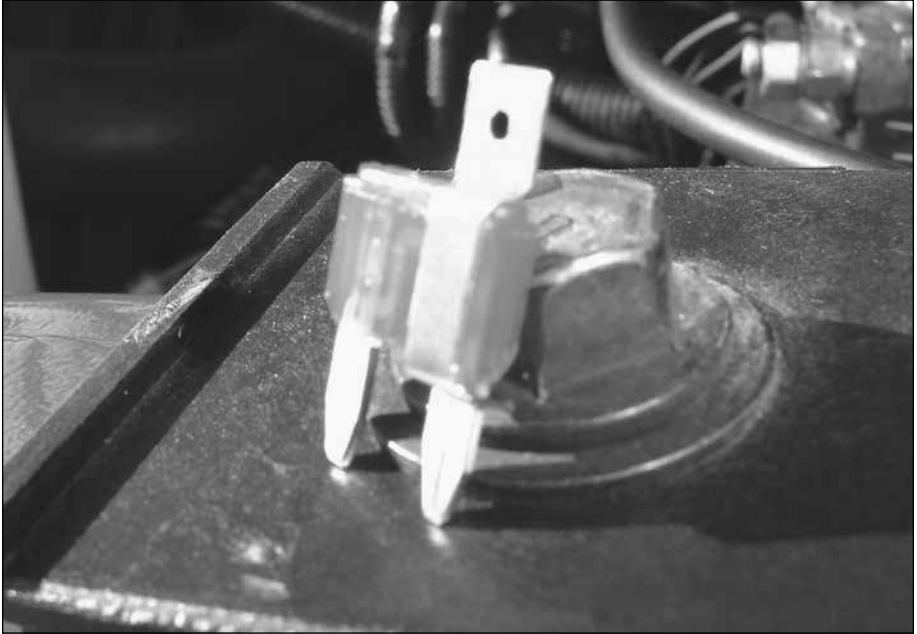


Figure 11



Figure 12: Removal of hood latch cable clip (2003-04 model year vehicles only)

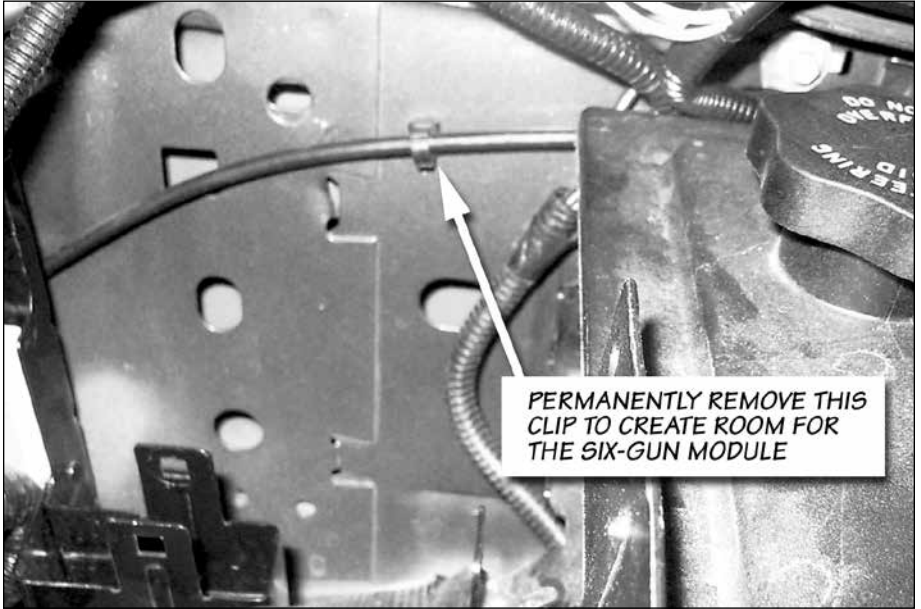
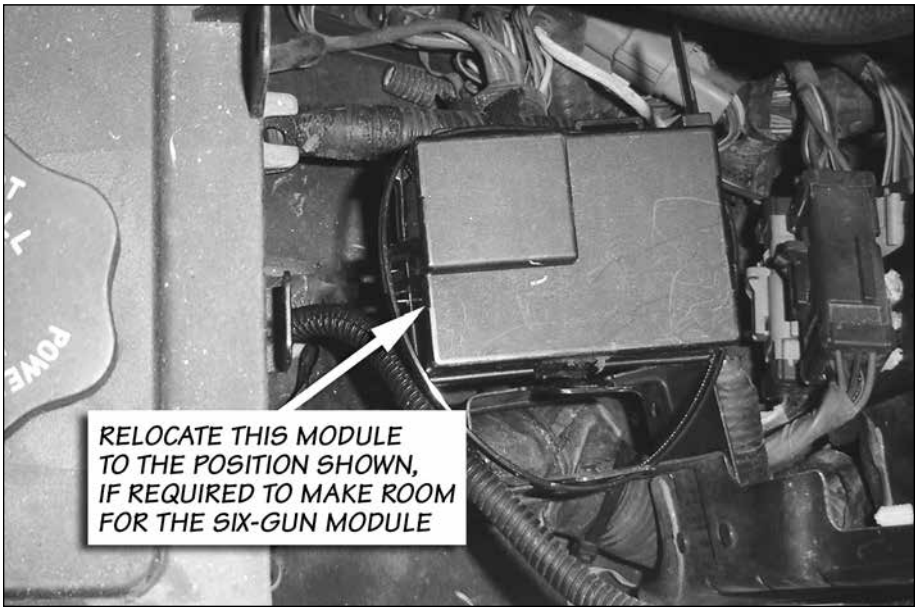


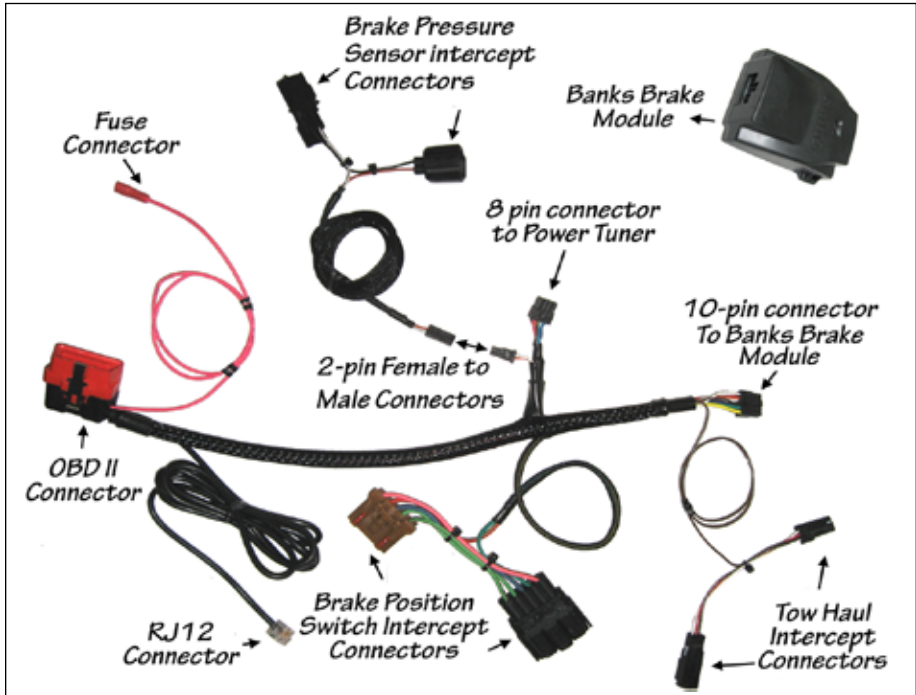
Figure 13



Section 2

INSTALLATION OF WIRING HARNESS & CONNECTIONS FOR OPTIONAL BANKS SPEEDBRAKE

Figure 14 Banks SpeedBrake Wire Harnesses



If installing Banks SpeedBrake, proceed to step 1.

If an existing Six-Gun/EconoMind Tuner has been previously installed, verify that the Tuner has the latest version firmware. Check and compare to the current version available on the Banks website. Banks Brake may not function properly if Six-Gun/EconoMind Tuner firmware is not up to the current version. If the Tuner is not to the latest version refer to section 10.

If not installing Banks SpeedBrake, skip to Section 3.

1. Remove the fuse access panel below the steering column as shown in Figure 15.

2. Remove the fuse box cover, located in the cabin compartment.

If Six-Gun/EconoMind was previously installed, continue to step 3.

If Six-Gun/EconoMind was not previously installed, skip to step 8.

Removing a Previously Installed Banks OBD II Interface Cable

3. Locate the RED single terminal connector on the Banks 'OBDII Interface Cable' and disconnect it from the mini-fuse blade tap location #22 if already connected. **DO NOT** remove the mini-fuse blade tap as it will be used for the Banks SpeedBrake wire harness installation. See Figure 16.

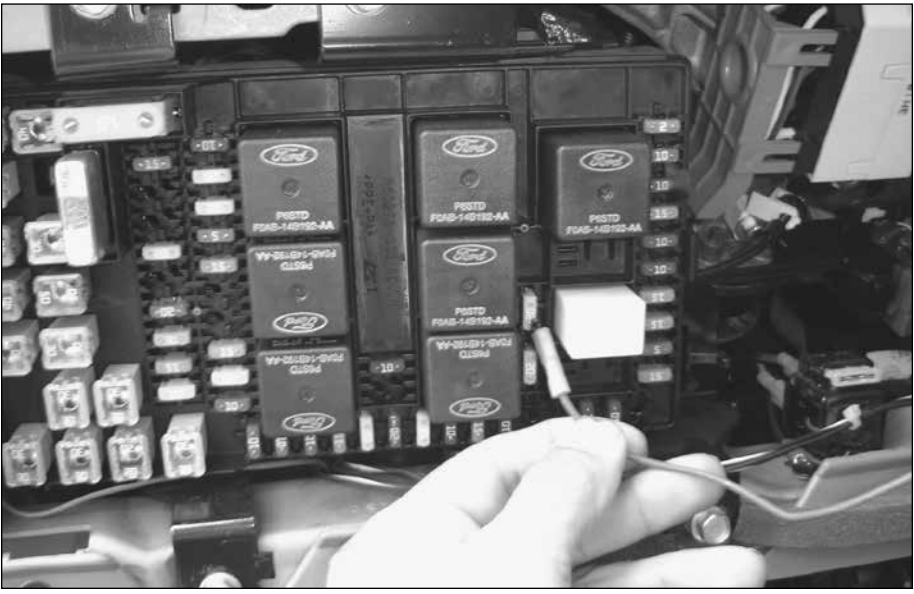
4. Disconnect Banks OBD II interface cable from the vehicle OBD II connector.

5. Disconnect the 8-pin connector from the OBD II interface cable from the 8-pin connector on the Six-Gun/EconoMind in-cab cable.

Figure 15 Ford ('05-'07)



Figure 16



6. Remove the OBD II interface cable from the vehicle.

Installing Banks SpeedBrake Wire Harness

7. From inside the engine compartment, locate the factory brake pressure sensor connector on the brake master cylinder. The brake pressure sensor will be the connector farthest away from the firewall. See **Figure 17**. Disconnect the factory brake pressure sensor connector.

8. Locate the Brake Pressure Sensor harness in your kit. Connect the female connector on the Brake Pressure Sensor harness to the factory male connector. Connect the male connector on the Brake Pressure Sensor harness to the factory female connector.

9. Route the 2-pin connector on the Brake Pressure Sensor harness following the Six-Gun/EconoMind in-cab cable through the fire wall. Secure the wiring harness with the supplied cable ties away from any heat

source or moving parts.

10. From under the dash, pull the 2-pin connector on the Brake Pressure Sensor harness through the fire wall.

11. Locate the Banks SpeedBrake Wire Harness and connect the 2-pin male connector on the Brake Pressure Sensor harness to the 2-pin connector on the Banks SpeedBrake wire harness.

12. Connect the Banks SpeedBrake Wire Harness OBD II connector to the vehicle's OBD II connector. Use a cable tie, as shown in **Figure 18** to secure the Banks SpeedBrake Wire Harness to the vehicle's OBD II connector.

13. Locate the Fuse connector on the Banks SpeedBrake Wire Harness and connect it to the mini-fuse blade tap location #22. Replace the fuse cover and make sure not to pinch the Fuse wire.

14. Now, connect the 8-pin connector from the Banks SpeedBrake Wire Harness to the 8-pin connector on the Six-Gun/EconoMind In-Cab Cable.

Figure 17 Brake Pressure Sensor

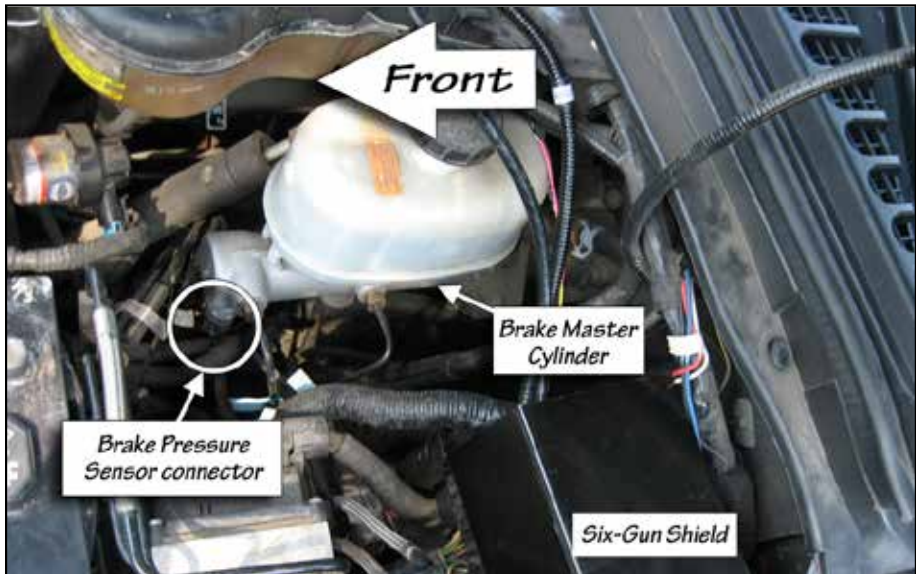
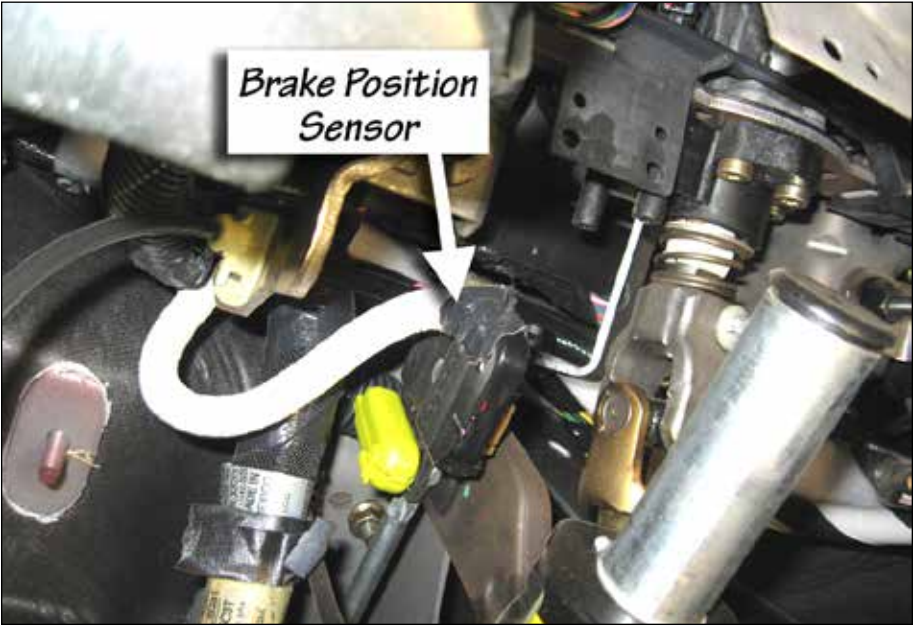


Figure 18 OBD II Connector



Figure 19 Brake Position Sensor location under dash



15. Locate the Foot Brake position switch connector under the dash. See **Figure 19**. Disconnect the foot brake position switch connector.

16. Locate the Brake Position Switch intercept connectors on the Banks SpeedBrake Wire Harness. Connect the female connector on the Brake Position Switch intercept connectors to the factory black brake position switch connector. Connect the male connector on the Brake Position Switch intercept Connectors to the factory female brake position connector that was disconnected.

17. From under the steering column, remove the three (3) screws that hold the steering column panel covers in place. See **Figure 20**.

18. Using a standard screw driver remove the plastic ignition key guide. See **Figure 21**.

19. Move the steering column down to the lowest possible position to aid in removal of the top steering column panel. Remove the top steering column panel.

CAUTION: Be careful when removing the top steering column panel or damage may result.

20. Locate the tow haul connector under the main wire harness towards the top rear of the steering column. See **Figure 22**.

21. Disconnect the tow haul connector.

22. Locate the tow haul intercept connector on the Banks SpeedBrake Wire harness. Route the Tow Haul intercept connectors under the dash towards the front of the vehicle and up to the top of the steering column following the factory harness to the factory tow haul connector. Make sure the connectors and wires are free of rotation from the steering column. Connect the female connector on the Tow Haul intercept connectors to the factory male tow haul connector. Connect the male connector on the Tow Haul intercept connectors to the factory female tow haul connector. Secure the connectors and wires with supplied cable ties.

23. Connect the Banks SpeedBrake module 10-pin connector on the Banks SpeedBrake wire harness to the SpeedBrake module. The connector will be the only one with a label.

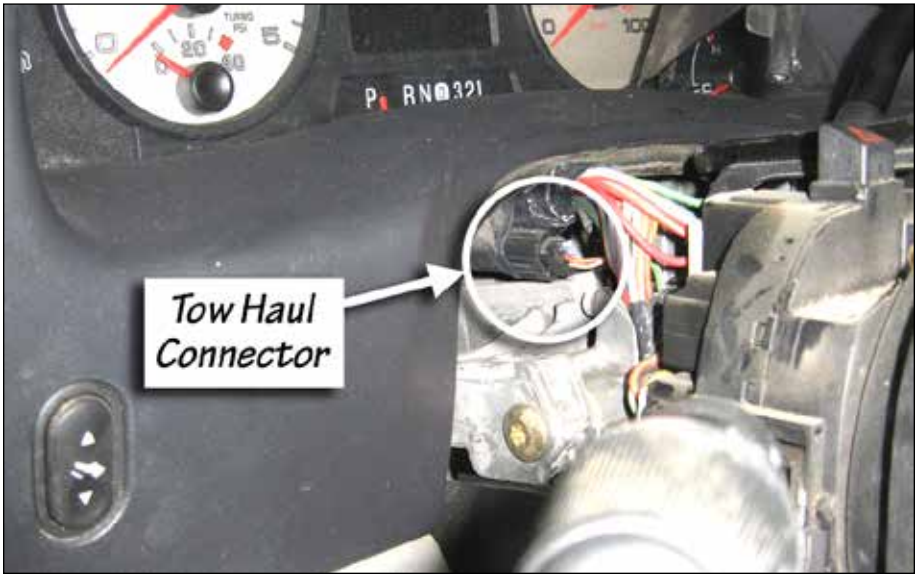
Figure 20 Remove column panel covers



Figure 21 Remove Plastic Ignition Key Guide



Figure 22 Tow Haul Connector on steering column, under main harness



NOTE: Make sure the correct connection is made to the Tuner and the Banks SpeedBrake module before proceeding.

24. Remove the adhesive backing from the dual-lock fasteners on the back of the SpeedBrake Module and attach the module to the location shown in **Figure 23**. Apply light pressure to the SpeedBrake Module by hand for 60-seconds to create a strong bond between the steering column surface and hook & loop interlocking fasteners. Using the supplied cable ties, secure the Banks SpeedBrake module wire harness away from any moving components.

NOTE: Make sure all mounting surfaces are entirely clean and free of dirt and oil before mounting the SpeedBrake module. Clean and dry as required using a cloth dampened in rubbing alcohol or similar cleaning solution.

25. Install the top steering column panel back in place.

26. Reinstall the plastic key guide into place. Make sure it is snapped into place.

27. Reinstall the three (3) factory screws to fasten the steering column plans back together.

28. The RJ12 connector (phone like connector) on the Banks SpeedBrake Wire harness will be connected in **Section 3, step 7 or 10**. Leave this wire loose.

29. Go over all connection. Secure the wire harness with the supplied ties under the dash.

WARNING: Take care to keep any cables away from the pedals or where they could become tangled.

-END, SECTION 2-

Figure 23 SpeedBrake Module Mounting Location



Section 3

MOUNTING AND CONNECTING THE BANKS IQ



FOR IDASH 1.8 INSTRUCTIONS, SEE IDASH MANUAL 97654 & 97674

Section 4

OPTIONAL THERMOCOUPLE INSTALLATION

If not installing the Optional Thermocouple, skip to Section 5

1. The thermocouple monitors the temperature of the exhaust gases entering the turbocharger at the turbine housing. Installation requires that the exhaust manifold be drilled near the manifold outlet. It is recommended that the manifold be removed from the engine to thoroughly clean out all metal chips from drilling. All metal shavings must be cleaned from the manifold to avoid turbine wheel damage and possible interference with the turbocharger's variable geometry turbine stage.

2. Disconnect the Exhaust Back Pressure Sensor tap located at the front of the driver side manifold. The pressure tap must be removed by using a 9/16" open-end wrench to hold the fitting stationary, and loosen the tube using a 5/8" open-end wrench. The fitting is shown in **Figure 30**.

NOTE: Failure to hold the fitting stationary will damage the tube upon removal.

3. Remove the driver side exhaust manifold.

4. Drill a 7/16" hole in the driver side exhaust manifold at the location shown in **Figure 31**.

5. Tap the hole for a 1/4" NPT thread. Check the thread depth as you tap by periodically removing the tap and screwing the pipe coupling into the tapped hole. The coupling should thread in 3 to 3 1/2 turns hand tight. Do not install the probe in place at this time.

CAUTION: Running the tap too deeply can prevent the pipe fitting from properly sealing.

6. Remove the NPT fitting from the thermocouple and install it on the exhaust manifold. Use anti-seize lubricant on the threads and torque to 14–16 lb-ft.

7. Remove all metal chips from the exhaust manifold.

NOTE: Failure to remove all metal chips could result in catastrophic damage to the turbocharger's turbine wheel or interfere with the operation of the variable geometry vane mechanism.

8. Re-install the exhaust manifold. Apply anti-seize lubricant to the

Figure 30: Location of the static exhaust pressure line tap

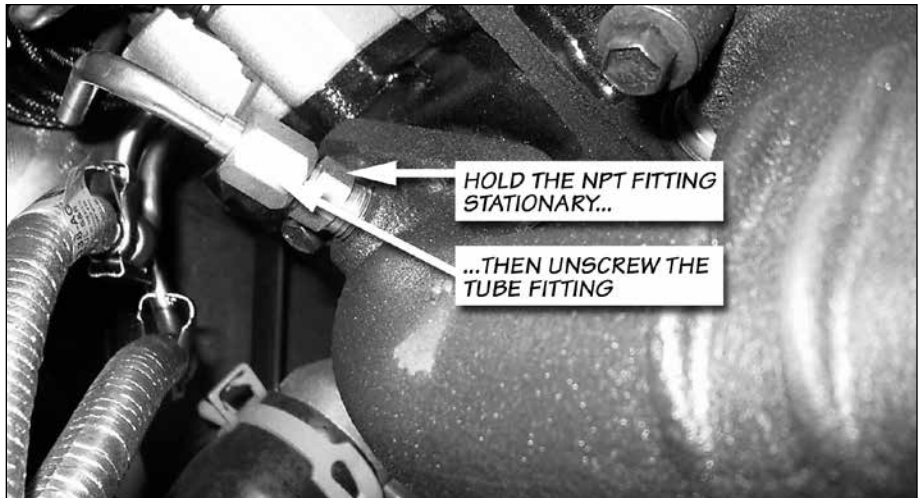


Figure 31: Location to drill and tap the driver side exhaust manifold for the thermocouple

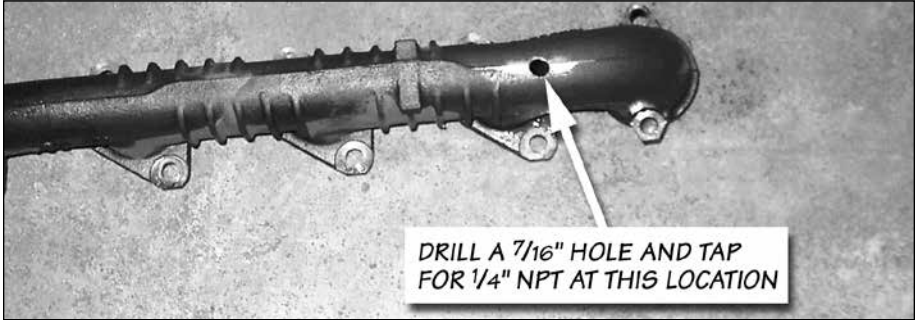
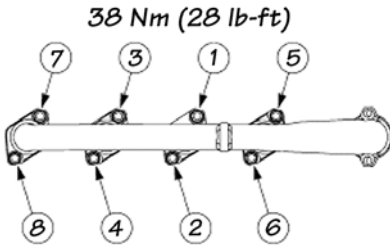


Figure 32: Exhaust manifold tightening sequence



manifold bolt threads and torque to 28 lb-ft. Use the tightening sequence shown in **Figure 32**.

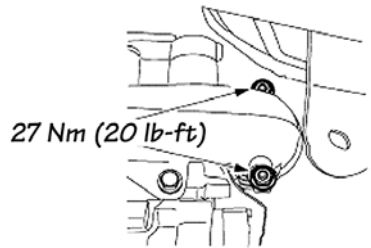
9. Tighten the turbocharger adapter pipe fasteners to 20 lb-ft as shown in **Figure 33**.

10. Reconnect the Exhaust Back Pressure Sensor tap.

11. Connect the thermocouple wires to the Six-Gun/EconoMind Diesel Tuner with the supplied screws. The YELLOW thermocouple wire attaches to the free YELLOW wire on the Six-Gun/EconoMind Diesel Tuner. The RED thermocouple wire attaches to the free RED wire on the Six-Gun/EconoMind Diesel Tuner.

12. Slide the heat shrink over the exposed metal junction, and supply moderate heat to seal the connection.

Figure 33: Turbocharger adapter pipe torque specification



A heat gun works well.

13. Route the thermocouple to the exhaust manifold and install the thermocouple in the fitting.

14. Reconnect the ground cables to the vehicles batteries.

NOTE: Once the Six-Gun/EconoMind Diesel Tuner is powered up at key-on, it will 'learn' that a thermocouple is installed. If the thermocouple is removed after being installed and run on the vehicle, the Six-Gun/EconoMind Diesel Tuner will assume that the sensor or connection has gone bad, and cease adding power while triggering the [2,3] diagnostic code (see Trouble Shooting **Section 7**).

-END, SECTION 4-

Section 5

AUTOMATIC TRANSMISSION LEARNING

The 6.0L Ford Trucks equipped with the TorqShift™ 5-speed automatic overdrive transmission use an adaptive shift control logic. This will require the transmission to learn how to cope with the additional power created by the Banks Power products before it will shift properly. Additionally, the Banks Six-Gun/EconoMind Diesel Tuner will require a short learning curve to characterize the transmission in order to optimize fueling during gear change events. The following sequence must be followed to allow for collaborative learning between the Banks Six-Gun/EconoMind and the transmission's control system. Failure to follow the sequence can result in damage to the transmission. **Perform the following sequence at a location where it is safe to accelerate to 60 mph without exceeding the posted speed limit.**

1. Start the truck and allow the engine to reach normal operating temperature.
2. Set the Banks iDash to power level 2.
3. Accelerate with the pedal to the floor, from a standing start to 60 mph. Repeat three (3) times.
4. Cruise at 30 mph, then press the accelerator to the floor to cause the transmission to downshift. Continue accelerating to 60 mph.
5. Repeat **steps (2) and (3)** for the next power setting.
6. Continue to increase the power setting and drive cycle until the desired power setting is achieved.

*The TorqShift™ 5-speed automatic transmission will continually adapt to the power output of the engine to optimize shift quality. This will result in the transmission un-learning how to cope with the higher power settings of the Six-Gun/EconoMind Diesel Tuner, if the Six-Gun/EconoMind Diesel Tuner is returned to a lower power setting. The rate that the transmission un-learns how to cope with the higher power levels, when switching to a lower power level, depends on the driving cycle. The transmission will quickly adapt to the power setting if the driving cycle includes regular gear changes at high loads. **The transmission learning procedure will need to be repeated when switching back to the higher power settings once the transmission adapts to the lower power settings.** It will be apparent when the transmission adapts to the lower settings by monitoring the feel of the gearshift. Gear changes will be noticeably harder when initially switching from a higher to lower power setting. This will soften as the transmission adapts to the new setting.*

For example: If the transmission has adapted to level 3 and it is desired to go to level 6, the transmission learning procedure can start at level 3.

IF TRANSMISSION SLIP IS DETECTED DURING THE TRANSMISSION LEARN PROCESS, REDUCE THE POWER LEVEL BY ONE, AND START OVER AT STEP 3.

-END, SECTION 5-

Section 6

CHECKING ENGINE PERFORMANCE

 **FOR IDASH 1.8 INSTRUCTIONS, SEE IDASH 1.8 MANUAL 97654 & 97674**

The Six-Gun/EconoMind Diesel Tuner requires the engine coolant temperature (ECT) to be above 110° before it will add fuel. Observe the operation of the boost and pyrometer (EGT) gauge values while driving under varying conditions. Turbocharger boost pressure will increase as a function of load and engine RPM, thus the engine will produce little boost while cruising at light throttle, with maximum boost while climbing hills heavily loaded during acceleration. Note the boost level seen during hard acceleration with a given load. If performance seems to have deteriorated sometime in the future, the maximum boost figures may be compared to see if boost has dropped off. Lower boost may be caused by turbo ducting leaks, a malfunctioning wastegate or fuel injection pump, or dirty air filter. Typical maximum boost pressure settings will vary considerably with stick or automatic transmission options, year model of vehicle and altitude.

NOTE: Before key-off, check tuner for error codes.

Use your Banks iDash to monitor exhaust gas temperature (EGT) in the engine. At idle, exhaust gas temperature will be very low, perhaps only 300°F. As the engine is accelerated for higher speeds with greater loads, the EGT will rise. The highest EGT will be seen under maximum load at full throttle, such as climbing a steep grade with a heavily laden vehicle.

To avoid heat damage to various engine components it is recommended that the exhaust gases cool below 400° before the engine is shut down. Your Six-Gun/EconoMind Diesel Tuner is calibrated to maintain a maximum EGT of 1350°F. You may experience brief excursions slightly above 1350°F under acceleration. This is normal and EGT should return to 1350°F or below within a few seconds. If you find that EGT remains high for any length of time, check for boost leaks or a dirty air filter.

-END, SECTION 6-

Section 7

TROUBLESHOOTING

If a Tuner has been previously installed, verify that the Tuner has the latest version firmware. Check your version to the current version available on the Banks website.

SpeedBrake may not function properly if Tuner/SpeedBrake firmware is not up to the current version.

Six-Gun/EconoMind/SpeedBrake Troubleshooting (using Tuner/Module LED's).

If you feel that your Six-Gun/EconoMind Diesel Tuner is not functioning properly, some diagnostics can be performed. Your Six-Gun/EconoMind Diesel Tuner is equipped with diagnostic features that will detect and display certain errors. Remove the Six-Gun/EconoMind Diesel Tuner from its mounting location while keeping all connectors plugged in. Turn the vehicle key to the ON position. Observe the two LEDs mounted on the upper corner of the Six-Gun/EconoMind Diesel Tuner.

- *A steady GREEN LED will illuminate* if all wire connections are correct, the engine is running and the engine coolant temperature is within its normal operating range.
- *The GREEN LED will flash* if all wire connections are correct, the engine is running, but the engine coolant temperature is not within its normal operating range. The GREEN LED will stop flashing once the engine coolant temperature is with normal operating range. Power will not be added if the coolant temperature is not within its normal range.
- *None of the LEDs will illuminate* if the fuse on the Six-Gun/EconoMind wiring harness is blown or the power supply hook-up is not properly connected. The power supply wire is the fused wire that connects to the t-tap at the PCM. If the power connection and fuses are okay, contact Banks Technical Service.

- *The RED LED will flash* if a connection is incorrect or if there is a problem with the system, when the engine is running. The RED LED will flash in sequence to identify a particular fault code. A Six-Gun/EconoMind Diesel Tuner's fault code is comprised of 2 digits. Each code is expressed in a sequence of 2 sets of the flashing RED LED separated by a brief flashing of the GREEN LED. Each set of a number of RED LED flashes represents a digit. A longer flashing of the GREEN LED separates the sequences. The LEDs will continue to flash to display all the errors, and then repeat.

Table 1 lists the Six-Gun/EconoMind Tuner fault codes.

Table 2 lists the SpeedBrake Module fault codes.

For example, if a faulty thermocouple is detected (code 2,3) by the Six-Gun/EconoMind Diesel Tuner, the following RED and GREEN LED flashing sequence is observed when the key is ON:

- (1) Two times flashing RED LED
- (2) One time quick flashing GREEN LED
- (3) Three times flashing RED LED
- (4) One time longer flashing GREEN LED

The above flashing sequence will repeat continuously. When the problem is corrected, the fault code will be eliminated and replaced with a steady GREEN LED. Note: If multiple codes are set, they will be displayed in a series separated by the longer flashing GREEN LED. When reading codes, make sure to watch the entire series until you see the first code repeat.

-END, SECTION 7-



Table 1: Banks Six-Gun/EconoMind Fault Codes

Code	Event	Course of Action
1,1	Injection Control Pressure (ICP) Input Voltage Out of Range.	Turn ignition OFF and check both 46-pin tuner connections. Turn ignition back ON and re-check for presence of code.
1,2	Manifold Absolute Pressure (MAP) Input Voltage Out of Range.	Turn ignition OFF and check 3-pin MAP sensor connections. Turn ignition back ON and re-check for presence of code.
1,3	Six-Gun/EconoMind Switch Input Value Out of Range.	Turn ignition OFF and make sure either Banks IQ or Six-Gun/EconoMind switch is connected to Six-Gun/EconoMind tuner. If Six-Gun/EconoMind switch is connected (no Banks IQ), check 2-pin connection on tuner's in-cab cable. Turn ignition back ON and re-check for presence of code.
2,1	Injection Control Pressure (ICP) Output Voltage Out of Range.	Turn ignition OFF and check both 46-pin tuner connections. Turn ignition back ON and re-check for presence of code.
2,2	Manifold Absolute Pressure (MAP) Output Voltage Out of Range.	Turn ignition OFF and check 3-pin MAP sensor connections. Turn ignition back ON and re-check for presence of code.
2,3	Exhaust Gas Temperature (EGT) Sensor Open Circuit.	Turn ignition OFF and check thermocouple ring-terminal connections (2). Turn ignition back ON and re-check for presence of code.
3,2	Power Up Error or Internal Module Malfunction.	Turn ignition OFF and check fuse-tap power connection to Six-Gun/EconoMind tuner (under-dash panel). Turn ignition back ON and re-check for presence of code.
3,3	Internal Module Malfunction.	Turn ignition OFF and check both 46-pin tuner connections and in-cab OBD II connection. Turn ignition back ON and re-check for presence of code.
3,4	CAN Communications Error With Vehicle ECM, ICM or OBD System.	Turn ignition OFF and check both 46-pin tuner connections and in-cab OBD II connection. Turn ignition back ON and re-check for presence of code.
4,2	Transmission Slippage Detected.	Transmission is slipping excessively. Code will automatically clear once transmission stops slipping (repaired).
4,3	Exhaust Back Pressure (EBP) Input Voltage Out of Range.	Turn ignition OFF and check both 46-pin tuner connections. Turn ignition back ON and re-check for presence of code.
4,4	Exhaust Back Pressure (EBP) Output Voltage Out of Range.	Turn ignition OFF and check both 46-pin tuner connections. Turn ignition back ON and re-check for presence of code.
5,1	Internal Module Malfunction.	Turn ignition OFF and check both 46-pin tuner connections and in-cab OBD II connection. Turn ignition back ON and re-check for presence of code.

If problem persists, call Gale Banks Engineering Tech Support.

Table 2: Banks SpeedBrake Fault Codes

Code	Event	Course of Action
1, 1	Insufficient power supply to SpeedBrake module	Turn Ignition OFF and check connection at fuse tap, 10-pin connection to module and 8-pin connection to Tuner. Turn ignition back ON and re-check for presence of code.
1, 2	Brake signal malfunction while Brake is on	Turn Ignition OFF and check connections at 5-pin male and female brake pedal connector. Turn ignition back ON and re-check for presence of code.
1, 3	Insufficient voltage to tow-haul switch	Turn Ignition OFF and check connections at 3-pin male and female tow-haul switch. Turn ignition back ON and re-check for presence of code.
1, 4	Brake Signal malfunction while brake is off.	Turn Ignition OFF and check connections at 5-pin male and female brake pedal connector. Turn ignition back ON and re-check for presence of code.
2, 1	No response to generated OBD ISO messages	Turn Ignition OFF and check connections at OBD II connection. Turn ignition back ON and re-check for presence of code.
2, 2	Brake pressure switch signal malfunction	Turn Ignition OFF and check connections at 2-pin male and female brake pressure sensor intercept connector and 2-pin in-cab cable connector. Turn ignition back ON and re-check for presence of code.
3, 1	Rear wheel slip during braking	Module has detected rear wheel slipping. Code will automatically clear 30 seconds after traction regained.
3, 2	Power Up Error or Internal Module Malfunction	Turn Ignition OFF and check connection at fuse tap, 10-pin connection to module and 8-pin connection to Tuner. Turn ignition back ON and re-check for presence of code.
3, 3	Internal Module Malfunction	Turn Ignition OFF and check connection at fuse tap, 10-pin connection to module and 8-pin connection to Tuner. Turn ignition back ON and re-check for presence of code.
4, 3	Exhaust Back Pressure (EBP) Input Voltage Out of Range	Turn Ignition OFF and check the 46-pin male and female PCM connectors. Turn ignition back ON and re-check for presence of code.
4, 4	Communication failure to brake module.	Turn Ignition OFF and check connections at 10-pin brake module, 8-pin Tuner, and OBD II connector. Turn ignition back ON and re-check for presence of code.
5, 1	Internal Module Malfunction	Turn Ignition OFF and check connections at 10-pin brake module, 8-pin Tuner, and OBD II connector. Turn ignition back ON and re-check for presence of code.

If code does not re-appear at key ON, start engine and check for presence of code both at engine idle and under varying driving conditions.

Section 8

CLEARING LEARNED INFORMATION

If the Six-Gun/EconoMind Diesel Tuner has been moved to a different vehicle, or you are instructed to do so by Banks Technical Staff, it is possible to reset all of the parameters that the Six-Gun/EconoMind has 'learned' - presence of an EGT thermocouple or Speed-Loader, etc.

CAUTION: The following procedures can only be carried out with the engine OFF!

1. Turn the vehicle key to ON but **DO NOT** start the engine.

2. Fully depress the throttle pedal and then release it completely. Repeat 5 times. The GREEN LED will flash when this is completed successfully.

3. Turn the key OFF. Wait 30 seconds, or until the GREEN LED goes off and stays off. Turn the key back to the ON position but **DO NOT** start the engine.

4. Fully depress the throttle pedal and then release it completely. Repeat 5 times.

-END, SECTION 8-

Section 9

REMOVAL OF THE SIX-GUN/ECONOMIND DIESEL TUNER

If the Six-Gun/EconoMind Diesel Tuner should ever need to be removed from the vehicle, perform the following:

NOTE: The ignition must remain in the OFF position throughout the removal process.

1. Disconnect the Six-Gun/EconoMind's 46-pin connector (connector C) from the middle connection on the PCM.

2. Re-connect the vehicle's 46-pin connector back into the middle connection on the PCM.

3. Disconnect the Six-Gun/EconoMind's MAP connections from the vehicles MAP sensor and harness. Re-connect the vehicle's MAP connector back into the MAP sensor.

4. Disconnect the 2-ring terminals from the EGT thermocouple.

5. Disconnect the 3 small connectors on the 'In-Cab Cable' and gently pull the cable back through the firewall.

6. Remove the Six-Gun/EconoMind Diesel Tuner.

Failure to follow the above instructions when removing the module will result in a "Check Engine" light on the dash and a Diagnostic Trouble Code being stored in the factory computer, in addition to the engine not running.

NOTE: Banks SpeedBrake & will not function without the Six-Gun Tuner installed.

-END, SECTION 9-

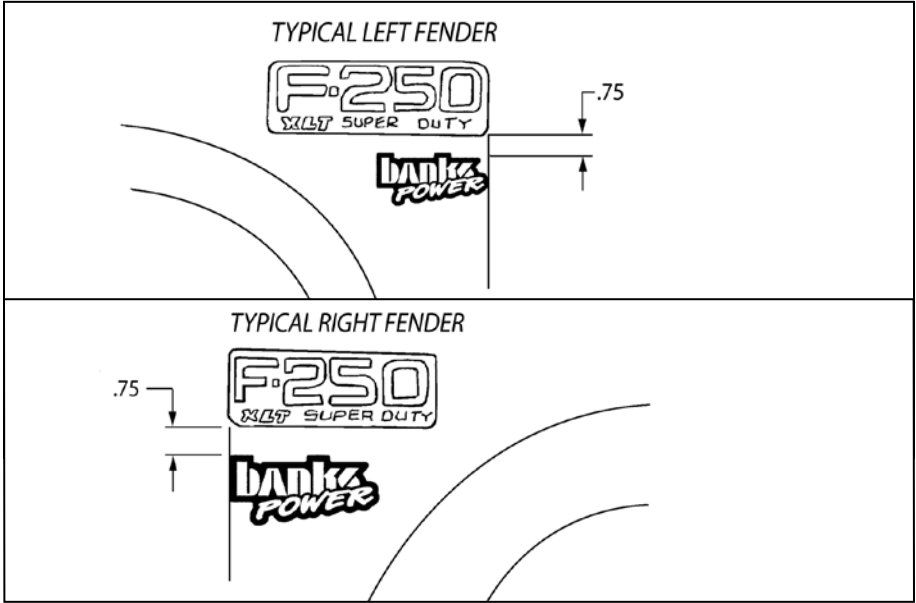
Section 10

**FOR BANKS IDASH 1.8 INSTRUCTIONS, SEE IDASH 1.8 MANUAL
97654/97674 & BANKS SIX-GUN/SPEEDBRAKE SOFTWARE**

Section 11

PLACEMENT OF THE BANKS POWER DECALS

Figure 39: Placement of the Banks decals



-END, SECTION 11-

Gale Banks Engineering
546 Duggan Avenue • Azusa, CA 91702
(626) 969-9600 • Fax (626) 334-1743

Product Information & Sales: (888) 635-4565
Customer Support: (888) 839-5600
Installation Support: (888) 839-2700

bankspower.com