



Installation Manual for 1989-1997 Ford Power Stroke v1.1

Please read all instructions before the installation of the ATS Commander

Thank you for purchasing the ATS Co-Pilot. This manual is to assist you with your installation and operation of the unit. If you are installing the unit for a customer, pass this manual on to your customer for future reference.



Understanding the ATS Co-Pilot

The ATS Co-Pilot is recommended for use with light duty pickup trucks with a heavy-duty aftermarket transmission and torque converter package are installed on vehicle. While the Commander will still function perfectly on a stock transmission, factory transmission shafts are weak and prone to breakage. The factory torque converter clutch will also fail if applied under high load conditions. Factory computers are programmed to disengage lockup under certain conditions which will protect the transmissions internal components under higher load. This is when we recommend having a heavy-duty aftermarket transmission installed on your vehicle to prevent transmission failure. If you have a stock transmission it is recommended that you leave your Co-Pilot in a less aggressive setting when under high load conditions. ATS Diesel Performance sells many parts for all levels of trucks that will strengthen your transmission and

improve reliability, whether you have a stock daily driver or a fully built race truck! Give us a call today if you feel the need to get a fully rebuilt transmission for your truck, or if you just want to strengthen your current transmission with a few upgraded parts. Our experts can help answer any questions you have and guide you in the right direction.

Setting up the ATS Co-Pilot module for installation

The ATS Co-Pilot will need to be set up for your vehicle and application. The Co-Pilot will need to be disassembled to access the dip switches on the electronic board. You will need a 1/16th - inch hex (Allen wrench) to remove the face from the Co-Pilot. After the face has been removed the electronic board can be slid out of the casing from the front. The digital face is attached to the circuit board with a ribbon cable; do not force the board from the case. There are four (4) switches on the circuit board; the switches allow the user to select the features desired. The settings are listed below. When reinstalling the face on the Co-Pilot do not over tighten the 2 small screws on the face.

Dip switch selection:

Switch #1

Set to **OFF** position

Switch #2

Set to **ON** position

Switch #3 - Speed setting

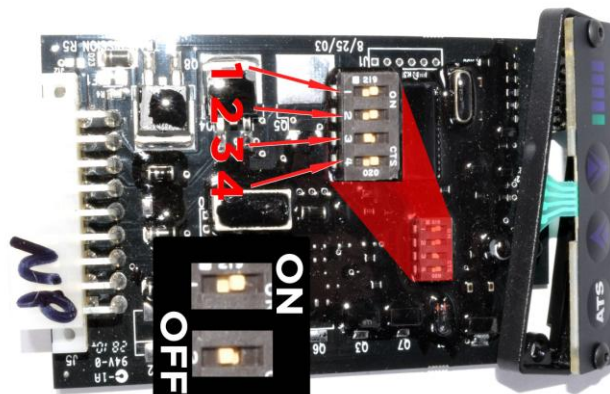
On=low speed cut out

Off= Hi speed cut out

Switch #4

Set switch to **ON** position

We have preset your module with #1-OFF, #2-ON, #3-OFF, and #4-ON.



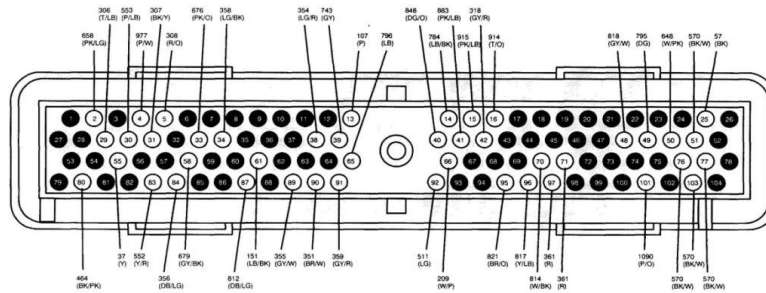
Co-Pilot Mounting Location

Find a convenient location to mount the Co-Pilot within reach and view of the driver. The Commander interface must be within visual range of the driver as well as in easy reach. We have found the ideal place to locate the module is just to the right of the driver on the lower dash panel just above the right knee. Use the Velcro supplied to secure it to the dash. Before sticking the Velcro to the dash use brake clean or acetone on the area the sticker will be. Run the Co-Pilot wires that are to be wired up to the PCM (Power-train control module) and the transmission through the firewall



Wiring The Co-Pilot For 1989-1994 models

-The Co-Pilot has several connections that need to be made in order for it to function properly. There are several wires which are optional but still included to give the Co-Pilot a more versatile use depending on your trucks current setup. Use the diagram below as a reference when installing your Co-Pilot to avoid any conflicts or confusion.



C1027
POWERTRAIN CONTROL MODULE (PCM) (7.3L DI TURBO)

| PIN | CIRCUIT | CIRCUIT FUNCTION | PIN | CIRCUIT | CIRCUIT FUNCTION | PIN | CIRCUIT | CIRCUIT FUNCTION |
|-----|-------------|------------------------------|-----|-------------|---------------------------------------|-----|-------------|---------------------------------------|
| 1 | - | Not Used | 36 | - | Not Used | 71 | 361 (R) | Power Input |
| 2 | 658 (PK/LG) | PCM Data Link Connector | 37 | - | Not Used | 72 | - | Not Used |
| 3 | - | Not Used | 38 | 354 (LG/R) | Engine Oil Temperature Sensor | 73 | - | Not Used |
| 4 | 977 (P/W) | Brake Warning Indicator | 39 | 743 (GY) | Ambient Air Temperature Input | 74 | - | Not Used |
| 5 | 308 (R/O) | Idle Position Switch | 40 | 848 (DG/O) | Speed Control Ground | 75 | - | Not Used |
| 6 | - | Not Used | 41 | 883 (PK/LB) | A/C Cycle Pressure Switch Input | 76 | 570 (BK/W) | Ground |
| 7 | - | Not Used | 42 | 318 (GY/R) | Exhaust Pressure Regulator | 77 | 570 (BK/W) | Ground |
| 8 | - | Not Used | 43 | - | Not Used | 78 | - | Not Used |
| 9 | - | Not Used | 44 | - | Not Used | 79 | - | Not Used |
| 10 | - | Not Used | 45 | - | Not Used | 80 | 464 (BK/PK) | Wait to Start Output |
| 11 | - | Not Used | 46 | - | Not Used | 81 | - | Not Used |
| 12 | - | Not Used | 47 | - | Not Used | 82 | - | Not Used |
| 13 | 107 (P) | Generic Scan Tool Input | 48 | 818 (GY/W) | IDM Signal Input | 83 | 552 (Y/R) | Injection Pressure Regulator |
| 14 | - | Not Used | 49 | 795 (DG) | CAM Position Sensor | 84 | 356 (DB/LG) | BARO Sensor |
| 15 | 915 (PK/LB) | Generic Scan Tool Input | 50 | 648 (W/PK) | Tachometer Feed to Instrument Cluster | 85 | - | Not Used |
| 16 | 914 (T/O) | Selectable RPM Control Input | 51 | 570 (BK/W) | Ground | 86 | - | Not Used |
| 17 | - | Not Used | 52 | - | Not Used | 87 | 812 (DB/LG) | Injection Control Pressure Sensor |
| 18 | - | Not Used | 53 | - | Not Used | 88 | - | Not Used |
| 19 | - | Not Used | 54 | - | Not Used | 89 | 355 (GY/W) | Accelerator Pedal Position Sensor |
| 20 | - | Not Used | 55 | 37 (Y) | Keep Alive Power Input | 90 | 351 (BR/W) | Reference Output Voltage |
| 21 | - | Not Used | 56 | - | Not Used | 91 | 359 (GY/R) | Sensor Signal Return |
| 22 | - | Not Used | 57 | - | Not Used | 92 | 511 (LG) | Brake ON/OFF Switch Input |
| 23 | - | Not Used | 58 | 679 (GY/BK) | Vehicle Speed Sensor | 93 | - | Not Used |
| 24 | - | Not Used | 59 | - | Not Used | 94 | - | Not Used |
| 25 | 57 (BK) | Ground | 60 | - | Not Used | 95 | 821 (BR/O) | Fuel Delivery Command Signal Output |
| 26 | - | Not Used | 61 | 151 (LB/BK) | Speed Control Common Signal | 96 | 817 (Y/LB) | Cylinder Identification Signal Output |
| 27 | - | Not Used | 62 | - | Not Used | 97 | 361 (R) | Power Input |
| 28 | - | Not Used | 63 | - | Not Used | 98 | - | Not Used |
| 29 | 306 (T/LB) | Clutch Pedal Position Switch | 64 | - | Not Used | 99 | - | Not Used |
| 30 | 553 (P/LB) | Exhaust Back Pressure Sensor | 65 | 570 (BK/W) | Cam Position Sensor Return | 100 | - | Not Used |
| 31 | 307 (BK/Y) | Brake Pressure Switch | 66 | 209 (W/P) | PCM VIP Data Link Input | 101 | 1090 (P/O) | Glow Plug Control Output |
| 32 | - | Not Used | 67 | - | Not Used | 102 | - | Not Used |
| 33 | 676 (PK/O) | Vehicle Speed Sensor Ground | 68 | - | Not Used | 103 | 570 (BK/W) | Ground |
| 34 | 358 (LG/BK) | MAP Sensor | 69 | - | Not Used | 104 | - | Not Used |
| 35 | - | Not Used | 70 | 814 (W/BK) | IDM Enable Output | | | |

NOT USED: Orange Wire (Pin 4), White Wire (PIN #5), Pink Wire (PIN #12), Purple Wire (PIN #16) And Gray (PIN #14).

Red Wire- +12V Power – PIN #1

Locate the **Red** wire coming from the vehicle’s PCM Pin #37. Tap this wire with the **Red** Commander wire by soldering. Shield the tap from the elements.

Black Wire- Ground (GND) – PIN #9

Locate the **Black w/ White** wire coming from the vehicle’s PCM Pin #60. Tap this wire with the **Black** Commander wire by soldering. Shield the tap from the elements.

Yellow Wire– PCM - PIN #10 and Blue Wire– TCC - PIN #11

Locate the vehicle’s Torque Converter Clutch (TCC) wire coming from the vehicle’s transmission. This **Purple w/ Yellow** stripe wire can be found at the transmission connector (passenger side of the transmission, above the pan rail). Cut this wire and solder, or attach a butt connector to the wire leading back to the transmission and attach a butt connector to the wire

heading into the wire loom to the vehicle's computer (PCM). Reference the supplied wiring schematic before cutting wire.

Connect the **Yellow** wire coming from the **Co-Pilot** to the wire that goes to the PCM. Connect the **Blue** wire coming from the **Co-Pilot** to the wire that goes to the transmission.

Protect the connections from the elements.

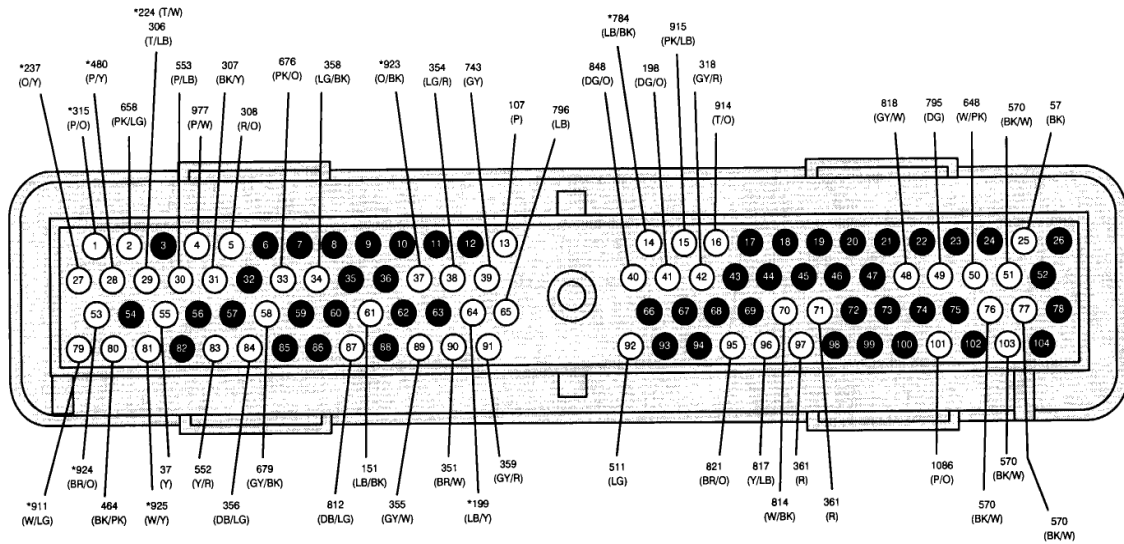
Green Wire- Vehicle Speed Sensor (VSS) – PIN #17

Locate the VSS (Vehicle Speed Sensor) wire. This **Gray w/ Black** stripe wire can be found at the transmission connector (passenger side of the transmission, above the pan rail). Tap by soldering the Green Co-Pilot wire to the VSS wire and protect from elements. A poor VSS connection is the most common wiring problem.

If at any time you would like to bypass the Co-Pilot's operation, simply unplug the wiring harness from the Co-Pilot Module and jumper the harness' blue and yellow terminals together with a paperclip.

Wiring The Co-Pilot For 1994.5-1997 models

-The Co-Pilot has several connections that need to be made in order for it to function properly. There are several wires which are optional but still included to give the Co-Pilot a more versatile use depending on your trucks current setup. Use the diagram below as a reference when installing your Co-Pilot to avoid any conflicts or confusion.



**C1027 (GRAY)
* WITH E40D TRANSMISSION POWERTRAIN CONTROL MODULE (PCM) (7.3L DI TURBO)**

| PIN | CIRCUIT | CIRCUIT FUNCTION | PIN | CIRCUIT | CIRCUIT FUNCTION | PIN | CIRCUIT | CIRCUIT FUNCTION |
|-----|--------------|------------------------------------|-----|-------------|---------------------------------------|-----|-------------|--|
| 1 | 315 (P/O)* | Transmission Shift Solenoid #2 | 35 | - | Not Used | 70 | 814 (W/BK) | IDM Enable Output |
| 2 | 658 (PK/LG) | Check Engine Light | 36 | - | Not Used | 71 | 361 (R) | Power Input |
| 3 | - | Not Used | 37 | *923 (O/BK) | Transmission Fluid Temperature Sensor | 72 | - | Not Used |
| 4 | 977 (P/W) | Brake Warning Indicator | 38 | 354 (LG/R) | Engine Oil Temperature Sensor | 73 | - | Not Used |
| 5 | 308 (R/O) | Idle Validation Switch | 39 | 743 (GY) | Ambient Air Temperature Input | 74 | - | Not Used |
| 6 | - | Not Used | 40 | 848 (DG/O) | Speed Control Ground | 75 | - | Not Used |
| 7 | - | Not Used | 41 | 198 (DG/O) | A/C Cycle Pressure Switch Input | 76 | 570 (BK/W) | Ground |
| 8 | - | Not Used | 42 | 318 (GY/R) | Exhaust Pressure Regulator | 77 | 570 (BK/W) | Ground |
| 9 | - | Not Used | 43 | - | Not Used | 78 | - | Not Used |
| 10 | - | Not Used | 44 | - | Not Used | 79 | *911 (W/LG) | Transmission Control Indicator Lamp |
| 11 | - | Not Used | 45 | - | Not Used | 80 | 464 (BK/PK) | Wait to Start Output |
| 12 | - | Not Used | 46 | - | Not Used | 81 | *925 (W/Y) | Transmission Electronic Pressure Control |
| 13 | 107 (P) | Generic Scan Tool Input | 47 | - | Not Used | 82 | - | Not Used |
| 14 | 784 (LB/BK)* | 4x4 Low Input | 48 | 818 (GY/W) | IDM Signal Input | 83 | 552 (Y/R) | Injection Pressure Regulator |
| 15 | 915 (PK/LB) | Generic Scan Tool Input | 49 | 795 (DG) | CAM Position Sensor | 84 | 356 (DB/LG) | BARO Sensor |
| 16 | 914 (T/O) | Auxiliary Powertrain Control Input | 50 | 648 (W/PK) | Tachometer Feed to Instrument Cluster | 85 | - | Not Used |
| 17 | - | Not Used | 51 | 570 (BK/W) | Ground | 86 | - | Not Used |
| 18 | - | Not Used | 52 | - | Not Used | 87 | 812 (DB/LG) | Injection Control Pressure Sensor |
| 19 | - | Not Used | 53 | *924 (BR/O) | Transmission Coast Clutch Solenoid | 88 | - | Not Used |
| 20 | - | Not Used | 54 | - | Not Used | 89 | 355 (GY/W) | Accelerator Pedal Position Sensor |
| 21 | - | Not Used | 55 | 37 (Y) | Keep Alive Power Input | 90 | 351 (BR/W) | Reference Output Voltage |
| 22 | - | Not Used | 56 | - | Not Used | 91 | 359 (GY/R) | Sensor Signal Return |
| 23 | - | Not Used | 57 | - | Not Used | 92 | 511 (LG) | Brake ON/OFF Switch Input |
| 24 | - | Not Used | 58 | 679 (GY/BK) | Vehicle Speed Sensor | 93 | - | Not Used |
| 25 | 57 (BK) | Ground | 59 | - | Not Used | 94 | - | Not Used |
| 26 | - | Not Used | 60 | - | Not Used | 95 | 821 (BR/O) | Fuel Delivery Command Signal Output |
| 27 | 237 (O/Y)* | Transmission Shift Solenoid #1 | 61 | 151 (LB/BK) | Speed Control Common Signal | 96 | 817 (Y/LB) | Cylinder Identification Signal Output |
| 28 | 480 (P/Y)* | Torque Converter Clutch Solenoid | 62 | - | Not Used | 97 | 361 (R) | Power Input |
| 29 | 306 (T/LB) | Clutch Pedal Position Switch | 63 | - | Not Used | 98 | - | Not Used |
| 30 | 224 (T/W)* | Transmission Control Switch | 64 | *199 (LB/Y) | Transmission Range (TR) Sensor | 99 | - | Not Used |
| 31 | 553 (P/LB) | Exhaust Back Pressure Sensor | 65 | 796 (LB) | Cam Position Sensor Return | 100 | - | Not Used |
| 32 | 307 (BK/Y) | Brake Pressure Switch | 66 | - | Not Used | 101 | 1086 (P/O) | Glow Plug Control Output |
| 33 | 676 (PK/O) | Vehicle Speed Sensor Ground | 67 | - | Not Used | 102 | - | Not Used |
| 34 | 358 (LG/BK) | MAP Sensor | 68 | - | Not Used | 103 | 570 (BK/W) | Ground |
| | | | 69 | - | Not Used | 104 | - | Not Used |

* W/E40D TRANSMISSION

NOT USED: Orange Wire (Pin 4), White Wire (PIN #5), Pink Wire (PIN #12), Purple Wire (PIN #16) And Gray(PIN #14).

Red Wire (12volts)-Pin #1

Locate the **Red** wire coming from the vehicle's PCM Pin #71. Tap this wire with the **red** Co-Pilot wire by soldering. Shield the tap from the elements.

Black Wire- Ground (GND) – PIN #9

Locate the **Black** wire coming from the vehicle's PCM Pin #51. Tap this wire with the **black** Co-Pilot wire by soldering. Shield the tap from the elements.

Yellow Wire– PCM - PIN #10 and Blue Wire– TCC - PIN #11

Locate the vehicle's Torque Converter Clutch (TCC) wire coming from the vehicle's PCM to the transmission. This **Purple w/ Yellow** stripe wire can be found at the PCM at pin #28. Cut this wire and solder, or attach a butt connector to the wire leading back to the transmission and attach a butt connector to the wire heading to the vehicles computer (PCM). Reference the supplied wiring schematic before cutting wire.

Connect the **Yellow** wire coming from the **Co-Pilot** to the wire that goes to the PCM. Connect the **Blue** wire coming from the **Co-Pilot** to the wire that goes to the transmission.

Protect the connections from the elements.

Green Wire- Vehicle Speed Sensor (VSS) – PIN #17

Locate the VSS (Vehicle Speed Sensor) wire. This **Gray w/ Black** stripe wire can be found at the PCM at pin #58 Run the green wire from the Co-Pilot module to the VSS wire and cut off any excess, but leave some slack. Solder the Green Co-Pilot wire to the VSS wire and protect from elements, this is the most common install problem with wiring

Wiring The Co-Pilot For 1997 models E350 models

CALIFORNIA EXCEPT SUPER DUTY

* E40D TRANS

| PIN | CIRCUIT | CIRCUIT FUNCTION | PIN | CIRCUIT | CIRCUIT FUNCTION | PIN | CIRCUIT | CIRCUIT FUNCTION |
|-----|--------------|---------------------------------------|-----|-------------|--|-----|-------------|---------------------------------------|
| 1 | - | Not Used | 35 | - | Not Used | 70 | 464 (BK/PK) | Wait to Start Output |
| 2 | 658 (PK/LG) | Check Engine Light | 36 | - | Not Used | 71 | 361 (R) | Power Input |
| 3 | - | Not Used | 37 | 923 (O/BK) | *Transmission Fluid Temperature Sensor | 72 | - | Not Used |
| 4 | 323 (LB/Y) | Power Take-off Feed | 38 | 354 (LG/R) | Engine Oil Temperature Sensor | 73 | - | Not Used |
| 5 | 977 (P/W) | Brake Warning Indicator | 39 | 743 (GY) | Ambient Air Temperature Input | 74 | - | Not Used |
| 6 | 237 (O/Y) | Shift Solenoid #1 | 40 | 848 (DG/O) | Speed Control Ground | 75 | - | Not Used |
| 7 | - | Not Used | 41 | 198 (DG/O) | A/C Cycle Pressure Switch Input | 76 | 570 (BK/W) | Ground |
| 8 | 339 (GY) | Glow Plug Relay | 42 | 318 (GY/R) | Exhaust Pressure Regulator | 77 | 570 (BK/W) | Ground |
| 9 | 1054 (GY/BK) | Glow Plug Relay | 43 | - | Not Used | 78 | - | Not Used |
| 10 | 308 (R/O) | Idle Validation Shift | 44 | - | Not Used | 79 | - | Not Used |
| 11 | 315 (P/O) | Shift Solenoid #2 | 45 | - | Not Used | 80 | 814 (W/PK) | IDM Enable Output |
| 12 | 911 (W/LG) | *Transmission Control Indicator Lamp | 46 | - | Not Used | 81 | 925 (W/Y) | Electronic Pressure Control |
| 13 | 107 (P) | Generic Scan Tool Input | 47 | - | Not Used | 82 | - | Not Used |
| 14 | 784 (LB/BK)* | 4x4 Low Input | 48 | 818 (GY/W) | IDM Signal Input | 83 | 552 (Y/R) | Injection Pressure Regulator |
| 15 | 915 (PK/LB) | Generic Scan Tool Input | 49 | - | Not Used | 84 | - | Not Used |
| 16 | 914 (T/O) | Auxiliary Powertrain Control Input | 50 | - | Not Used | 85 | - | Not Used |
| 17 | - | Not Used | 51 | 570 (BK/W) | Ground | 86 | - | Not Used |
| 18 | - | Not Used | 52 | - | Not Used | 87 | 812 (DB/LG) | Injection Control Pressure Sensor |
| 19 | 648 (W/PK) | Tachometer Feed to Instrument Cluster | 53 | - | Not Used | 88 | 358 (LG/BK) | MAP Sensor |
| 20 | 924 (BR/O) | Coast Clutch Solenoid | 54 | 480 (P/Y) | *Torque Converter Clutch Solenoid | 89 | 355 (GY/W) | Accelerator Pedal Position Sensor |
| 21 | 795 (DG) | CAM Position Sensor | 55 | 37 (Y) | Keep Alive Power Input | 90 | 351 (BR/W) | Reference Output Voltage |
| 22 | - | Not Used | 56 | - | Not Used | 91 | 359 (GY/R) | Sensor Signal Return |
| 23 | - | Not Used | 57 | - | Not Used | 92 | 511 (LG) | Brake ON/OFF Switch Input |
| 24 | 570 (BK/W) | Ground | 58 | 679 (GY/BK) | Vehicle Speed Sensor (VSS) | 93 | - | Not Used |
| 25 | 57 (BK) | Ground | 59 | - | Not Used | 94 | - | Not Used |
| 26 | - | Not Used | 60 | - | Not Used | 95 | 821 (BR/O) | Fuel Delivery Command Signal Output |
| 27 | - | Not Used | 61 | 151 (LB/BK) | Speed Control Common Signal | 96 | 817 (Y/LB) | Cylinder Identification Signal Output |
| 28 | - | Not Used | 62 | - | Not Used | 97 | 361 (R) | Power Input |
| 29 | 224 (T/W) | *Transmission Control Switch | 63 | 356 (DB/LG) | BARO Sensor | 98 | - | Not Used |
| 30 | 553 (P/LB) | Exhaust Back Pressure Sensor | 64 | 199 (LB/Y) | *Transmission Range (TR) Sensor | 99 | - | Not Used |
| 31 | 307 (BK/Y) | Brake Pressure Switch | 65 | 796 (L/B) | Cam Position Sensor Return | 100 | - | Not Used |
| 32 | - | Not Used | 66 | - | Not Used | 101 | 1086 (P/O) | Glow Plug Control Output |
| 33 | 676 (PK/O) | Vehicle Speed Sensor Ground | 67 | - | Not Used | 102 | - | Not Used |
| 34 | 466 (PK/O) | Glow Plug Relay | 68 | - | Not Used | 103 | 570 (BK/W) | Ground |
| | | | 69 | - | Not Used | 104 | - | Not Used |

Red Wire (12volts)-Pin #1

Locate the **Red** wire coming from the vehicle's PCM Pin #71. Tap this wire with the **red** Co-Pilot wire by soldering. Shield the tap from the elements.

Black Wire- Ground (GND) – PIN #9

Locate the **Black** wire coming from the vehicle's PCM Pin #51. Tap this wire with the **black** Co-Pilot wire by soldering. Shield the tap from the elements.

Green Wire- Vehicle Speed Sensor (VSS) – PIN #17

Locate the VSS (Vehicle Speed Sensor) wire. This **Gray w/ Black** stripe wire can be found at the PCM at pin #58 Run the green wire from the Co-Pilot module to the VSS wire and cut off any excess, but leave some slack. Solder the Green Co-Pilot wire to the VSS wire and protect from elements, this is the most common install problem with wiring

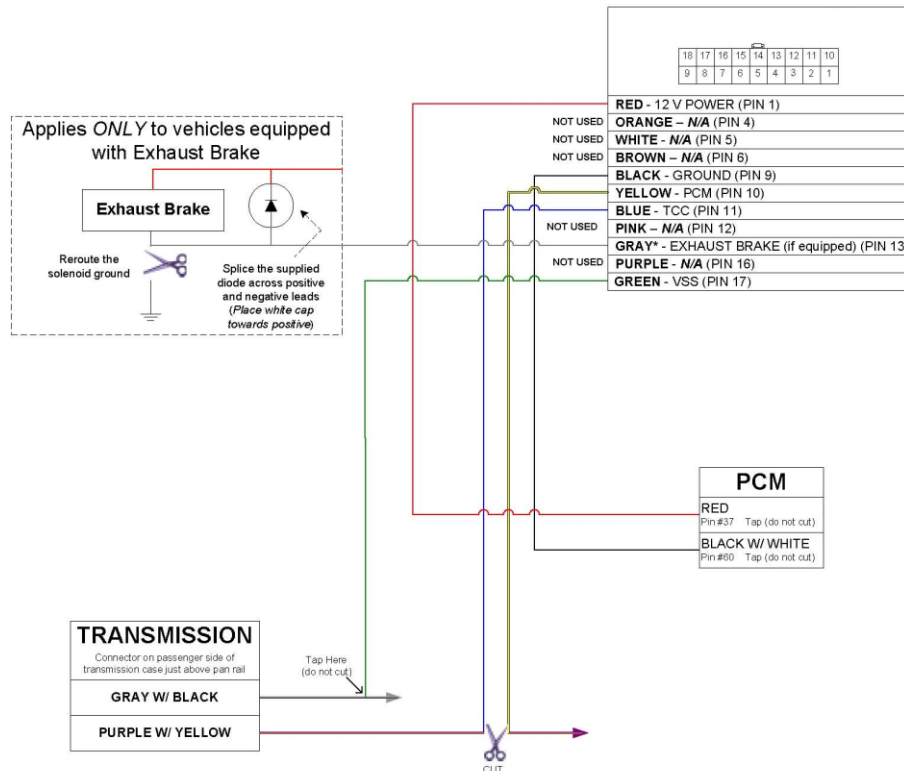
Yellow Wire – PCM – PIN #10 and Blue Wire– TCC - PIN #11

Locate the vehicle's Torque Converter Clutch (TCC) wire coming from the vehicle's PCM to the transmission. This **Purple w/ Yellow** stripe can be found at the PCM at pin #54. Cut this wire and solder, or attach a butt connector to the wire leading back to the transmission and attach a butt connector to the wire heading to the vehicles computer (PCM). Reference the supplied wiring schematic before cutting wire.

Connect the **Yellow** wire coming from the **Co-Pilot** to the wire that goes to the PCM. Connect the **Blue** wire coming from the **Co-Pilot** to the wire that goes to the transmission. Protect the connections from the elements.

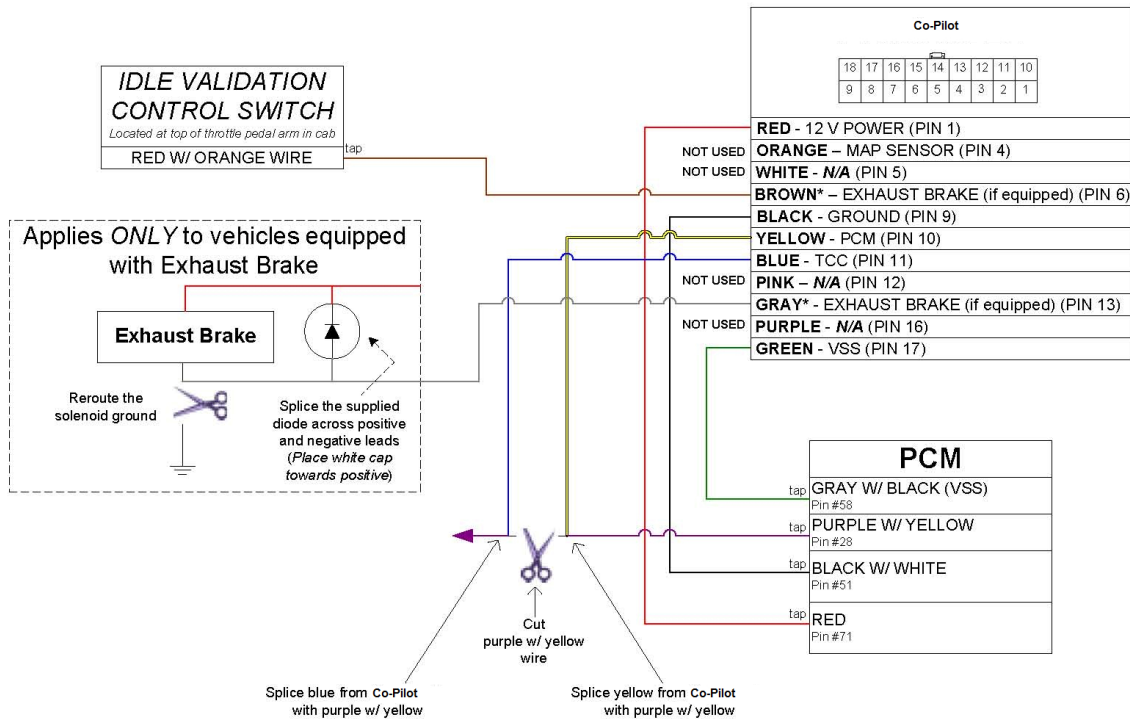


Lockup Controller Ford 1989-1994





**Co-Pilot
Lockup Controller**
Ford 1994.5-1997
E4OD



Troubleshooting

If you experience problems after installation, there is a simple test to help diagnose the problem. Simply unplug the wiring harness from the back of the Commander module and **put a bent paperclip into blue and yellow terminals of the harness' plug** (jumper the blue and yellow together). This reconnects the wire that you cut at the transmission plug and bypasses the Commander completely.

