

Building an Injector Breakout Box (aka. Injector Performance Analyzer)

This is a device that plugs in to the engine harness connector located above the left side valve cover, and lets you disable injectors.. It's quicker and cleaner than pulling the valve covers to cut out injectors and can be used while underway as well as at idle. I put mine together from connectors items from the wrecking yard and materials from the local electronics supply store. Mine cost me about \$80, and took 3-4 evenings to build.

I got the initial idea from a post by "dawglips" (Randy) who posted the instructions on the 99&up 7.3 Engine & Drivetrain Forum on TheDieselStop on Dec 1, 2003. I did some additional research on my 99 Service CD, gathering wiring diagrams and the connector pinout for connector C138 (the main engine harness connector). Then I set about gathering the materials I needed.

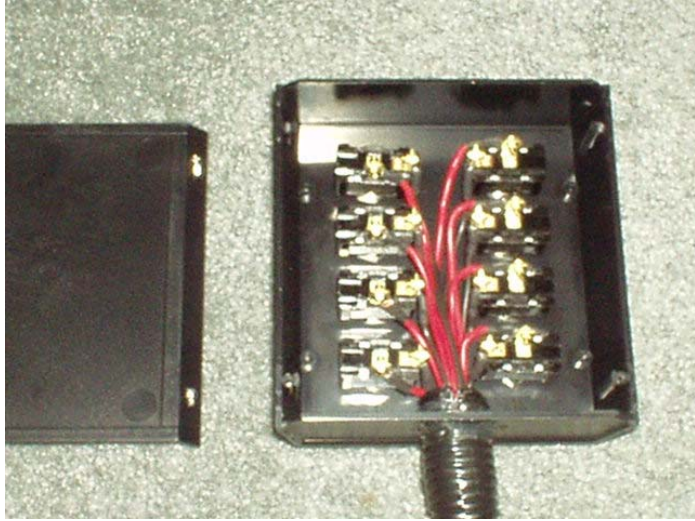
- 42 pin Male & Female harness connectors from the wrecking yard (mine came off an Excursion and an Explorer, but most any late model Ford uses them) The engine side connector (female) is harder to come by, Chassis side (male) are 10c a dozen. Try to get about 6" or so of wire with these if you can.
- 8 SPST 120V 10amp(minimum) rated toggle switches.
- Ring terminals for the switches
- A kit box from Radio Shack or electronics store (Mine is a Serpac Model A-31, black plastic, about 6"x6"x2")
- A bunch of 16 gauge stranded wire (I got 100' each of black and red, you'll need at least 65 feet of each)
- 6-8 ft of 3/4" ID wire loom (the plastic corrugated tubing stuff you see on your engine harness)
- 1 ft of 1" ID wire loom
- Electrical Tape
- Heat shrink tubing



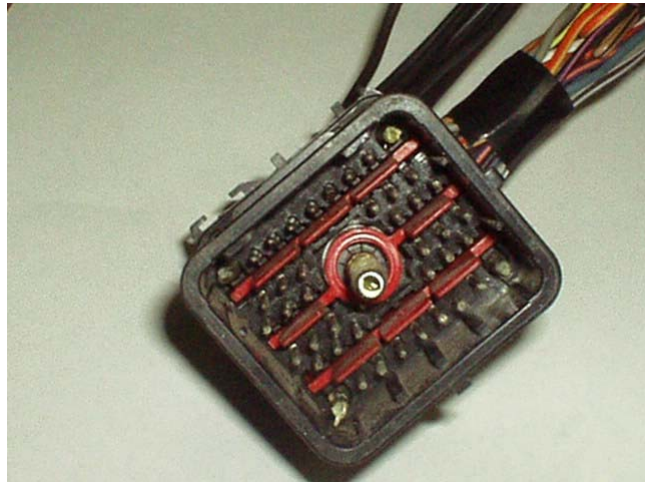
I started at the box, drilling 8 holes for the switches, arranged like each bank of cylinders I drilled the holes a bit undersized, then carved a post in them to match the notch in the switch. This helps hold them in the correct position. I arranged my switches so they were off toward the center of the box on both sided. I connected ring terminals to one end of 8 ft pieces of wire, one red and one black for each wire. I found it's easiest to fasten the terminals on

the switch and then mount each switch in the box, working from the end where the wires

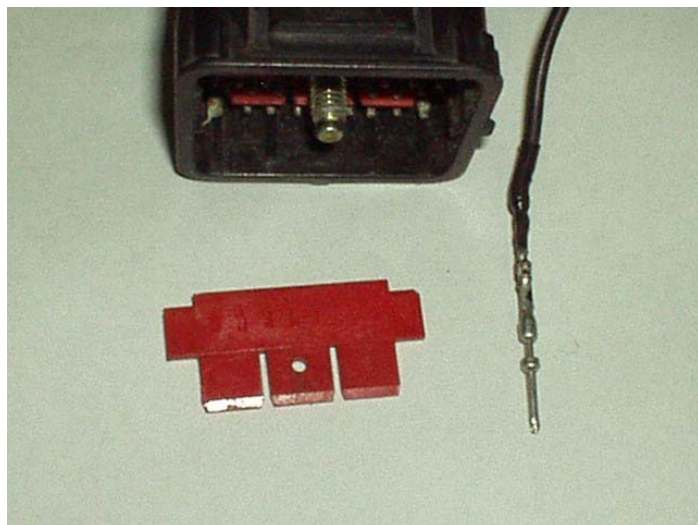
exit. I put a piece of tape on the opposite end of each pair of wires to identify the number of the cylinder. Once I had all the switches in place in the box, I drilled a hole in the removable end panel for the 3/4" wire loom, sized so the loom snapped in place, and then hot-glued the loom in place and threaded the wires through.



I then started working on the plugs that connect to the engine harness. If you look at them, there are red dividers inside the business end.



Those dividers pull out with needle nose pliers, and expose the locking latches for the connecting pins. The latches can be gently pried back with a small screwdriver or pocket knife and the pins can be pulled out from the back. I took all the pins out of both halves, and uncrimped the wires from 8 male and 8 female pins to solder on the wires from the switchbox. For the other pins, I decided to leave the pins on the wire stubs and use a solder splice. I just matched up the wire colors as best as

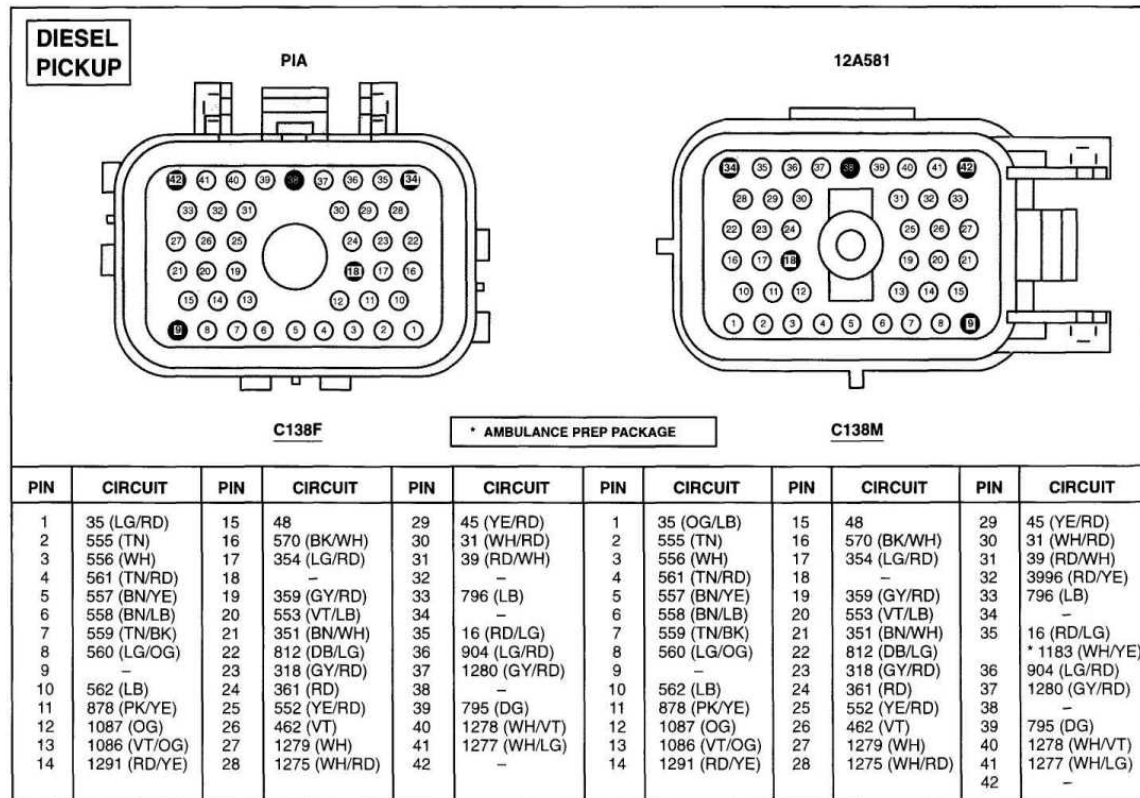


possible. Here's where you'll want to do a little planning and fitting. I arranged my wiring bundle so it pointed toward the rear of the truck when connected to the engine harness connector. There seemed to be more space there to install the tester. The pins that go to the injectors are on the bottom. I spliced the male and female pins together and inserted them in the connector halves individually to try and keep the bundle as straight and compact as possible.



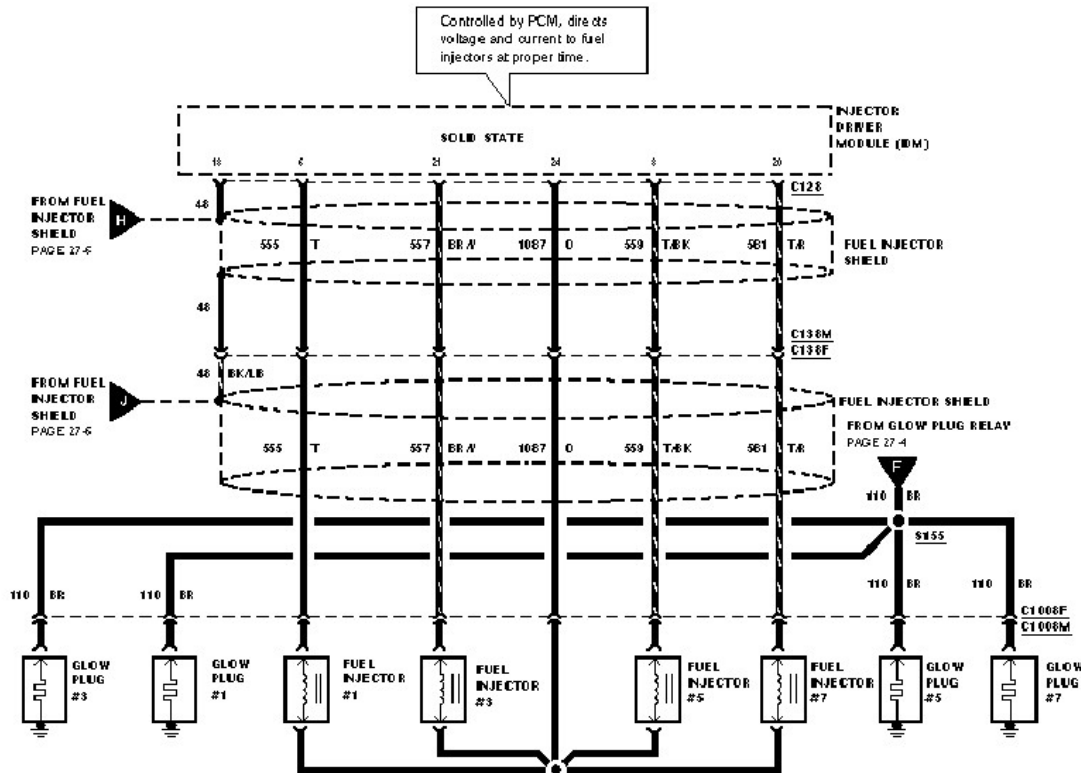
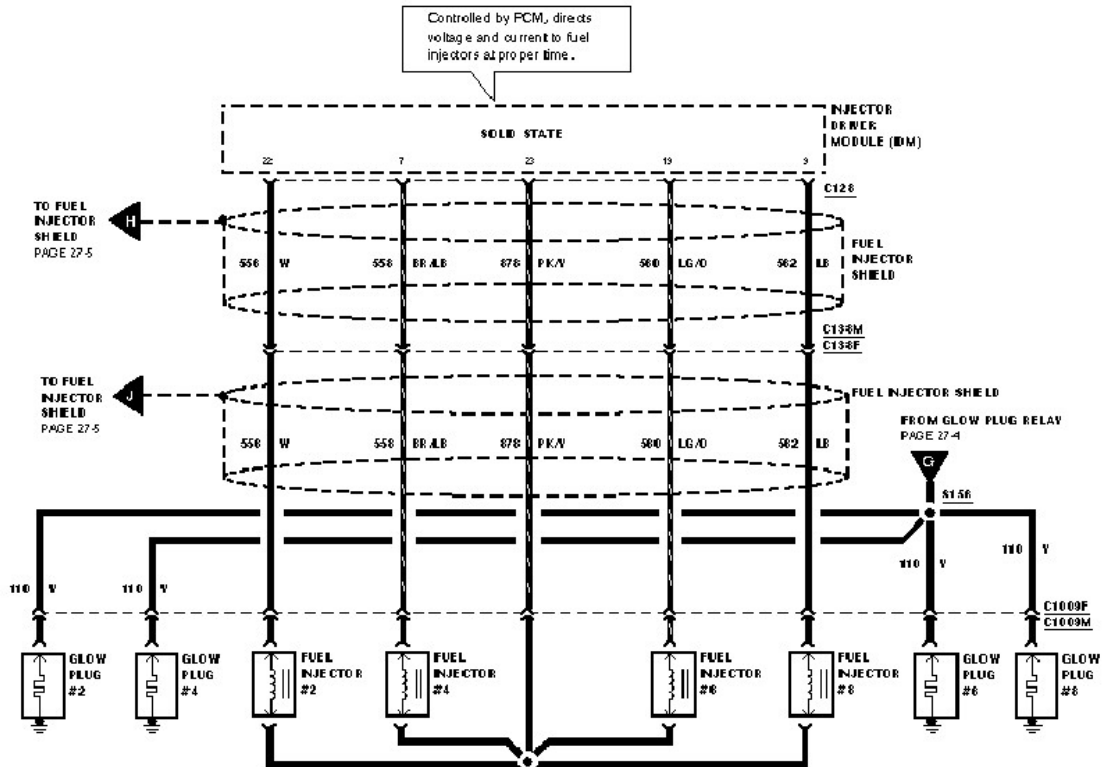
This photo shows the final arrangement of the plugs on my tester. Pins 2-8 and 10 (red and black wires in the photo) are the injector circuits, which I wired last. All the other pins connect to their corresponding number in each connector half (numbers are on the back). My female connectors didn't have enough pins to fill all the holes, but they're not all used on the PSD.

Check the pinout diagram for C138



for the ones that you don't have to connect. If you have enough pins, connect all the pins straight through.

Starting with the wires from the switch for cylinder #1, I soldered a male pin on the black wire, and a female pin on the red wire. Polarity doesn't really matter, but it makes for a neater looking job. These pins go in spot #2 in the connectors. The pin numbers 2 thru 8 and 10 correspond in sequence to the injector numbers in firing order (1-2-7-3-4-5-6-8), so cylinder 1 goes to pin 2, cylinder 2 to pin 3, cylinder 7 to pin 4, and so on. Check the wiring diagrams and circuit numbers (also on the connector pinout diagram) to verify the correct order.



You'll want to keep the wiring from the switch box to the connectors combed out and not tangled (more about this in a bit) as you solder the pins on the other wires and insert them in the connectors. What you'll wind up with is the two connectors halves with a short

section (6-8 inches) of wiring between them, with 6'-8' ft of wiring teed off to the switch box. Check the positioning of the connectors and wiring relative to the vehicle mounted connectors, making sure that they will plug together properly. At this point, I used a multimeter to check continuity and pin arrangement of all 42 pins to make sure my wiring was OK. I also checked the order of the switches this way, flipping the switches on and off to see which pin they were tied to. Install the wire loom, tape, etc, for a neat appearance. About 8" above the tee, I flattened the wires alongside each other for about 16 inches and used liquid electric tape (from a marine supply house) to keep them together, then taped over that flat section. That's why you'll want them untangled (don't ask how I know this.) This flat section makes it possible to close the hood over the wires and get the box into the cab to use while underway.



Here's a photo of the completed setup. For finishing touches, in place of the masking tape I had marking the cylinder numbers of the switches, I printed numbers on a stick-on

label and cut them apart. You could also get vinyl stick-on numbers, but I couldn't find them at the one office supply store I tried.

It takes about 10 minutes to hook up, and about the same to put back to normal condition. A 10 mm socket is needed to pull the connector off the engine and secure the tester in place. It's a little tight to get to, but there's no need to take anything off to get at unless your arms are like Popeye.