STINGER
Performance ENGINEERING

PiMPx | PiMPxs | PiMPxshift
Coil On Plug Expansion Harness

This expansion harness plugs into the PiMPx/PiMPxs/PiMPxshift ECU's expansion port, through the firewall, and to the engine. It is completely independent of the engine harness itself so it works with stock Ford harnesses, or our PiMPx/PiMPxs harnesses. It allows you to ditch the TFI module, stock ignition system/coil, etc. and convert to a modern coil per cylinder/coil near plug/coil on plug ignition system. It's designed to

connect directly to our CAS conversion kit or you can ditch the distributor entirely and run a crank trigger and cam sensor of your choosing. The harness connects directly to the stock GM coil harness (the harness that connects 4 LS truck coils to a single connector) or we offer a pigtail to connect it to other coil types like the popular IGN-1A coils.

All wires have their function printed on the wire, and are color coded for ease of use. Also contains all of the wires in the standard expansion pigtail that aren't part of the coil/ignition conversion. All of those "extra" wires are rolled up and kept inside the firewall for a clean install. Then you can pull whichever additional features you want to use through the firewall. Complete list of functions is provided in the PiMPxs Startup Guide Table 2.

The assumption with this guide is that you've already got your CAS or crank trigger & cam sensor mounted as well as your coils mounted to your engine, firewall, or wherever you decide to mount them. So your setup is mechanically done and we're just dealing with the wiring with this guide.

Requires:
--PiMPx, PiMPxs, or PiMPxshift ECU
--Our Cam Angle Sensor (CAS), or a Crank Trigger & Cam Sensor of your choosing (you provide pigtails for those components).
--LS Truck Coils with Coil Harness (connects four coils to a single connector that plugs into expansion harness). or
--IGN-1A Coils with our IGN-1A coil harness for each coil to get power/ground and connect to expansion harness.
--Coil Mounting Brackets.

Mechanical Installation:

1) Disconnect battery.
2) Remove kick panel to gain access to the ECU. Remove from stock ECU hanger if access to rear expansion port isn't available while in the hanger. F150's can access expansion port without removing ECU from hanger, Mustangs must remove ECU from hanger.
3) Route the expansion harness through the firewall. Do not connect to ECU at this time.
   For Mustangs and other vehicles with large rubber grommet around the stock harness, you can drill a hole through the rubber grommet and get a nice seal if you don't want to drill the firewall and use a universal grommet. If ECU is mounted to firewall and EEC connector is on engine side (like F-Series), look for other rubber boost/grommets you can use to get harness through the firewall before assuming you have to drill the firewall.
4) Lay out harness on engine so everything is routed to its approximate final layout. If you want to try to hide the harness or route it under certain components for a clean look, now is the time to do so.
5) Connect coil adapter harness to main expansion harness.
   Picture of coil adapter harness PM-8
6) Connect coil adapter harness to coil wiring.

7) Connect to CAS or crank/cam triggers.
8) Plug into expansion port of ECU
   Expansion port picture here
9) Ensure all jumpers are configured as you need them before installing ECU back into final location. Full COP/CAS kit requires removing of "Dist In" jumper.
10) Configure TunerStudio as shown on "TunerStudio Settings" (page 5) below.
11) Run firing order/output test. Use the output test mode, and fire coils in firing order. Make sure it is correct. You just put a timing light on it and it will blink.
    "Enable Test Mode," select one coil, a 100ms output interval, and 4ms dwell. Click start.
    TS output test screenshot here
12) Orient harness to ensure proper firing order with info from output test.
13) Crank and verify timing.
14) If spark is present and set properly and ECU is configured, it's ready to start.

Expansion Harness Flying Lead Connections:

BLACK wire with 5/16" eyelet goes to ECU ground post.

BLACK wires with 1/2" eyelet grounds to the engine, typically to the head(s).

6 pin connector with shielded VR1 and VR2 going to it connects to CAS (Black – 6, Red – 5, White w/Blue Tracer - 2 (or Crank VR2 & Cam VR1).

8 pin connector goes the coils.

There are a few flying lead wires:

18 gauge **GREEN** - Tach Output

18 gauge **ORANGE** - Keyed 12v

12 Gauge **RED** - Battery +

Orange and tach output run together. The intent is to connect them to the stock coil wires (orange +, green -). You can use spade connectors or cut the stock harness and connect directly, that's up to your preference. Connecting this gets you keyed 12v and the tach signal. If the tach doesn't work (some do, some don't), you'll need to add an inductor between those two wires to make it work. See Tach section below.

The 12 gauge red wire is battery +. Connect direct to the battery, or to the positive side of the starter solenoid.

Large ground wire(s) go to the head(s). Small brown ground wire goes to the ECU ground point.

The coil harnesses can easily be flipped bank to bank and end to end, both of which throw off the firing order. Rather than trying to go through the lengthy process of trying to verify everything is oriented properly, it's best to just use the ECU's output port settings to fire the coils in order to verify firing order is correct.

IGN-1A Coil Harness Flying Lead Connections:

BROWN or **BEIGE** – Ground to same place as the ECU if the engine isn't well grounded. Ground to heads if it is. **BLACK** wires with ½" eyelet grounds to the engine, typically to the head(s).
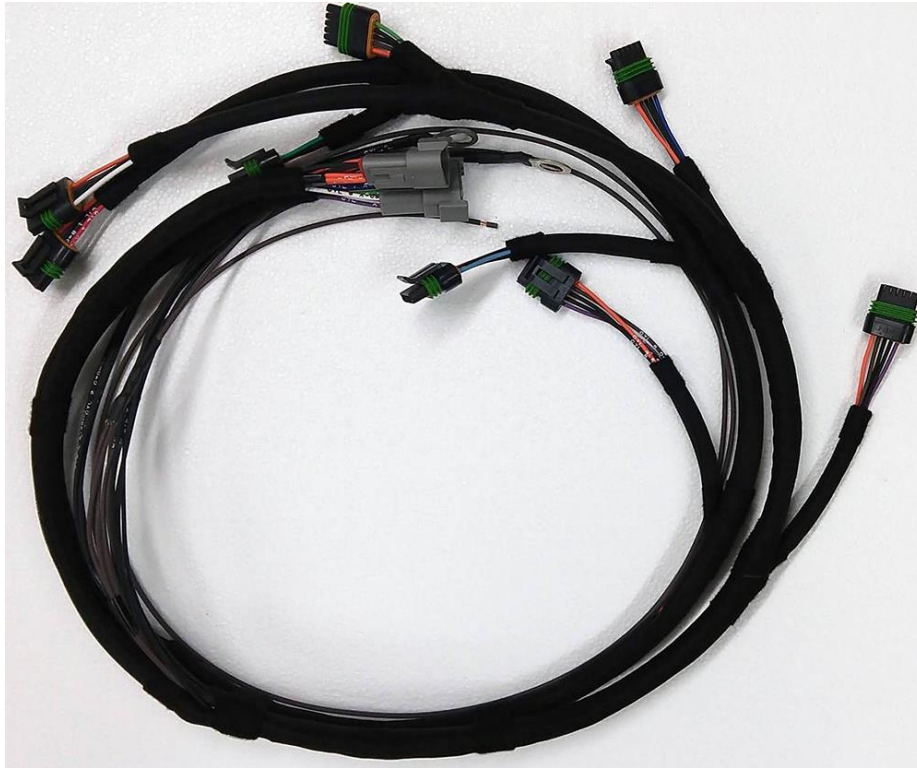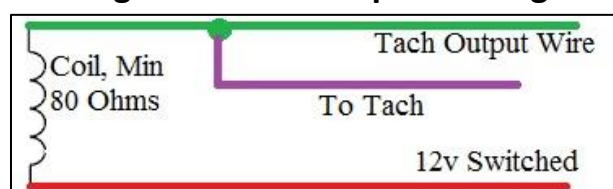

Coils:

There are too many coil options to cover within this document. LS coils and IGN-1A coils are two common choices. We sell the IGN-1A coils and coil harnesses for those who want to use them.

Tach:

PiMP, PiMPx, PiMPxs, and PiMPxshift all have intrinsic tach outputs. These are pulled up to 12v when JP24 (Tach Out) is jumpered to pins 2-3 (12v), and with that, many tachs will function simply by connecting the wiring formerly connected to ignition coil (-) to the tach output wire (and enabling this function in software). It is recommended this is tried first. Some tachometers actually require an inductive "spike" from a coil to function. If this is the case for your tach, the coil of a relay or an inductor can be used for this "coil substitute". See Figure 6 below for tach circuit diagram.

Figure 6: Tach Adapter Wiring

TunerStudio Settings:

Open your project and navigate to (*Ignition Settings > Ignition Options/Wheel Decoder*). For LS Coils or IGN-1A coils configure to match settings shown in image below.

For other coil types you'll need to set dwell type, dwell duty %, cranking dwell and nominal dwell to match your coils. You'll also need to set number of coils to match your setup.

Make sure "Spark Output In Use" matches your ECU type. If you don't have this information then consult with us on the support forum. For "Nominal Dwell" with IGN-1A coils, start at 4.0 and turn it up until you have no misfires.
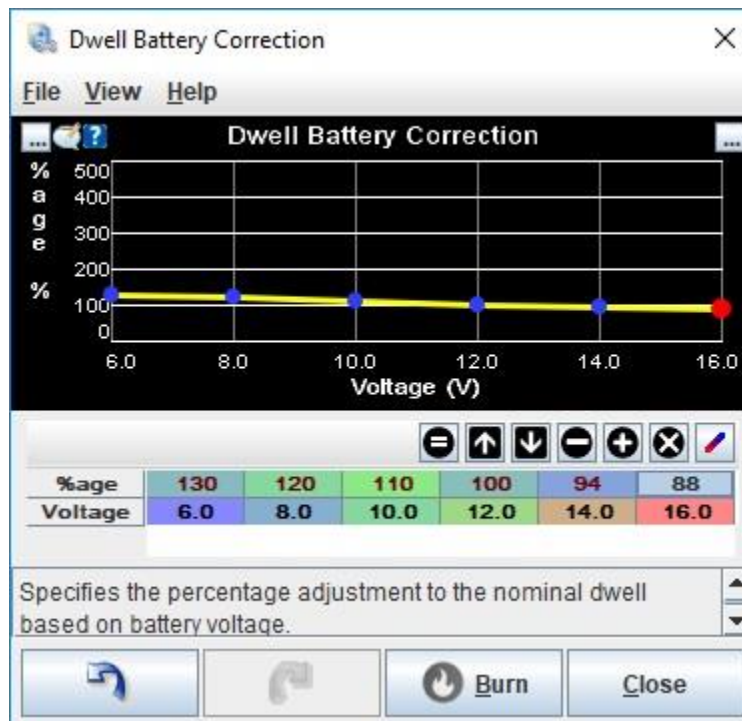
CAS & LS/IGN-1A Coil Settings:
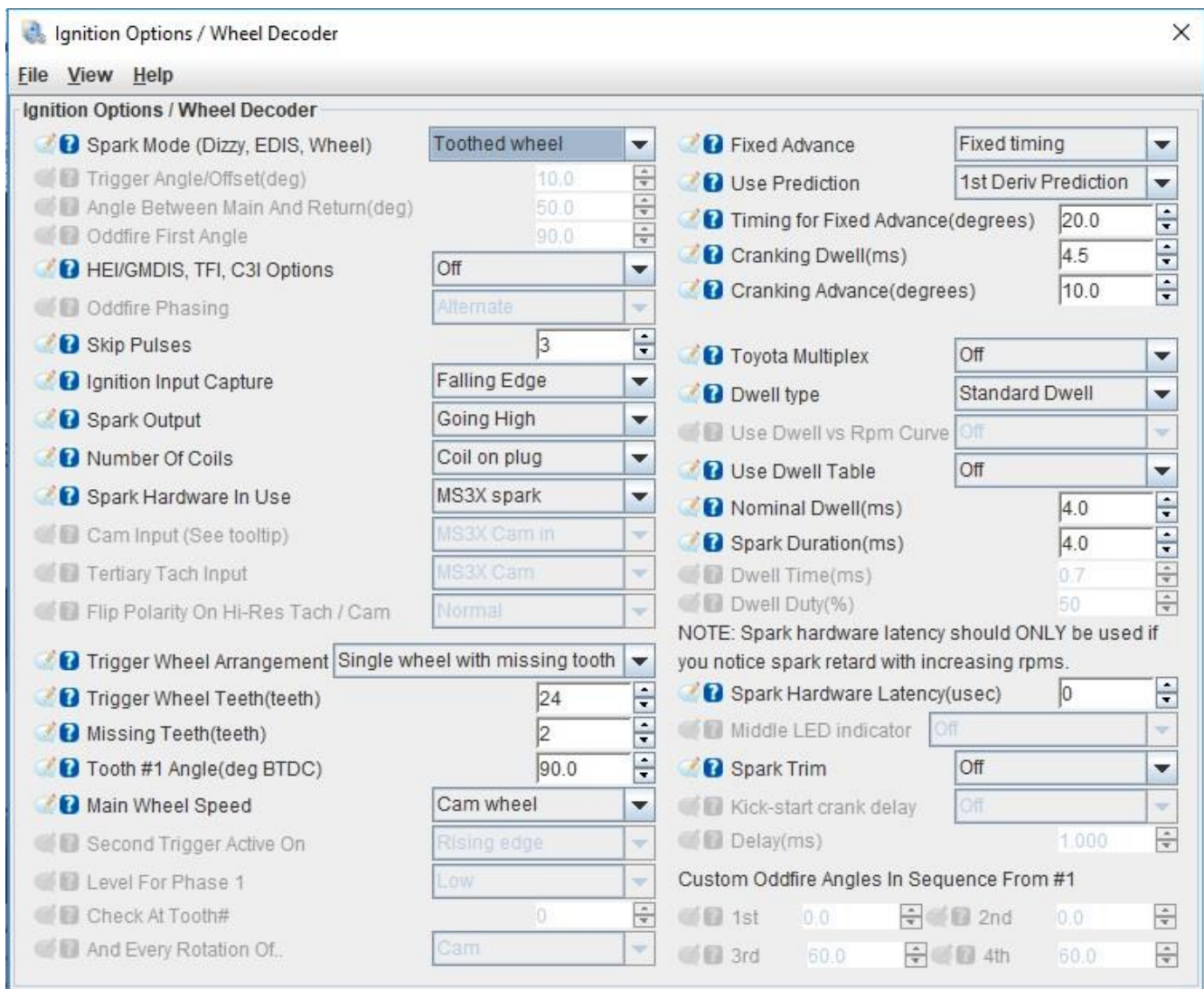
LS Coil Specific Settings:

LS Coils need to use the Dwell Battery Correction table below. Other coils should be fine with the base tune table. Navigate to *(Ignition Settings > Dwell Battery Correction)* and match the settings shown below:

LS Coil Dwell Battery Correction:

Firing Order:

Firing order is not changed in the software. Rather, it is determined by the order of the pins in the 8-pin connector that joins the expansion harness to the coil harness. The coil side of this connector in the 4 cylinder kit is wired for 1-3-4-2 for 2.3L engines and the V8 kit is wired for the 5.0 HO/351w firing order (1-3-7-2-6-5-4-8). If you've got a non-HO engine or big block Ford or another engine that has a different firing order, you'll need to move the pins in this connector to your firing order. If you've got questions about how to do this, what wire to move where, etc., ask for assistance on the support forum. Once the wires are in the correct orientation for your engine, proceed to the coil output test below.

Coil Output Test:

Before first startup, it's advisable to do a coil output test to make sure the coil firing order is correct. To do so, in TunerStudio go to *(CAN-Bus/Test Modes > Output Test Mode Inj/Spk)* and then for Coil Testing settings use:

Output Interval(ms): 100.0
Coil Testing Mode: One
Coil Output To Test: Coil A
Dwell(ms): 3.0

Remember that we are testing these in your firing order. So put a timing light on plug wire #1 and then click "Start". It should blink. Now click "Stop" and change to Coil B and put your timing light on the next cylinder in your firing order. For a 5.0 HO/351w this would be cylinder #3. Coil Label to Cyl # Examples:

5.0 HO/351w	**2.3L**	**Your Engine (fill in your firing order top to bottom)**
Coil A = Cyl 1	Coil A = Cyl 1	Coil A = Cyl
Coil B = Cyl 3	Coil B = Cyl 3	Coil B = Cyl
Coil C = Cyl 7	Coil C = Cyl 4	Coil C = Cyl
Coil D = Cyl 2	Coil D = Cyl 2	Coil D = Cyl
Coil E = Cyl 6		Coil E = Cyl
Coil F = Cyl 5		Coil F = Cyl
Coil G = Cyl 4		Coil G = Cyl
Coil H = Cyl 8		Coil H = Cyl

If all coils fire when they should, you're reading to move on to initial startup. If they don't fire in the correct order, you'll need to adjust the pin locations in the 8 pin coil harness connector to fix it and prevent a no-start or backfiring issue.

Initial Startup:

If installed per the image in Figure 3, spark timing should be close enough to start and run. After initial start up, confirm timing with a timing light. Adjust the CAS as you would a distributor to set timing by rotating the distributor body.

If timing is within 5 degrees, you may adjust by changing "Tooth #1 Angle" in TunerStudio instead of mechanically moving the distributor body. A smaller tooth #1 angle will advance the timing while a larger angle will retard the timing.