

# SPARK PLUG WIRE ROUTINGBY JIM GIBSON

In the underhood area of a performance vehicle, *appearance* can be nearly as important as *function*. Creativity can be combined with a wide range of performance ignition products to satisfy both objectives.

f you look at a road map, it's obvious that there's usually more than one way to drive from point A to point B. The same applies to routing an engine's spark plug wires. Granted, for a run-of-the-mill production vehicle, you'll likely always duplicate the factory-original path. However, for custom engine applications (street performance, street rods, show cars, etc.), the only rules to follow relate to obtaining solid connections and avoiding abrasion and direct contact with highheat sources, and avoiding wire interference with moving objects, such as throttle linkage or cables.

Appearancewise, it's up for grabs. In addition to function, a customized engine bay can be visually enhanced by *creative* routing and mounting of the spark plug wires. Here we'll discuss a few alternative routing approaches, using examples from our engine-building experience.

If plug wires are allowed to flop around, or are routed so tightly they make constant contact with a sharp object, abra-

This custom engine features 7mm spark plug wires routed through ¾-in. polished tubing. Careful attention to detail during tube bending resulted in a uniform flow.



sion wear may eventually take its toll. Typical high-performance wires feature fairly thick silicone outer jackets (8mm or more), but constant rubbing over a sharp edge can only do harm. Wires are available with braided composite shielding that helps protect the outer jacket, which should definitely be considered if you simply can't avoid locations where rubbing is a concern.

You want to avoid extreme heat contact as well, so it should be obvious to prevent any plug wire from directly contacting a high-heat source such as an exhaust manifold or tubular header pipes. In cases where you're concerned about abrasion or heat, protective sleeves and booties are available from the performance aftermarket. Design Engineering (DEI) offers great stuff for street performance and racing applications. I recently built a 632 cu.-in., 1115-hp drag engine where I routed the plug wires directly under the cylinder heads behind the headers. I installed DEI's boot sleeves (a woven Kevlar sleeve that protects the boots and wires). On wires you're trimming to length, install the boot sleeves before attaching the distributor ends.

### Custom vs. OE Routing

If the vehicle in question has been *restored* to original (where the owner requires every aspect of the build to replicate what the factory did when the vehicle was first built), you may have no choice but to use OE-appearing spark plug wires (in terms of color, diameter and length), routed exactly as original, using whatever looms and brackets that were *originally* available.

However, if the vehicle is modified or of a custom nature, the owner will likely not care about original wire design or routing. Instead, he'll want to create a neat, tidy appearance, with wires that are larger in diameter and of a color that compliments the engine and surrounding engine bay.

Commonly used custom routing usually requires an off-

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the-shelf bracket/loom/separator system readily available from the performance aftermarket. Examples include plastic or aluminum brackets that are installed to the outer valve cover fasteners, and that run parallel to the valve covers. Wire stand-offs or separators mount to the long brackets and serve to organize the wires. Billet aluminum wire organizers that mount in a similar

manner also are available, but feature a base and top cover that traps the wires, essentially hiding them, except for where the wires run from the distributor to the organizers, and from the organizers to the spark plugs.

With regard to any pieces that are made from aluminum, the performance industry always refers to components as billet, which implies that they were CNCmachined from solid billet stock. In reality, many items are actually cast aluminum that are then finish-machined. From a marketing standpoint, *billet* is a catchall term that's popular for anything constructed of aluminum, whether it's true billet or not.

Wire looms/separators are available for either horizontal (wires running alongside each other) or vertical orientation (wires stacked), with material construction that includes chrome steel, aluminum and/or a variety of composite plastics.

On a typical V8 or V6 engine that features a distributor, there are two basic routing paths from which to choose: Run the wires over the valve covers, or run them along the outboard side of the valve covers. In most cases, the choice will be based on the customer's preference in terms of appearance.

An old school approach is to use tall stand-off brackets that mount to the valve cover fasteners. Atop these metal stand-off brackets are two-, three- or four-wire looms that capture the individual wires. With this approach, the wires run from the distributor to these looms, then drape over the valve covers on their way to the spark plugs. This is the most common (and least expensive) approach. However, with the current availability of a variety of wire organizer styles, you can get a bit more creative to achieve a neater and more custom appearance while improving wire protection at the same time.



The tubes terminate under the rear dual-quad are actually cast aluminum that are then finish-machined. From a marketing standpoint, *billet* is a catchall term that's popular for anyterm that's operator and fauthing constructed of aluthing constructed of aluthing constructed of alu-

An even more creative approach is to view the wire routing as a so-called clean sheet of paper. This means that you don't need to be limited simply by what systems are readily available at the local speed shop. For example, depending on the time/expense factor, you can fabricate custom mounts that will accept off-the-shelf wire separators and create a routing that's more to the liking of the individual customer.

#### Wire Mounting Hardware

The terms used relating to spark plug wire mounting may be slightly confusing, but we'll try to sort them out for you.

**Stand-offs.** This can refer to any bracket that allows anchoring or mounting wires from a nearby attachment point, such as valve cover fasten-





The wire tubes were formed to provide good clearance with the exhaust header tubes. The spark plug boot end of each tube is fitted with a tube nut and -6 hose end, which is epoxy-glued in place, simply to dress the end of the tube.

ers, intake manifold fasteners, etc. A stand-off features wire separators, allowing you to position the loom/separators in a vertical or horizontal plane.

**Looms.** This term is often misused, and can refer to just about any item that secures or groups plug wires. In addition, the term *loom* can also refer to wire covers, such as split corrugated plastic tube-looms or spiral plastic wire covering—basically any piece that deals with mounting or organizing.

Separators. Technically speaking, a

wire separator is a one- or two-piece unit that separates wires from each other. These are available in two- to four-wire versions. They're installed along the wire path wherever wires need to be grouped and/or separated.

Spark plug wire mounting systems are available in both vertical and horizontal styles. This means that, when using a system that runs the wires

alongside the valve covers—a vertical system—the wire group can be stacked vertically (wire runs are stacked one atop another). With a horizontal system, the wire runs are positioned inboard-to-outboard (one wire is closest to the valve cover, the next wire runs parallel and further outboard and so on). Depending on clearance issues and desired appearance, this provides a choice.

An example of very custom spark plug wire routing can be seen on an engine I recently built. I didn't want to conform to run-of-the-mill wire routing, and preferred to create something more unique.

I built a custom small-block Chevy engine specifically for a street rod application. I refer to the engine as a small-block Chevy due to the basic long-block design. In fact, this engine was built using 100% performance aftermarket components (there's not a single GM part in the build!).

For plug wire routing, the approach involved using a cut-to-length set of 7mm MSD plug wires, routed through %-in. aluminum tubing. The tubing was hand-bent to completely hide the entire length of each wire. After *lightly* coating each plug wire with white lithium grease, they actually slid through the tubing without too much hassle.

To hide the wires at the distributor end, I chose a dual-carb aluminum air cleaner assembly from K&N. The front air cleaner mounts in the normal fashion to the Holley carb. The rear air cleaner mounts to the MSD distributor, using a custom-fabricated mounting adapter. Each aluminum tube was fitted with a -6 tube nut and female hose end, then flared to capture the hose

## **Performance Plug Wire & Hardware Sources**

ACDelco www.acdelco.com

American Autowire www.americanautowire.com

Autolite www.autolite.com

Billet Specialties www.billetspecialties.com

Bosch www.boschautoparts.com

Crane Cams www.cranecams.com

Design Engineering (DEI) www.designengineering.com

Ford Racing www.fordracingparts.com

GM Performance Parts www.gmperformanceparts.com Made For You Products www.made4uproducts.com

Magnecor www.magnecor.com

Mallory www.mallory-ignition.com

Mitech Ignition www.mitechignition.com

Mopar Performance www.moparperformance.com

Moroso Performance Products www.moroso.com

Mr. Gasket www.mrgasket.com

MSD Ignition www.msdignition.com

NGK Spark Plugs USA www.ngksparkplugs.com Performance Distributors (D.U.I.) www.performancedistributors.com

Pertronix Performance Products www.pertronix.com

R&M Specialties www.rmspecialties.com

Scott Performance Wire www.scottperformance.com

Spectre Performance www.spectreperformance.com

Summit Racing www.summitracing.com

Taylor Cable/Vertex www.taylorvertex.com

Trans-Dapt Performance Products www.tdperformance.com

Vintage Parts www.vintagepartsusa.com end. The bottom rear area of the rear air cleaner was drilled and tapped with  $\frac{1}{100}$  n. NPT holes and fitted with -6 to  $\frac{1}{100}$  in. NPT fitting adapters. The tubes then attached to the fittings (-6 hose ends threaded onto the -6 fittings).

Inside the rear air cleaner, the plug wires were then free to connect to the distributor cap. At the spark plug end of each aluminum tube, I also installed tube nuts and -6 hose ends that mate flush to the spark plug boots (the hose ends were secured using epoxy adhesive, giving them the



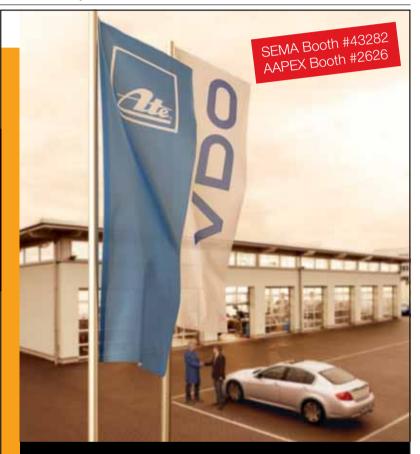
Rather than running the wires over the valve covers, a wrap-around routing creates a tidy package. Taking advantage of wire number identifiers eases firing order placement during future service.

appearance of being attached to the boots). In addition, after all test fitting was finished, I had all of the aluminum tube nuts, hose ends and fitting adapters custom-anodized in violet to coordinate with the color scheme of the engine.

If spark plug wire replacement is ever needed, it won't be quick, but the work won't be difficult, either. Simply cut the distributor boot end, break the epoxy loose at the spark plug boot end, slide the wire out, slide the new wire in and redo the connections.

The result: The plug wires resemble polished plumbing lines that run in parallel back to the rear air cleaner. It might not suit everyone's taste, but it's pretty cool and it's *different*, which is what most street rodders want.

Obviously, you can route spark plug wires strictly to suit function (positive connections, avoiding sharp edges and high heat sources) or design the wire routing to suit both *form* and function. While a wide variety of spark plug wire mounting hardware is readily available, between ready-to-bolt-on systems and using your own imagination, you can create exactly what the customer wants. The only real limitation is the size of his wallet.



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