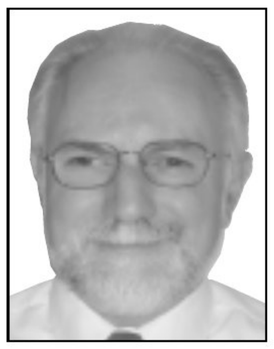
Don't let diagnostic tools overwhelm you

By Dan Marinucci



Years ago, a technician could retrieve trouble codes from most vehicles without using special equipment of any kind. However, those days of "jumper-wire access" are long gone. It's time to equip yourself with a trouble code reader or basic scan tool because you can't retrieve trouble codes today without one.

Many ERE readers perform retail or "drive-in" electrical diagnosis and repair. Today, an illuminated Check Engine light may or may not affect your troubleshooting on that particular vehicle. However, you don't know if a trouble code directly affects your work until you retrieve it. Reading or retrieving codes is a snap—provided you have a modern code reader or scan tool.

Maybe you already have an appropriate tool for this task. If you do, then I'm preaching to the proverbial choir. But if you don't, here are some tips that should help you make a wiser choice. And don't let the enormity of this topic overwhelm you; I've found that there's a tendency to make this subject far more complicated than it needs to be. Let's cover some vital details here, one at a time.

OBD-II diagnostics

Since 1996, OBD-II has been *the* diagnostic system used on cars and light trucks sold in America. Note that OBD-II did appear on a relative handful of vehicles prior to 1996. There are two major characteristics of this format. First, it created an industry-standardized access point for vehicle diagnostics. This point is an under-dash diagnostic connector, commonly referred to as the DLC (Diagnostic Link Connector). The DLC is usually somewhere under the left side of the dashboard.

The other important trait of OBD-II is a standardized diagnostic trouble code (DTC) system. This format is covered in numerous automotive sources such as articles, books and manuals. The trouble code format is five characters, beginning with a letter that defines where the code originated. P, for instance, indicates powertrain, the area where most of us do most of our troubleshooting.

Meanwhile, B refers to body; C refers to chassis. Finally, U refers to network. The U codes will become more important as network-equipped vehicles reach service age and appear in your bays more often.

The next character in the OBD-II code format tells you if the code is generic or manufacturer-specific. The generic ones are SAE-defined, industry-standard code—there's a massive list of these.

Manufacturer-specific ones occurred because the automakers had the latitude to bolster or fortify the OBD-II system with additional codes. These OEM-specific trouble codes may apply to some component or system that's unique to a given make and model. But more often, the manufacturer-specific code simply offers more detail about the failure than a generic code does. For example, the generic trouble code may describe a condition as a "sensor failure." On the other hand, a manufacturer-specific code may describe the condition as "sensor signal fixed high" or "sensor signal fixed low."

Diagnostic capabilities

Years ago, reading the manufacturer-specific trouble codes could be quite a challenge. The task required just the right scan tool and no other. But that's changed for the better because the latest crop of code readers and basic scan tools do, in fact, read both types of codes. This includes retrieving codes from vehicles equipped with CAN networks. Lately, I've been very impressed with the code-reading capabilities of these newer tools—some of which cost you less than 100 bucks!



This palm-sized tool is just one example of the latest crop of compact and affordable code readers. In fact, this unit doubles as a scan tool but it only shows one slice of data at a time.

Anyway, when in doubt, double-check the tool's published performance specs or else contact its manufacturer for the straight scoop on its code-reading abilities.

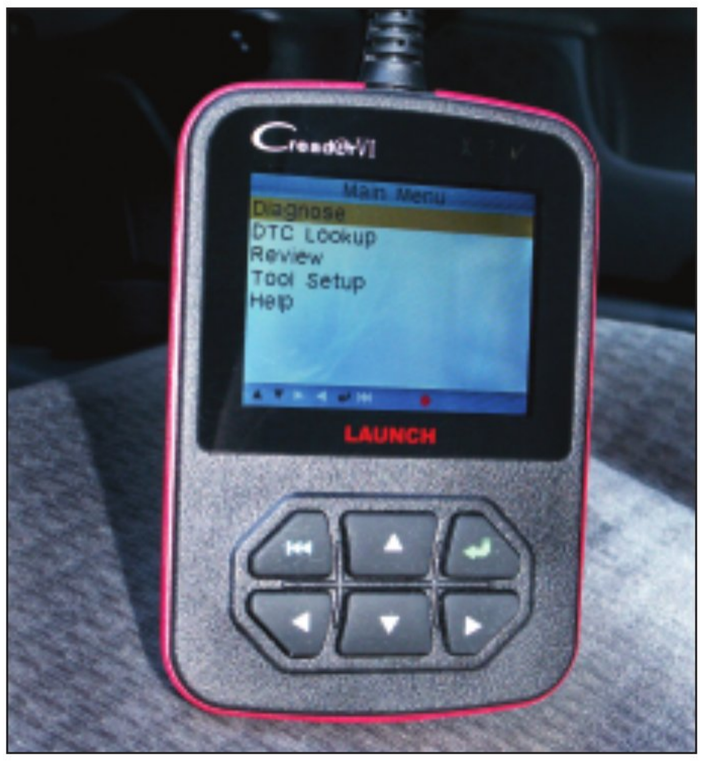
Note that the most common, most affordable code-retrieval tools are designed *only* for the OBD-II system. These tools only plug into the common DLC that I described earlier. Therefore, you'll have to shop for additional test capability if your business happens to service lots of pre-1996 vehicles.

Code readers

A code reader does only what its name suggests—it retrieves codes. Some of the latest code readers are no bigger than a pack of cigarettes and may cost less than $100. Typically, you just plug one of these tools into the DLC under the dash. Then you turn the ignition switch on, engine off and follow the prompts on the tool's display. Easy?

The first thing a good code reader will tell you is if there are any codes stored on the vehicle—period. The second thing it does is display the code or codes. Based on the first letter of the code, you know the system within the vehicle that generated this trouble code. Third, the code reader gives you a concise little code description. Last but not least, it enables you to clear codes after you repair the vehicle.

For instance, I recently checked a car for codes because the Check Engine light was on. The code reader showed me P0131 as well as the description "Primary



This is another example of the small-scanner trend today. This tool reads codes and is able to show more data on the same screen than the simpler tool does. With this kind of convenience, why not practice "scanning" every job that comes in the door?

Oxygen Sensor Signal Stuck Low." Based on these two pieces of information, I knew I'd be performing some specific oxygen sensor tests to see if and why the signal was stuck low.

To me, a code reader provides inexpensive access as well as flexibility. It may provide code-reading capability your existing scan tool does not. It allows you to read codes when another technician is using the shop's scan tool on another diagnosis—possibly a lengthy job.

During a difficult diagnosis of an intermittent condition, some technicians connect a code reader to the vehicle. They give the customer a pen and notepad. If and when the vehicle finally acts up again, the driver is supposed to pull off the highway, check the code reader and then write down any codes that appeared.

Basic scan tools

The next step above a code reader is a scan tool. Besides retrieving and erasing trouble codes, the simplest of scan tools can do several important jobs. For the sake of this short article, let me cite four valuable scan tool capabilities.

First, a scan tool shows live data from various sensors and actuators. Mind you, the simpler, lower-cost tools show less data than the larger, high-dollar scanners do. But the relatively short list of data items in a basic scanner is still invaluable to a good technician.

Second, a scan tool shows what I call vital "trending" information. The most-valuable trend is fuel trim. Fuel trim readings tell you if the engine control computer is compensating for problems by forcing the air/fuel mixture richer or leaner than normal.

Third, a scan tool shows you the results of monitors. Simply put, monitors represent critical self-tests the computer performs on various sensors, actuators and underhood systems. Knowing the results of these self-tests can be extremely helpful to a diagnosis.

Fourth, a scan tool provides Mode 6 data, which is related to the monitors. A more skilled technician can use Mode 6 data to evaluate how closely a component or system came to passing or failing the monitor (self-test). In the right hands, this is powerful information.

Furthermore, I have more good news. Today you can buy a basic but very practical scan tool for less than $200! A prime example is the Creader VI from Launch (launchtechusa.com). This new style of simple, compact scan tools represents affordable flexibility.

For instance, these compact scanners may suffice as stand-alone testers at some auto electric or auto repair shops. Also, some shops already equipped with larger, big-buck scan tools use testers such as Creader VI to *complement* their existing equipment. It increases productivity by adding an affordable, additional scanner to the tool crib. (Whereas the shop may own the larger, more sophisticated scan tools, I notice that Creader VI owners are more likely technicians who bought the tools themselves.)

What's more, grabbing a compact scanner is much more efficient than dragging out a larger one when the diagnostic task is a relatively simple one.

Modern technology has brought us a long, long way from the earliest scan tools I saw circa 1979. Price should no longer be a barrier to owning either a decent code reader or simple, compact scan tool. Plus, the Internet makes it even easier to shop for these testers. Hopefully I've given you some points to ponder as you're shopping.

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