he process of choosing the right diagnostic scan tool for the shop is challenging, to say the least. Prior to 1996, the choices were simple: the Snap-on MT2500, the OTC Monitor 4000, the Vetronix Mastertech or any of the OE scan tools, if you could get them. The introduction of the OBD II generic standard in 1996 and subsequent updates to the OBD II standard, like the single CAN communications protocol, have resulted in an increased number of companies introducing scan tools. The updated EPA Clean Air legislation and NASTF's efforts have made access to the factory scan tools a little easier. In May, I scanned MOTOR Magazine and several other publications and counted more than 60 advertisements for scan tools. It was the most heavily advertised type of equipment in those magazines.

The most commonly asked question at the PWR Training events I conduct is: "What scan tool should I buy?" The honest answer to the question is: "As many as you can afford." Why? Because I don't believe a do-it-all scan tool exists and we're not likely to see one anytime soon. Some aftermarket scan tool manufacturers may claim to have the total solution, but what you may find is an adequate engine diagnostic scan tool that falls short in body and chassis system diagnosis. The diagnostic capabilities of the GM Tech 2, Ford NGS and Chrysler DRB III are difficult to duplicate in an all-inclusive aftermarket combination scan tool.

With all this confusion, how do you know which scan tool will provide the greatest value? There are many factors to consider before you upgrade or purchase a new scan tool. This article will focus on developing a strategy that will make the decision a little easier.

I have broken scan tools into three general categories: OBD II generic scan tools, aftermarket combination scan tools and vehicle manufacturer scan tools. Let's take a look at the categories:

OBD II Generic Scan Tools

Every shop should own at least two inexpensive OBD II generic scan tools. Why? Due to the imperfect implementation of the OBD II specification



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Are you getting everything possible out when you plug it *in*? Here's how to evaluate your current scan tool capabilities, determine shop needs and plan purchase decisions. by some vehicle and scan tool manufacturers, one scan tool may not communicate with a particular vehicle, but another one will. There are three basic types of OBD II generic scan tools:

•Dedicated scan tools such as the AutoXray EZ-Scan 6000, Injecto-Clean CJ-15 and SPX/OTC ScanPro.

•PDA-based tools, including those offered by InjectoClean, AutoEnginuity and EASE, among others. These tools may operate on the Palm OS or Pocket PC platforms.

•PC-based OBD II generic tools from InjectoClean, AutoEnginuity, EASE and others offer PC-based solutions.

Each type has benefits and limitations. The dedicated and PDA units are designed to be inexpensive, simple and quick diagnostic scan tools. I like using them to retrieve fault codes, check readiness status and take a quick look at high-priority parameters. (If you're not sure which data parameters are important, you might want to review my "Interpreting Generic Scan Data" article in the March 2005 issue of MOTOR.)

The limitations of OBD II generic scan tools usually relate to small display screens and slow sample rates of live scan data. If you're willing to invest a little more money, the EASE OBD II generic PC-based scan tool has several very useful features. Those I find invaluable are unlimited data recording and customized data graphing. This is the tool I use to diagnose difficult intermittent driveability problems.

Aftermarket Combination Scan Tools

If you're operating a general repair shop and service many vehicle makes and models, it makes sense to own at least one combination scan tool. Examples of this type of tool include the SPX/OTC Genisys, Snap-on Solus, EASE PC-based combination scan tool, etc. These scan tools generally work best when diagnosing engine control systems on domestic vehicles. Some scan tool manufacturers also offer upgrades for Asian and European vehicles.

Some aftermarket scan tools are

Photo: Karl Seyfert



Photos of scan tools: Bob Pattengale

manufacturer-specific. For example, the Vetronix Mastertech works well on Toyota and Honda vehicles, and Baum makes tools that work well on European vehicles. There are other examples, but the point is that when looking for the right scan tool, knowing what vehicle makes you work on or don't work on can simplify your options.

Some aftermarket manufacturers may claim their scan tools can diagnose a particular system, but once you begin the diagnostic process, you might be missing some parameters and bidirectional controls that would be available on a factory scan tool. In an example I came across recently, one scan tool manufacturer's marketing materials claimed to offer air bag diagnostics for Nissan vehicles. The scan tool was connected to a 1997 Nissan Altima. In this case, the scan tool did not actually communicate with the air bag module, but did provide information on how to retrieve the fault codes manually. Although retrieving the fault codes was a good first step, the fault code diagnosis required additional tests that needed to be performed with the Nissan factory scan tool. Most of us have run into similar issues, and it can be frustrating. The important point here is to understand the limitations of the all-in-one tool. A list of aftermarket scan tool manufacturers, with website information, is given on page 28.

Vehicle Manufacturer Scan Tools

If yours is a specialized repair facility or you work on a particular make of vehicle more than 40% of the time, you should own the factory scan tool for that vehicle maker. This will provide the best overall coverage for all vehicle systems, including powertrain, air bag, climate control, etc. The limitations to this solution are cost and the learning curve for each tool.

One potential solution to the cost issue is to work with other shops in the area. For example, three shops could pool their resources to purchase a group of factory scan tools like the Ford NGS, GM Tech 2 and Chrysler DRB III, then share them as needed. Another option, which worked well for one shop, is to purchase several factory scan tools, then rent them out to other shops. See the box "Vehicle Manufacturer Scan Tools" on page 26 for contact information for the various vehicle manufacturers. This list was compiled from the NASTF service information matrix (www.nastf.org).

Each shop may need a combination of scan tools from all three categories to make the diagnostic process as efficient and successful as possible. There are a few questions you need to con-



sider before making the next scan tool decision. For example, should you purchase an all-in-one diagnostic platform or separate tools? The trend from many equipment manufacturers is to combine all the diagnostic tools into one platform. This is designed to save money and simplify the learning curve. Although this may seem like a good idea, there are some issues that need to be considered.

Also, what happens if the all-in-one tool malfunctions? If you purchased a combined scanner/scope/gas analyzer, you now have no diagnostic equipment available. Are the combined platform items as good as dedicated tools? In order to combine all the features and keep the cost down, some corners may need to be cut. The best example is the micro gas analyzers that are available for many of the allin-one tools. The accuracy, reliability and expected life are reduced, when

Vehicle Repair Matrix

Carmaker	lobs	Total
Acura	1/	1%
Audi		
Chrysler/Dodge/Jeep	4	
Ford/Lincoln/Mercury	6	1%
Geo	8	1%
GM: Buick, Cadillac,		
Chevrolet, GIVIC,		
	C	0%
	145	140/
	105	14%
		2%
Isuzu		5%
Jaguar		0%
Kia	4	0%
Land Rover		0%
Lexus	38	3%
Mazda	79	7%
Mercedes-Benz		
Mini		0%
		070

	No. of	0/ of
Carmaker	lobs	Total
Mitsubishi	26	2%
Niccan	196	16%
Dorscho		00/
	• • • • • • • • • •	
Saap		
Scion		0%
Saturn		0%
Subaru	41	4%
Suzuki	5	0%
Toyota	414	36%
Volkswagen	60	5%
Volvo	2	0%
Total	.1149	
Vehicle		
Model Year		
1991-1995	369	
1996-2000	419	
2001 2005	.	
2001-2003	220	

compared to dedicated full-size gas analyzers. The all-in-one tool is, however, a good choice for a shop that needs an extra backup tool or to provide options for multiple technicians.

Finally, should you purchase OEM or aftermarket tools? This is a difficult decision to make, but in many cases the OEM tool will provide the most comprehensive capabilities for a given vehicle make. Aftermarket tools are designed to combine features, reduce cost and simplify the user learning curve. This is where a specialized repair shop has an advantage over a general repair shop. The specialized repair facility normally services vehicles that fall into a range of years, makes and models. In this case, purchasing the factory diagnostic scan tool is the best choice.

The next couple of questions to answer are: Do you know if you already have the correct scan tools? And if not, how do you decide what to purchase next? The first step to answering these questions is to evaluate the specific needs of your shop. This may take a little time, but the exercise will help with other shop decisions, like repair information and training requirements. Begin by reviewing the vehicles repaired during the last year. Your shop management program may be able to provide this information electronically. If not, manually review the invoices. The information collected should include vehicle year, make and mileage.

If you want to spend the extra time, consider documenting the type of diagnostic work that was performed on these vehicles—for example, powertrain, air bag, antilock brake system, etc. This information will be used to determine what types of scan tools will provide the greatest benefit for the shop. If you would like the sample spreadsheet in electronic format, visit the PWR Training website at www.pwrtraining.com/resources.

The box "Vehicle Repair Matrix" on page 24 shows information that was compiled from an import service shop in the Tucson area. As you can see, this shop focuses on Asian and European vehicles. Also, Toyota, Honda and their subsidiaries repre-



Vehicle Manufacturer Scan Tools

Carmaker	Scan Tool Contact	Phone	Website
Acura (see Honda)			
Audi		1-800-892-9650	N/A
BMW			N/A
Chrysler/Dodge/Jeep	SPX		N/A
Ford/Lincoln/Mercury	N/A		www.motorcraft.com
GM: Buick, Cadillac,			
Chevrolet, Geo,			
Oldsmobile Pontiac	SPX Kent-Moore	1-800-825-5886	www.amtechinfo.com
Honda	Teradyne	1-800-210-8699	www.serviceexpress.honda.com
Honda	Vetronix	1-800-321-4889	www.vetronix.com
Hvundai	SPX Kent-Moore	1-800-336-6687	
Infiniti (see Nissan)			
Isuzu	SPX Kent-Moore	1-800-345-2233	www.isuzutechinfo.com
Jaguar	N/A	N/A	www.jaguartechinfo.com
Kia	N/A	1-866-542-8665	www.kiatechinfo.com
Land Rover	N/A	N/A	www.landrovertechinfo.com
Lexus (see Toyota)			
Mazda	Hickok Customer Care	1-800-342-5080	www.mazdatechinfo.com
Mercedes-Benz	N/A	1-800-FOR-MERCEDES .	www.startekinfo.com
Mini	N/A	N/A	www.minitechinfo.com
Mitsubishi	SPX	1-888-727-6672	www.mitsubishitechinfo.com
Nissan	SPX	1-800-662-2001	www.nissantechinfo.com
Porsche	N/A	N/A	www.techinfo.porsche.com
Saab	SPX	1-800-345-2233	www.saabtechinfo.com
Scion (see Toyota)			
Saturn	SPX	1-800-533-6127	www.gmtechinfo.com
Subaru	SPX Kent-Moore	1-866-213-4690	www.techinfo.subaru.com
Suzuki	SPX Kent-Moore	1-800-345-2233	www.suzukitechinfo.com
Toyota	SPX	1-800-933-8335	N/A
Toyota	Vetronix		www.techinfo.toyota.com
Volkswagen	Equipment Solutions	1-800-892-9650	erwin.volkswagen.de
Volvo	SPX	1-800-345-3399	www.volvotechinfo.com

sent more than 50% of the shop's repair volume. So what does this information tell us? First, this shop needs to look for scan tools that provide the greatest coverage for Asian and European vehicles. Second, based on the information, they may want to consider purchasing a scan tool that will provide the best coverage for Toyota and Honda vehicles. This data can also be used to help make other shop management decisions.

Here's something else to consider when selecting scan tools and diagnostic equipment for the shop: How do you know if a piece of shop equipment will stand the test of time and deliver the best value? Most diagnostic equipment will fall into one of two categories—equipment that defies obsolescence and equipment that becomes obsolete.

Examples of equipment that defies obsolescence are vacuum gauges,

smoke machines, DMMs, fuel pressure gauges, lab scopes and gas analyzers, among others. Once these items are purchased, they normally need to be replaced only when they're worn out or broken. The most common example of equipment that may become obsolete is the diagnostic scan tool. Each time a manufacturer releases a new vehicle with enhanced electronic features, a scan tool will need to be updated or, in some cases, replaced.

Equipment that defies obsolescence forms the backbone of diagnostics, but the scan tool is the heart, and the most valuable piece of diagnostic equipment in the shop today. Scan tools should be updated as often as possible and replaced when that is no longer a practical option.

The next step is locating scan tools that might meet your shop's needs. How do you know if a particular scan



Circle #18

tool is right for your shop? Often a salesperson will show a new scan tool or product that is interesting, but may not be right for your shop. The goal here is to ensure that a decision to purchase is based on true need and not emotion. The following questions should be answered long before you arrange product demonstrations. This list is not all-inclusive, but contains some of the most important decision-making questions:

•What scan tool do I want and why do I need it?

•What vehicles can this scan tool service?

Aftermarket Scan Tool Manufacturers

Actron Manufacturing/KalEquip www.kalequip.com AutoEnginuity www.autoenginuity.com Autologic www.autologicco.com Automotive Electronics Services www.aeswave.com AutoTap www.autotap.com AutoXray www.autoxray.com Baum Tools Unlimited www.baumtools.com Blue Streak Electronics www.bsecorp.com Davis Instruments www.davisnet.com **EASE Diagnostics** www.obd2.com Equus Products/Innova www.iequus.com GxT www.gxtauto.com IniectoClean www.injectoclean.com Interro Systems www.interro.com Launch Tech www.cnlaunch.com **Snap-on Tools** www.snapon.com SPX/OTC www.otctools.com Teradyne Diagnostic Solutions www.teradyne-ds.com Vetronix www.vetronix.com Waekon www.waekon.com

•Are these the same vehicles identified as the most popular on your vehicle repair spreadsheet?

•Will this scan tool pay for itself or save money or time in the diagnostic process? Take the time to perform a realistic ROI calculation to determine the true return on investment.

•Will my technicians use this scan tool? If the answer is no, you need to ask why.

•Can my technicians use this scan tool?

•What training will be required at the time of purchase, and down the road?

•What are the likely update costs for this scan tool?

•What are the limitations and capabilities of this scan tool?

After answering these questions honestly and completely, the next step is to research and locate the potential products that fit your shop's needs. This can be accomplished in a number of ways, including through magazine advertisements or by making contact with various equipment companies. The most valuable source is other shop owners or equipment users who have similar interests.

An often overlooked research resource is the International Automotive Technicians Network (iATN) at www.iATN.net, a network of over 50,000 shop owners and technicians with over a million years of shared information and experience. A sponsoring iATN member has the ability to search the entire database for comments about tools and equipment. If you don't find an answer in the database, you can post a question to the members. In most cases you'll receive answers within a few hours. One of the iATN forums specifically focuses on Snap-on products. Never rely solely on what a salesperson tells you about his product. If you can't find others who use and believe in the product, don't buy it.

Advancing vehicle technology is guaranteed to accelerate changes in diagnostic scan tools. How do you cope? First, make sure the scan tools you select best suit the needs of your shop. Next, start adjusting your equipment purchase budget to place an increased emphasis on scan tools. Third, use creative methods for purchasing equipment, including working with other shop owners. Finally, keep your technicians trained, to maximize their abilities with the scan tools on hand.

Perhaps you were hoping for a direct answer to the complex question "What scan tool should I buy?" The bottom line is only you know the exact situation in your shop. I know that if you use the steps discussed here, your chances of success will be greatly improved.

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