Do I need a Vantage? This seems to be a question that is frequently asked by automotive technicians. Like many of you, I was confused as to why I needed another multimeter when the Vantage first appeared. After all, I already had a DSO, a multimeter and a CD ROM-based information system.

To clear up the confusion, perhaps we should start by describing what the Vantage is. The Vantage is a relatively new tool offered by Snap-on Tool Corporation that fits somewhere between a digital storage oscilloscope and a digital multimeter. Although it is primarily a graphing multimeter, Snap-on has added some features to make it user-friendly to automotive technicians. Snap-on describes it as a power graphing multimeter with a diagnostic database. I should point out that there are other graphing multimeters available, but this article will focus entirely on the Snap-on Vantage.

I first obtained the Vantage sometime last fall and have been using it frequently in preparation for this article. This research alone wasn’t enough, so I decided to talk to technicians around the country to see what they liked and disliked about the Vantage. Their comments and observations had a big influence on the shape of this article. I would also like to thank the people at Snap-on for their cooperation and input.
When discussing the Vantage, technicians can be grouped into one of two categories. The first group consists of those who don’t own a graphing multimeter. Their argument is a DSO seems to do everything a Vantage will do and they are reluctant to spend money on a tool that duplicates what they already have. I can’t argue with this point of view and I must admit to being in this group before I started using the Vantage. We all have limited resources for buying tools and must choose what is best for each of us.

The second group are those who have the Vantage and like it. I don’t recall talking to a tech that was unhappy about purchasing the Vantage and I think this says a lot about the versatility of the tool. Many of these technicians were originally in the first group, but now say they grab the Vantage before they use their scopes. When I asked them why, most said it was quicker to use and the database helped to guide them through unfamiliar systems. It seems these two items were the most important to the average user.

What Can It Do?

To understand what the Vantage can do for you, we need to start by learning how it works. The Vantage samples a signal just like your DSO or DMM, but how it displays the signal is unique. A DMM converts the sampled signal into a digital number so that it can be displayed on an LCD. This number is easy to comprehend but can be somewhat misleading. Voltage is a good example of this problem. Because voltage can change rapidly, the DMM may not show what is truly happening in the circuit you are testing. Take an AC signal, for example. AC voltage is actually changing constantly, but a DMM will give you a steady number that is a computation of what is really going on.

A DSO also samples the signal, but instead of giving you a computed number, it displays the actual voltage versus time. A DSO is much more accurate at displaying what is truly occurring in an electronic circuit. When viewing AC on a DSO we see voltage that is constantly changing. In fact, it is difficult to relate what we see on a DSO to the DMM.

The Vantage does a little of both. It samples the signal, converts it to a digital number and then plots this versus time. The main difference is that it gives a simple number like the DMM, but extends the range of comprehension by plotting the point in time when the event happened.

The easiest way to show this difference is to look at frequency. Reading frequency on a DMM is very easy. It is displayed in Hertz as a digital number such as “30 Hz”. When viewing this same signal on a scope we might see it as a pulse train rising from 0 to 5 volts. We can then compute the frequency by measuring the time it takes to repeat. The Vantage gives us another unique view of this same signal. It takes the digital number, like on the DMM, and plots it versus time. This presents a graph with each point being the frequency at that moment.

Using The Vantage

Frequency measurement is one of the Vantage’s most useful features. By plotting this graph, we can monitor a changing frequency as if it were a DC voltage. Checking a Hall effect sensor is now as easy as checking a throttle position sensor. This picture shows a frequency pattern that has skipped a beat and caused the pattern to drop low. Viewing frequency in this matter makes finding the problem easier. Catching this on a DSO can be difficult. It depends on your time base setting. If it is set for a short period you will not see the momentary drop out in frequency. A DMM is much too slow for this and the Hertz reading usually never changes. I have found this to be the single biggest advantage with the Vantage. I have used it successfully to find several intermittent problems with crank sensors.
The spike you see in this frequency graph is caused by the frequency changing for an instant.

Graphing frequency is only one of many functions a user can select on the Vantage. The choices are similar to many good DMMs and include items such as: Ohms, Amps, DC Volts, AC Volts, Duty Cycle, Pulse Width, Low Amps and even Diode Check. By adding transducers, a technician can extend the range to measure inputs such as RPM, Pressure and Vacuum. These features are only limited by your imagination. I have found graphing vacuum versus frequency a nice feature for MAP sensors like those found on Ford vehicles.

The dual mode capability of the Vantage is another important feature. In this mode the user may choose to view two items at once. Comparing a MAP sensor reading to actual vacuum, injector pulse width to battery voltage, or MAF to TPS are just a few examples of this feature in use. Some technicians have said they compare pulse width to TPS, MAP or MAF. Using injector pulse in this way can help solve some of those strategy-based problems we encounter.

One technician I spoke with told me that he likes to view the duty cycle of the carburetor feedback solenoid and compare it to the oxygen sensor voltage. Using this configuration helps him to keep track of solenoid operation as conditions change over an extended period of time.

Another technician told me he was using the Vantage to find intermittent starting problems with some Asian imports. He would connect one lead to the starter and one lead to the ignition side of the starter solenoid. This would allow him to determine the source of the high resistance. If the voltage appeared on the ignition side and not on the starter side, he knew the solenoid was bad. As many of us
know, it is tough to find out whether the ignition switch or starter solenoid is at fault on those pesky Toyotas.

The Vantage also includes a waveform viewer. This feature is aptly named because it does not replace a good DSO's ability to sample and display, but I don't believe the Vantage was intended to completely replace the DSO. I find the waveform viewer most useful for confirming my connections or as a quick check for a pattern.

**Database Information**

Patterns and signals are nice, but you can't find the problem unless you know how to hook up to the circuit. Snap-on helps with this problem by adding a database that identifies the connectors and wires on the vehicle you are checking. Many technicians I spoke with said this was of great help to them. Even when they had a CD ROM-based information system they said it was faster to find what they needed on the Vantage.

I found the database especially useful on a test drive. I didn't have a wiring diagram with me but I could still scroll to the component and it illustrated where I needed to probe. The information covers most all sensors for the popular vehicles. Occasionally you run across a component that is not covered. Most notable are the PCM connectors, but coverage is very good and each software update adds more information.

The database also has information regarding how a sensor works and any other data a technician may need. For instance, choosing oxygen sensor for a Honda will tell you how the O2 works as well as the pinout for the connector. This vehicle also has a tech note about oil contamination on the four wire connector and how it can affect the signal. Selecting tests lets the user choose either O2 voltage, heater voltage or heater resistance tests. Choosing the O2 voltage test brings up yet another menu. This menu will let you choose either quick test, propane in car or bench test or PCM response test.

If you choose quick test, the Vantage will describe the test and tell you how to hook up the probes. While you are proceeding through these menus, a multimeter or waveform viewer window is present on the upper half of the screen so you can see what your sensor is doing. These menus are especially helpful for young technicians as well as for experienced technicians that are working on an unfamiliar vehicle.

**Other Features**

The Vantage is easily upgradeable by simply changing a card in the side of the unit under the hand grips. A fuse is also present to help protect the Vantage against an overload when checking amperage. The latest software version at this time is Version 2 which includes Domestic, Asian and European vehicles. Version 2 also includes a few improvements over Version 1, such as waveform storage and the ability to return directly to multimeter mode on power up. Both of these improvements
are worth the upgrade. It’s very convenient to be able to go straight to the multimeter without advancing through a menu system. Although waveform storage is limited, it gives the user a chance to store a few waveforms before he unhook from the car and downloads to his PC or printer. (Especially nice during test drives.)

are worth the upgrade. It’s very convenient to be able to go straight to the multimeter without advancing through a menu system. Although waveform storage is limited, it gives the user a chance to store a few waveforms before he unhook from the car and downloads to his PC or printer. (Especially nice during test drives.)

Optional accessories include three pressure transducers. Each has a specific pressure or vacuum range.

Version 2 also includes the ability to use the new vacuum and pressure transducers offered by Snap-on that range from 20 hg to 5000 psi. These sensors have a wide range of uses including A/C and ABS systems. It is also possible to hook up two transducers at the same time by using an adapter. This would allow a technician to monitor separate pressure inputs, like high and low pressure A/C.

Monitoring fuel pressure is another good idea. Many are aware of the dangers of allowing a fuel gauge to be draped outside of a vehicle during a test drive. Using the transducer leaves the fuel in the engine area and only the wires are routed into the passenger compartment. The transducers do not come with adapters but with a little ingenuity technicians are finding ways to connect to almost anything.

The Vantage, like many modern diagnostic tools, has the ability to print or upload to a PC via a serial port located in the top edge of the unit. This allows the user to present information to a customer or save files for his own use. Many are exchanging waveforms via the Internet and having this capability may help you fix a car by exchanging your files with other technicians. The software that Snap-on sells for the Vantage is called “PC Link” and comes with a floppy disc and cable. It runs on most DOS computers and will export files to PCX format. The files in this article were collected using PC Link.

The Vantage is powered by two D cell batteries and, according to Snap-on, can last up to 60 hours with the backlight turned off and no accessories connected. Most technicians I spoke with told me their batteries are not lasting this long. Their suggestion was to keep spare batteries close at hand.

It seems Snap-on has found a niche for the Vantage between the DSO and DMM. I know many of you reading this article may have already purchased one. If you are ready, I would like to extend an invitation: Send me your tips and tricks and I will pass them along to other technicians. You may send email to me at: bernklau@gemini-comm.com, or send your regular mail to me here at Import Service.

If you would like to receive more information about the Vantage, please Circle No. 160 on the Reader Service Card.

—By Randy Bernklau