

# diagnostic tools



## Fine-Focus Noncontact Thermometer

Noncontact laser thermometers are great for checking the temperature of most larger automotive components under normal running conditions, but problems can arise when you want to measure the temperature of something smaller than the 'field-of-view' the thermometer sees. Answer? A noncontact thermometer with a narrower sampling channel. Raytek, a leading manufacturer of noncontact thermometers, has expanded its line to include the Raynger MX with its coaxial circular laser sighting, allowing measurement of a space just under a quarter of an inch at a distance of a foot. This resolution allows the mechanic to distinguish the object measured from background temperatures and from nearby objects, if for instance several A/C lines, one in and one out of the evaporator, are so closely adjacent you can't otherwise measure them. This discrimination could even be useful for some overlapping exhaust manifolds, trying to distinguish which of several cylinders was burning hotter or cooler than the others.

**Raytek Corporation**  
Circle Number 132

## Automotive-Specific DVOM's

Mac Tools EM710 and EM720 digital multimeters are automotive-specific, meaning their designs focus on automotive diagnostic applications to speed access to the kinds of information typically sought in vehicle work. Each can measure AC and DC current and volts, frequency and resistance. The EM720 can record frequency and pulses at a 20,000-count detail, which it can then display on a high-resolution 4000-count display. The unit also has a backlit screen, making it easier to read under a dash or hood.

Each meter can perform a battery of automotive tests, like rpm readings using a special inductive pickup. The user can test fuel injection systems, feedback carburetors and ignition systems, with even a dwell readout for certain purposes. There is a step-adjustable trigger for more precise measurements. A pulse-width function allows testing not only fuel injectors, but also idle air control motors and electronic transmission controls. Using thermocouples, the meters can measure temperatures up to 2498 degrees F. The EM720 includes a serial interface (RS-232) to allow connection to a PC for information storage. Both meters include electrostatic shields and surge protection. They're both CE-mark certified.

**Mac Tools**  
Circle Number 133





## Vetronix Engine Analyzer

The Vetronix MTS 5100 combines engine analyzer, ignition analyzer, four-channel oscilloscope and graphing digital multimeter in one tool. Its four functions, combined with its ease of use (including touch-screen technology) can cover the work of several different diagnostic implements.



As an engine analyzer, it can display primary and secondary ignition waveforms, ECU input and output waveforms and can graph data from other automotive circuits requiring diagnosis — all in real time to maximize the chances of catching an intermittent problem. The MTS 5100 runs the normal mechanical tests, cranking tests, ignition power balance tests, charging system tests and tests for the fuel system.

In its ignition analyzer mode, the MTS 5100 shows primary or secondary waveforms in single-cylinder, parade, raster or superimposed formats. The mechanic can see firing voltage, burn voltage and time or dwell in either bar-chart or numerical displays. Adapters allow use on each of the common ignition systems: direct ignition, direct ignition with integral coil, waste-spark and coil-on-plug systems.

As a four-channel oscilloscope, the MTS 5100 was developed specifically for automotive computer systems, making it ideal for diagnosing elusive problems, according to the manufacturer. It includes preconfigured setups for dozens of vehicle components to make it quick and easy to use by anyone. If, for example, you choose “upstream O2 sensor,” it will set the scope’s time and voltage slices appropriately, pick a usable trigger and sampling rate and lie in wait for the plausible glitches. The scope memory includes a library of ‘known-good’ waveforms, and you can capture and save more as the carmakers throw us new and weirder high inside curves.

As a graphing multimeter, the MTS 5100 displays readings both as numerals and as a graph showing how the value has changed over time. It can display AC or DC voltage, AC or DC current, pulse width, resistance, duty cycle, frequency, rpm, temperature, dwell and diode integrity, among other tests.

Vetronix says the tool can sample data several million times per second for accuracy and detail, and that it was designed for functionality upgrades over time to forestall obsolescence.

**Vetronix Corporation**  
Circle Number 134

## Pocket DMM

Jensen’s JTM-69 multimeter is small enough to fit in a pocket and tough enough to survive a four-foot drop to the floor, but it has one-handed operation, automatic power-off, a 3200-count display and a bar-graph. The safety design includes a protective holster. The meter can track AC amps and measure capacitance, in addition to the more common tests.



**Jensen Tools**  
Circle Number 135

## Fiber-Optic Borescope

An ‘eyeball-on-a-snake,’ a borescope allows you to see inside components that would otherwise require substantial disassembly to inspect, such as the inside of combustion chambers, transmissions or differentials. The Renegade from Sidewinder Products Corporation is also a 60x microscope so you can see details of valve margins, gear tooth or bearing wear and the like. It uses glass fibers to transmit the image from the objective lens to the eyepiece, as well as to transmit light from the adapter to the area inspected. The view subtends a 55-degree angle, and the right-angle viewing objective can get as close as 3/32-inch to the workpiece.



The flexible shaft with the glass fibers is 17 inches long and 6.5 mm in diameter, watertight and chemical-resistant. The bend radius of two inches means the tool is very flexible, and the 10,000-pixel imaging guide eliminates the ‘honeycomb’ view of earlier fiberoptic borescopes. The tool can adapt for a camera or computer monitor, so observations can be printed out. A hard-shell ABS carrying case keeps and protects the instrument.

**Sidewinder Products Corporation**  
Circle Number 136



## Fuel System Analyzer

Mac Tools' ET4556 Scanalyzer can, according to its manufacturer, rapidly assess problems throughout the fuel injection system as it analyzes raw data from the injectors, pressure regulator, fuel pump, filter and check valve all at once. Its Quick Test Sequence conducts a systematic



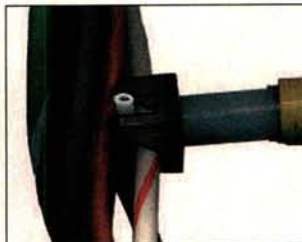
array of diagnostics, pinpointing specific problems in minutes. The operator can also choose from many individual tests to focus more clearly on aspects of interest. The tests include fuel pump voltage, system leakdown, an inductive test of the current draw and both static and dynamic injector flow tests. Besides those, it can also perform injector balance tests, volume tests and deadhead pressure measurements. Taking about five minutes to connect, its testing routine is completely automatic.

**Mac Tools**

**Circle Number 137**

## Wiretap Probe

Its makers call the Wire-Tap "the world's ultimate piercing probe," a diagnostic tool that can thread its way into wires from 0.030 to 1/4-inch in diameter. The Wire-Tap comes in two lengths, ten or fifteen inches, long enough to reach into the otherwise most inaccessible parts of a wiring loom. The tip is small enough to grab a single wire out of a bundle for testing. Instead of stabbing into the wire, it threads into the insulation just the amount you determine. The Wire-Tap connects to multimeters, lab scopes and graphing multimeters using standard, sheathed or retractable banana plugs. After many years' use, you can remove and resharpen the silver-plated beryllium copper needle.



**Automotive Electronics Services**

**Circle Number 138**



## Ignition Primary Probe

Ferret's 72 Primary Ignition Probe can measure the electrical properties of most coils and modules found on current ignition systems. The tool measures on-time, ramp-time and peak amps of the module and coil or coils, using current-ramping technology.

A BNC connector allows the user to view the waveform on most graphing multimeters or labscopes.



**Ferret Instruments**

**Circle Number 139**

## Fluke 98 Starter Kit

With all the features of the regular Fluke 98 automotive scope, the Fluke 98 Automotive ScopeMeter Starter Kit includes most of the accessories needed for testing vehicle systems. The scopemeter itself is a two-channel labscope, engine analyzer, flight recorder and digital multimeter in one tool. The price is more affordable since the tool does not include the hard case and some of the accessories for ignition secondary circuit tests, which can be purchased later if needed. The starter kit does include a 60-minute video training cassette, the protective yellow 'holster,' the Ni-Cd battery pack, an A/C adapter, two five-foot heat-shielded test leads and a ground lead, a low-pass adapter for oxygen sensor testing, three alligator clips, three breakout-box adapters, three 2 mm adapters, three flexible backprobing pins, a manual and, of course, the scope itself.



**Fluke Corporation**

**Circle Number 140**



## Radiator Adapter

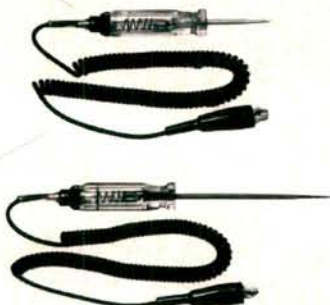
Testing coolant systems for leaks used to be easier when most carmakers used almost the identical radiator caps. Now there are at least 25 different cap designs, which would require separate adapters to pressure test. The Mityvac Universal Radiator Adapter may not be completely universal, but it does fit 95 percent of all vehicles, according to the manufacturer. Setup time is minimal, and the durable hard-body adapter does not require inflation or other forms of 'conditioning.'



**Mityvac/Prism**  
**Circle Number 141**

## Circuit Testers with Coiled Wire

These circuit testing lights include a coiled wire, 12 feet long, that 'retracts' when not in use, solving the snarl problem among electrical tools. The ground clips are heavy-duty and insulated, and a spring-loaded strain relief is at the other. Bulbs on both the three-inch and the 6 1/2-inch probes are easily replaced.



**S & G Tool Aid Corp.**  
**Circle Number 142**

## Infrared Noncontact Thermometers

Stanley offers several infrared noncontact thermometers, the ETST1 and ETSTL1, the latter with a laser sight for accurate target acquisition. This allows users to get an accurate temperature measurement of a



specific component in a fraction of a second by merely pointing and shooting. The noncontact feature, of course, means there's no need to touch very hot or cold objects, eliminating the chances of personal injury or equipment damage. Both thermometers are lightweight and pocket-sized, fitting comfortably in the palm of the hand. Readings range from zero to 500 degrees F (-18 to 260 C).

**Stanley-Proto Industrial Tools**  
**Circle Number 143**

## Digital Tire Pressure Gauge

This digital tire pressure gauge makes it even easier to check for proper tire inflation. According to the manufacturer, it is accurate and easy to read, and it shuts off automatically after removal. Keeping tires correctly inflated, of course, improves handling, increases tire and fuel mileage and makes for a smoother and more comfortable ride.



**Tru-Flate/Stant**  
**Circle Number 144**

## Heater Core and A/C Evaporator Tester

Before you go to the trouble of taking a dash apart to replace a heater or air conditioning core, it's comforting to know — not just reasonably suppose — that your leak or other problem comes from that deeply buried component. Mityvac's heater and evaporator core test accessories kit let's you pressurize the suspected component through the inlet/outlet lines before you start the dig. The tool will also let you test the replacement part for pressure/vacuum integrity before you install it, to eliminate what might now and again be a very irritating discovery once all the work is done.



**Mityvac/Prism**  
**Circle Number 145**



# diagnostic tools

## Phoenix Injector from Raybestos



The Phoenix Injector is a unique brake bleeder. It can directly pump fluids under either vacuum or pressure, bleeding brakes thus in either direction. For certain difficult brake hydraulic circuits, this has the advantage that the fluid and the bubbles are moving in the same direction. This not only makes it much easier to prime master cylinders on the bench or on the firewall, but facilitates working on vehicles with complex plumbing, ABS systems and the like. The tool's maker says reverse-flush bleeding has proven to be the best way of all for certain clutch master/slave cylinder hydraulic systems. The tool is made of high-quality durable materials and includes a transparent barrel where the fluid pumped is visible with each pull of the trigger handle.

**Raybestos Brakes**  
**Circle Number 146**

## Five-Gas Emission Analyzer

Meeting both BAR 97 and OIIML specifications, the SpectraGas emission analyzer diagnoses gasoline engine exhaust chemistry. The easy-to-read backlit display shows hydrocarbons, carbon monoxide, nitric oxide,

carbon dioxide and oxygen. It can also show the air/fuel ratio (lambda), engine rpm, oil temperature and other relevant factors. Emissions numbers can appear either as percents, parts-per-million or calculated grams-per-mile. Since the analyzer is small and portable, you can use it for loaded road tests, with no need for a dynamometer. The display can be adjusted for contrast as well as for how it shows the readings: digitally, in line graphs or bar graphs. Of course, once you've completed your emissions controls repairs, you can test and display the improvement percents.



The tool is powered through the cigarette lighter socket. Just five buttons on the keyboard are required, and the analyzer has multiple snapshot and storage capacity. A dual pump draws the samples through the meter. All its results are quickly and easily uploaded to a PC. The system's memory allows searching by owner's name, VIN, make, model and year. It can also test propane- and methane-fueled vehicles' emissions. Several different accessory packages are available, depending on how much you want to do with the tool.

**MPSI**  
**Circle Number 147**