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The Great Detector Test

With sales of these fuzz sniffers stalled, the makers search for the right frills.

BY ANDRÉ IDZIKOWSKI

It's been almost five years since our last radar/lidar detector test (*C/D*, April 1997). Since all the major manufacturers have either updated their wares or introduced all-new models, the time is right for a fresh look at the high-end segment of the detector market.

Radar is still the most popular form of speed detection—some 100,000 guns are in use, and roughly 20,000 new ones are sold each year. A radar gun works by transmitting a microwave beam at your car. When that beam reflects off the moving vehicle, it changes frequency, and the reflected frequency is used to calculate speed. Traffic radar, which is regulated by the Federal Communications Commission (FCC), operates on three frequency ranges. The oldest is X-band, from 10.500 to 10.550 gigahertz (GHz); about 10 percent of all radar guns use this band. The biggest chunk, about 60 percent of guns, operates on K-band, at 24.050 to 24.250 GHz. Increasingly popular is Ka-band, which spans a wide range of frequencies from 33.400 to 36.000 GHz; Ka-band accounts for 30 percent, including photo-radar units.

Photo radar involves a camera set up at the side of the road that automatically photographs the license plates of speeding vehicles. These devices are popular in Europe, although their use in the U.S. has stalled—just nine police jurisdictions in four states have deigned to rely on them.

Conventional radar can be used in either a stationary or moving patrol car and can transmit its signal coming or going, front or rear. And don't count anymore on using that slow-moving semi-truck in the right lane to shield your smaller but faster-moving Corvette. This technique used to work with older radar guns that would only display the speed of the truck, the stronger reflected signal. Most newer radar guns can clock both vehicles at once and pick out the faster-moving one. The state-of-the-art Stalker Dual DSR radar unit is especially lethal; it can clock cars in opposing lanes or in the same lane the patrol car is in, whether the target is oncoming or moving away. With other units, the officer has to determine whether the gap to the target is opening or closing. The Dual DSR does all this automatically and makes clocking speeders easier than shooting rats in a barrel.

All radar guns can also be set in a steady-state mode and used to monitor traffic continuously. Or the gun can be switched to an instant-on mode in which the operator flicks the unit on and off to instantaneously measure the speed of passing cars. This "instant on" mode is much more difficult to distinguish because the detector must sniff out the occasional brief zap intended for another vehicle in front or behind. Detecting and correctly identifying these brief signals is your *only* defense.

Because the FCC allows many other devices to operate on the police radar bands, detector warnings do not always signify the presence of police radar. Automatic door openers at markets and malls, burglar-alarm motion sensors, and other devices broadcast on X-band and to a lesser extent on K-band. Some radar detectors even emit a weak signal on a frequency in the Ka-band spectrum, thereby sending false alarms to fellow motorists.

Lidar is another, especially fearsome speed-enforcement tool. A lidar gun works by firing a series of laser light pulses (with a wavelength of 904 nanometers) at a targeted vehicle. The device times the return of the reflected pulses and uses that number to compute the vehicle's speed. The lidar gun sends a narrow beam at its target; even at a distance of 1000 feet, the most intense portion of it is only six feet wide—narrow enough to pick a single car out of a crowd.

But this narrow beam is also the lidar gun's major weakness. Unlike radar, it must be precisely aimed from a stationary position, typically at a range of 500 to 1200 feet. Lidar cannot be used in mobile units. Unfortunately, because there is almost no "signal scatter" for a laser detector to pick up, most detectors can't warn you when Smokey is using lidar until the beam is already focused on your car—and that's usually too late to avoid a speeding ticket.

With roughly 25,000 of these units in use and their numbers growing by 4000 to 5000 a year, lidar represents a very serious threat. Fortunately, detectors are being improved, and on several occasions we've been able to pick up the scatter signal of a laser clocking from a car ahead of ours in time to haul down our speed.

Radar warning has improved, too, but a lot of effort has been focused on "bells and whistles" unrelated to warning drivers of speed-monitoring devices.

Faced with a stagnant market—over the past five years, detector sales have remained stuck at about 1.1 million units per year—manufacturers appear to be

PHOTOGRAPHY BY DON KUREK

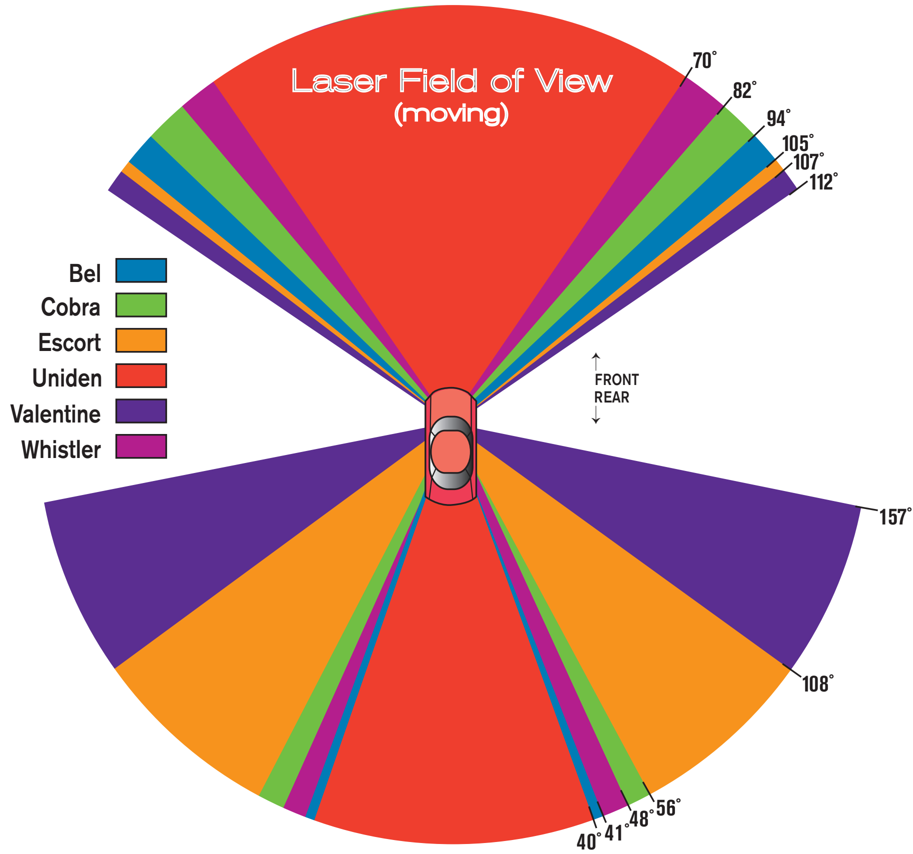
searching for the right frills to reawaken buyers.

One detector in this test displays a compass heading; another can record the driver's voice for up to 90 seconds' worth of memos; and features such as weather radio are also being touted.

After 25 years of evaluating detectors, we've refined our technique to a few simple, repeatable tests. To avoid any stray microwave radiation that would produce false alarms, we conducted our tests on the roads of the DaimlerChrysler proving ground in Chelsea, Michigan. Radar testing took place on an unobstructed 2.5-mile straightaway. A gun of each band—X, K, and Ka—was rigidly mounted, one at a time, in a police cruiser that was positioned on a downgrade at one end of the straightaway. By carefully setting each "trap," we adjusted the radar strength so that even the best detector could not find the signal at the far end of the 2.5-mile straight. This type of trap replicates a real-world scenario in which a trooper would be clocking traffic from a low spot in the median or from a dip in the road. It also allowed us to avoid any radar "hot spots" caused by hills and rises that can set off both strong and weak detectors in the same spot.

We tested the detectors' sensitivity, or range, with each radar gun in steady-state and instant-on modes. The farther away a detector sounds its alarm, the more effective it will be at providing a timely warning to the driver. Each detector's sensitivity was evaluated in unfiltered "highway" mode and in the most filtered, or selective, "city" mode. We drove toward the radar guns in both modes and measured the distance at which each detector sounded its first *audible* warning.

Lidar is used at shorter distances, typically up to 1200 feet. A lidar beam looks like a cone, and a lidar detector must be able to see the weak fringe of the beam, or to pick up weaker reflections off cars in



the traffic ahead. We use two different tests to measure a detector's ability to find the edge of that beam or its scattered remnants.

In the first test, we clamped a lidar gun to the top of a stack of cinder blocks five feet high and aimed it precisely at the center of a 32-foot-wide platform 1000 feet away. We then placed each detector behind a piece of windshield glass and moved it laterally toward the center of the platform to determine its sensitivity to the edge of the lidar beam. We do this test with the detectors facing forward and to the rear; this measures each detector's front and rear lidar sensitivity.

Our second test determined the angular field of view of each detector. We mounted a detector in the center of the windshield and then drove forward and backward, at various angles, through a beam aimed across the road. (Police try to keep within an angle of 15 degrees to either side of the target vehicle's line of travel to reduce the amount of error in their speed measurements.) All the detectors in this test respond to a lidar beam within this narrow field, but we think a wide field of view would more reliably enable a detector to see this beam. It should also be better able to pick up any scattered reflections coming off the targeted car.

We conducted two more tests at the proving grounds: one to determine whether the detector is invisible to a VG-2 "detector detector"—a device used by authorities in Canada and states where radar detectors are illegal—and the other to check each detector's propensity to falsely set off other detectors. Finally, we drove a 14-mile urban loop around Ann Arbor to check each unit's resistance to false alarms. Highway mode and most highly filtered city mode were tested.

Unlike other testers, we do not accept samples from the manufacturers, removing the possibility that we might receive a juiced-up ringer unit (this has indeed happened in the past). Each of our detectors was purchased by a nonstaff member and mailed to his home.

As in past detector tests, our numerical ratings are the sum of six separate evaluations as follows: Of a total 100 points, 50 are assigned to a detector's radar sensitivity (range), 10 to its lidar sensitivity, 15 to selectivity (a score calculated by comparing a detector's sensitivity with the number of false alarms it sounds), 15 to its ergonomics (readability of displays, intuitiveness of knobs and switches, mount design, effectiveness of audio warning), 5 points to a calculated city-mode score that compares how well this mode reduces false alarms without diminishing the detector's sensitivity, and a final 5 points are awarded for loudness with the strongest singer receiving 5 points and the weakest just 1.

Valentine One
Overall Score: 97

In a perfect world, the ultimate radar/lidar detector would sniff out only police radar or lidar, pinpoint its location, and then concisely communicate that information back to you. Although such a device doesn't yet exist, the Valentine One comes the closest to that ideal and thus ranks highest in this test of top-notch detectors.

In highway mode, the Valentine One could detect X-band radar from almost two miles away and K- and Ka-band radar from about a mile and a half. Only the Escort Passport in Ka-band came close to the Valentine's range in highway mode.

Falsing in highway mode is a common occurrence with most of these detectors—the average in our tests was 12.5 falses—and the Valentine One scored poorer for the 14-mile course, at 14 false alarms. The Valentine has two city-mode filters, and switching to its "most filtered" setting reduced the number of falses to eight (the city-mode average for falses was 6.7). That's still a few more than we'd like, but the Valentine's patented radar-direction arrows and bogy counter made it easy to decide which warnings to worry about. The LED arrows indicate whether the radar source is ahead, beside, or behind you, and the numeric display tracks the number of sources. We've said this before and it's still true: Once you live with the arrows, you'll wonder how you ever managed without them.

The Valentine One's ability to detect lidar was slightly better than its performance in our '97 face-off. It still has, by a large margin, the widest angle of view both front and rear. Facing forward, only the Passport matched its ability to find the laser beam's edge at 1000 feet.

The big change to the Valentine is that all the electronics have been packaged into a first-generation "thin" case. In previous models, the addition of laser-detection sensors had forced Valentine to use a thicker, bulkier case. A column of LEDs to the right of the numeric display indicates what the threat is, radar or lidar, and a row of LEDs under the display shows its strength. Power and volume are controlled by a rotary knob. Pushing on the knob changes the city filter modes and also mutes the audio warning.

The Valentine was invisible to the VG-2 detector detector, and it also didn't set off other detectors.

A lot of folks think the $399 price is off-putting, but its superior abilities make it a solid long-term investment.

Escort Passport 8500
Overall Score: 73

The sleek-looking Passport 8500's second-place score of 73 is the closest a detector has ever come to the Valentine One in any of our comparisons. That 24-point spread correlates with its price, which is a fourth cheaper than the Valentine. Escort's latest detector offers good performance and a long list of features for tailoring it to the owner's individual tastes.

The Passport did well in this test because of its above-average sensitivity in all three radar bands. In highway mode, it picked up K- and X-band signals from close to a mile away and Ka-band signals from more than a mile, even in instant-on tests. Its good sensitivity also contributed to a high selectivity score.

On our test loop, the Passport falsed 14 times, a score worse than average. The number of falses dropped to just three when we switched to its most-filtered city mode. In this setting, the X-band sensitivity to superfluous signals bouncing around was reduced, and the K-band sensitivity was unaffected, which is more desirable since a K-band warning is usually the cops. In addition to its highway and city modes, the Passport also has a selectable automatic mode to filter out false signals. In this mode, after an initial audible warning, the type of signal band and its strength are only visually displayed on the LED screen.

Detecting lidar was another area in which the Passport performed well,

Vital Statistics

	price, list/ street	dimensions with bracket, D x W x H, inches	power cord, type/length, inches	weight with coiled cord and plug, ounces	threat discrimination	signal-strength indication	maximum alert loudness, X/K/Ka/laser, dBA		features
BEL 980	$340/ $230	4.7 x 3.0 x 2.3	straight/48; coiled/66	9.1	alphanumeric LED display, audible	beep or click frequency, numeral and 5-segment LED meter	89/87/86/86		2 city modes, bright/dim/dark, mute/auto-mute, SWS* discrimination with voice and text, full-settings memory, tutorial mode
COBRA XR-1050	$399/ $249	5.1 x 3.0 x 2.0	coiled/60	6.8	alphanumeric LED display, audible	beep frequency, numeral and 5-segment LED meter	82/77/72/83		1 city mode, bright/dim/dimmer/dark, mute/auto-mute, Safety Alert discrimination with voice and text, full-settings memory, VG-2 detection
ESCORT PASSPORT 8500	$299/ $245	5.3 x 2.8 x 2.8	coiled/124	12.1	alphanumeric LED display, audible	beep frequency, 6-segment LED meter	88/86/82/92		3 city modes, auto mode, 4 dim modes, dark mode, mute/auto-mute, SWS discrimination with text, full-settings memory, 2 signal-strength meter modes
UNIDEN LRD 987	$150/ $120	4.3 x 2.8 x 2.2	coiled/68	6.3	alphanumeric LED display, audible	beep frequency, 6-segment LED meter	78/82/81/86		1 city mode, 4 dim modes, mute/auto-mute, SWS discrimination with voice and text, electronic compass
VALENTINE ONE	$399/ $399	4.5 x 3.6 x 2.0	straight 96; coiled/72	9.2	numeric, 12-segment LED display, audible	beep frequency, 8-segment LED meter	90/89/87/87		2 city modes, auto dim, mute, directional arrows, radar-source counter, city-mode memory
WHISTLER 1780	$220/ $209	4.6 x 2.9 x 2.3	coiled/84	7.3	alphanumeric LED display, audible	beep frequency, numeral and 5-segment LED meter	80/81/82/88		3 city modes, dim/dark, mute/auto-mute, SWS discrimination with text, Stay-Alert mode, tutorial mode, VG-2 detection, memo-recording mode, battery-save mode

*Safety Warning System

scoring a maximum 10 points. Its front and rear laser sensors both detected 10 feet of beam width at 1000 feet, and its front angle of view was only five fewer degrees than the Valentine's 112. However, its 108-degree rear angle of view was 49 fewer degrees than that of the Valentine. Remember, a wider field of view improves a detector's chances of picking up the scattered reflections of a laser beam aimed at another car, and this increases your odds of getting warned and not caught speeding.

Although it looks slim and trim, the Passport's 12.1 ounces make it the porkiest detector of the bunch. Its audible warnings are clear and easily discerned, and they increase steadily as the incoming signal gets stronger. The LED screen is easy to read and displays the kind of signal being received and its strength. Various audible warnings and display screens are just a few of the options that can be reprogrammed to the user's tastes, but it's not duck soup—you'll need the owner's manual. We found the ExpertMeter option quite informative. That feature identifies and tracks the strength of up to eight radar signals, using multiple columns of LED lights, each representing a separate signal.

The Passport receives Safety Warning System alerts, displaying them in text form using the LED screen, and its presence could not be picked up by the VG-2 detector detector. Factory-direct, the Passport sells for $299, but brand-new units can be found on eBay for $245.

The increasing use of same-lane and truly instant-on speed measurements like those of the Stalker Dual DSR makes detecting a warning and how you react to it much more difficult. The Passport offers less range than the Valentine and, like all the non-Valentine units, lacks the useful directional arrows. On the other hand, its warnings are easy to interpret and can be customized to your taste. At a little more than half the Valentine's price, the Passport represents good value.

Bel 980
Overall Score: 61

The Bel 980 didn't finish far behind its cousin, the Passport, in this face-off. Bel and Escort merged about five years ago, so this result wasn't surprising.

On average, the 980's X-band sensitivity in highway mode was second only to the Valentine's, and its K- and Ka-band highway ranges were only about 1400 feet less than those of the Passport. The 980 falsed 13 times in highway mode on our 14-mile test loop. Switching to its most-filtered city mode only brought the number down to nine, hence its lower city score.

The 980's front laser sensitivity was satisfactory, detecting 8.5 feet of beam width. Its rearward capability was much less—it could find only four feet of the beam width. The same was true for its laser field of view, which was 105 degrees from

the front but only a narrow 41 degrees from the rear. The 980's weak rear vision means it will likely miss some laser pulses coming from that direction.

A handy tutorial mode made it relatively easy to figure out the 980's array of audible and visual alerts. Radar and lidar warnings start with a digital voice prompt that's followed by beeping tones. The LED screen visually identifies the signal and shows its strength with a bar graph. There are beeps, and then there are *BEEPS*, and these had an unpleasant sound to them, even with the volume keyed down. The selectable auto-mute function that shifts to softer clicking sounds was a welcome relief from the auditory abuse. Four buttons on the top of the detector control power, display brightness, volume, and the two city modes.

The list of programmable options on the 980 is a bit shorter than the Passport's, but here too you'll need the owner's manual. Beltronics needs to redesign the windshield suction-cup mount on the 980—it's too heavy and requires a screwdriver to make adjustments.

The 980 responds to Safety Warning System alerts; the digital voice announces the message, and the screen displays it in text form. The VG-2 detector detector couldn't sniff out the 980, either.

The Bel 980 has a suggested retail price of $340, but we bought ours via the Internet for $230. With the exception of the shortcomings in its rear laser vision, the 980 performed its other basic functions almost as well as the Passport.

Cobra XR-1050
Overall Score: 43

With a suggested retail price of $399, the Cobra ties the Valentine One for most expensive detector in the test, but we managed to buy one online for a remarkably discounted price of $249. Its price suggested it would perform on a par with the Bel and Escort, but surprisingly that turned out not to be the case.

The Cobra in highway mode sniffed out the presence of X-band radar roughly 300 feet sooner than the Passport. The Cobra was capable of picking up Ka-band signals at a range of just over a half-mile but could only sense K-band at less than a half-mile. This level of sensitivity is acceptable if the user is paying close attention.

The Cobra falsed 14 times in highway mode. We switched to city mode and rang up 11 falses. The Cobra has only one city mode, which when engaged doesn't sound an audible warning until it gets close to the radar gun and the radar signal strength exceeds a preset limit. During X-band testing at the proving ground, we also got Ka-band warnings when the only signal being transmitted for miles around was the X-band beam from our own gun.

The Cobra's laser sensitivity was second only to that of the Passport and Valentine. It detected nine feet of beam

width from the front and eight feet from the rear at 1000 feet, and its angle field of view forward was a respectable 94 degrees. However, the field of view from the rear was a considerably narrower 56 degrees.

By way of warning, a digital voice first gives an alert, followed by a series of beeping tones. As the strength of the signal grows, the cadence quickens. An LED screen identifies the type of threat and indicates its strength using a bar graph. The LED screen was highly visible to the driver, but the audible warnings were never loud enough even with the volume cranked to its loudest level. The Cobra also warns of the presence of the VG-2 and displays three Safety Alert warnings.

It's an easy detector to use. On the top surface are three buttons that control the manual and auto-mute functions, the brightness of the LED display, and the city-mode setting. A power button and a volume toggle switch are on the left side. The windshield mount with its black suction cups must be bent to adjust it, and that doesn't bode well for its long-term survival under the stress of frequent use.

At the discounted price, the Cobra is still expensive, *very* expensive considering its underachieving test score.

Whistler 1780
Overall Score: 35

The Whistler 1780 is packaged in a stylish, trim case and comes with its own list of programmable options, some of them unique. A suggested retail price of $220 makes it competitive, but the 1780 needs to work on the basics.

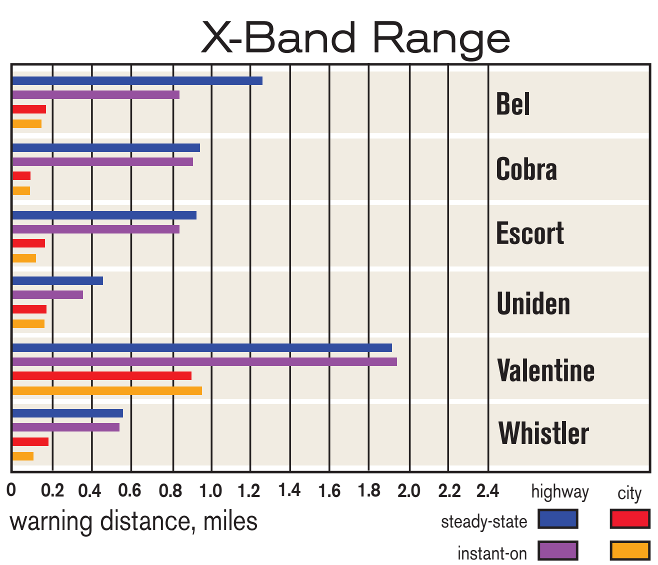
In highway mode, this Whistler could sniff out X-band radar from more than a half-mile away. Its K-band range averaged about 1400 feet, and the Ka-band range averaged slightly better than 1700 feet. These numbers, although adequate, are only slightly better than those

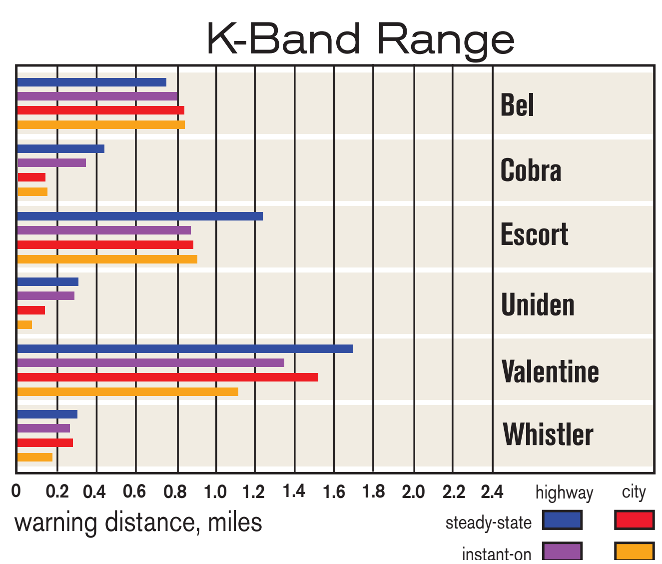
of the less expensive Uniden.

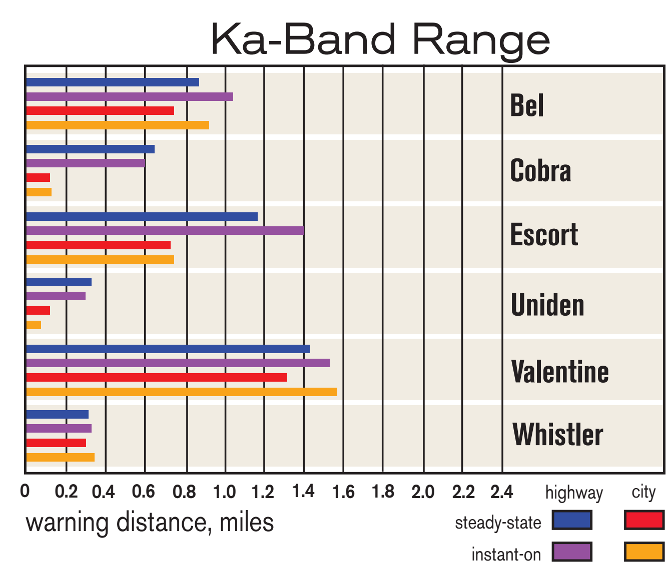
On the 14-mile cruise, the detector falsed 10 times. The 1780 has two filter modes, City1 and City2. Switching to City1 reduced the number of falses to seven. In City2 mode, X-band detection was completely disabled. But there are plenty of X-band radar guns out there, so it's something we wouldn't recommend owners doing just yet. Sensitivity to K- and Ka-band radar wasn't affected in either city mode. The Whistler's low radar sensitivity and its rate of falsing reduced both its selectivity and city scores.

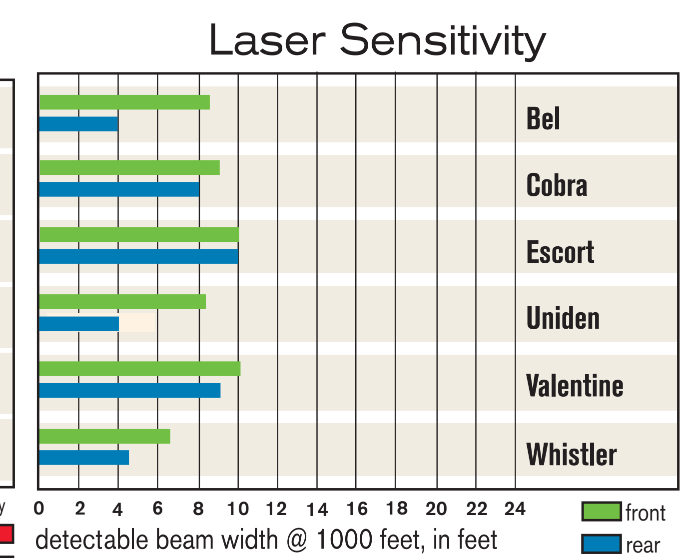
The 1780 was also a little myopic when it came to laser vision. It could see only 6.5 feet of beam width from the front and 4.5 feet of beam width from the rear at 1000 feet. Its forward field of view was adequate at 82 degrees but was a little narrow to the rear at 48 degrees.

A digital voice and beeping tones are used to alert the user. The voice can be deactivated, and there is also a choice of three different tones. We found it rather









difficult to discern one tone from another in any of the optional settings, so we left the voice on. An LED screen also identifies the signal and its strength but is so small and narrow that the characters displayed on it can barely be read. They were hard to make out in full daylight, too; even with its brightness turned all the way up, the display was too dim to get a clear reading quickly.

When the Whistler detects a VG-2 in its midst, it goes into a cloaking mode by turning itself off—adios radar warning. It then checks for the presence of VG-2 every 30 seconds, and once it finds it's gone, it turns itself back on. The 1780 can record up to 90 seconds of memos. For the sleepy-headed, there's an optional Stay-Alert feature that will beep at the driver every 20 to 30 seconds, and if the user fails to respond by pushing a button within five seconds, the LED flashes "Get rest."

We bought our Whistler via the Internet for a discounted $209. That's still a major-league price, and the 1780 needs to improve its radar and lidar sensitivities to be a serious player.

Uniden LRD 987
Overall Score: 34

In every comparison test we do, someone has to finish last. In this case, it happens to be the Uniden LRD 987 but by only the slimmest of margins. The Uniden

was the smallest and least obtrusive detector in our test, but unfortunately, it was also short on performance.

In highway-mode tests, its X-band sensitivity averaged a little more than 2000 feet. Its K-band and Ka-Band sensitivities were a little worse at about 1500 and 1600 feet. These distances are barely adequate if the cops are using instant-on radar, which greatly diminishes the 987's chances of picking up pulses aimed at cars farther down the road. The 987 falsed 10 times on the urban loop in highway mode. Its poor sensitivity rather than its falsing contributed most of all to its low selectivity rating.

Lidar sensitivity was another weak area. From the front, it detected 8.3 feet of beam width but only 4.0 feet of beam width from the rear at 1000 feet. The Uniden also had the narrowest angle field of view both forward and rearward. This might make it less apt to pick up the scatter of laser beams from cars up ahead that are being clocked.

The 987 comes with one city mode. Engaging it reduced the number of falses on our loop to just two, the best in this test. The city mode works by flashing a visual warning on the LED screen when it first senses a radar signal, and there's no audible warning until the signal strength exceeds a preset limit. The problem is that the city mode works the same way with all three radar bands and only sounds a warning 500 to 800 feet from the radar gun. That's way too close for comfort.

A digital voice sounds the initial alert, and then beeping tones take over, monitoring its strength. The LED screen displays the type of signal being detected, and a bar graph shows its strength. There are three buttons on the top of the 987: The audio button turns off the LED screen or can adjust its dimness, the auto button activates an auto-mute mode, and the city button switches that option on or off.

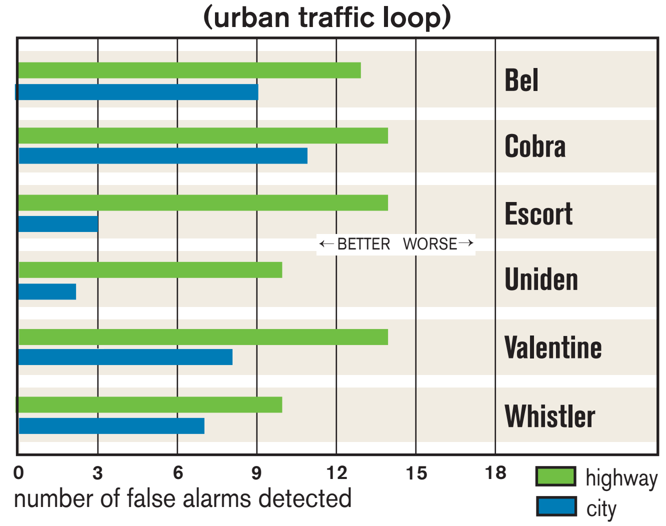
Bright reflections on a sunny day made the curved-plastic face plate on the 987 difficult to view. We had trouble with the suction-cup windshield mount, which had to be adjusted by bending it, and the button on the detector for releasing it from the mount was stiff and hard to use. It broke after only a couple months on the job.

With a suggested retail price of $150 (we found ours on the Internet for $120), this is hardly a high-end detector. Testing confirms that conclusion. ●

Overall Ratings

	radar sensitivity	lidar sensitivity	ergonomics and features	radar selectivity	city mode	sound level	TOTAL
maximum points possible	**50**	**10**	**15**	**15**	**5**	**5**	**100**
BEL 980	28	7	10	8	3	5	**61**
COBRA XR-1050	19	9	7	5	2	1	**43**
ESCORT PASSPORT 8500	31	10	12	10	5	5	**73**
UNIDEN LRD 987	10	7	7	3	5	2	**34**
VALENTINE ONE	50	10	13	15	4	5	**97**
WHISTLER 1780	12	6	8	3	3	3	**35**

False Alarms
(urban traffic loop)



Detector Manufacturers

Beltronics
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Mississauga, Ontario L5L 1J9
800–341–2288
www.beltronics.com

Cobra Electronics Corporation
6500 West Cortland Street
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Escort
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800–433–3487
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Uniden America Corporation
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Valentine Research
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