Do Jammers Work?

We test the latest crop of cop-dusters. Uh, make that alleged cop-dusters.

BY DON SCHROEDER

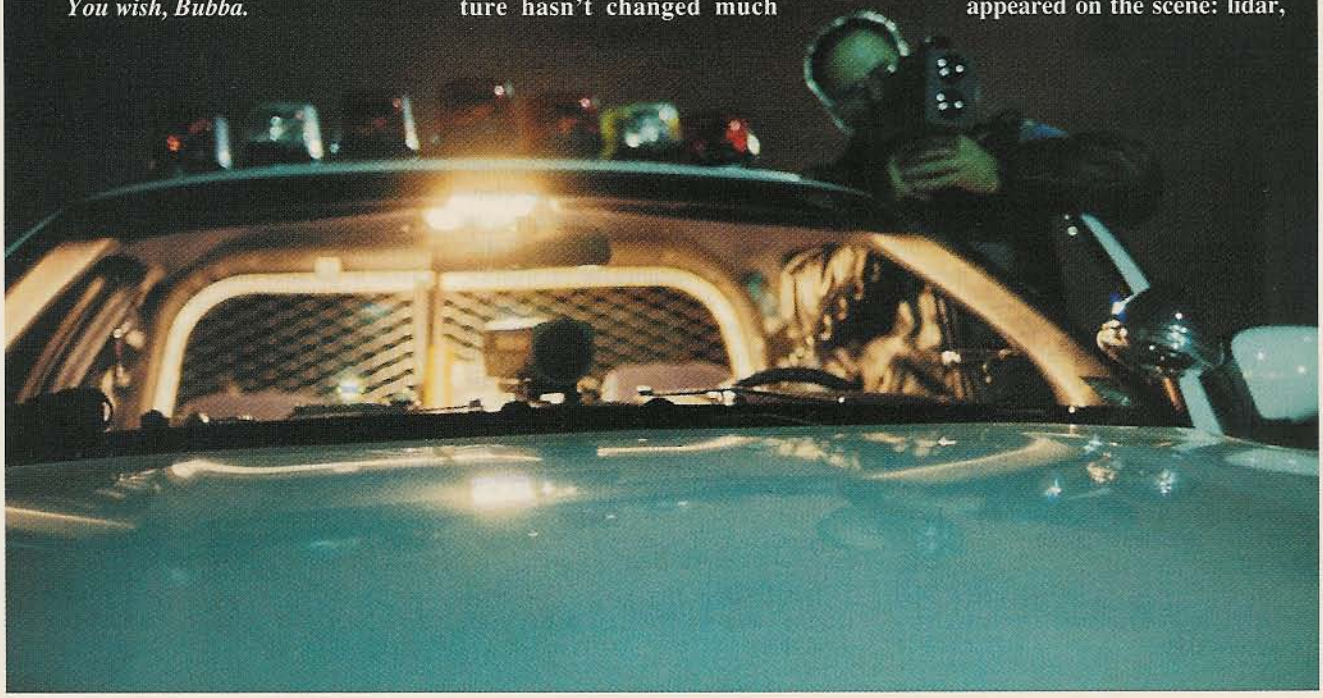
See if this jammer's fantasy makes you smile: you're blasting down your favorite two-lane, and going around a bend you come upon a police car. The black box on your sunvisor beeps urgently. In a flash, the cop's radar gun explodes in a cloud of silicone smoke. In your rear-view mirror, you see the officer yelling, shaking his fist out the window, and pounding on the dash like Nikita Khrushchev.

You wish, Bubba.

Of course, we would never think such malicious thoughts. Not us. The jammers of our dreams would be more respectful of the law, merely confusing the radar or laser guns long enough to allow us to adjust our speed, to remind that officer how law-abiding we really are. Recently, we tested a number of devices that claim to befuddle police radar and lidar, and a few of them have made us smile.

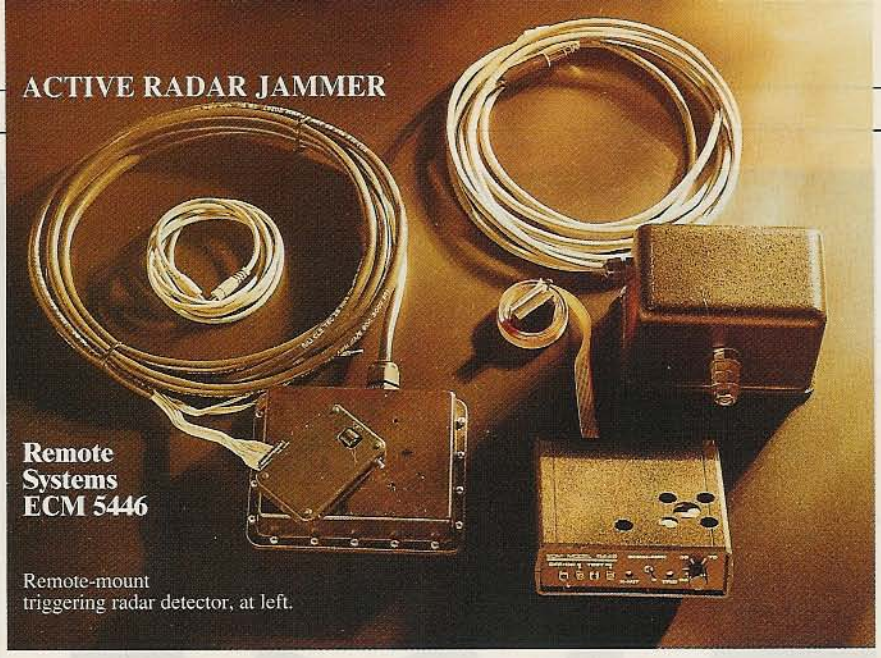
The speed-enforcement picture hasn't changed much since the last time we looked at jammers in November 1993. The predominant speed-measuring medium is still microwave radar, operating on X-band, K-band, and the very wide Ka-band. Police use it in many ways—always-on or instant-on (to surprise detector-equipped motorists), with the patrol car moving or stationary, with the radar gun pointed frontward or backward.

In 1992, a new police weapon appeared on the scene: lidar,



SCOTT C. HILL

PHOTOGRAPHY BY JIM FRENAK



which monitors speed with infrared laser beams. It's being used more widely now. Although police have to park their cars to use it, many of them prefer it because radar detectors don't pick up lidar signals, and its near-pinpoint accuracy allows officers to pick out cars from the herd.

In our last test, we evaluated an "active" radar jammer, which transmits its own signal to confuse the police gun, as well as two "passive" radar jammers, which are designed to reflect back a distorted signal. We found the active jammer only marginally effective, and the passive jammers were completely ineffective. The countermeasures we looked at to defeat lidar included a small infrared-emitting box that is attached to the front of a car, as well as a simple bumper-mounted driving light. Both reduced lidar's capabilities, but not conveniently or inexpensively. This lackluster track record may explain why there are so few jammers out there. If you don't count passive jammers, we estimate that only one in 40,000 cars uses a jammer.

The market now has more offerings. There are translucent license-plate covers and infrared-emitting license-plate frames—they're designed to counteract the reflective qualities of front-mounted license plates. The active radar jammer we tested previously has been improved, and it has been joined by two other competitors. We gathered all these devices to take one more look at passive radar jammers, due to requests from both readers and passive-jammer makers.

Testing was conducted at a location free of speed-enforcement detritus: Chrysler's proving grounds in Chelsea, Michigan. The target we used was our long-term Ford Contour SE. As a target for radar, it's average-sized; for lidar, its dark-red paint and lack of chrome (that's good) is offset by exposed, highly reflective headlamps (that's bad). In short, the Contour is a fine testing compromise.

We fired a variety of guns used by police at the jammers. Our X-band gun

Active Jammers Are Illegal . . . But Available

Jamming can work, but is it legal?

Rules long on the books of the Federal Communications Commission, the federal agency that has jurisdiction, declare active jammers to be illegal because they transmit signals whose main purpose is to cause interference. These rules used to exempt devices that transmitted signals under 100 milliwatts, such as a child's walkie-talkie produces. The FCC rules now make the transmission of any signals by unauthorized citizens technically illegal. The feds obviously won't go after a child with a toy, but the law gives them leverage against increasingly sophisticated electronics, such as ARC Interceptor and VRCD jammers, whose output is one milliwatt (a thousandth of one watt).

As for passive jammers, under FCC rules they are not illegal because they do not transmit signals—they simply reflect microwaves. It's a moot issue, because all the passive jammers we tested were unsuccessful.

Since the first jammers appeared in the mid-1980s, only two states, Minnesota and Oklahoma, have bothered to outlaw them.

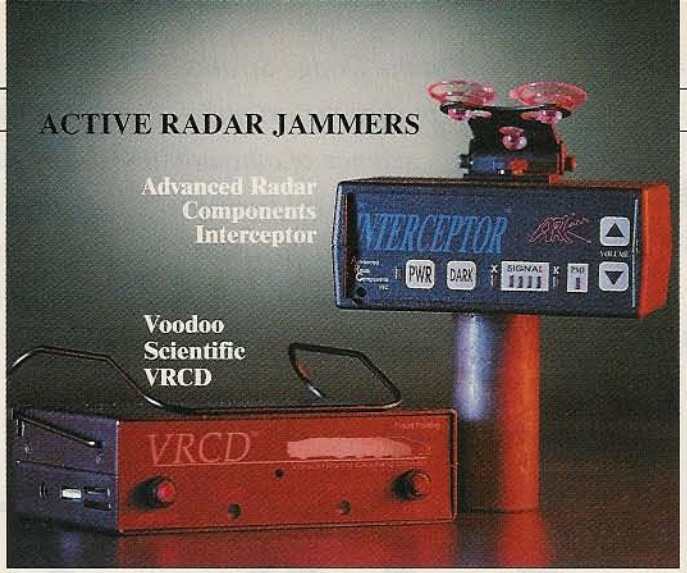
Well-known radar-detector companies—Valentine and K40, for example—haven't built jammers because of their illegality. So jammers are available from small entrepreneurs who have less to lose.

Steve Fong, a Minnesota resident involved in the radar-detection business, was a pioneer of these jamming devices. He began offering jamming kits in 1986, but apparently steered clear of FCC laws by selling them incomplete—as boxes of do-nothing electronics that only became jammers with the addition of two Gunn oscillator transmitters. To acquire the oscillators, customers of Fong's Remote Systems firm were pointed in the direction of burglar-alarm manufacturers. So legally, the customer, by putting the parts together, became the manufacturer—not Fong. But last August, Minnesota passed a law authored by a state legislator from Fong's district that was aimed squarely at him, making the sale or possession of a jammer a $200 misdemeanor. "The Fong Law," as it's called, has put his powerful 2-watt jammer and his business activity on legal hold.

Much less powerful is the active jammer built by Frank Jungman, president of Advanced Radar Components in San Diego. He's aware that his one-milliwatt jammer is illegal even though its signal output is 1/80th that of a hand-held cel phone. But he thinks the FCC is too busy battling pirate radio stations and big-time offenders to go after the few thousand U.S. motorists who have jammers. (Fong says he's sold less than a thousand of them in 10 years.) And to prosecute jammer owners—except in Minnesota and Oklahoma—a police officer must enlist the U.S. Attorney's office to go after them.

VRCD's inventor, David Sullivan, appears to have had more business problems than legal worries—distribution disputes have kept his jammer off the market for the last two years. The VRCD is currently distributed by Premier Motoring Accessories of Fort Worth, Texas, which plans to market a new laser jammer this spring.

Active jammers show potential. But because the legal playing field is too chancy for big-time companies, we'll have to get our jammers from hungry young hobbyists. —*Phil Berg*



was an MPH Industries K55. For K-band, the radar frequency used in many states, we used a Kustom Signals HR-12 and the more sophisticated Kustom Falcon. We used real cops, too—two officers from the traffic-enforcement unit of a mid-size city in upstate New York. They stepped up to the plate with their Kustom Eagle, with its expensive digital signal processing (DSP), and a Kustom Hawk—both sophisticated radar guns. Our lidar gun was the LTI 20.20, the most popular laser clocker. So come along for a real-life radar/laser shootout with the cops.

Radar Countermeasures

Radar clocks the speed of a vehicle by transmitting a cone-shaped microwave beam at a target car and measuring the difference in frequency between the outgoing signal and its reflection back from that car. Much as a train whistle changes its pitch as it approaches you and then passes by, the frequency of the microwaves reflected from an approaching car will be slightly higher than the frequency transmitted if the car is being driven away from the gun. This phenomenon is named after Christian Doppler, the Austrian physicist who discovered it. The gun computes speed from the magnitude of this Doppler shift.

This computation assumes that the gun's receiving diode can clearly hear its own reflected signal. Active jammers seek to mess up this tidiness by overwhelming the receiving diode with rapidly changing frequencies, which confuses the gun so it can't compute a speed. A jammer can also present the diode with a strong, clear signal on a false frequency; the gun then computes an erroneous speed.

Passive jammers take a different approach, attempting to manipulate the signal reflected from the car. These devices have an antenna to collect the gun's microwaves, process them, and spit them back with an electronic distortion—a frequency (or speed) "chirp." Electronically, these passive jammers try to confuse the gun by "vibrating" the reflective surfaces of your car, rendering its reflections meaningless.

If instant-on radar didn't exist, there would be no need for jammers because even an inexpensive radar detector can usually detect continuous-wave (always-on) radar early enough to allow a driver to slow down. The instant-on ambush is the jammer's reason for being. We structured our tests around this fact.

First, we had to find the outer limit—the "capture range"—of the gun in relation to our test car. (If a cop tries to clock a car and the car's not within range of the radar gun, the driver is going to think the jammer *works marvelously*.) Then we approached the police guns driving at 50 mph with our jammers turned on. The moment our test vehicles entered the distant edge of the capture range, the police radar was switched on. We repeated this test at shorter distances—500 and 750 feet—to measure each jammer's effectiveness in the face of a stronger signal.

Finally, we tested those jammers that will not work in tandem with radar detectors—but offer their own radar warnings—to see if their warnings went off well before the capture range of the guns. The idea was to see if these jammers could provide an adequate warning when approaching continuous-wave radar.

Active Jammers

The first active jammer we considered was the **Remote Systems ECM 5446,** designed by Steve Fong, who made a living for many years modifying the original Escort radar detector to be mounted out of sight in a car. Fong's jammer is designed to befuddle only X- and K-band guns. Fong can't sell you the **ECM 5446** for legal reasons (see sidebar on page 106), but he will sell you the plans for it. The parts required are easily acquired but will cost you at least $1700.

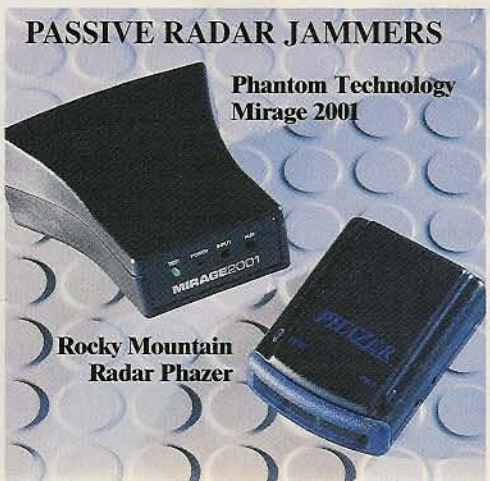
The main antenna on the **ECM 5446,** a 3.5 x 5.5 x 4.0-inch box, is mounted outside the passenger compartment, most commonly behind any nonmetallic grille or panel at the front of the car, and is connected to a radar-detector-sized faceplate that mounts to the dashboard. This jammer takes the brute-force approach, carpet-bombing most of the X- and K-band guns with microwaves to interfere with the gun's signal. It can be left in "scramble" mode or can be set to give the radar gun a false speed reading from 30 to 75 mph, a unique feature of this jammer and one that can be adjusted from a rheostat on the faceplate. Fong says it works best on scramble mode, and we did most of our testing in that mode. For an evalutation of the constant-speed jamming, see our police sidebar.

This ambitious endeavor requires powerful antennas inside the remote box. A total of 500 milliwatts may or may not be enough to heat a muffin, but it *is* enough to overheat the jammer if it's left on for 30 seconds. This is why the **ECM 5446** uses a standard radar detector to turn itself on. (Fong recommends using the original analog Escort, but he says it also works with a specially modified Valentine One, the Escort 4600 and 5000 models, and the Cobra 216.) The driver sets the amount of time, from 8 to 28 seconds, that he wishes it to remain on, giving him time to slow down.

The **ECM 5446** turned in consistent performance, jamming our X-band radar in instant-on mode every time at the X-band's capture range of 1150 feet—and also all the way down to about 300 feet, where the gun's signal would punch through and grab a speed. The **5446** jammed successfully through our 500- and 750-foot instant-on traps as well.

Fong's **ECM 5446** also stymied our K-band Falcon gun at its capture range of 1100 feet, and at 750 and 500 feet. Punch-through—that point where the gun, with the trigger held down, was able to get a clocking—happened at 350 feet, a distance where lucid drivers cannot miss noticing a cop car.

Interestingly, the **ECM 5446** was completely ineffective against HR-12 K-band radar, a more powerful but less sophisticated gun. This gun was able to acquire a speed



instantly at all three distances.

Another X- and K-band active jammer is the $595 **Voodoo Scientific VRCD** (Vehicle Radar Cloaking Device), a visor-mounted unit that has a radar detector integrated into it. This unit (formerly made by Stealth Technologies) was an inconsistent performer in our last test. Since then, the K-band output power has been increased. Its performance this time around is markedly improved.

X-band was the most difficult for the **VRCD** to confuse. This jammer was most effective out near the edge of the gun's capture range. At this distance, it worked five of six times, either jamming the gun continuously or providing a crucial three or four seconds of jamming (while sounding its radar-detector warning) before the radar gun could register a speed.

If the X-band gun's trigger was held down, though, the **VRCD** was unable to jam the radar between 800 and 550 feet. This was due to signal fade, where a portion of the radar beam bouncing off the road was likely canceling the rest of the beam from the gun, resulting in the jammer's losing the gun's signal briefly (much as your car radio can lose a weak FM signal when blocked by buildings). Our X-band instant-on tests at 750 and 500 feet confirmed this; at 750 feet, the **VRCD** had no effect on the guns. At 500 feet, it was again able either to continuously jam the gun or to provide a two- or three-second window for slowing down.

The **VRCD** had a much easier time with our K-band guns. It befuddled them consistently in every situation except the test at 750 feet, where fade was once again a problem. This is still impressive performance.

As a radar detector, the **VRCD** is sufficiently sensitive. Its first warnings came at about double the distance of each gun's capture range.

The **Advanced Radar Components Interceptor** is similar in concept to the **VRCD,** but internally it uses digital signal processing instead of the **VRCD's** analog electronics. It mounts to the windshield with suction cups and costs $565.

The **Interceptor** couldn't match the performance of the **VRCD.** Occasionally, facing X-band radar, it would stymie the gun from its capture limit all the way up to and *past* the radar unit. Most of the time, though, it would fail to react quickly enough, allowing the gun a moment to clock the car's speed before it blanked it out again. This was also the case with the instant-on tests at 750 feet and 500 feet. Sometimes, the **Interceptor** failed to jam the gun at all, as if it were working to jam some incorrect frequency. Which indeed it probably was, according to engineer Frank Jungman, president of ARC and the engineer who designed the **Interceptor.** He conceded that the **Interceptor** is vulnerable to "aliasing," meaning it can erroneously latch on to a harmonic multiple of the correct frequency. A fix is on the way, he assured us.

The **Interceptor** worked better on K-band radar. In testing at the edge of the radar's capture range, it would completely jam the Falcon gun from acquiring a speed—but only every other time it was tested. On the runs where it failed to work, it once again behaved as if it were trying to fog the wrong frequency. Ditto with the

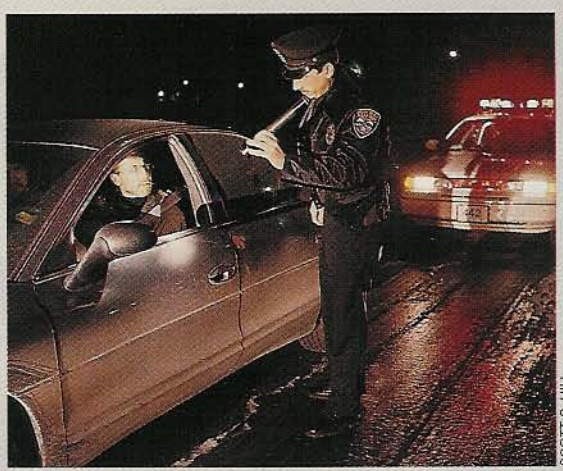
We Play Radar Tag With Real Cops

So, how do jammers work in real-life situations? We arranged a cops-and-speeders scrimmage, using real live cops from a metropolitan police department to find out. They were full-time traffic hounds, and as part of their jobs they have had a full week's training in radar and lidar operation.

The cops parked their two Crown Victorias at the edge of a side road that led into the wide boulevard of a deserted industrial park. For four hours, we drove a jammer-packed Olds Aurora past the cops and their collection of four radar guns and one lidar gun, trying to bamboozle them with our arsenal of a lidar jammer and three radar jammers.

The prototype K40 Defuser lidar jammer successfully baffled the police lidar gun, the LTI 20.20, every time. (The Aurora was zapped at distances from 500 to 600 feet.)

The Remote Systems ECM 5446 radar jammer has two settings: "mph" and "scramble." The "scramble" mode is random and generally more successful, while the "mph" mode allows the driver to dial in a speed that supposedly will bounce back onto the



SCOTT C. HILL

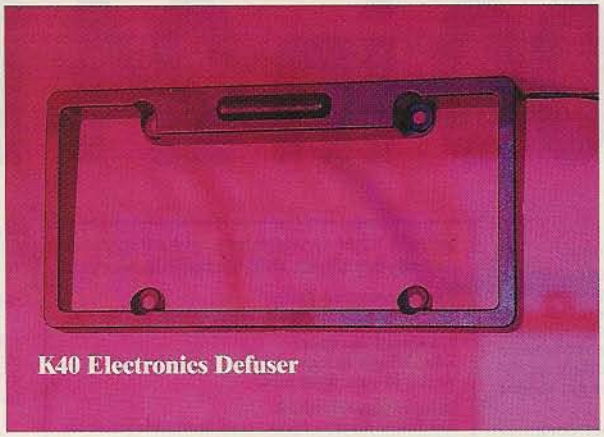
officer's gun after he's zapped you. "Mph" mode is somewhat less reliable than "scramble" mode, but the range goes from 30 to 75 mph. In "mph," we fooled the displays of the cops' less-sophisticated Kustom HR-12 guns into thinking we were traveling at 30 mph on every pass. We were moving at a constant 40 mph. However, we could jam the police's sophisticated Kustom Hawk or the Kustom Eagle guns only about half the time, even in "scramble" mode; "mph" mode didn't jam them at all.

When we used the ARC Interceptor and VRCD jammers, we were able to confuse the police Hawk for the first second it tried to clock us. The VRCD jammer successfully dewinged the Eagle radar gun about half the time. The ARC Interceptor was slightly less effective against the Eagle.

Our adversaries in blue were surprised at the defeating performance of the Remote Systems ECM 5446 in "mph" mode and by the K40 prototype laser jammer. Our cooperative cops pull over as many as 30 drivers a day, and they had never come upon a motorist armed with a jammer. Unfortunately, they learned something: the sounds jammers make on their radar. Now they can probably tell when someone's trying to jam them. What would they do in response? They'd probably confiscate the units—for "obstructing justice"—and their superiors would decide if prosecution was appropriate.

Because jammers are viewed as transmitters—like mini radio stations—jurisdiction falls to the Federal Communications Commission (FCC), which enforces microwave laws when the government is open. Apparently, no one can remember a motorist being prosecuted for using a jammer. *—Phil Berg*

HR-12 gun. At 750 and 500 feet, the **Interceptor** could not intercept the instant speed readings of either gun. Jungman believes the **Interceptor** isn't locking on the radar's frequency quickly enough, and he is confident he can resolve the problem. He's also promising Ka-band coverage in a future version of the **Interceptor.**



K40 Electronics Defuser

The Passive Jammers

We were leery of another test of passive jammers after we'd shelled out $149 for the utterly ineffective "Eclipse" in our previous test. In the arena of avoiding speeding tickets, it worked as well as a voodoo doll with a pin plunged through its blue uniform. Nonetheless, these passive jammers are still being sold—even in ads in this magazine. We swallowed hard and ordered the two most visible ones: the $199 **Phazer,** from **Rocky Mountain Radar,** and the $199 **Mirage 2001 Radar Scrambler,** from **Jammers, Inc.,** a "retail sales division of Phantom Technology, Inc."

Our skepticism was rewarded. The radar guns did their clocking work totally unfazed by the **Phazer,** and the **Mirage's** jamming capabilities were indeed shown to be a mirage. Both manufacturers claim their devices will jam Ka-band, too. But our Ka-band Stalker gun remained similarly unaffected. We tried everything to get these things to work. We put them outside the car. We put the **Phazer** and the **Mirage** together and turned them toward the guns. We even hooked them up to a 12-volt battery and mounted them to a bicycle, with its greatly reduced frontal target area, and switched on the passive jammers. No luck—the guns clocked us normally, every time.

To be sure these devices were functioning at all, we brought the passive jammers up close to each radar gun. We switched on the gun, and indeed, its audio tone emits a bleeping sound of the type you might hear from a spacemobile on "The Jetsons." How this bleeping could possibly shield a car from radar, though, is beyond us. We parked the target car (with the passive jammer) bumper to bumper in front of the radar-equipped car, and then backed up. Almost as soon as we moved, the bleeping on the radar gun's audio was drowned out by the low moan of the target car's more powerful Doppler reflection. At 300 feet away, the bleeping noise isn't even powerful enough to hear with the target car parked.

The passive jammers aren't completely valueless. Within 10 feet or so, we found that they could prevent the police radars from reading the tuning forks used to calibrate them. So if you're looking for a tuning-fork jammer for under $200, your prayers have been answered. This may explain why these passive jammers have found their way into respectable catalogs like The Edge and The Sharper Image: we bet that this experiment looks mighty impressive when performed on a conference-room table, or at an electronics trade show. Two phone calls to Sharper Image headquarters—we wanted to know if they had tested the jammers—were not returned.

Lidar Countermeasures

Lidar guns are much tougher to evade than radar guns. First of all, lidar is always "instant-on" because it only operates when the trigger is pulled and it must be aimed at a particular car. As if that weren't disheartening enough, the laser beams also aren't easy to detect even with a good laser detector because they're not very wide—only six feet or so wide at 1000 feet away from the gun—and they don't bounce around and reflect like radar. What this means is, barring the uncommon false laser alarm, if your laser detector has just gone off, you've probably just been clocked and the cop is about to pull you over. So much for checking your speed.

Lidar works by firing short pulses of infrared laser light at a 904-nanometer wavelength and timing their return to the gun as they're reflected from the target car. Success of lidar is based upon two assumptions: First, there are enough surfaces on the front (or back) of the car to reflect the pulses back to the gun. Second, that the gun can distinguish those pulses from whatever stray infrared light is out there.

Lidar jammers wreak havoc with these assumptions. There's the passive approach—and don't confuse lidar with radar—that works to reduce the reflecting ability of the target car. And there's the active approach, flooding the lidar gun with so much infrared light that it can't distinguish its own reflected pulses.

Police officers are often trained to aim lidar guns at the front license plates, which, with their luminous paint, make excellent reflectors. (As we've demonstrated in past

tests, merely having a front plate drastically increases the range at which lidar can clock your car.) Up close, say at the typical clocking distance of 1000 feet or less, a front plate will make it highly likely the cop will get a speed on the first trigger pull. With the popular LTI 20.20 lidar gun, that can take as little as a third of a second.

The passive lidar devices we considered are license-plate covers that reduce the reflections from the plate. Testing them was easy: we first determined the baseline distance at which the LTI 20.20 (off the shoulder of a straight road) could clock our Contour with a front-mounted California license plate. This turned out to be about 1900 feet. We then installed the plate covers to see how much they shortened that distance.

The **T3 Alpha** from **T3 Technologies** costs $50 and is distinguished among the plate covers by its green tint. By a small margin, it was the most effective of the absorber covers we looked at, reducing the clockable range of the Contour from 1900 feet to about 1400 feet, not significant considering that most police clock cars with lidar at shorter distances.

But wait. You can always turn on your high-beam headlights, which spew their own little infrared beams. With headlights alone, the Contour's clockable range drops to 1100 feet. Add the **T3** plate cover, and the distance tumbles to 400 feet. A cop car is quite noticeable at 400 feet. Now we're making progress.

Another plate cover with an infrared absorber, the $50 **Laser Guard** from **Taylor-Bell Technologies,** performed almost as well as the **T3 Alpha,** but it has the advantage of being tint-free. It reduced the average clockable range of the front-plated Contour to 1450 feet. The high beams reduced that number again to 500 feet. Not a bad result.

The least expensive of the plate covers we looked at was the $25 **Laser Plate,** from **Laser Stealth Technologies.** It has a foggy white surface that disperses rather than absorbs lidar light. Used alone, this cover reduced the Contour's clockable range to only 1700 feet. But with high beams on? About 550 feet. The company also provided a **prototype Laser Plate** impregnated with a light-beige-tint absorber. This **prototype Laser Plate** was about as effective as the **T3 Alpha** and the **Laser Guard.** Co-inventor Mark Jones expects the price of this plate (on sale about the time you read this, with the same brand name) to be about $30.

Of course, plate cover or not, you can't go around driving with your high beams on all the time. For $199, **K40 Electronics** steps in with an invisible infrared-light-emitting license plate frame called the **Defuser** that claims to spray jamming light.

Installed around the front plate, the **Defuser** did not have a discernible effect on the guns. But mount it with one of the plate covers and things get interesting. When combined with the least expensive **Laser Plate,** clockable range dropped to about 550 feet, well into the range of a typical lidar clocking. (It would be better still with one of the absorber covers.) Throw the high beams into this combination and the speed of the Contour could not be read until it was less than 300 feet away. At that distance, a cop car looms big indeed.

K40 also provided us with a **prototype Defuser** with revised electronics and a laser detector with a cockpit-mounted warning buzzer. Once again, when used alone, it was ineffective. But when combined with the **Laser Plate,** it managed to confound the LTI 20.20 to a very impressive 250 feet. With the high beams thrown into this combination, the LTI 20.20 couldn't clock the Contour at all, even as the car passed by. K40 engineer Mike Boyer expects production of the **revised K40 Defuser** to begin by March.

One last thing: the **Phazer** claims to jam lidar, too. Just to be sure, we stuck it to the windshield with its two small laser diodes facing forward, powered it up, and headed toward the LTI 20.20. The **Phazer** had no effect on the LTI 20.20 gun.

The Bottom Line

As far as passive radar jammers go, unless you value their aesthetic beauty, don't bother. As for active jammers and our other bag of tricks, the issue isn't whether these defenses work or not, but rather how you might tip the scales in your favor with a combination. With that in mind, what's worth buying?

It's likely that both the do-it-yourself **ECM 5446** and the **VRCD** will sufficiently jam most kinds of X- and K-band radar. We prefer the **ECM 5446** because it combines the advantages of both a jammer and a radar detector and, unlike the **VRCD,** it works only when it's needed and doesn't set off everyone else's detector all the time. (It's difficult to keep a low profile while every detector user is going for the brakes.) Of course, the **ECM 5446** must be assembled, it isn't portable like the **VRCD,** and it's much more expensive.

But neither of these units can protect you against Ka-band radar. They are also powerless against certain X- and K-band guns. And they cost $595 and up. We suggest a $400 Valentine One detector—it may not jam any guns, but its warnings are much more reliable and consistent.

As for lidar, the license-plate covers alone won't save you, but they do work in your favor. Add the high beams, or the **K40 Defuser,** and Officer Bob may be blasting you with lidar for a considerable time before you're clocked. If the rest of your car has a good stealth quotient and you've got a good lidar detector screaming bloody murder the whole time, you'll be well on your way to beating a lidar ticket.

Before you whip out that Visa, consider what happens if you're pulled over. While many states outlaw plate covers, being cited for such a nonmoving violation is certainly preferable to getting a three-point speeding ticket. Only Minnesota and Oklahoma explicitly outlaw jammers, but that may not matter (see sidebar on page 106). One of the city patrolmen we talked to said that if he discovered a jamming device of any kind, he would likely take it, give the motorist a receipt, and let the department decide whether to return it. There's also the fact that the police often write tickets on visual speed estimates alone, jammed guns or not. Who says the cops don't have all the cards?

Of course, you could always slow down. Never thought of that, eh? •

List of Manufacturers

ARC Interceptor
Advanced Radar Components, Inc.
619–274–6614
800–597–2327

K40 Defuser
K40 Electronics
800–323–5608
708–888–7200

Laser Guard
Taylor-Bell Technologies, Inc.
800–945–1141
770–751–5787

Laser Plate
Laser Stealth Technologies L.L.C.
800–999–7264

Remote Systems ECM 5446
Remote Systems
612–894–7000

T3 Alpha
T3 Technologies, Inc.
800–509–LASE

VRCD
Voodoo Scientific, Inc.
Premier Motoring Accessories
800–552–8242