Product Review & Short Takes Columns from *QST* Magazine

February 2000

Product Reviews

Ten-Tec Pegasus HF Transceiver

Short Takes

Lakeview Company TM-1 License Plate Mount

BeaconSee HF propagation analyzer shareware

Ten-Tec Pegasus HF Transceiver

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Technical Assistant

If I don't stop playing with this rig, I will never get this review written. The problem, I confess—is that this is one of the neatest rigs I have ever used. If fact, if I don't stop playing with it, this review will never be finished and I won't get to work either—and that's not a good idea! The trouble is—every time I try a new function, I make another contact—and there appears to be no end to the functions, bells and whistles on this rig.

I have also learned a few lessons: Never try a rig like this out on CW during the last few hours of the CW Sweepstakes! Forget doing "just one more test" when you are supposed to be getting dressed to go out to dinner—especially on your wife's birthday!

OBE—Out of Box Experience

This is a term usually applied to new personal computers—how easy, or even pleasant, is the setup procedure? Setting up the rig appeared to be fairly simple—all the jacks and plugs are well labeled. I just took the $3^1/_2$-inch floppy disk, installed the software, plugged up the rig—one serial cable, mike, paddles for CW, antenna, power and ground connection—and turned it on. In less than five minutes, without reading the book, I had a rig that—just didn't work. I made one of the few possible mistakes—I plugged the rig into the second serial port (COM2) when the software default setting was COM1.

I still didn't want to read the manual, so I took a quick peek at the one-page *Troubleshooting Guide* section. The third suggestion on the page recommended looking at the serial port assignment. After one or two clicks I was tuning 40 meters.

Is It a Bird, a Plane or Superman?

Just what is this thing? Apparently this transceiver is derived from Ten-Tec's military/government radio line (see their Web site). The overall performance of this HF rig is on par with some of the other rigs in its price class, but instead of a fixed mechanical front panel, the Pegasus is software based. This allows a level of flexibility that far exceeds that of "similarly priced" rigs.

The Pegasus software installed easily and the hardware can be connected through either a serial or USB port. (USB connection however, does require a USB to serial port adapter.) But before you jump to the conclusion that you must lay out another $1000 on a new PC to use with this rig, this is not true. A very modest (for the year 2000—boy it still feels funny to type that year) 486 PC is up to the task (see sidebar). If you want to run the Pegasus and several other programs at once, a better PC will be required, but for one program at a time operation—a modest 486 running *Windows 3.1* will do just fine. No, I didn't just take Ten-Tec's word for it; I actually tried this system out on an old 33-MHz 486 running *Windows 3.1*.

Most of the time, I had the Pegasus connected to my 200-MHz Pentium—and yes, I am typing this review in *Microsoft Word* on one part of the screen, while the remaining portion of my monitor displays the working transceiver. In fact, that is part of the problem—I am listening on 15-phone, and the band is open—be back in a minute… (see Figure 4).

Installation Requirements

A stable 12 to 14 V dc at about 20 A is required. My shack dc power comes from an automotive battery that's located in my garage. A trickle charger has kept the battery alive for many years. I did have to disconnect the charger while operating CW to keep a trace of hum off the signal, but this was probably due to the connection point of the charger—the shack end of the power leads.

As is usual with the newer generation of solid state rigs, a really good ground is suggested. Most hams who run a PC in the shack for logging or for digital modes have already discovered the strange things that can happen when a little RF feeds back into the computer.

Most of the Pegasus's chassis connections are located on the front of the enclosure—mike, CW key or paddles, serial port, audio line out, remote control pod and **ACCESSORY**. It would seem more appropriate that one of these, the serial port connector, would be located on the back panel. It's really no big deal—as it's likely that many will choose to locate the radio chassis under the operating bench. The only control on the rig itself that you need ready access to is the power switch.

The dc power and antenna connectors and connections for a linear amplifier are on the back side of the chassis—along with that very important ground connection.

As any ham who currently uses a PC for logging will tell you, physically placing the typical transceiver, monitor, keyboard, mouse, key or paddle and mike all within easy reach can be challenging. The Pegasus makes this a little easier, since you just need to view the PC monitor screen—you won't

BOTTOM LINE

An economy-class HF radio that offers mid-level performance, the Ten-Tec Pegasus puts the novelty and flexibility of a PC-based transceiver within reach of the budget-conscious ham.

Joe Bottiglieri, AA1GW ♦ Assistant Technical Editor

Table 1

Ten-Tec Pegasus (Model 550), serial number 09A10199

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency coverage: Receive, 0.1-30 MHz; transmit, 1.8-2, 3.5-4, 7-7.3, 10.1-10.15, 14-14.35, 18.068-18.168, 21-21.45, 24.89-24.99, 28-29.7 MHz.	Receive and transmit, as specified
Power requirement: Receive, 1.0 A; transmit, 20 A.	Receive, 0.9 A; transmit, 18 A. Tested at 13.8 V.
Modes of operation: SSB, CW, FM, AFSK, AM (receive only).	As specified.
Receiver	*Receiver Dynamic Testing*
SSB/CW sensitivity, 3 kHz bandwidth, noise floor: –126 dBm (typical).	Noise floor (mds), 500 Hz bandwidth: 1.0 MHz, –123 dBm; 3.5 MHz, –133 dBm; 14 MHz, –132 dBm.
AM sensitivity: Not specified.	10 dB (S+N)/N, 1-kHz tone, 30% modulation: 1.0 MHz, 3.0 μV; 3.8 MHz, 0.7 μV.
FM sensitivity: Not specified.	For 12 dB SINAD: 29 MHz, 0.8 μV.
Blocking dynamic range: Not specified.	Blocking dynamic range, 500 Hz filter: 3.5 MHz, 113 dB*; 14 MHz, 110 dB*.
Two-tone, third-order IMD dynamic range: 90 dB at 50 kHz spacing.	Two-tone, third-order IMD dynamic range, 500 Hz filter: 3.5 MHz, 84 dB; 14 MHz, 77 dB.
Third-order intercept: +10 dBm at 50 kHz spacing.	3.5 MHz, +6.7 dBm; 14 MHz, +7.2 dBm.
Second-order intercept: Not specified.	+44.3 dBm.
FM adjacent channel rejection: Not specified.	20 kHz channel spacing: 29 MHz, 66 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz channel spacing: 29 MHz, 66 dB*.
S-meter sensitivity: 50 μV at S9.	S9 signal at 14.2 MHz: 26 μV.
Squelch sensitivity: Not specified.	At threshold: SSB, 14 MHz, 0.16 μV; FM, 29 MHz, 0.55 μV.
Receiver audio output: 1.0 W into 4 Ω.	1.1 W at 3% THD into 4 Ω.
IF/audio response: Not specified.	Range at –6 dB points, (bandwidth): CW-N (525 Hz bandwidth): 222-1176 Hz (954 Hz); CW-W: 63-2000 Hz (1938 Hz); USB-W: 143-2857 Hz (2714 Hz); LSB-W: 143-2777 Hz (2634 Hz); AM: 69-3011 Hz (2942 Hz).
Spurious and image rejection: 60 dB.	First IF rejection, 122 dB; image rejection, 123 dB.
Transmitter	*Transmitter Dynamic Testing*
Power output: SSB, CW, FM, 100 W (high); 5 W (low).	Typically 103 W high, <1 W low.
Spurious-signal and harmonic suppression: ≥40 dB	53 dB. Meets FCC requirements for spectral purity.
SSB carrier suppression: >50 dB.	As specified. 52 dB.
Undesired sideband suppression: >60 dB.	As specified. 63 dB.
Third-order intermodulation distortion (IMD) products: 25 dB below two tone.	See Figure 1.
CW keyer speed range: Not specified.	1 to 50 WPM.
CW keying characteristics: Not specified.	See Figure 3.
Transmit-receive turn-around time (PTT release to 50% audio output): <20 ms.	S9 signal, 35 ms.
Receive-transmit turn-around time (tx delay): Not specified.	SSB, 22 ms; FM, 19 ms. Unit is suitable for use on AMTOR.
Composite transmitted noise: Not specified.	See Figure 2.
Size (hwd): 10.8×5.1×11.5 inches; weight, 9 pounds.	

Note: Unless otherwise noted, all dynamic range and intercept point measurements are taken at the ARRL Lab standard spacing of 20 kHz.
*Measurement was noise-limited at the value indicated.
Third-order intercept points were determined using S5 reference.
An expanded test result report is available on the ARRL's Members Only Web site.

need to position the transceiver chassis directly in front of you on the operating bench.

PC Controls

Normally, in a review of a new rig, a photograph of the front panel is included, and the controls are described as seen in the picture. However, there is no actual "control panel" on the front of the Pegasus enclosure.

The lead photograph in this article shows the Pegasus transceiver chassis to the left of a conventional computer monitor, keyboard and mouse. The optional hand microphone is shown to the left; the optional Remote Control Encoder pod is shown to the right. The PC being used to run the radio is positioned out of sight under the table. Figure 5 provides a more important view—a close-up of the *virtual* front panel.

If you find this rig interesting, why not take it for a test drive? It's easy, and you can do this right from the comfort of your shack. Go to the Ten-Tec Web site, **http://www.tentec.com**, download the software and install it on your PC. This will allow you to personally explore all the submenus and play with the controls. (No, you can't actually work anyone, but you will get to experience first hand how the various controls and menus are implemented.) You can even follow along as I further explain some of the finer points.

As is typical with *Windows*-based software, there are generally two or more ways to perform any given operation. Tuning the Pegasus is a good example. The virtual main tuning dial can be "rotated" with your mouse clockwise or counterclockwise, depending on the location of the cursor. Tuning steps are adjustable from 1 Hz to 100 kHz per step. As with any digital rig, this takes a bit of getting used to. If you set the tuning rate to 1 kHz steps for fast tuning, you must reduce it to 100 or even 50 Hz steps once you get near the target frequency. The frequency digits may also be entered directly on the computer keyboard. You can also control the frequency with the keyboard up and down arrow keys.

At first, I was a bit disconcerted—the

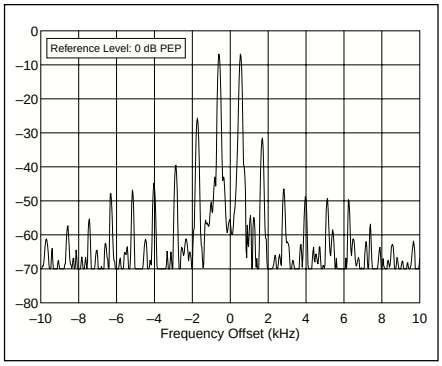


Figure 1—Worst-case spectral display of the Ten-Tec Pegasus transmitter during two-tone intermodulation distortion testing. The worst-case third-order product is approximately 27 dB below PEP output, and the worst-case fifth-order product is down approximately 41 dB. The transceiver was being operated at 100 W PEP at 28.350 MHz.

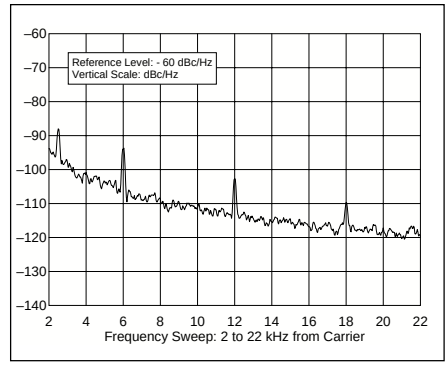


Figure 2—Worst-case spectral display of the Ten-Tec Pegasus transmitter output during composite-noise testing. Power output is 100 W at 14.020 MHz. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.

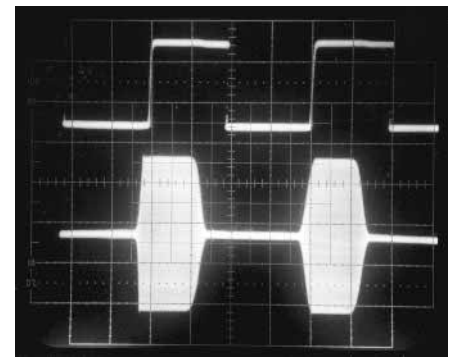


Figure 3—CW Keying waveform for the Ten-Tec Pegasus showing the first two dits in full-break-in (QSK) mode using external keying. Equivalent keying speed is approximately 60 wpm. The upper trace is the actual key closure; the lower trace is the RF envelope. Horizontal divisions are 10 ms. The transceiver is being operated at 100 W output at 14.2 MHz.

frequency scale is horizontal, and I visualized frequency as low on the left and high on the right—so the left and right arrows *should* change the frequency in those directions. However, you are really moving up and down in frequency, so I guess it's logical that Ten-Tec assigned tuning to the up and down arrow keys.

I was not able to really get the hang of controlling the frequency with a mouse or track ball and the virtual tuning dial. The need to change frequency steps and "mouseing around" made the process seem a bit awkward. However, using the up and down arrow keys on the computer keyboard solved this problem for me.

The optional Remote Control Encoder that we decided to purchase for this review has a very nice conventional tuning knob. The controller also includes a direct entry keypad and three additional user-programmable buttons. I would definitely recommend considering this accessory.

"Front Panel" Functions

The top tool bar item selections on the software's main screen—**File**, **View**, **Help**—each bring up their own submenus—just as you would expect with any *Windows* program. The **View** selection offers instantaneous recall of any selected WWV or CHU frequency, a very handy feature.

Primary rig control operations are accessed through a **Settings** menu in a second toolbar. If the apparent irrationality and strangeness of the menus used on many *Windows* programs bother you, you will be delighted with the menus on the Pegasus. For the most part, the functions are exactly where you might expect—Ten-Tec did a really nice human factors job. Too often the panels and menus on amateur equipment seem to be designed by either summer interns or non-hams; that is certainly not the case here.

Figure 6 shows the CW Settings menu. All the sidetone and keyer settings are available in this window. A built in CW keyer is enabled by checking the box in the lower right hand corner. Straight key operation is the default setting.

The SSB Settings window is shown in Figure 7. Several SSB transmit bandwidths between 900 Hz and 3.9 kHz can be selected. One word of warning—the bandwidth is determined by a DSP filter—virtually nothing is transmitted outside of the selected bandwidth. With analog filters, the slope of the cut-off is considerably more gentle, and as a result a wider range of frequencies sneaks through. To many ears, the sharp cut-offs will make the audio seem harsh, but the rig is just doing its job (and complying with FCC rules on bandwidth). In a contest, this sharply delineated audio may be just what you want for more

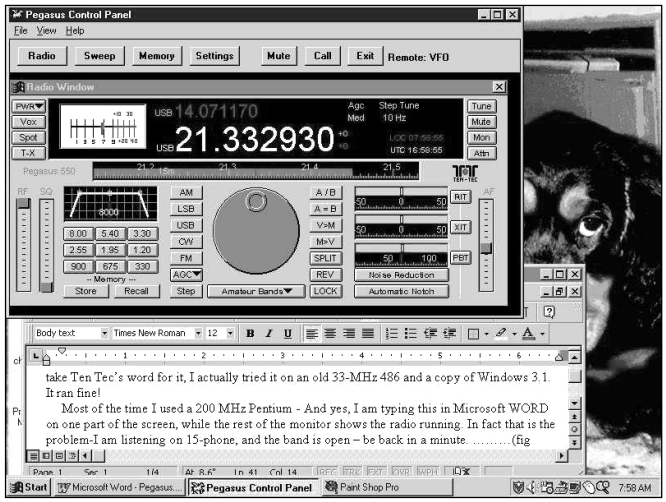


Figure 4—*Microsoft Word* on one portion of the screen, with the Pegasus transceiver program up and running simultaneously. That's wallpaper of my dog Candy peeking out from behind the active windows.

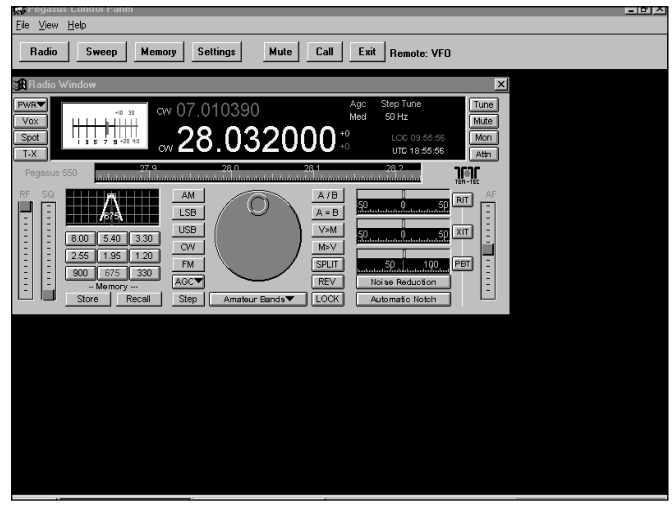


Figure 5—The virtual front panel of the Ten-Tec Pegasus HF transceiver. Your mouse cursor is used to "push" the buttons, "turn" the tuning knob and "slide" the control levelers.

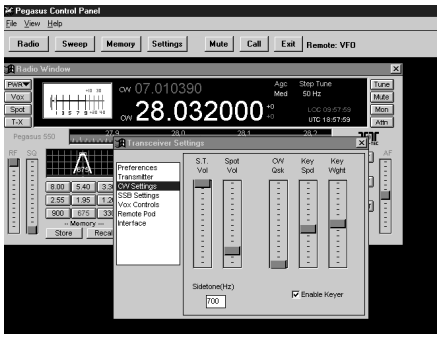


Figure 6—The CW Settings menu. Slide controls allow you to adjust the volume level of the sidetone and spotting tone, adjust the QSK delay, and set the speed and weighting of the built in CW keyer. The CW pitch can also be varied.

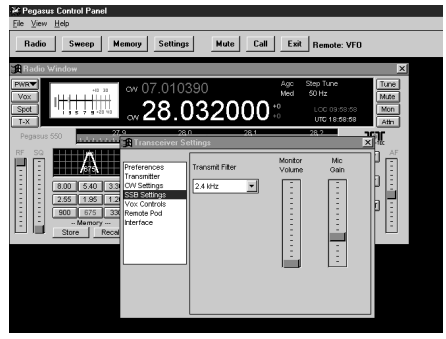


Figure 7—The SSB Settings menu. Settings on this menu allow you to select several different transmit filter bandwidths from 900 Hz to 3.9 kHz. Slide controls are also provided for adjusting the monitor volume and the microphone gain.

"punch," but to the locals used to hearing the full audio range of your voice on 146.52 FM simplex, you may not sound quite as pleasant!

Receiver—Performance, Bells and Whistles

The general coverage receiver performance of the Pegasus is comparable to many other receivers, with one exception—the ability to select a very precise frequency. Coverage is from 100 kHz to 30 MHz, and the AM sound was very acceptable on both strong and weak shortwave broadcast stations. The internal speaker is not exactly hi-fi, but it is good enough that I did not feel compelled to connect the audio from the Pegasus line output to my computer's sound card. Curiously, a jack for a conventional external speaker on the chassis of the unit is not provided.

Performance below the broadcast band was not remarkable. As is typical with most of the wide coverage receivers, if you are serious about VLF listening, an outboard tuned filter between the receiver and your antenna may be needed. However the DSP noise reduction and automatic notch filter were very handy capabilities, and were especially nice to have down below 500 kHz.

The full frequency memory capability of the Pegasus was not tested—I just did not have the time to try to store several thousand frequencies. The memory contents are stored in the PC, and for all intents and purposes are unlimited.

The mute button proved very convenient. There are many little things you won't notice missing from a PC controlled rig until you need them—a mute button is a good example.

The phone rings. Instead of being able to grab the conventional transceiver's AF gain control, twist the audio level down, and answer the phone—you now would have to move the mouse to the gain slide control, left click and hold, and slide the bug down. With this rig, you can just click on the mute button—a very handy control.

RIT, **XIT** and **PBT** are set up as slide controls. I had a considerable amount of difficulty controlling them, but no doubt more practice would make them easier to use. My current conventional transceiver has one offset control, which can be used to offset either transmit, receive or both. In a DX pileup, where the DX station is working split, I usually use the receive offset to find the last station the DX worked, push the button that makes my transmitter offset to this frequency, and release the receive offset. I am now tuned back to the DX station's transmitting frequency. On the Pegasus I ended up using the dual VFOs and the **A=B** and the **A/B** controls for this operation. **A=B** sets VFO **B** to the frequency of VFO **A**, and **A/B** sets receive to **A** and transmit to **B**.

Many recent (and not so recent) rigs provide dual VFOs and only offer an RIT tuning control. Therefore, most operators are used to having to manipulate the two VFOs to work "tail-ending" and offset simultaneously. The primary difference with the Pegasus is that VFO control is performed by "mouseing around" and left-clicking, rather than punching a button or two.

While the numbers measured in the ARRL Lab show medium range performance, I did not find the receiver performance anything to remark on, good or bad. As with most of the mid-priced solid state rigs in the past 10 years, a strong signal in the vicinity of the frequency you are tuned to will get in and either pump the AGC or otherwise affect the intelligibility of weak signals. In any case, while Sweepstakes and DX contests (at least for the first few hours) could be a problem, for general operating, most operators will be pleased with the overall performance level of this transceiver.

Software and Updates

Ten-Tec has been very busy since the in-

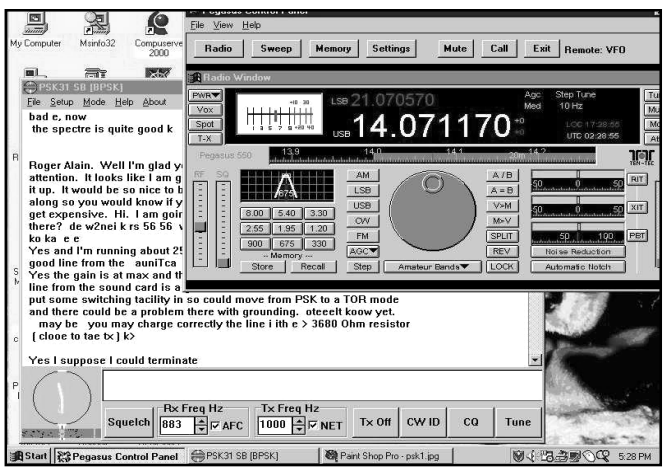


Figure 8—This screenshot shows one of the popular PSK31 programs—PSK31 SB—running in one window, with the Ten-Tec Pegasus, in a second window, serving as the HF transceiver.

Digital Modes

One of the first questions that pops up in many people's minds is "Can you run a digital mode on your PC while controlling the rig through the same PC?" The answer is a definite yes. Figure 8 shows the rig tuned to 14.071 (plus another 171 Hz for you perfectionists). Under the Pegasus control window is a second window with PSK31 SB running. The receiver was set to a bandwidth of 675 Hz.

Copy that day was not great—although PSK31 has earned a reputation as a mode that produces good copy even with very weak signals. The S-meter reading of the Pegasus indicates an S-6. In this case, the meter reading was primarily due to hash and QRM. The signals from W2NEI and the station he was working were at or below the level of the noise.

The audio gain and the RF gain were turned down to avoid overloading the sound card. If this was a permanent installation, I would have installed an attenuator in the audio line between the Pegasus and the PC sound card.

Since this version of PSK31 runs on the sound card, and the Pegasus uses the serial port, no problems were encountered. But as usual, if you are trying to use two I/O channels on your PC simultaneously, you have to make sure that the IRQ assignments are set up properly.

troduction of this radio tweaking and fine tuning the Pegasus software. Minor bugs that cropped up in the earlier versions of the software have been addressed, and each new version has also included some refinements and enhancements to the capabilities and controls.

Since the time that the initial transceivers—delivered with the first version of the software—hit the streets, subsequent software updates have included the addition of the CW sidetone volume, CW spot and keyer weighting controls. Earlier purchasers have been able to simply download the new versions of the software from the Ten-Tec Web site, install it in their computers and enjoy the new features. The software package is small—about 700k zipped—and installs easily.

Ten-Tec intends to continue to enhance and improve the software and release updated versions every few months.

The Pegasus relies on the computer processing power inside your PC to operate. Unlike the majority of the HF radios currently on the market, a conventional computer control interface connection point on the chassis of the radio is not provided. Controlling the Pegasus from within the presently available logging and contesting computer programs is not yet supported. Ten-Tec is communicating with the various software companies and has offered to provide technical assistance in adding this capability to their software packages.

IF DSPs

I have used several audio DSPs and evaluated them for the *ARRL Handbook* and for *QST*, but this was my first experience with an IF DSP. While you should rely on the lab numbers for actual quantitative results, I found some small but interesting differences between audio DSP and this built-in IF DSP. First, and most important, you don't have to worry about overload. With an outboard DSP, I always find myself riding the audio gain control. The better ones require less care, but the problem is always there. This is not much of a problem for general listening, unless you are in an environment with lots of varying signals, such as a DX pileup.

The narrowest filter on the Pegasus is 300 Hz. There have been times when a narrower filter has been very handy, although selection of bandwidths under 100 Hz have always proved to present a tuning problem for me, especially when I am listening to more than one station "on frequency."

I did notice an "apparent" increase in the receiver's background noise when using a narrow bandwidth on a very weak CW signal. Usually, as you narrow the bandwidth of any filter, the weak station is competing with less noise and tends to come up—a very dramatic effect with a good crystal filter. Here the signal did not pop-up, and to take best advantage of the narrow bandwidth the noise reduction had to be enabled.

Again, this is not much of a problem, since I tended to keep the noise reduction function on all the time—at least on CW. On phone, where the minimum bandwidth used was much wider, the effect did not seem to appear.

Sweep Function

The rig has a "sweep" function, which is actually a neat little panoramic band scope display. The bandwidth of the sweep can be varied from 3 kHz to 1.5 MHz. To really see what was going on, I found I had to bring the bandwidth down to either 75 or 30 kHz. You can use your mouse to position a set of crosshairs on a signal, left click, and the transceiver will tune to that frequency. Unfortunately, the station creating the blip is not always found in the middle of the blip—a little fine tuning may be required. You can set the vertical scale to log or linear divisions. For relatively quiet band monitoring purposes, this is a nifty toy.

Documentation

A very thin (22 pages, $8^1/_2 \times 11$) *Operators Manual* is supplied. But that is all, and it's probably more than you'll need. Ten-Tec did a nice job on this one—the included illustrations are clear and you can actually read the captions and labels without a magnifying glass. Most of the information is reference data and brief control listings and explanations. As with most software programs, the best way to get a feel for the controls used in the Pegasus software is to actually try each and every one of them.

The software includes a help section you can bring up from the tool bar. This relieves the need for a great deal of the printed information that's typically packed with a transceiver. One obvious advantage to the software help file is that changes, corrections and additions can be easily incorporated into the latest release.

You can download a copy of a *Programmers Reference Manual* from Ten-Tec's Web site. This will give you the information you need to roll your own software (I did not try it!) and can help you get a better idea of how this rig really works. The programmable basis for the rig, most probably inherited from the military/commercial Ten-Tec line, really shows.

The *Reference Manual* also contains the block diagram, a brief system overview and a start-up flow chart. The block diagram shows the five boards used in the Pegasus and their interactions.

Where Do You Put the Stuff?

Finding a spot for this transceiver in your shack shouldn't be a problem. As mentioned previously, as long as a good ground connection is available and the power leads are kept short (or large wire sizes used for the 20 A required), the chassis can be placed on the floor under the operating position.

However, you will still need to make room for the mouse or track-ball, the keyboard, mike and key or paddle—and the Remote Control Encoder, if purchased. I used a slide-out keyboard tray. I placed the paddles on an extension of the tray on the right that usually just holds a track ball. I positioned the remote on a second extension of the tray to the left of the keyboard. When I wasn't using it, I just left the mike on the floor—a situation I've become accustomed to after many years of mobile operation!

Of all of the contacts I made while using this modern, computer-controlled, digitally based rig, the one with Bob, KA3P, was perhaps the most memorable. He was using a good old fashioned hand key with his one-tube, 20 W rig. It's not clear who was having more fun, Bob or myself.

Thanks and Acknowledgements

As usual, I was able to enlist many members of the Greater Norwalk Amateur Radio Club for help with on the air testing. I also gathered reports from a large number of unsuspecting hams from across the country and overseas. I normally became quite evasive whenever they asked what rig I was using—not that I did not want to tell them, but if I let them in on my secret it typically extended the conversation by an hour or two. I can't spend my entire life on the air! Thanks also to Paul Clinton, WD4EBR, Ten-Tec's service manager, who cleared up several small mysteries for me.

Manufacturer: Ten-Tec, 1185 Dolly Parton Pkwy, Sevierville, TN 37862; 865-453-7172; fax 865-428-4483; **sales@tentec.com**; **http://www.tentec.com**. Price: Pegasus (Model 550), $895; Remote Encoder Keypad (Model 302), $139; hand-held microphone (Model 701), $24; desk microphone (Model 705), $79.95.

Test Computer

For most of the testing, a *Quantex* 200-MHz Pentium was used. This is an older machine, and is running an original version of *Windows 95*. At no time did the computer speed seem to be an issue, even with several programs running at once. The display is a 17-inch unit.

A test with a 33-MHz 486 was successful, but no attempt was made with this second computer to run other programs at the same time. As this is being written, used 100+ MHz Pentium PCs are selling locally in a recondition shop for around a hundred bucks and new 15-inch displays are about $150. Older machines, such as 486s and under 100-MHz Pentiums are sometimes available for free (or for a small fee) from ham radio and computer clubs that have received these obsolete machines as donations.

Lakeview Company TM-1 License Plate Mount

I've discovered an elegant solution to my HF mobile antenna woes. For the last couple of years I've used a heavy-duty magnetic mount to secure my Hamstick antennas to the trunk lid of my Saturn SL-2. Although it worked very well, the magnetic mount was plug ugly. Worse yet, the mount scratched the finish of my precious Saturn no matter how carefully I removed it.

Enter the Lakeview TM-1

The TM-1 antenna mount attaches to your car in one of the places least likely to suffer visible damage—behind the license plate. The mounting plate is fashioned from stainless steel and it feels like a piece of tank armor. With strategically placed holes top, bottom and center, the main plate attaches snugly between the license tag and your bumper or trunk lid.

A 3-inch horizontal "tongue" protrudes from the bottom of the TM-1. The tongue has two sets of holes to accept the hardware for the extension piece. You can attach the extension to either hole set, which effectively gives you about an inch of "play" to compensate for recessed license plate holders.

The extension has a large hole to accommodate a standard $^3/_8$-inch × 24-threaded antenna connector. The connector includes an SO-239 jack on the opposite end. This allows you to attach or remove your coaxial cable quickly and easily. The TM-1 package also contains a ground strap, instructions and an assortment of nuts and bolts.

The main plate of the TM-1 is ready for installation. Note the ground strap in the upper corner.

Installation

I began the installation by threading my antenna coax and ground strap through a rubber grommet that was conveniently located just above my license tag. I attached the main plate and license tag using the original top corner screws, but it was quickly obvious that the flexing of the antenna would cause the heavy TM-1 to pivot on the screws like a hinge. Not good! Luckily, Lakeview had provided a long bolt and nut in the hardware set, so I drilled through one of the unused lower corner holes and secured the TM-1 at that point. (The new hole was invisible behind the TM-1.)

With the lower portion of the TM-1 in place, I reattached the ground strap along with the license tag using the two top corner screws. The ground strap secured to the interior of the trunk lid, which is at ground potential in my Saturn.

I thought I was home free, but another problem cropped up after I attached the PL-259 coaxial connector to the TM-1 and attempted to close the trunk: There wasn't enough clearance between the underside of the antenna connector and the Saturn's bumper. Flipping the TM-1 upside down wasn't an option; there wasn't enough clearance along the top. The solution entailed a quick trip to RadioShack for their $^3/_8$-inch × 24 mount that features solder lugs instead of an SO-239 (21-950).

Off went the PL-259 on the wire-cutter guillotine. Out came the portable soldering iron and within 10 minutes I was finished. That little bit of extra space below the antenna connector was exactly what I needed.

Passing the Spouse Test

With my 20-meter Hamstick antenna attached, I fired up my transceiver and checked the SWR. It was 1.2:1—exactly the same as my magnetic mount. After a couple of quick QSOs it seemed as though the antenna worked just as well in its new location.

For the most difficult test of all, I asked my wife to inspect the installation. She raised her eyebrows and nodded, "That looks *nice!*"

There is still a dent in our driveway where my jaw struck the asphalt.

How's this for a clean installation?

Bottom Line

With hundreds of different vehicles on the road, it isn't practical for Lakeview to manufacture the TM-1 as a one-size-fits-all solution. You may find, as I did, that you need to do a little "tweaking" to achieve the best installation. Even so, the TM-1 has worked flawlessly—and you can't beat the aesthetic improvement. If you want to go mobile with a lightweight antenna, yet can't find an acceptable way to attach it to your car, the solution has finally arrived!

Manufacturer: Lakeview Company, 3620-9A Whitehall Rd, Anderson, SC 29626; tel 864-226-6990; **hamstick@hamstick.com**; **http://www.hamstick.com**. *Suggested retail price: $44.95.*

Next Short Take

Steve Ford, WB8IMY ♦ QST Managing Editor

BeaconSee

BeaconSee is shareware designed for *Windows 95/98* by Bev Ewen-Smith, CT1EGC. This innovative software allows any 486-66 or faster PC equipped with a 16-bit SoundBlaster-compatible sound card to function as an HF propagation analyzer as it monitors the global network of NCDXF/IARU CW beacons.

Installation is a snap. You simply connect a cable between the audio output of an HF receiver or transceiver and the audio input of your sound card. If you want *BeaconSee* to automatically switch your radio between the NCDXF/IARU beacon frequencies (14.100, 18.110, 21.150, 24.930 and 28.200 MHz), you'll need to connect a serial cable between the rig and one of your computer's COM ports (along with the appropriate level converter, if required). This full-automation setup is convenient, but not necessary.

When you run *BeaconSee* you're greeted with a segmented screen displaying the beacon call signs. Each narrow segment is actually a DSP *waterfall* display (think of it as an audio spectrum analyzer). As each segment becomes active (highlighted) *BeaconSee* quickly sweeps through the audio data provided by the sound card.

Signal information appears as bright dots or triangular shapes—the stronger the signals, the larger and brighter the images. After *BeaconSee* has made a few sweeps through the beacons, you are rewarded with a fascinating visual display of propagation conditions.

Getting in Sync

How does *BeaconSee* identify the individual beacons? It doesn't. Instead, the software depends on time synchronization. Each NCDXF/IARU beacon transmits for just 10 seconds in each three-minute cycle. *BeaconSee* "steps" through its display accordingly, highlighting the segments that *should* be active for the beacons in question.

For this synchronized dance to work properly, your PC clock must be set *very* accurately. While I was evaluating *BeaconSee* I set my PC clock manually using WWV. This worked well, although I quickly learned that there was about a two-second delay between the time I clicked on the **OK** button in the *Windows* Control Panel time-setting box, and the moment that the software clock was actually updated. Even that tiny lapse was sufficient to knock *BeaconSee's* synchronization out of step. I learned to "fudge" just a bit, clicking my mouse button about two seconds before the WWV start tone.

If you intend to do long-term monitoring with *BeaconSee* over several days, you may need to reset your clock repeatedly (some PCs keep more accurate time than others). If you happen to own a GPS receiver with a NMEA-0183 serial output, there is a free applet known as *GPSTime* (available for downloading on the *BeaconSee* home page) that will maintain a super-accurate PC clock at all times.

Other Goodies

BeaconSee is extremely flexible, allowing you to customize the program as necessary to fit your station. You can adjust the CW center frequencies, audio filter bandwidths display contrast and more.

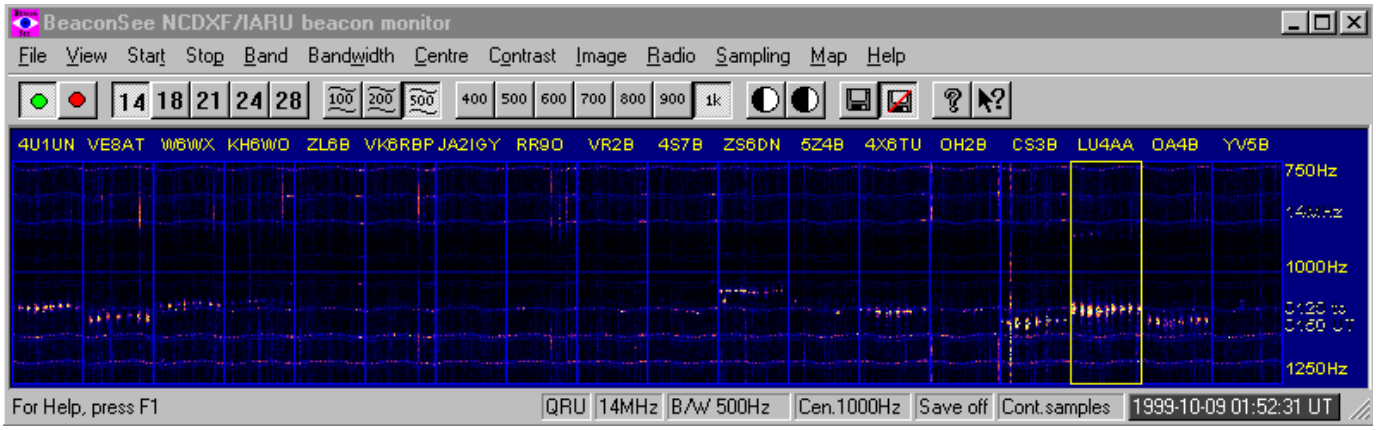
In addition, *BeaconSee* will display a Great-Circle map of the world centered on your location showing the positions of all NCDXF/IARU beacons relative to your position. The global map also displays the portions of the world that are in sunlight and darkness.

BeaconSee is a Bargain

The cost to register *BeaconSee* is US $29 and is handled online by a secure server in United States. When you register *BeaconSee* you receive the complete package that allows you to configure the software to sample beacon signals at periodic intervals so that you can see up to 24 hours of propagation history on a single screen. In the registered version you can even save the display automatically to a graphics file, at regular intervals, to build up a continuous record of band openings when you are away from your shack.

Twenty-nine dollars is a bargain for such a clever piece of software. Not only is *BeaconSee* a terrific addition to any HF station, it is a superb teaching tool. Imagine a classroom with a shortwave receiver, a PC and a copy of *BeaconSee*. Each day, students could view an active display of ionospheric propagation in real time. Or, they could conduct propagation studies over days or months.

Download *BeaconSee* at **http://sapp.telepac.pt/coaa/** and give this ingenious program a try. If you're impressed, cough up the $29 registration fee. Considering the value, it is a trivial expense!



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