Product Review & Short Takes Columns from *QST* Magazine

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Product Reviews

Alinco DJ-596T Dual-Band FM/Digital Hand-Held Transceiver
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Short Takes

WIRES: The New Vertex Standard Repeater Interlink

Alinco DJ-596T Dual-Band FM/Digital Hand-Held Transceiver

Reviewed by Stan Horzepa, WA1LOU
QST Contributing Editor

Alinco's latest dual-band H-T—the DJ-596T—provides FM transceive capabilities on the 2-meter and 70-cm amateur bands. This radio is an example of what's come to be known as a "one-band-at-a-time" dual-bander. *Translation*: Dual simultaneous receive and full-duplex cross band operation are not supported.

Noteworthy features include 102 memory channels, extended receive, CTCSS and DCS encode and decode, 4 W of RF output with the included 9.6 V/700 mAh NiMH pack (5 W with an external 13.8 V power supply) and cross band half-duplex split capabilities (suitable for FM satellite work). This radio also boasts a few Alinco exclusives that first appeared in some of its previous transceivers: the "Mosquito Repel," "Theft Alarm" and "External Terminal Control" systems.

The '596 is nicely equipped, but it has one particular capability that truly sets it apart from the competition. Install the optional EJ-43U accessory board, and you can be a pioneer on what many perceive to be Amateur Radio's next great frontier: *digital voice communications*.

In feature articles in the Jan and Feb 2002 issues of *QST*,[1] Doug Smith, KF6DX—chair of the ARRL's Digital Voice Working Group—gave us a short history, explained some of the underlying technology and filled us in on the current state—and likely future—of amateur digital voice communications. He also provided some basic operating guidelines. I highly recommend that you consider these articles required reading—at the very least look at the section covering operating guidelines—*before* you venture forth into this new territory.

While significant progress is already being made by amateurs experimenting with this mode, the Alinco DJ-596T is the first ham transceiver to show up in the US market to deliver digital voice capabilities in an off-the-shelf system. (Alinco now also offers a compatible digital voice accessory board—the EJ-40U—for its most recently released series of single band FM mobile transceivers, the DJ-135, '235 and '435.)

It can be lonely at the edge of the wilderness, though. At the present time it's pretty unlikely that you'll stumble upon other amateurs communicating using digital voice, and—even if you did—they might not be using the same protocol that this transceiver employs. To ensure I'd be able to experiment with the mode, ARRL Product Review staff purchased a pair of DJ-596Ts and a digital voice board for each.

The Basic Layout

The DJ-596T is lightweight and fits very nicely in the palm of my hand. It has a reasonably large, easy-to-read LCD display. Most of the radio's control operations are simple to access and use, and the keys provide positive sensory feedback when properly engaged.

The unit sports an 18-button illuminated keypad up front, an encoder dial on top, and PTT and MONI LAMP keys on the left side. Volume and squelch levels are adjusted by pressing either the VOL BELL or SQL DIGI keys and then turning the encoder. Each provides 21 levels of adjustment.

Primary and secondary key assignments are labeled in white and yellow directly on the body of the radio. While the unit is in the receive mode, frequency digits can be punched in directly. While transmitting, these same keys can be used to transmit DTMF tones manually. Secondary assignments—related to operations such as tuning step size, repeater offset magnitude and direction and tone/code settings—are accessed by first pressing the FUNC SET key. If a particular setting requires further refinement—CTCSS tone frequency, for example—the encoder dial is used to scroll through the selections. If a feature involves only two settings—ie, high and low RF power output—each press of the function button followed by the associated key toggles between the two possible choices.

For hamming in the dark, a press of the FUNC SET followed by the MONI LAMP key will illuminate the display and the keypad buttons. The lamp remains lit as long as you continue to manipulate the front-panel keys. It switches off automatically a few seconds after the last key is pressed. The lamps can also be programmed to remain on continuously.

Total Recall

The DJ-596T contains 100 regular memory channels and two separate call channels—one for each band. Besides the operating frequency, each memory can also store up to 14 additional operating parameters. These include the repeater offset and shift direction, any CTCSS or DCS settings, the power output level (high or low), the modulation mode (wide or narrow FM or digital), battery save, memory skip and busy channel lock out. Each of the memory channels can also be tagged with an alphanumeric title (of up

Bottom Line

The DJ-596T is more than just another nicely equipped dual-band FM H-T. Pop in an optional accessory board, and you can be among the first to stake a claim on the amateur digital voice frontier.

[1]"Digital Voice: The Next New Mode?" *QST*, Jan 2002, pp 28-32 and "Digital Voice: An Update and Forecast," *QST*, Feb 2002, pp 38-41, by Doug Smith, KF6DX. These articles are also available in PDF format on *ARRLWeb*. See **www.arrl.org/tis/info/digivoice.html**.

Joe Bottiglieri, AA1GW ◻ Assistant Technical Editor

Table 1
Alinco DJ-596T, serial number M000662

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency coverage: Receive and transmit, 144-148, 420-450 MHz.	Receive, 136-174, 400-512 MHz; transmit, as specified.
Power requirements: 6-16 V dc; receive, 0.075 A; transmit, 1.5 A (maximum, high power).	Receive, 0.17 A (maximum volume, no signal); transmit, 1.3 A, tested at 13.8 V.
Size (HWD): 4.9×2.2×1.6; weight, 9.9 ounces (with EBP-50N battery pack).	
Receiver	*Receiver Dynamic Testing*
Sensitivity: 12 dB SINAD, 0.18 μV.	12 dB SINAD, VHF, 0.17 μV; UHF, 0.18 μV.
Two-tone, third-order IMD dynamic range: Not specified.	20-kHz offset from 146 MHz, 42 dB*; 10-MHz offset from 146 MHz, 76 dB. 20-kHz offset from 440 MHz, 43 dB*; 10-MHz offset from 440 MHz, 68 dB.
Adjacent-channel rejection: Not specified.	20-kHz offset from 146 MHz, 38 dB; 20-kHz offset from 440 MHz, 40 dB.
Spurious response: 60 dB.	IF rejection, VHF, 97 dB, UHF, 90 dB; image rejection, VHF, 75 dB; UHF, 64 dB.
Squelch sensitivity: 0.32 μV.	At threshold, VHF, 0.05 μV; UHF, 0.06 μV.
Audio output: 200 mW at 10% THD into 8 Ω.	200 mW at 10% THD into 8 Ω.
Transmitter	*Transmitter Dynamic Testing*
Power output: With EBP-50N 9.6 V battery pack, VHF, 4.5 W, UHF, 4 W; with external dc (13.8 V), VHF and UHF, 5 W.	With EBP-50N battery pack: 146 MHz, 4.7 / 0.9 W, 440 MHz, 4.9 / 1.1 W; external dc (13.8 V), 146 MHz, 4.8 / 0.9 W, 440 MHz, 5.1 / 1.1 W.
Spurious signal and harmonic suppression: 60 dB.	VHF, 67 dB; UHF, 60 dB. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, VHF, 175 ms; UHF, 187 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	VHF, 122 ms; UHF, 124 ms.

*Measurement was noise limited at the value indicated.

to six characters in length).

Unfortunately, cross band split frequency pairs can not be programmed into the memories. The lack of this capability may be an important consideration for those who might want to use this rig for FM satellite operation. While this doesn't preclude satellite operation, split cross band memory capabilities would add considerable convenience. Some have used 12.5 kHz tuning steps along with programmable memories as a means of setting up smaller tuning steps for Doppler shift compensation.

The Search is On

The DJ-596T includes a variety of scanning features. The "VFO scanning" mode causes the radio to scan the entire selected band. You can change the direction of the scan—to either ascending or descending—with an appropriately directed twist of the encoder knob.

The "memory scanning" mode—as the name implies—evokes a scan of the programmed memory channels. Selected memories can be excluded from a memory scan by activating the memory skip setting in the offending memory channel or channels.

The DJ-596T offers two scan resume conditions: "timed" or "busy channel." In the timed scanning mode, the radio stops on an active channel and resumes after a 5-second pause. When in the busy channel mode, the radio will stop on a busy frequency and remain there until activity ceases.

Tone and Code Access

In the FM modes, the DJ-596T supports "selective communications" with its CTCSS and digital code squelch (DCS) systems. Independent encode and decode CTCSS tones can be assigned to a single frequency. Transmit and receive DCS codes must be the same on a given frequency, however. Thirty-nine CTCSS tones and 104 DCS codes are available. Selective calling features are not accessible while in the digital voice mode, however.

Tone burst, sometimes used for repeater access control in areas outside of the US, is also included. Available tones are 1000, 1450, 1750 and 2100 Hz, and there's even a selection that transmits a sound similar to a ringing telephone. This one might be useful for regaining the attention of an inattentive operator.

CTCSS and DCS "scan" capabilities—for determining the tone or code in use on a particular frequency—are not provided.

'LOU—Phone Home

The DJ-596 can generate DTMF tones for telephone autopatch and remote control applications. Ten 16-digit autodial memory slots are available.

To transmit one of the autodial memories, you simply press the FUNC SET and then the DIAL key, and then touch the digit key—0 through 9—that corresponds to the desired memory slot number.

There are also several advanced settings related to DTMF autodial operation. DTMF "wait time" inserts a programmable delay between the time that the transmitter is activated and the autodialer begins sending the tones. The "first digit burst time" setting varies the duration of the initial DTMF tone. The DTMF "burst/pause time" setting allows variations in the delay between digits.

A convenient DTMF "redial" feature can resend the most recently transmitted DTMF string—regardless of whether it was manually or memory generated.

Mind Your Manners!

Have you ever been chatting with someone on simplex, and when you released your PTT you discovered that the other operator was already halfway through a transmission? Your unfortunate associate most likely assumed (or perhaps *hoped*) that a brief pause in your dissertation was the end of your transmission, so they jumped right in. The DJ-596T has a feature that can help avoid this embarrassing on-the-air faux pas. If enabled, the "end peep" feature appends a beep at the end of each of your transmissions. Imagine that—a locally generated courtesy tone! A friendly warning, though: Some folks find these very annoying!

To avoid being the responsible party in just such an on-the-air social blunder, the radio can also be set up in a "busy channel lock out" mode. When this feature is activated, the DJ-596T will flatly refuse to switch into transmit while a signal is being received.

An old radio pal of mine—"Danny Diode"—was fond of saying, "Long winds are great for sailing, but keep it short on the repeater." The engineers at Alinco must be familiar with DD's philosophy; the DJ-596T has its own transmit time-out timer. The game clock can be programmed in 30-second increments anywhere from 30 up to 450 seconds. When just 5 seconds remains before time expires, the radio will emit a beep. Ignore that warning, and you'll find yourself ushered into the receive mode. You can even punish yourself further with a "timeout timer penalty" feature. This will keep you on the sidelines for from 1 to 15 *additional* seconds after you've tripped the timer.

Set 'Em and Forget 'Ems

The DJ-596T includes several operating parameters that I consider "set and forgets." A battery save feature can greatly extend the operating time between charges. This feature is activated in the "factory default" radio configuration. The radio's internal power is discretely cycled on and off during periods of inactivity—a sort of "sleep mode."

Yet another item that you're likely to set once and forget is the "beep" feature. Some folks like their radios to emit a beep when the keys are pressed, while others prefer to avoid the racket. Your call.

Those who either like or dislike key beeps will probably feel similarly about the "bell" feature, which sounds a bell whenever a signal is received. Choose a setting for this feature once and forget about it, as well.

And now for the final set-it-once-and-forget-about-it feature: If you tend to find yourself dozing off and waking up to an expired battery pack, perhaps you should take advantage of this transceiver's "automatic power off" (APO) feature. Neglect to turn the '596T off, and it's smart enough to turn *itself* off 30 minutes after the last button is pressed.

Alinco Exclusives

The DJ-596T has a few tricks up its sleeve that we've seen in some of Alinco's previous offerings. These include a theft alarm feature that might come in handy for those who use the radio in high crime areas. You've got to cobble up your own tether cable, though. (This is just a length of wire or cable with a $^1/_8$-inch stereo phone plug with the ring and ground connection shorted on one end and a loop formed on the other.) Simply thread the alarm cable through some stationary object—your vehicle's steering wheel, for example—pass the connector end through the loop and plug it into the external speaker jack of the radio. Power up the radio, enable the theft alarm feature, power down the radio, and the alarm is armed. Removing the alarm cable without first disabling the feature will cause the radio to generate an obnoxious racket.

The DJ-596T includes an "experimental" feature that's also been offered on a couple of Alinco's previous H-T releases, a "mosquito-repelling signal." When enabled, the radio continuously emits an ultrasonic tone that the manufacturer claims is disliked by some—but admittedly not *all*—varieties of mosquitoes. Alinco doesn't guarantee that the DJ-596T's ultrasonic drone will drive off the bloodsuckers in your neighborhood. *But heck*, it's certainly worth trying!

The third Alinco exclusive is "external terminal control." When the squelch breaks, a 5 V dc (5 mA maximum) voltage becomes available on the ring connector in the microphone jack. This could be useful for switching on a tape recorder or for remote control of some other type of electrical device. For remote control applications, you'll probably want to program in a CTCSS or DCS squelch setting to reduce the possibility of unintentional false activation.

Cloning Without Controversy

After you finish programming all the various parameters and memories to your liking, you can copy the settings and memory data from your radio to another '596. The cloning procedure involves connecting two radios together through their external speaker jacks and punching in a few commands. A simple, commonly available cable that's terminated at each end with $^1/_8$-inch stereo phone plugs is all that's required. Since I had a pair of transceivers for this review, this turned out to be a very convenient capability.

Setting Up for Digital Operation

The optional digital voice board, the EJ-43U, is easy to install, but the text portion of the installation instructions packed with the board is printed in Japanese. It's not a big deal, though—the pictures tell the story. Remove the battery pack, take off a small metal cover, press the board into its mating connector inside the radio and replace the cover and battery.

According to Alinco, the tiny board—about $1 \times ^3/_4$ inches—contains a continuously variable-slope delta modulation (CVSD) codec, a CPU and gaussian minimum-shift keying (GMSK) modem circuits. The system encodes and decodes 14k bit/s digital voice signals.

No mention whatsoever of this radio's digital voice capabilities or operating instructions for this mode appears in the radio's *Instruction Manual*. It took direct communications with Alinco to find out how to activate and deactivate the system.

To switch it on, you begin by pressing the FUNC SET key and then the SQL DIGI key. A "meaningless number" (according to Alinco) appears in the display—"000000" in our case—with the leading 0 flashing. You touch the PTT button to activate the mode. A small speaker-shaped icon pops up on the right edge of the LCD. To switch back into analog FM mode, you press the FUNC SET key, and then press the SQL DIGI key twice.

Goin' Digital!

Ultimately, digital voice has the potential to provide low-noise high-qual-

ity audio. With this radio, though, Alinco's clearly stated design objective was to keep both the occupied bandwidth (about the same as a "wide" FM analog signal) and the cost of the equipment reasonable.

KF6DX's February *QST* article quotes Alinco spokeman Jeff Reinhardt, AA6JR, as describing the company's current digital voice implementations as "purely experimental" and "a transitional step."

This corresponds well to what this radio's digital mode operation sounded like in use. I switched the H-Ts into the digital voice mode and passed them around along with a copy of the "How Do I Sound" sidebar from Doug's January article. The sidebar details a method of describing the quality of a digital voice signal on a linear scale: the *mean opinion score*. You'll definitely want to refer to the actual sidebar—it contains a more complete explanation—but the basic concept is that you rate the decoded receive audio on a scale of 0 to 5. A score of 5 corresponds to "excellent quality with imperceptible impairment"; 0 indicates "unusable quality with total impairment." A score of 3 corresponds to what is historically known in telephone communications circles as "toll quality" or "good enough to pay for" (or perhaps a more accurate way to put this would be "good enough to *charge* for").

An ad-hoc survey of a dozen randomly selected ham evaluators (*Hey! Check this out!*) places the audio quality of this system, over a short path, at an average of about 2.5—right between "fair/slightly annoying" (toll quality) and "poor/annoying." Most described it as sounding similar to an FM signal that's slightly off frequency. This shouldn't be considered a scientific study, though. You be the judge. A sample audio clip is available on *ARRLWeb*. See **www.arrl.org/files/qst-binaries/dj-596.wav**.

An FAQ on Alinco's Web site (**www.alinco.com**) includes a handful of questions and answers related to their current digital voice systems. One of them addresses repeater operation, and states, in part:

Q: Is it possible to use this unit for amateur repeater communications?

A: If the system is very accurately aligned, theoretically yes. But in actual use, passing through a repeater increases the possibility of communication errors that may result in poor communication quality.

I decided to give it a try through a couple of nearby repeaters. No evidence whatsoever of the repeated signal was heard in the second DJ-596T. Of course, your results may vary.

While in the digital mode, the radios will not respond to analog FM signals at all—the S meter is unaffected and no sound is heard from the speaker. You can hear the un-demodulated digital audio signals in an analog FM receiver, however. They sound like a signal containing white noise. This could lead to chaos on a single frequency that's being used for both modes of communications simultaneously, so be careful when selecting simplex operating frequencies. It wouldn't hurt to listen and ID in the analog FM mode at regular intervals. Again, refer back to Doug's articles. He touches on the topic of operating considerations.

On the Air and In the Lab

The DJ-596T works pretty much as you'd expect in the analog FM modes. Transmit audio received glowing reports on its clarity and overall tone. Receive audio is sufficiently clear for most handheld applications, but its maximum level is a bit anemic for use in high ambient-noise situations. I'd recommend bringing along an earphone for public service events, and you'll probably want to connect a decent external speaker for noisy mobile applications.

Let's turn our attention to Table 1. As always, those who live in areas that might fit the definition of "tough RF environment"—such as in close proximity to strong commercial VHF and/or UHF communications systems—will want to begin by considering the two-tone, third-order IMD dynamic range figures. The 10-MHz offset numbers posted by the DJ-596T point to considerable potential for problems with rejecting interference from just such sources (ie, those that are close in frequency to the VHF and UHF ham bands).

The 20-kHz offset 2T3O IMD dynamic range and the adjacent channel rejection figures are also poor. If you live in the vicinity of multiple amateur repeaters that are close in frequency, you will likely experience difficulty sorting them out. These shortcomings didn't lead to any serious difficulties while in my usual geographical areas of operation, but a knowledgeable amateur should always keep the "overall RF density" near his or her own home turf in mind when selecting *any* transceiver.

The Ecstasy and the Agony

With most radios, you typically set the squelch to some nominal level and then forget about it. The problem with many radios is that the squelch is set using a rotary control that's often mounted close to the volume control. This arrangement results in a high potential for inadvertently upsetting the squelch level. As a result, you find yourself constantly readjusting the squelch.

The designers of the DJ-596T have eliminated this problem by doing away with the easily maladjusted rotary squelch control. As I mentioned before, with the '596T, you set the squelch level by pressing the SQL DIGI key and then dialing up the desired level with the encoder knob. It would be tough to do this accidentally.

Unfortunately—at least in my opinion—the volume control on this radio works essentially the same way. During typical operation, I find myself tweaking the volume control all the time. It is probably the setting that I (and most likely you, as well) change more than any other on a radio. I find it inconvenient to have to press the VOL BELL button before I can adjust the volume, particularly when the radio is clipped to my belt. I'd like to see the VOL BELL key become a "volume/tuning bell" key. I think it would be nice to be able to temporarily set up the encoder to remain as the volume control until I'm ready to change frequency. I use the volume control more often than I change frequencies. As it is now, I'd prefer a good old-fashioned dedicated rotary volume control any day!

One common feature that's not included on the DJ-596T that I especially missed was an "automatic repeater offset" system. Perhaps I've become spoiled, but I sure find this handy, and it's included on most of the other contemporary FM equipment that I own. For those who might not be familiar with this feature, it automatically selects the appropriate repeater offset direction as outlined in the *ARRL Band Plan*—positive, minus or simplex—for the range of frequencies that you are operating in.

Overall...

All in all, I like the DJ-596T. It sure was fun to be able to experiment with digital voice communications. The transceiver offers a reasonably complete selection of the most important features, and the Alinco exclusives—particularly the external terminal control system, have my creative juices flowing.

I want to thank Ed Gamache, N1ED; Joe Bottiglieri, AA1GW, and my wife Laurie for their assistance with this review.

Manufacturer: Alinco Inc, Shin Dai Building 8F, 1-2-6 Doujimahama, Kita-ku, Osaka 530-0004, Japan. Alinco's US distributor is ATOC Amateur Distributing LLC, 23 S High St, Covington, OH 45318; 937-473-2840; fax 937-473-2862; **alinco@alinco.com**; **www.alinco.com**.

Manufacturer's suggested retail price,

$301.95. Typical current street price, $219.95. List prices of selected optional accessories: EJ-43U digital voice board, $119.95; EBP-51N high capacity NiMH battery pack (9.6 V/1500 mAh), $37.95; EDC-36 filtered cigarette lighter power cord $24.95; EDC-97 drop-in rapid charger, $70.95; EDH-30 dry cell battery case, $15.95.

MFJ-1275 Sound Card Radio Interface

Reviewed by Steve Ford, WB8IMY
QST Editor

MFJ has jumped on the Amateur Radio sound-card bandwagon with its new MFJ-1275 interface. For those not familiar with these devices, they function as audio routing and transmit/receive-switching "middlemen" between sound-card-equipped station computers and transceivers. By loading any one of a number of sound-card applications, you can use these interfaces to operate RTTY, SSTV, PSK31, CW and many other modes.

The internal workings of the MFJ-1275 interface.

'1275 Features

The '1275 interface comes in two flavors: the standard model with an 8-pin mike jack on the front panel, and the '1275M that sports a modular RJ45 jack. We used a '1275M for this review.

Sizeable pushbuttons on the '1275 front panel select manual or VOX transmit/receive switching, as well as the option to bypass the interface entirely. There is one additional switch that isn't often found on other interfaces—a sound card right/left input switch. Why is this necessary? The answer has to do with the fact that some sound card programs supply transmit audio on either the right or left channels of the sound card output. With this convenient slide toggle, you can quickly select either channel, or both together.

On the back panel you'll find a coaxial 12-V dc power jack (power supply not included), a DB9 female connector for the serial cable to your computer's COM port and 1/8-inch jacks for the audio connections to your computer, transceiver and external speaker, if desired. The line to the transceiver microphone jack is available at the rear panel as well. Inside the '1275 there are sets of jumpers that allow you to configure the interface to be compatible with just about any radio's microphone input. A set of shielded audio cables is provided in the package, along with a dc power cable.

Operation

I used the MFJ-1275 with several applications, including *MMSSTV*, *MMTTY*, *Stream* and *WriteLog*. In all cases the '1275 performed flawlessly. Transmit/receive switching was reliable and the audio isolation was perfect. On-air reports indicated no hum or other unusual noise. The '1275 also seemed to exhibit good RF immunity (my antenna is fairly close to my operating position).

The '1275 jumpers were easy to set up, which is a credit to the manual. It describes the process clearly.

Interestingly, the '1275 offers audio output *and* input adjustments in the form of internal trim pots. Most interfaces only provide audio output adjustments. Although the pots are inside the interface, there are holes in the top cover that allow access. In most cases this is an adjustment you'll only make once.

CD-ROM

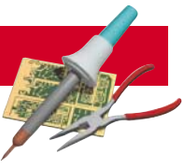
The MFJ-1275 package includes a CD-ROM that is filled with an astonishing amount of data. On the CD you'll find applications for CW, RTTY, SSTV, PACTOR and even a voice keyer. The only disappointment is the PACTOR software, which requires a specialized sound card with an Analog Devices Personal Sound Architecture (PSA) chip set, such as the Orchid Soundwave 32, or the Cardinal Digital Sound Pro 16. The real surprise on the '1275 CD is found in the "goodies" folder—Adobe PDF files containing instruction manuals for virtually all MFJ, Mirage, Ameritron and Vectronics products!

Conclusion

The MFJ-1275 is a rugged, capable sound card interface. The dual input/output audio adjustments and sound-card audio channel switching are attractive features. The only thing it lacks is the ability to do FSK keying when used with RTTY software that supports FSK, but that is a minor deficiency.

Manufacturer: MFJ Enterprises, 300 Industrial Park Rd, Starkville, MS 39759; 800-647-1800; **www.mfjenterprises.com**. $89.95 QST

SHORT TAKES



WIRES: The New Vertex Standard Repeater Interlink

How would you like to link your club's repeater to another group 100 miles away? Or 1000 miles away? Or a continent away? Vertex Standard (Yaesu) has a new product that can help you do exactly that.

WIRES (Wide-Coverage Internet Repeater Enhancement System), as a concept, was born out of requests from a group of California repeater owners for a simple-to-use, easy-to-install method of linking a small group of repeaters together for extending the coverage area of their repeater systems. It provides an efficient, low-cost way of expanding a single repeater into a network that is equally suited for emergency use, or just plain *fun*, especially if you link to a "Sister City" in England or somewhere else around the world. Yaesu created the *WIRES* software to facilitate the realization of the dream of Internet linking. However, the system can be accessed using *any* manufacturer's radio that has a DTMF pad.

"What started as a private development project grew in scope, and the initial beta-testing proved quite popular," explains Chip Margelli, K7JA, of Vertex Standard. In addition to using Internet linking to expand the coverage area of a current repeater system, across town or across the continent, Chip points out that their new WIRES black box differs from IRLP by how easily it may be set up in an emergency.

"WIRES can be used as a closed-loop network for emergency radio groups wishing to establish a permanent, yet quick-access linked system. If a hurricane has just taken down communications in a city, the ability to link to another repeater of known capability and infrastructure is good assurance that you'll be able to summon help rapidly," adds Margelli.

Setup and Operation

The operation of WIRES is relatively simple. It is a hardware/software package that provides connection between a *Windows* based personal computer and the repeater. The WIRES interface box is smaller than most mobile radios. The personal computer, 56k modem, and a dial-up Internet service connection complete the hardware requirements. The *WIRES* software drives the system. No special high-speed phone line is required.

As long as the repeater system is on 222.15 MHz or higher, you can install the WIRES equipment at your house and use a mobile radio as a remote-control link to access the system. This avoids the need to put the WIRES equipment on top of a mountain. And because the system operates without the need for an expensive T1 or DSL line, monthly operation costs are low. For 50 or 144-MHz repeaters, of course, the WIRES equipment is installed right at the repeater site, and interconnections may be accomplished in minutes, without any internal modifications to your repeater.

I tested the operation of the WIRES system and it was quite simple. I worked with four other area repeater operators with

the same equipment installed. On a handheld radio you key the push-to-talk (PTT) button, and push a single DTMF button corresponding to the number assigned to the other repeater you want to work through. It takes about 10 seconds to get communications up and running due to an initial 5-second delay. The other station presses the touch pad for your particular repeater assignment number and they answer your call. You then press your keypad for their number and the conversation goes on. Each time you transmit, you need to address the desired repeater with the specific touch-pad number. When communications are finished, the unit automatically resets after 20 seconds.

While the requirement to send an initial DTMF tone seems cumbersome at first, this protocol allows users the ability to interject quick "local" comments via their own repeater, or give brief operating instructions to a new user, without tying up the Internet link or bothering users on the remote repeater. You can return to Internet linking at once by pressing the single DTMF access key, which will immediately restore the link. And if a "group call" is needed, pressing the [A] DTMF key will link you to all networked repeaters. This is ideal in a dire emergency when assistance—from anywhere—is needed.

Additional features and enhancements are being incorporated as the test users provide feedback on operation and new applications for WIRES. Late-breaking information has it that Vertex Standard's new VX-7R tri-band handheld has an "Internet" key that provides automatic transmission of a WIRES-access DTMF tone each time the PTT switch is pressed, and there may be other radios supporting the WIRES concept as well. The WIRES system will be a featured Yaesu product at the 2002 Dayton Hamvention.

Conclusion

Vertex Standard is interested in expanding this system's capability via user input. Setting up a WIRES network with other repeater owners might be a great opportunity for your repeater group to enter the world of repeater linking without having to go to an elaborate IRLP setup. For us here in Southern California, this new system worked really well!

Manufacturer: Vertex Standard, 10900 Walker St, Cypress, CA 90630; tel 714-827-7600; **www.yaesu.com**. *Price undetermined at press time. Contact Vertex Standard.* QST

Gordon West, WB6NOA ▫ 2414 College Dr, Costa Mesa, CA 92626-6331 ▫ swmeow@aol.com