

Remote-Controlled HF Operation over the Internet

If you can't get on the air from home, the Internet may provide the answer.

Over the last several months I have enjoyed the opportunity to operate HF by remote control over the Internet using my desktop and laptop computer from several different locations in the US.

Consider my situation: I live in a condominium that prohibits towers or outside antennas. With this remote-control capability, I can now operate HF almost as I did before when I lived in a single-family home with a tower and beam. It also happens that I was temporarily in Atlanta, Georgia for medical treatment from Thanksgiving 2000 to mid-January 2001 and in Charleston, South Carolina for the 2000 Christmas holidays. In both locations I was able to remain active on the air with just my laptop and an Internet connection. Imagine the possibilities for handicapped amateurs, new hams without equipment, club stations and more.

It has been a very interesting and exciting experience, and one new to me in my 50 plus years of hamming. On SSB, I have operated 75 and 40 meters locally and worked significant DX on 20, 17 and 15 meters. While it is not quite like having your own rig, tower, beam antenna and so on, it is certainly superior to not being on the air at all.

One of the goals of this article is to encourage not only use of these existing stations, but to motivate others to build

similar stations. For those of you interested in developing your own similar Remote-Controlled HF station, I know that Keith Lamonica, W7DXX, at keith@lamonica.com; Bob Arnold, N2JEU, at n2jeu@ralabs.com; and Stan Schretter, W4MQ, at w4mq@hotmail.com would be very willing to offer guidance and assistance.

A Remote Fascination

I have been interested in HF remote control operating for many years, going back to the late 1940s when I was first licensed. Among the first HF remote-controlled stations was one owned and operated by John Knight, W6YY (SK), then Chief Engineer for TV channel 4 in Los Angeles. He installed a 20-meter station at the transmitter site on Mt Wilson several thousand feet above his home in the La Canada, California area. John controlled the station over telephone lines. The advantages of remote control were recognized early and innovative hams have been exploiting them ever since.

I'm aware of several remote-controlled HF stations, and there are probably many more. One typical system is the single-operator-to-remote-site configuration. Examples include W6BH in Southern California (www.w6bh.com), W6RJ and KD6UO¹ in Northern California, and ¹P. Winter, N6BIS, "Remote Operation Comes Home," *QST*, Jan 1996, p 46.

OH2BH in Finland. Another popular configuration is essentially a repeater system with an HF output. Examples of these include WB6MZS in Northern California (wb6mzs@telocity.com) and the WA6TWF "Super System" in Southern California (www.wa6twf.com). All of these stations are a substantial challenge to construct and are usually controlled over UHF and/or local telephone links.

Until just recently my interest in remote-controlled HF operating consisted of musing and talking, and not much doing. All of this changed abruptly when I learned through a casual conversation with another local ham of the W7DXX HF remote-controlled station, which I understood to be controlled over the Internet.

W7DXX

It did not take long to find the Web address—www.lamonica.com—and access it to learn more about the station and its function. I discovered that Keith Lamonica, W7DXX, who lives in North Easton, Massachusetts was the owner of the station. Through a set of interesting circumstances, Keith learned of Bob Arnold, N2JEU, in Canastota, New York, who had been working with remotely controlled receivers over the Internet. They decided to collaborate. Keith supplied the site and hardware (with assistance from other sources) and Bob supplied the soft-

W7DXX Remote Base Systems -- Boston

User: K6WR from 65.96.105.163 at 8/24/2001 13:17:10 UTC.

Transmitter Status: Transmitter Enabled - This account has transmit access.
System Information: None
You have -15 minutes 0 seconds remaining in this session. (If no one else wishes control, you may renew the timer.)

You need to call in with NetMeeting for audio.
When finished, please select the LOGOUT option: [Normal Operation]

Enter the Receive Freq(kHz): [14195] RX Fine Tune (+/- Hz): [0]

Split Freq. Mode: [Off]

Enter the Transmit Freq (kHz): [14195] TX Fine Tune (+/- Hz): [0] Mode: [USB]

Enter TX Power (1 to 100 watts): [100] External Amplifier: [Off]

Select receive filter width (Hz): [2550] Select AGC: [Medium]

RX Atten: [Off] Noise Blanker (0=OFF): [0] Auto Notch Filter: [On]

80 and 40 Meter Array: [OFF] 20-10 Meter Beam: [ON] Antenna bearing (0 to 359 degrees): [190]

HTML Version

Rx Freq(kHz) Preamp

USB 3.0kHz

14292.000

Tx Freq 14292.000

Rx H.Boost 5.0

RECEIVE

Filter (kHz) 4.0 1.0 3.0 0.5 2.5 0.2 2.0 0.1

Enter Freq

Mode AM USB CW LSB

Step 500Hz

RIT [0] [0] [0]

BAND 20m

RF Gain AF Gain RF Power Mic Gain

Push-to-Talk

PREAMP NOISE RX EQ SPLIT VOX

ATTEN NOTCH TX EQ RX <=> TX TX PROC

HELP MESSAGE BOARD

Submit LOG Callsign: Name: QTH: Info:

CW KEYBOARD: Select a Speed Auto Tx ON/OFF TX DISABLED

Figure 1—This is what I see on my computer screen when I access the W7DXX remotely controlled station. As you can see, you set up your operating parameters with a fill-in-the-blank form.

Figure 2—This is what I see on my computer screen when I access the W4MQ "Standard Web page."

ware to make it work. They started with a Kachina 505DSP transceiver, which has now been replaced with a Ten-Tec Pegasus radio and currently moving to a Kenwood TS-2000 transceiver. Their implementation approach was to make the interface to your computer through a Web browser for ease of use and maintenance for the end user. Just recently, Carl Moreschi, N4PY, has joined the team to provide software enhancements.

Currently the W7DXX HF remote-controlled station, although still in the development stage, is fully operational on SSB on 75-10 meters as an SSB only, VOX-controlled station. It has many operators from all over the US and overseas. A visit to the Web site will bring you all the details about becoming an operator and instructions written by K6WR on how to set up and operate the system. Future plans include UHF/VHF and other capabilities.

W4MQ

I've also explored a second HF remotely controlled station—the W4MQ Web Radio. The owner and developer is Stan Schretter, W4MQ, in Reston, Virginia. The address for this site is www.w4mq.com. Stan's creation has different characteristics. It supports SSB in VOX and "push-to-talk" modes. You can also operate CW—interestingly, using the VOX function. Future plans include the addition of PSK31, UHF/VHF and satellite communication.

Although he started with a Kachina 505DSP, Stan has since moved to a Kenwood TS-2000 transceiver. Stan has developed two distinct approaches for control: one is to connect to the end user via Internet browsers (both *Netscape* and *Internet Explorer*); the other is a "standalone" peer-to-peer approach that does not use Internet browsers. Both approaches provide an "image" of a radio that you control, although the images are slightly different depending on which approach you choose. The key difference is that the Internet browser approach uses unique software at the host while the standalone approach requires that the user install and maintain some unique software on his own computer.

Currently the W4MQ HF remote-controlled station, although still in the developmental stage, is fully operational on SSB and CW on 160-10 meters. A visit to the Web site will bring you all the details about becoming an operator and instructions written by K6WR on how to set up and use the system.

From the Operator's Point of View

Figure 1 shows the control screen for the W7DXX remotely controlled station illustrating the various features and functions of the fill-in-the-blank, nonpictorial



Figure 3—This is what I see on my computer screen when I access the W4MQ standalone "Peer to Peer" control screen.

format. Figure 2 is the W4MQ control screen for the "Standard Web page" version showing the various features and functions. Figure 3 shows the W4MQ standalone peer-to-peer version. You can readily see many common elements among the three pictures, but there are also unique features in each.

From an operator's perspective, there appear to be advantages and disadvantages to both the browser and standalone interfaces, and the ways they are currently implemented. Clearly, the browser interface is easier for many users because the software is all maintained at the host end. On the other hand, the W4MQ standalone implementation requires programs to be resident and updated on the user's computer. These current implementations provide an interesting set of trade-offs between speed of interaction, appearance of the "transceiver" or fill-in-the-blank approach and whatever end user software maintenance is required.

One of the key issues for satisfactory operation, from an operator's point of view, is the timeliness of transmission and stability of the Internet audio transmission system itself, Voice over Internet Protocol—VoIP. Essentially, VoIP converts the analog audio into digital packets for transmission, sends the packets, and reconverts them to analog audio at the other end. The current implementation of VoIP contains some inherent "packet latency" within Internet itself, due to the multiple paths the packets may take. Unfortunately, currently you cannot really control this latency regardless of the equipment at the host or operator ends. At times these problems can result in noticeable delays between the time the operator's voice is sent and when it is actually transmitted (but nothing is lost) and similarly in the receive mode; however, overall the result generally works quite well. It is hoped that future implementations of VoIP will minimize this problem.

You don't need a sophisticated computer system to use remote stations like these. My home computer system is an IBM Aptiva E3N (a 300-MHz system) with a 56-kbaud dial-up modem, a good

sound card, a RadioShack combination headset and boom mike. My laptop has essentially this same configuration. Originally, for software I used *Windows 98*, *Netscape 4.51* and *Microsoft Netmeeting 3.01* (NM) for audio on both my home and laptop systems to operate the browser-oriented versions on both stations. In late July 2001, I began testing and using *Internet Explorer 5.0* to operate the browser-oriented versions on both stations. Both browsers provide the same function, but each has its own characteristics, which makes operation of the remote station slightly different in each case. Of course, neither browser is used with the W4MQ stand alone peer-to-peer version.

But is It Legal?

One of the questions that usually comes up while I'm engaged in a QSO through one of these sites is, "Is it legal?" Keith, W7DXX, has researched this matter extensively with FCC. The short answer is "yes." Of course, US operators must abide by their own license privileges since they are, in effect, the control operators. This means, for example, that Technician licensees who have not passed a 5 WPM Morse code test cannot use these systems below 30 MHz. (And Technicians who *have* passed their code tests can only operate in designated portions of the 80, 40 and 15 meter bands using CW, and on portions of the 10 meter band using CW, voice and digital modes.) Think of an Internet remotely controlled station as a transceiver with a *very* long microphone cord and you'll get the picture. (It's *not* a repeater.) These stations must abide by the US FCC rules in Part 97. An e-mail message from Bill Cross, W3TN, of the FCC that elaborates on this matter is posted on the W7DXX Web site.

Regarding operators outside the US, they can use these stations as long as there is a reciprocal licensing and operating agreement, such as CEPT, IARP, or bilateral agreements between their country and the US. You might also read FCC Part 97.3(a)(12) and (38) dealing with the definition of "control operators" and "remote operation."

Try Them!

As antenna restrictions become more severe throughout the country, remote-controlled stations like these offer a viable alternative for enjoying Amateur Radio—either by using sites that already exist or even creating one of your own. Do you want to put your station on the Web? Keep watching—N2JEU and W7DXX plan a follow-up article on that topic.

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