

Remote Control Over the Internet (RCoIP)

Ever have the urge to run your home station from your hotel room or vacation cottage? *TRX-Manager* makes it feasible.

Writing in January 2003, *QST Short Takes*, Steve Ford, WB8IMY, provided an excellent overview of the radio control program *TRX-Manager*.¹ Written by Laurent Labourie, F6DEX, *TRX-Manager* provides a rich array of radio and rotator control features, DX spotting, Logbook and more. The closing paragraph of Steve's *Short Take* had an enticing discussion of *TRX-Manager*'s ability to provide remote control over the Internet.

With *TRX-Manager* installed on a remote computer to act as the *master*, and on the base-station computer to serve as the *slave*, you can control many of the operating functions of your radio and carry on successful QSOs across the Internet. See Figure 1.

TRX-Manager Setup

Before attempting to set up remote communications, be sure *TRX-Manager* is successfully installed and fully operational as a base-station radio control program. Learn about its many features and thoroughly familiarize yourself with the setup dialogs. The more comfortable you are with *TRX-Manager* in general, the easier

¹ *TRX-Manager* is distributed in the US and Canada by Personal Database Applications, 1323 Center Dr, Auburn, GA 30011-3318; tel 770-307-1511; www.hosenose.com; \$69.

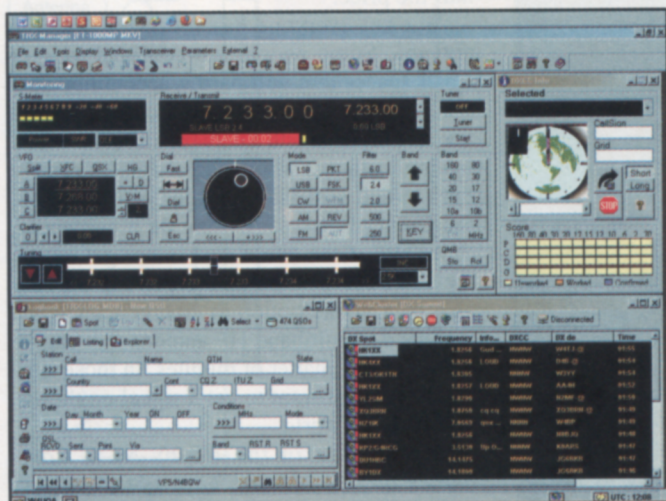


Figure 1—Screen grab of *TRX-Manager* operating remotely from a Mark-V transceiver on 40 meters. DX spotted on DX Summit is shown at the lower right, and the Logbook is ready for entry of QSO information.

you will find it is to set up *TRX-Manager* for remote control. The following is a brief summary of the steps to configure both the slave and master installations of *TRX-Manager*.

On the *slave* installation of *TRX-Manager*, click on:

1. Under "Parameters-Setup-TRX1"
 - Check "Dual Control"
2. Under "Parameters-Preferences-Transceiver/Rotator-Remote"
 - Check "Control enabled"
 - Check "Slave"
 - Select a "TRX-Address" (Address 0 is just fine)
 - Select "Telnet."

On the *master* installation of *TRX-Manager*, click on:

1. Under "Parameters-Setup-TRX1"
 - Check "Dual Control"
2. Under "Parameters-Setup-Rotator 1" (only necessary if you want to control your rotor)
 - Using the drop down menu under Rotator Model, select "Remote"
3. Under "Parameters-Preferences-Transceiver/Rotator-Remote"
 - Check "Control enabled"
 - Check "Master"
 - Select a "TRX-Address" (Specify the same address you selected on the slave.)
 - Select "Telnet"

As many *QST* readers know, all devices connected to the Internet have a unique address—known as the *IP* or *Internet Protocol* address. To connect, the master must know the IP address of the slave. There are three ways this can be done.

1. In the "Parameters-Preferences-Transceiver/Rotator-Remote" dialog, you can check "Notify IP address to" and you can also specify a delay in seconds. (See Figure 2.) *TRX-Manager* then sends the slave's IP address to the specified e-mail address. While you are working at the master, you can check your e-mail remotely and determine the slave's current IP address. This, of course, presumes that the IP address has not changed during the time between when the slave sends the e-mail and when you check your e-mail at the master.

2. A second strategy is to determine your base-station IP address before you leave home. You can use Internet resources such as showmyip.com to check your current IP address. If you're like most of us, however, your Internet service provider (ISP) assigns you a *dynamic* IP address, even if you have a cable or other high speed connection. While you can check your IP address, it is quite

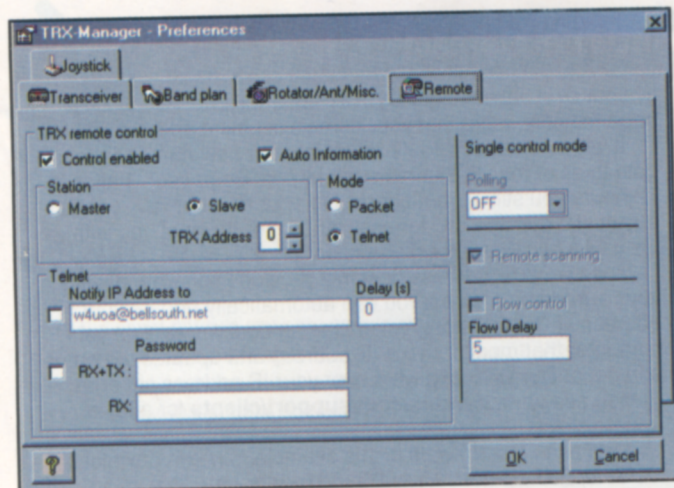


Figure 2—Setup window for *TRX-Manager* showing how to select the Remote Control functions.

possible that by the time you get to your destination, your IP address will have changed. This is particularly true if you're going on vacation and plan to do a little ragchewing with your buddies back home while sitting beside the pool at your favorite resort.

3. A third and much more reliable approach is for your base-station computer to have an Internet *domain name*. In this case, the audio and master/slave connections can be made by simply pointing each application to the base-station (slave's) domain. See the sidebar "How to Set Up Your Own Domain Name."

Audio Link

As Steve Ford suggested in his *Short Takes* article, a very workable strategy for the audio link is Microsoft's *NetMeeting* application. *NetMeeting* is distributed free with later versions of the *Windows* operating system. Setup is easy so long as you have already connected your radio's mic input and audio output to your computer soundcard. If you have not already set up this link, an Internet search for "radio soundcard interface" will yield a great many interface choices. For a good review, please see "The HF Digital 'Tower of Babel,'" by Steve Ford, WB8IMY, in the January 2001 issue of *QST*. For a Product Review of one of the latest interface offerings, see the April 2003 *QST* review of the West Mountain Radio RIGblaster Pro.

In addition to *NetMeeting*, you might consider *Skype*. *Skype* is free and can be downloaded from www.skype.com. Like *NetMeeting*, *Skype* must be installed on both the master and slave computer. *Skype* provides excellent audio quality and has proven to be very reliable.

TRX-Manager also comes with a program called *TRX-Audio*. Although not supported by the developer, it can provide an acceptable two-way audio link between slave and master. Based on personal experience, however, I recommend starting with *NetMeeting*. The following is a brief summary of the steps to configure *NetMeeting* on both the slave and master computers.

On the *slave* computer:

1. Under "Tools-Options-General"
 - I suggest entering your call as the First name, and "Station" as Last name. Under Directory Settings on this same dialog window, check "Do not list my name in the directory."
2. Under "Tools-Options-General-Bandwidth Settings"
 - When you set the speed of your connection, err on the side of underestimating your effective bandwidth. This is to ensure *NetMeeting* adequately buffers your audio in both directions.
3. Under "Tools-Options-Audio"
 - Check "Enable full-duplex..."

- Check "Enable auto-gain..."
 - Select "Adjust silence detection automatically"
4. Check "Call-Automatically Accept Calls"
 - If you don't do this, someone will have to be at the base-station (slave) to accept the incoming *NetMeeting* call.

On the *master* computer:

1. Use all of the same settings as above.
2. Under "Tools-Options-Audio," select:
 - "Let me adjust silence detection myself."
 - Start with the slider in the center position.

Connecting the Slave and Master

Before you leave home don't forget to:

1. Turn on your radio.
2. Turn on your rotator control box, if appropriate.
3. Start *TRX-Manager* with slave configured.
4. Start *NetMeeting*.
5. Be sure to check "Automatically Accept Calls" after you start *NetMeeting*.

Once you are at your remote location, start your RCoIP session by running *NetMeeting* on your remote computer. In the textbox to the left of the telephone icon, enter the IP address or domain name of your base-station computer and click the telephone. After a few seconds you should hear the audio from your radio.

Start *TRX-Manager* on your remote computer. When it has fully loaded, launch the "Terminal Window." You can do this from the menu "Windows-Terminal," or by hitting the Ctrl-t key combination. In the Terminal window click the "Telnet" tab. At the bottom of the Telnet window, enter the IP address or domain name of your base-station computer in the "Host" field and then click the green "connect" arrow. In a few seconds you will see communications text scroll by in the Telnet window, reporting the establishment of a connection to *TRX-Manager* at your base station.

Assuming you are familiar with *TRX-Manager*'s radio control features, you're ready for your first remote QSO. Your PTT is the KEY command button in the Monitor window. All the Monitor window functions are available to you from your remote computer.

Final Thoughts

I have met schedules with friends back home while on business trips and done demos under the watchful eyes of fellow hams. Every time I travel now I think about what opportunities I might have to meet my early morning coffee group on 40 meters before I start the business day. It has added a new dimension to Amateur Radio for me.

There are several important considerations worth noting. First, remote frequency tuning is not like moving the silky smooth knob on your FT-1000. As Laurent, F6DEX, points out, "The best way to tune a rig is with the knobs!" And, of course, he's right. Remote tuning is in steps, which you can control, but there is silence between each tuning step. While you can, with a little practice, learn to search to locate your next QSO, finding the early morning coffee group on an appointed frequency is a lot easier!

There is also the issue of latency—the elapsed time between your speech or keyboard action and when the event occurs at your station. This is most noticeable when you switch from transmit to receive and receive to transmit. Using a 2 Mbps (megabits per second) connection, I find the latency to be 2 to 3 seconds. As a result, you will frequently miss the first syllable or word after an over, and you must wait 1 to 2 seconds to un-key after your over or you will cut off your last few words. As we are frequently reminded, "Your mileage may vary." Experiment—that's part of the enjoyment of exploring new facets of this hobby.

Then there is the question of microphone and speakers. When I first started used *TRX-Manager* remote, I used a headset with a boom mike, thinking it was necessary for acceptable audio.

How to Set Up Your Own Internet Domain

To establish an Internet domain name, you must register your domain name and have a provider to which you can delegate name service. I chose www.dyndns.org/ and will use them in this example.

First create an account with **DynDNS.org**. Click on "Set Up Now" in the login box at the top right of the screen. Follow the instruction to create an account then return to www.dyndns.org/. Scroll to the bottom of the page and enter your chosen domain name, "**yourcall.com**," for example, in the textbox. Assuming your chosen name is available, you will be given the choice to either "Register with Custom DNS" or "Register Only." These are provided as hyperlinks at the top of the screen. Click on "Register with Custom DNS."

Assuming you have not previously registered your name, accept the default "No" and the default "Standard" user level. The one-year charge to register your domain with **DynDNS.org** is \$37.45. On completing your purchase, the last page of the purchase transaction provides a link to your domain's registration page. Go there.

Your domain has been delegated to ns1.mydyndns.org, ns2.mydyndns.org, ns3.mydyndns.org, ns4.mydyndns.org and ns5.mydyndns.org. These are the DNS name servers that will resolve your domain name into your IP address. **DynDNS.org** assumed you registered your domain name from the IP address of your new domain. To confirm your actual IP address you can point your browser to showmyip.com.

To confirm your IP address at dynDNS.org, click on "Account" at the top of the page. Under "Custom DNS" click on your domain name. If this is not the IP address you want your domain name to point to, click on your domain name under the word "Host."

You can use this maintenance page to manually change your IP address or take your domain offline. If you do not spec-

ify your own offline page, **DynDNS.org** will provide a default page to notify users that your domain is offline and unavailable.

It will take from 24 to 72 hours for your new name to propagate to all of the DNS servers worldwide. Be patient. If after 72 hours you still cannot connect to your new domain, contact support@dyndns.org for assistance. For those of you with a fixed or static IP address, you're done!

A dynamic IP address does not preclude you from having your own domain name. You can automatically update your IP address at **DynDNS.org** by running an *update client* on your computer that monitors your IP address and updates the name servers at **DynDNS.org** whenever your IP address changes. Please see www.dyndns.com/support/clients for a list of update clients.

I will use *DirectUpdate* in this example. You can download *DUSetup363.zip* from www.DirectUpdate.net/. Run *DUSetup363.exe* to install *DirectUpdate*.

DirectUpdate will connect to your base station computer as Localhost. Select the "Status" tab. Use the pull down menu to select "**DynDNS.org** (Custom)." In the "Domain:" textbox enter your domain name, **yourcall.com**, for example. Enter your **DynDNS.org** "User name:" and "Password:" in the textboxes provided. Click "OK." *DirectUpdate* will connect to **DynDNS.org** and update your IP address on the **DynDNS.org** name servers if they do not match current IP address. Click "Exit" and you're done.

DirectUpdate will always start when you start your computer. If your IP address changes, *DirectUpdate* will automatically update the name servers at **DynDNS.org**. I recommend you explore the features of *DirectUpdate*. You'll find that you can change how *DirectUpdate* detects your currently assigned IP address and how often it checks to see if your IP address has changed.

Recently, I've just used the speakers and mike built into my Dell laptop. While testing the Internet link for a recent demonstration, I worked a station on 40 meters who was surprised to learn I was talking to my keyboard. While I don't recommend getting rid of your Heil headset, if you're using a laptop for your remote Internet operations, don't be afraid to try out the built-in speakers and microphone.

RCoIP with *TRX-Manager* works. If you enjoy exploring at the convergence of Amateur Radio and computing, consider remote control over the Internet for your next adventure.

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QST

New Products

AM RADIO LOG, 26th EDITION

♦The *AM Radio Log*, edited by Wayne Heinen, NØPOH, and published by the National Radio Club, is a comprehensive source of information on AM broadcast stations in the US and Canada. The 26th edition is said to have nearly 3500 updates since the previous edition and consists of 276 looseleaf pages in 8.5x11 inch format. The pages are pre-punched—you provide a three-ring binder. Listings are organized by frequency and include call sign, location, transmit power and antenna configuration, operating hours, format, network affiliation and other information. The data is cross referenced by city and call sign, and there is a separate list of AM stereo stations. Price: \$25.95 postpaid for nonmembers in the US. See the Web site for pricing for NRC members and for shipping outside the US. For more information or to order, see www.nrcdxas.org or contact NRC Publications, PO Box 164, Mannsville, NY 13661-0164.

TAPR TADD-1 RF DISTRIBUTION AMPLIFIER

♦TAPR's TADD-1 kit is a six channel RF distribution amplifier designed to allow a single frequency source (for example, a GPS disciplined oscillator) to drive the external reference input of several test instruments. The usable frequency range is said to be 200 kHz to 30 MHz, and the maximum signal output level into 50 Ω is 2.75 V_{p-p} or 5 V_{p-p} with a high-impedance output. The RF and dc inputs are arranged so that two (or more) TADD-1 boards can be stacked, sharing common RF and dc inputs.

To minimize ground loops in sensitive test applications, the input and each of the six outputs is transformer coupled and dc blocked. RF connectors are of the ground-isolated BNC series. An optional band-pass filter can be installed to reduce spurious responses. Power requirements are 12 V dc at 150 mA max. Price: \$99 for TAPR members (\$109 for non-members). For more information, visit www.tapr.org/kits_tadd-1.html or e-mail tapr@tapr.org.