Radio Remote Control 1258MkII

As often happens with *QST* "Product Reviews" and "Short Takes," some of the best suggestions for new product reviews come from our readers. In this instance the suggestion came from Rick Hilding, K6VVA, who wanted us to take a look at the Remote Rig units being manufactured and sold by Mikael Styrefors, SM2O.

Interest in remote station operating is on the upswing, driven by the fact that so many hams are facing restrictions on their ability to erect effective antennas. For some it's a matter of local ordinances or lack of real estate, but for others it is the result of life-altering changes such as moving from homes to apartments. Thanks to products such as Mikael's Radio Remote Control 1258MkII, a "downsized" lifestyle doesn't have to mean abandonment of Amateur Radio.

Removing the Computer

Using the Internet to remotely control a ham station is not a new concept. However, most configurations require a computer at the radio (the "host") to communicate with the remote operator (the "client") and allow him to change frequencies, power levels, filter settings and so on. The computer is also needed to convert the audio signal from the radio to data for the Internet link and vice versa.

The 1258MkII effectively removes the host computer from the equation. Not only does it "talk" to the transceiver for control purposes, it also handles the two-way audio stream. This makes it much easier to establish a remote station. All you need is a radio, an antenna, an Internet connection and a 1258MkII — no computer required.

The 1258MkII Package

SM2O's Radio Remote Control package consists of two 1258MkII units. One is intended for installation at the host location while the other remains with the client. Both devices connect to Internet routers via Ethernet cables (one is supplied). We ordered the package directly from Mikael's Web site based in Sweden (**www.remoterig.com**) and it arrived within a week.

One of the most elegant approaches to Internet remote control is to use a transceiver that offers a detachable front panel such as an ICOM IC-706 series, Kenwood TS-480 and so on. The front panel resides with the client while the rest of the rig remains at the host. The 1258MkIIs are specifically designed to make this type of installation as seamless as possible. By plugging in the correct cables at both ends of the path, the 1258MkIIs perform the magic of linking the hardware as though you were simply connecting a *very* long set of control cables.

If you don't own the requisite "remotable" transceiver, you can still use the 1258MkIIs, along with a computer on the client end, to achieve the same result. For the purpose of this review, I remotely controlled a Kenwood TS-2000 with a Toshiba laptop running *Ham Radio Deluxe* (**www.ham-radio-deluxe.com**) software. The 1258MkIIs made the connection and *Ham Radio Deluxe* performed the control functions. As far as the software was concerned, it was connected directly to the radio through the laptop's USB "virtual serial port."

I connected a microphone to the client 1258MkII along with a small speaker. There is no need to run *Skype* or other VoIP software to handle the audio connection — it is all built into the 1258MkIIs.

Not Plug and Play

Once I had the 1258MkIIs completely configured, they worked perfectly. It was remarkable to hear the audio from the remote radio pouring out of the speaker. By the same token, on-air reports of my transmit audio were outstanding. In fact, no one guessed (until I told them) that I was 10 miles from the radio. The 1258MkIIs also include a CW capability that functions surprisingly well. You simply plug your key into the unit at the client end and adjust the front panel control to set your keying speed. Since the sidetone is heard on the client side, you're able to operate without being distracted by audio delays.

All that said, it is important to point out that 1258MkII system is most definitely *not* plug and play. Depending on the type of transceiver and microphone you are using, you may need to construct microphone adapter cables (I did). You must also open both units and configure the wire "strapping" jumpers to permit correct microphone keying as well as the correct audio pathways.

Finally, you'll need to know how to properly configure your network routers and software firewalls to allow the 1258MkIIs to pass data from one unit to the other. If you're not comfortable with network terminology and architecture, this could be a challenge. I've been working with computers for decades, so I found it straightforward. Others, however, may not.

There are no manuals for the 1258MkIIs as such. Instead, the setup information exists on several pages at Mikael's Web site. The units are well built and perform smoothly, but a comprehensive user manual, perhaps downloadable in PDF format, would be a huge benefit and would help expand their appeal beyond computer "power users."

Manufacturer: Microbit, Nystaden 1, 95261 Kalix, Sweden; **www.remoterig.com**. *$449. Purchase must be made from Mikael's Web site using PayPal.* QST

Steve Ford, WB8IMY ♦ *QST* Editor ♦ sford@arrl.org

If only you could operate at home with your station out at the lake … or maybe the club's big contest station on the mountain. But you don't like the idea of operating over a computer screen. Well, says renowned DXer OH2BH, that no longer has to be a problem.

Advances in Remote Site Control without Computers

BY MARTTI J. LAINE,* OH2BH

The personal computer and the internet made possible the ability to remotely control an amateur radio station, and continued fine-tuning has made this capability ever more available. This benefits radio amateurs who live in antenna-restricted neighborhoods, poor radio locations, or places where noise issues persist.

Still, many who may have wanted to take advantage of remotely controlled amateur radio operation lacked an extensive knowledge of computer and/or internet architecture. A recent approach using relatively simple interconnecting devices having their own internet protocol (IP) addresses (see "First Takes," May 2010 *QST*) has eliminated the need for a PC on each end of the remote-control circuit. The SM2O Remote Radio Controller (RRC) now opens the door to controlling a remote amateur radio station virtually from anywhere there's an internet connection (WLAN or Ethernet), with or without a PC.

For several years now, various radio-specific or general-purpose radio programs such as *Ham Radio Deluxe* have let you use your PC to remotely control a station. Audio was routed via the PC's sound card with third-party software such as *Skype* used to carry it over the internet. For many, however, operating a station via a PC display with a mouse does not offer the same satisfying look and feel of operating a real radio. Employing the IP-address-based concept consolidates all signal paths (except RF, of course) within a single path. The RRC acts like a server at the radio end with its own IP address, allowing the remote-site unit to engage in direct two-way communication with the radio. The SM2O PC client lets you operate while on the road using nothing more than a laptop and a small USB "stick." An audio codec optimizes and digitizes speech with good voice quality and minimized latency, all with less than 500 kb/s internet speed.

This is all that Jaakko Silanto, OH1MA, has at home while operating his powerful remote station where large antennas and quiet reception help him work major DX. (All photos courtesy of the author)

Look, Ma! No PC!

As described in the "First Takes" article last year, the RRC concept took advantage of transceivers having separable control heads, such as the Kenwood TS-480 or ICOM IC-706. The head remained at the operating position, while the body was installed at the remote site. The latest RRC wrinkle now takes advantage of a radio's serial port (CAT) to command and control the same or similar radio at the remote site. The radios communicate with each other with the help of the RRC unit. This means that Radio 1 at the operating site can control

The latest version of laptop-based Remote employs an RRC PC Client which packages the needed software, audio codec, and PTT function into one slick unit the size of a USB memory stick. You just have to download the radio software from the web and you will be in control of your radio wherever you are.

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Control and remote RRC units utilize three communication channels; a simple text-based SIP protocol is utilized for radio-to-radio communication, while a UDP datagram protocol is used for control and audio streams. The RRC unit also provides two additional serial ports for connecting devices such as an amplifier and a rotator control.

all functions of Radio 2 at the remote (i.e., antenna) site, just as if the entire station were at the operating site.

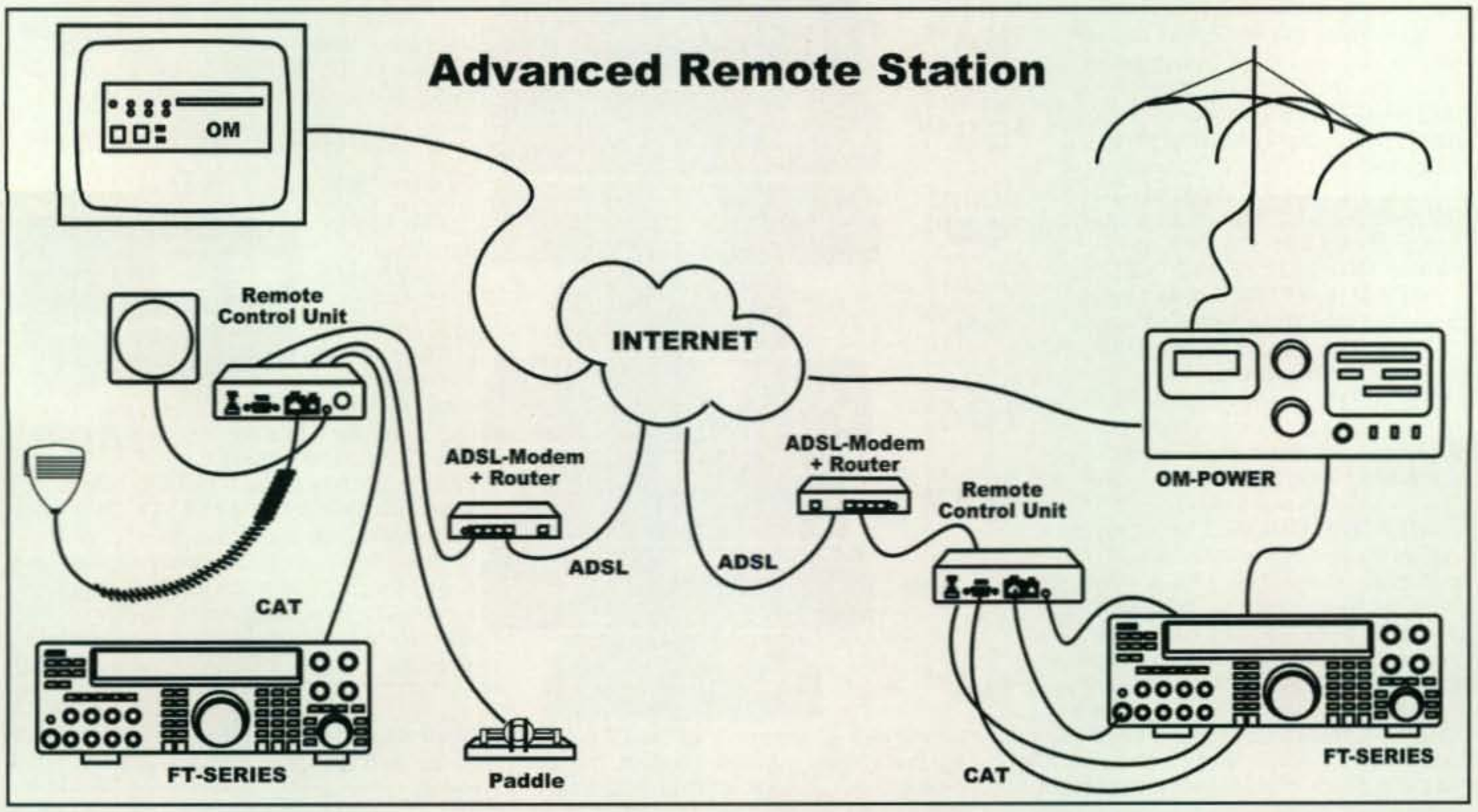
When Radio 1 switches or tunes the bands, so does Radio 2. But hold on! It gets even more exciting. The radio at the operating position can even display S-meter readings from the remote radio by using a calibrated S-meter table. Even the power switch—turning the radio on or off at home—will turn the radio on or off at the remote site. The latest RRC has added CW capability, including a keyer, so that smooth CW would also be available in remote operation. Monitoring CW sending at the operating site is part of the RRC; thus there is no problem to deal with latency issues.

It now is even possible to have different radio models on each end, as long as they use the same CAT protocol and have essentially corresponding front-panel controls. (This new concept applies initially to the Yaesu family of radios sharing the same serial communication command base.) Applying the same approach to other manufacturers' radios should be easy, and I believe that future radios will incorporate these features or offer them as an option.

Amplifier and Rotator Remote Control

Until now, operating a remote-site amplifier or beam rotator typically has involved your logging computer at the operating site. But even here new winds are blowing, so it is reasonable to have an amplifier than can be truly controlled and monitored over the internet using an HTTP approach. Here you should have web-browser-based software on your logging PC that enables the PC to communicate with an amplifier having an IP address, to set and show its operation on a real-time basis.

Radio Arcala (OH8X), a Finnish high-tech consortium, jointly undertook with



The overall station layout connects all necessary building blocks together in a simple way that today's ham operators are bound to know in the contemporary internet-dominated world. Changing between local operation and remote operation is as easy as changing the microphone and headphones. No RF or data-related cables need to be touched.

the European OM-Power amplifier manufacturer to work out such a concept—the first of its kind. It lets you communicate with the amplifier over the internet and see its functions just as though the amplifier were sitting on your operating table. Here the amplifier is not connected to a local computer as currently is often done through an RS-232 port; rather it is hooked up directly with the internet. Radio Arcala <http://www.radioarcala.com> offers the needed open-source software.

Only a few commercial rotators currently fit into the remote-control scheme, although Yaesu's DXA series can be an integral part of the radio and therefore can be controlled from the radio itself. While IP-addressed interface boards are just becoming available for standard rotators, all requisite technologies and building blocks are avail-

Several of the hams working to make traditional amplifier technology and latest IP technology talk to one another. From left: Toni Linden, OH2UA; Martti Laine, OH2BH; Tibi Ferenec, OM3RM; Ivan Miroslav, OM3LZ; and Jozef Lang, OM3GI.

Adding an IP-based radio controller and amplifier interface to your station will not change the traditional layout or assume extra space or heavy wiring but will keep your station's operating convenience and ergonomics intact. It is noted that in some cases, the operator has reappeared among the family members with his laptop (but is still on the air!).

Remote Station Vocabulary

Remote Radio: A remote site controlled from elsewhere.

Control Head: Where the remote radio is controlled by radio software or with another radio.

IP Address: An Internet Protocol Address is a numerical label assigned to each device participating in a computer network that uses the Internet Protocol for communication. An IP address serves two principal functions: host or network interface identification and location addressing. Its role has been characterized as follows: "A name indicates what we seek. An address indicates where it is. A route indicates how to get there."

HTTP: The acronym for Hyper Text Transfer Protocol, the underlying protocol used by the World Wide Web. HTTP defines how messages are formatted and transmitted, and what actions web servers and browsers should take in response to various commands. For example, when you enter a URL in your browser, this actually sends an HTTP command to the web server, directing it to fetch and transmit the requested web page.

Latency: Latency is simply defined as the time delay observed as data transmits from one point to another. Usually, to determine network latency the origin and destination points are used. A so-called low-latency network connection is one that generally experiences small delay times, while a high-latency connection generally suffers from long delays. 500-ms latency is widely used as the limit for speech.

SIP: Session Initiation Protocol, a very simple text-based application-layer control protocol. It creates, modifies, and terminates sessions with one or more participants.

UDP: Universal Datagram Protocol, a protocol to transfer sequential data over data networks.

URL: Uniform Resource Locator, the technical name for the address where a specific web page is found.

VoIP: Voice over Internet Protocol; general definition of voice services delivered over IP networks.

able to allow the remote station to play simply and efficiently. Once again, none of the elements used here suggest that you have to communicate with a PC at the remote site, an issue that typically has been a source of many shortcomings and hassles.

IP Addressability is King

The key to a remote world is having all radios and station accessories IP addressable. This permits the operator to control them locally or remotely in the same fashion. This scenario is coming soon, prompted by hardware and software options on hand today. The IP initiative for hardware radios has been presented to the radio manufacturing industry, and the RJ jack with related circuitry soon will allow you to hook up each piece of your station gear with the internet.

Realizing the magic of SM2O's approach, Radio Arcala had the vision to incorporate this smart concept into full-featured radios and devoted its application knowledge for the common good.

Remote Radio Controller (RRC) A Technical View

RRC is an intuitive way of utilizing existing VoIP technology. The connection established between the control end and the radio end uses the world standard session initiation protocol (SIP).

RRC boxes are built around reliable ARM microprocessor technology which interface with Ethernet networking, digital input/output (serial ports and PTT/CW), and audio channels for transmit/receive audio.

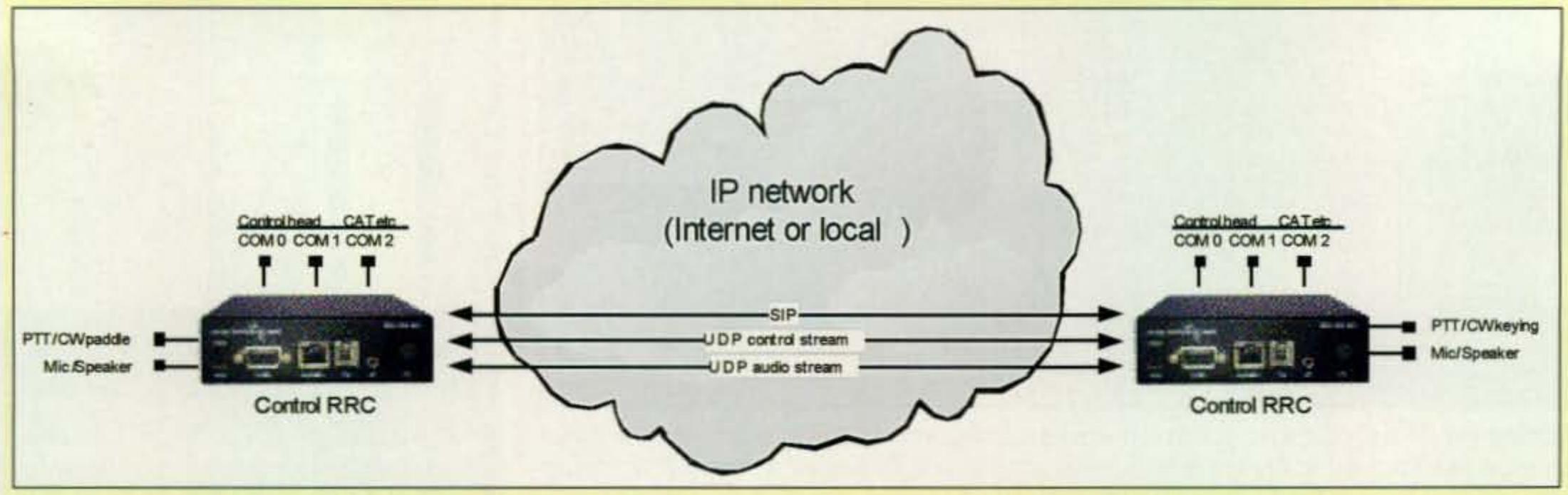
Audio coding in RRC features low latency, as there is really no processing power available to do compressed audio coding which would add audio coding/decoding but save network bandwidth. Several audio quality levels are available, even for low network speeds below 100 kbit/s. Better audio quality means more network bandwidth; highest quality consumes over 300 kbit/s network bandwidth but offers very good audio quality and dynamics. The latest version of Remoterig devices also feature dual audio channels to deliver both main and auxiliary receiver audio to the control end.

RRC comes with three serial ports which are tied together with the corresponding ports on the device at the other end; serial-port traffic flows multiplexed in the control data stream among PTT and CW information.

RRC functions well over firewalls and NAT technology, which is widely used in home broadband network routers, etc., from a single address which is managed by the broadband router. The router takes care of directing the inbound return traffic from the internet to the right machines. A Remoterig session is always established by the control end, which creates all connections to the remote end.

RRC is also capable of announcing the IP address it is assigned to a DynamicDNS service, making it reachable even with a dynamic IP address which changes periodically.

Erik Finskas, OH2LAK
Remoterig Technology Review



Connections and data paths between the Remote Radio Controllers at the control end and the remote end of the circuit. The two ends may be located anywhere that a broadband internet connection is available.

If amplifier noise and heat bother members of the household in a local operation, the small remote unit is all that is needed at the traditional station. The amplifier itself can be placed some 10 meters (30 feet) away from the station, connected over the internet.

What is now reality is so-called "Plug and Play Fixed Remote" at the highest level, connecting full-featured radios remotely to similar radios or using economy radios as their control heads.

The Mother Ship

Today, Radio Arcala members all are connecting to the OH8X Mother Station, allowing those desiring to operate to do so with the flip of a switch from the kind of radio station they cannot build themselves. Ultimately, Radio Arcala members will gather in a virtual world clubhouse from which they can make contacts as well as socialize and learn from each other in a 3D virtual world.

Many have wondered whether the internet is a threat or an opportunity for amateur radio. Clearly it is the latter, and recent innovations such as I've described clearly illustrate the coexistence of both worlds where one benefits the other. With many current supportive tools available on the web, it is time to appreciate the internet as a powerful tool that can enhance amateur radio and help make the younger generation more aware of its existence.

Yasme Foundation Director (and this article's author) Martti Laine, OH2BH, presents the 2010 Yasme Excellence Award to Michael Styrefors, SM2O, at a ceremony on board the cruise ship where two remote stations were operated as part of a live demonstration. Michael is only the seventh person to be so honored.

Remote Radio Interface Developer Honored by YASME Foundation

The 2010 Yasme Excellence Award was presented to Michael Styrefors, SM2O, who developed the Remote Radio Interface. The ability to connect radios and operators transparently and robustly over the internet is a key technological element in putting top-grade remote HF stations on the air—something which is more common every day. Remote stations will undoubtedly be important and popular in making and keeping amateur radio available to urban and suburban amateurs as they deal with mounting antenna restrictions and an increasingly noise-filled and interference-prone electromagnetic environment. For more information on the Yasme Foundation, visit <http:// www.yasme.org/>. *(© Reprinted with permission from Yasme Foundation website)*

This is how the remote amplifier appears on a local computer screen. With HTTP technology, you can control each function with your mouse, see the actual power and monitoring LEDs, plus receive a stream of messages on amplifier functionality. You need not worry about the amplifier being away where it will not cause noise or interference.