Meet The New Guy

Welcome to *CQ*'s new "Digital Wireless" column. My name is Steve Stroh, N8GNJ, and I'm the "new guy." This column is a successor to Buck Rogers' "Packet User's Notebook," but it's also different, with a broader focus on everything digital in amateur radio. I want to use this first column to introduce myself and to try to explain what you can expect from the column in the coming months.

First, I feel thrilled and privileged, and more than a bit awed, to have been offered this assignment. A quote from Sir Isaac Newton applies to my writing here: "If I have seen further it is by standing on ye shoulders of Giants." One of the first of my "Giants" was Bdale Garbee, N3EUA, for his beloved "Bits In The Basement" column which ran in TAPR's "Packet Status Register" newsletter a number of years ago. Bdale truly did see further, and by his writing about leading-edge topics, inspired many, many hams who wondered "... is this *all* there is? Bdale's answer was a profound *no*—there are many more interesting things out there.

Greg Jones, WD5IVD, the immediate past-President of TAPR (Tucson Amateur Packet Radio), personally encouraged me to write more about leading-edge wireless technology (about which I was writing professionally already) in amateur radio venues such as "Packet Status Register" and *CQ*. Don Rotolo, N2IRZ's, column in *CQ VHF* was consistently great and interesting, and I always learned something new from Don's column. Dewayne Hendricks, WA8DZP, shook up my life late one Saturday night in 1996, when I helped host the 1996 Digital Communications Conference in Seattle, and I've never been quite the same since. Dewayne's insights on where wireless technology was headed inspired me to begin my writing career (this was *interesting* stuff), and now that has come full circle.

Last, for now, two hams in the Cleveland, Ohio area—the late Maynard Weston, W8MW, and Tom Kryza, KB8CI, with whom I've regretfully lost touch—helped get me started in pack-

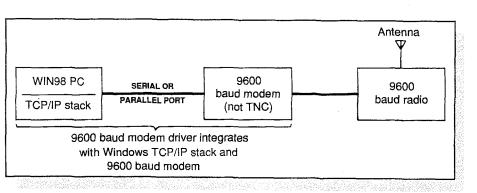P.O. Box 2406, Woodinville, WA 98072
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Fig. 1– Block diagram of a no-TNC, 9600 baud packet station, as described in the text.

et radio. Thanks *very* much, Maynard and Tom!

I've been licensed since the mid-1980s. My primary interest in amateur radio all along (including the years of interest prior to obtaining my license) has been focused on digital communications, and much of how I view the hobby is filtered through that lens. For example, my (latent, at the moment) interest in HF and satellites is digital communications.

Since late 1987 I have lived in the Seattle, Washington area. When I moved here from Ohio, I fell in with a crowd of techies then called NAPRA, Northwest Amateur Packet Radio Association, which had a digipeater network (on nice high mountaintops) of a sort that was in the very early stages of getting organized in Ohio. I've continued my involvement with this same group for more than ten years now, and I'm lucky to have them as a resource in writing this column.

The Puget Sound Amateur Radio TCP/IP Group and Network (a name I have created, as the informal name doesn't "convey" its purpose very well) is one of the more impressive amateur packet radio networks in the country. Currently we have six 9600 baud bit-regenerative repeaters in the Seattle area on various bands (including one portable repeater at my home on 222 MHz, which was elegantly built into an ammo can by Dennis Rosenauer, AC7FT/VE7BPE) with as many as three more under construction. All of them have Linux-based routers and access

to the Internet, and are used primarily for TCP/IP. The main purpose of this network is training, experimentation, and *fun!* You'll hear a lot more about what we're doing in the Pacific Northwest in the future.

Since the mid-1990s I've been involved with TAPR, which I consider one of amateur radio's true gems. I think it is vastly under-appreciated for *all* that it does. Currently I am Coordinator of TAPR's Networking Special Interest Group (NetSIG) and Coordinator of the 2000 ARRL and TAPR Digital Communications Conference to be held in Orlando, Florida on September 22–24, 2000. For a time I was Secretary of TAPR, and this allowed me to get to know the organization from the inside, and to acquaint myself with many of the current members of the Board of Directors. I frequently will write about TAPR and its projects in this column.

Earlier this year, my close association with TAPR led directly to a major "upgrade" in my career. I am now a full-time independent technical writer, columnist, speaker, and consultant, focusing on wireless internet access. I currently write three other columns, all on that topic—wireless internet access—and contribute feature articles in addition to the columns. I'm also working on a book on wireless internet access which is almost complete and will be published later this year. Prior to my career change, I was a self-taught System Administrator for a major company. I feel blessed and honored to have been able to develop enough writing work in my

chosen field to comprise a full-time job. My "core knowledge" of wireless came from my experiences as a ham, and that part of my career will often cross over into my writing about amateur radio.

IP Everywhere

I'm an advocate of IP *everywhere*. It's a core belief of mine that IP (Internet Protocol) is "good enough" for many, many functions in telecommunications, including wireless. For example, Voice Over IP (VOIP), sometimes called Voice Over Internet (VOI), is becoming the most cost-effective way of handling voice calls. I hasten to emphasize that I'm not saying that TCP/IP is ideal. However, the profound thing about TCP/IP is that (1) it is flexible and works *well enough*, (2) it is by far the best supported networking protocol on the planet, and (3) it is extensible and can grow to support new requirements, as has happened with IP version 6.

Please don't make the mistake, as *so* many have, of equating the utility and usability of TCP/IP based on *particular* implementations of TCP/IP for amateur radio. An equivalent of this would to be say that SSB doesn't work well at all, when in fact the radio you used was defective. I'll explore IP Everywhere in depth in future columns

Closely related is my belief in, and advocacy of, Spread Spectrum and related communications technologies (such as Ultra Wideband). Spread Spectrum allows far, far more efficient use of wireless spectrum. It seems to me the very worst type of abuse for a service that has as two of its "missions" advancement of the radio art and experimentation is to be so rigid in spectrum allocations that "... Sorry, no more room for your new system; go elsewhere if you want to try something new" is the most typical response to someone wanting to put a new system on the air.

My wake-up call about how badly we are abusing our "gift of spectrum" came during a speech given by Lyle Johnson, WA7GXD, at the 1996 Digital Communications Conference (see <http://www.tapr.org/tapr/html/lyle.banquet.html>). Very recently, Dale Hatfield, WØIFO, Chief of the Office of Engineering and Technology of the FCC, basically told amateur radio that it's doing a poor job of deploying new technology, particularly spectrally-efficient technology, and the countdown clock is ticking (see this month's "Washington Readout" or <http://www.fcc.gov/Speeches/misc/dnh061700.html>).

The recent amateur radio rules changes regarding Spread Spectrum

were a start, but only just that—a start. We need to go further.

One example of how capable Spread Spectrum technology is came from an amateur who had built his own spread spectrum system. As a test, his system is frequency-hopped specifically on the *input* channels of a large number of southern California amateur radio repeaters, with no one noticing, largely because the dwell time on-channel was a barely perceptible fraction of a second (*nonetheless, this is* not *a recommended practice—ed.*).

TAPR is developing a Spread Spectrum radio that hopefully will become available in 2001. This is a unique design specifically for the needs and requirements of amateur radio operators. It has the potential to begin the Spread Spectrum revolution in amateur radio, as the TNC-1 and TNC-2 did for amateur packet radio. I'll cover the SSR project extensively in this column.

In the interest of full disclosure, I am one of those "evil" folks who advocate the *selective* (not wholesale and indiscriminate) interconnection of amateur radio networks with the internet. There. I've said it, and hopefully you'll actually read these words in print. One of my absolute favorite examples of just such an "internet interconnect" that makes sense is the rapid emergence of *Igates* used in APRS (Automatic Position Reporting System) networks. Igates allow an APRS user to exchange short text messages with any other APRS user, knowing only another person's callsign. The Igate network will "route" the message from source to destination, making effective use of the internet for the backbone message transport, and using radio for what it does best. This topic requires extensive discussion and more than a bit of education in the future. It follows, then, that I'm not wholly supportive of a complete ham radio parallel to the internet, as Buck Rogers, K4ABT, proposed in his column in the June 2000 issue of *CQ*. Many of Buck's ideas have merit, but I disagree with others, and I'll state my case about AmNet in detail in a future column.

In my career as a writer, I live on the internet for much of my work day. One convention I have, which may take a bit of getting used to, is that I will quote a web address for almost any topic, manufacturer, etc., that I write about. I'll write about what I consider the high points, novelties, and subtleties of the news, product, etc. With the web address, *you* have the ability to do your own follow-up if you're seriously interested. As far as I'm concerned, internet access is as

necessary for business, personal life, and being an involved citizen as the telephone was to earlier generations.

I'm also a fan (mostly passive, at this moment) of using the Linux operating system in amateur radio. I'm in awe of the incredible capabilities of Linux and some of the things it makes possible. Linux has finally "met me halfway" with distributions that feature a reasonably friendly Graphical User Interface. My anticipated usage of Linux is mostly utilitarian; Linux and a cheap (older) PC make a great router and "black box" device that costs so little and does so much that it's worth dedicating an entire PC to the task. Becoming comfortable and effective with Linux is a skill of the present, not the distant future. Since I'll be learning Linux as I go, I'll keep you posted on the high points of that adventure.

2000 Digital Communications Conference in September

As I mentioned earlier in the column, the 2000 ARRL and TAPR Digital Communications Conference (<http://www.tapr.org/dcc>) is being held September 22–24at the Orlando Airport Marriott Hotel (7499 Augusta Drive, Orlando, FL 32822; Marriott phone number 407-851-9000, fax 407-857-6211). I *highly* recommend attending the DCC if any of what I wrote above resonated with you as an interest of yours. I call the DCC "Amateur Radio's Research and Development Conference." As always, there will be plenty of opportunities to learn from others who are doing interesting things, including internationally. Co-sponsors of the DCC this year include Packet Radio User's Group of Japan, Lake Monroe Amateur Radio Society, Orange County (FL) ARES/RACES, Seminole County (FL) ARES/RACES, and the Orlando Amateur Radio Club. Reservations for the DCC (only; call the Marriott to reserve a room) should be made by contacting the TAPR office at 940-383-0000 or e-mail <tapr@tapr.org>, or fax 940-566-2544.

High-Speed Wireless

One of the joys of the internet is a fast connection to the internet. Prices of Digital Subscriber Line (DSL) service are becoming quite reasonable, and it makes an absolute world of difference in your online experience to have a fast connection to the internet. My home is currently out of range for "conventional" DSL, so I opted for a DSL variant called IDSL—ISDN (Integrated Services Digital Network) DSL—which provides me with a 144 Kbps connection.

For now this is fast enough, and the fact that it's on all the time (as opposed to dial-up connections) makes even more of a difference.

I've experimented briefly with using my laptop and a long Ethernet cable to allow me to do some writing from my deck in the warm Seattle-area sunshine. That was nice, but ultimately it was unworkable because of the requirements to keep doors closed, etc. What did work well was the use of an "802.11" Wireless Local Area Network card and an "access point" attached to my household Ethernet network. The combination makes a startling difference, and it's delightful to be able to take the laptop anywhere around the house and still be in full contact with the internet, able to print, access the other PCs on the LAN, etc. Prices on 802.11 equipment are falling rapidly, with PC cards for laptops costing as little as $150.

A quick note: If you are buying new, make sure you get 802.11**B**, which operates at 11 Mbps, instead of the older 802.11, which operates at only 2 Mbps. If you see a product marked as having been tested to WiFi specifications, it is 802.11B.

TCP/IP and 9600 Baud—Painlessly!

I hinted above that many current TCP/IP implementations in amateur radio are "less than optimum" and have given many a "bad taste" of TCP/IP. What would be ideal is a "clean" way to implement "Amateur Radio TCP/IP" with a Windows system, and have it work well. If there was a relatively simple, reasonably inexpensive way to do Amateur Radio TCP/IP on a Windows 98 system, then TCP/IP might well become much more popular.

In the ongoing quest to have new members join our hobby, it's a theory of mine that amateur radio is a lot more interesting when it's explained in the context of something already understood. For the majority of computer users, that's Microsoft Windows, with its reasonable built-in internet capabilities such as Internet Explorer and Outlook Express for e-mail, and an adequate Telnet client.

For several years now it's been possible to put together such a system, and best of all, one which does not require the use of a TNC and its awkward KISS mode. Instead, a simple 9600 baud modem is used. While a TNC is often referred to as a "modem for radio," in reality it is much, much more than a modem. Therein lies the problem with

TCP/IP, which works best if it is able to do more of the "work" of packet communications than the TNC "allows."

The final link of the system is the radio, and there are far, far more choices for 9600 baud radios than there have ever been. Excellent, inexpensive data-only radios are available from Tekk and MFJ, with commercial data-only radios potentially being available from Maxon and Motorola.

The "glue" that holds such a system together is driver software that connects the "simple 9600 baud modem" into the TCP/IP communications "stack" of Windows 98. The combination works well, and "notifies" Windows that the connection is a slow one. Windows then adjusts timing settings in the TCP/IP stack accordingly.

All the pieces have been available for some time, but to my knowledge there hasn't been anyone who has "put them

all together" and written a paper or article, etc., that thoroughly documents this project. A friend of mine has gone much further than I have in this project to date, and will be releasing the info on his personal web page and even support it with a mailing list. However, he's not quite ready to go "live" with this project, so more details will have to wait for a future column. To answer a likely question... no, this idea doesn't have much overlap with Windows-based TCP/IP systems mentioned in recent issues of *CQ*.

Write To Me!

Please do write to me; e-mail is strongly preferred. Let me know what you think, let me know what you'd like to read more about, and most of all, let me know what's going on with you and your circle of digital hams.

73, Steve, N8GNJ