# NCPA Downlink

**The Official Journal of the Northern California Packet Association**
**Serving Amateur Radio Digital Communication in Northern California**

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## In This Issue



# The President's Letter

*Eric Williams, WD6CMU*
*NCPA President*

When N6RAL announced at the August board of director's meeting that he was unable to continue as president of the NCPA, it could not be said that there was a rush of people volunteering as his replacement. Being president of an organization like the NCPA that includes so many diverse interests is not an easy job. You'd have thought I'd have learned that when I was president back when NCPA was formed in December of 1987, but here I am again, thanks in part to the help of KB6OWT, who assumed the duties of vice-president, and N6QMY, who will be taking over as treasurer as soon as we get the bank papers all signed.

Packet is an exciting aspect of our amateur radio hobby, so much so that it brought me back from almost total inactivity over five years ago. It is the only medium today where the constraints of time and frequency can be overcome — two hams no longer have to be on the same frequency at the same time in order to have an exchange of information. On the other hand, packet also has its own unique price to be paid in order to realize its full potential. Cooperation and coordination between packet installations is not an option, but is an essential part of a working packet network. This is where the NCPA comes in.

The choice of name for the NCPA is appropriate. We are an association of related interests, not a ruling council. NCPA is a catalyst for coordination between these interests, but it does not decree what form that cooperation must take or have means other than peer pressure to enforce it. Our strongest method of persuasion is in educating people about what *works* and what *doesn't work* in the packet world, because reality is a hard thing to argue against. (Not that some hams haven't tried once in a while!) Perhaps it's the laid-back California attitude that has resulted in this structure, or maybe it's just the path of least resistance for your board of directors. Either way, there is one consequence that you

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# Taking Your First Steps with Packet Radio

*Larry Kenney, WB9LOZ*
*NCPA Education Coordinator*

You've heard a lot of interesting talk about packet radio or you've seen packet demonstrated at a friend's QTH, so now you've decided to buy a TNC and get on the air yourself. What kind of TNC should you buy? There are so many different types on the market now it can be a difficult decision to choose just the right one. First, you have to decide whether or not you want just packet, or whether you also want RTTY, AMTOR, BAUDOT, FACSIMILE, and CW too. You can buy a "packet only" TNC for less than $150 or you can spend more than double that amount for an "all mode" unit. Shop around, ask others who are already on packet for their opinions, and then choose the one you feel is best for you. If you plan to use the TNC on the low bands, you'll need to make sure that the one you buy is capable of tuning HF. Many units are made for VHF FM use only.

When you buy your TNC you'll find that cables are supplied with it for connecting the unit to the radio, but you'll have to buy the appropriate mic and speaker jack connectors for the radio you're going to use. You also have to furnish the cable that connects the TNC to your computer or terminal. In most cases, the standard RS-232 port is used between the TNC and computer, however this varies with the type of computer

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# Editorial

*Mike Chepponis K3MC*

Welcome to the NCPA Downlink's Fall 1990 issue!

We've had a blast putting this thing together. We've had an extraordinary outpouring of writer activity this month. Many new authors are featured in this issue (as well as our superb "regulars"!).

We've got an excellent beginner's article by our NCPA Education Coordinator, Larry Kenney, WB9LOZ. Please let Larry know how you feel about things like this! Maybe some of you "old timers" out there can use Larry's article to help Elmer one of your buddies into Packet. (Be sure to tell 'em about NCPA, too...)

In addition, we have Fred, K6RAU's article on how he goes about doing BBS coordination. Fred is the NCXPN BBS coordinator, and NCXPN (The Northern California aX.25 Packet Network) is one of the organizations under the NCPA umbrella. A related article talks about how to get your new BBS to work harmoniously with the NCXPN-coordinated BBSs, by KE6LW, the NCXPN BBS Standards Coordinator.

Steve, KA6ETB, talks about NTS, and how it relates to Packet, W5SMM writes about APLINK (you may have heard about this, here is the scoop!), and WW6L does some daydreaming...

Tom Wood, N6IXX, puts in a wonderful piece on the DX Packet Cluster; this gentleman really has a knack with words! Tom was just starting to get going as DXPSN representative to NCPA, when his employer (PG&E) yanked him from the area. Tom jokes about FarmNet; I hope he gets some big antennas up and keeps in touch with us!

In addition to all that excitement, we present two articles on 9600 baud FSK that is beginning to catch on here in the Bay Area. KH6JUZ talks about the easy way to get on, and N6VUW, the Great Populizer of 9600, also gives us the the Fast Talk. For balance, we also print a Japanese development: their use of 9600 baud FAX modem chips.

And, we are starting what we hope will be a regular feature: Our Book Review Corner. This month, our Book Reviewer, Pat N6QMY, tackles "Your Gateway to Packet Radio" by Stan Horzepa, WA1LOU.

Lastly, please remember that NCPA is YOU! YOU make it happen, it's your participation that makes it all work! I continue to look forward to your suggestions for future newsletters, and I welcome your comments on this or any newsletter. It is best to send your notes & ideas via packet to me at the address below.

So, from the San Francisco Bay Area, the Best Place in the World for Packet Radio, let me say until next time...

73!
Mike Chepponis
K3MC @ K3MC.#NOCAL.CA.USA.NA

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## The NCPA *Downlink*

*Editor:*
Mike Chepponis, K3MC
BBS: K3MC@K3MC.#NOCAL.CA.USA.NA
TCP/IP: mike@k3mc.ampr.org
Internet: k3mc@apple.com
or: mac@leg.ai.mit.edu
AppleLink: chepponis
CompuServe: 72117,2732
US Mail: 211 Kansas Way, Fremont CA 94539

*Layout/Typesetting:*
Eric Williams, WD6CMU
BBS: WD6CMU @ WD6CMU.#NOCAL.CA.USA.NA
CompuServe: 71336,1424

*Publishor/Mailing:*
Glenn Tenney, AA6ER
BBS: AA6ER @ K3MC.#NOCAL.CA.USA.NA
Internet: tenney@well.sf.ca.us

*Staff:*
Patrick Mulrooney, N6QMY
BBS: N6QMY @ N6QMY.#NOCAL.CA.USA.NA
Internet: pat@ubvax.ub.com

Steve Harding, KA6ETB
BBS: KA6ETB @ N6LDL.#NOCAL.CA.USA.NA
Internet: steveh@atherton.com

Larry Kenney, WB9LOZ
BBS: WB9LOZ @ W6PW.#NOCAL.CA.USA.NA

Jeff Komori, KH6JUZ
BBS: KH6JUZ @ N6LDL
Internet: jeffk@sgi.com

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# Taking Your First Steps with Packet Radio

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and TNC used. The operating manuals supplied with the TNCs have a good write up on the various computers and the cabling needed. I would advise that you read the introduction and set up procedures for your particular TNC very carefully. Most companies have supplied excellent manuals, and you usually can figure out everything you need to do to set up your TNC from the information supplied in the manual.

Once you have everything wired and connected together, turn on the computer, load a terminal program (anything used for a phone modem will work well for packet) and get into receive mode. Now turn on the radio and make sure the volume is turned up about a quarter turn (about the "10 o'clock" position) and make sure the squelch is set. It should be at the point where the background noise disappers, just as it would be set for a voice QSO. Next, turn on the TNC. You should receive a "greeting" or sign on message on your computer screen showing the manufacturer's name, software version, etc. If you see a bunch of gibberish it means that the data rate of the TNC and computer are not the same. This data rate is better known as the baud rate. The baud rate of the TNC has to match the baud rate used by your computer terminal program. This is easy to adjust. You can change the terminal program to match the TNC, or vice versa. Check your TNC manual for the procedure as it varies from TNC to TNC. If you don't see a "greeting" or the gibberish, check your cables and connections. Make sure that you have everything connected properly, that the right wires are on the right pins, and that everything is secured tightly.

Now you need to know about the three levels of communicating you can do from your keyboard. First, you can communicate with your computer for setting up the terminal program; second, you can communicate with the TNC; and third, you can communicate with the radio. It's very important that you know which level you're in when working packet. I can't help you much with the computer level, since that varies with manufacturer, model and the terminal program you're using, but once you get the terminal program ready to receive data, you're ready to talk to the TNC.

First, do a "control C" (simultaneously press the CTRL and the letter C keys); this puts the TNC in COMMAND mode, the level where you communicate directly with the TNC from the keyboard. You should see "cmd:" on your screen. Enter "MYCALL xxxxxx" replacing the x's with your callsign, such as "MYCALL WB9LOZ" followed by a carriage return (CR). All commands are followed by a (CR). This sets into the TNC memory the call that you're going to use on the air. Now if you type "MYCALL" (CR), it should respond with your call. If it does, you've proven that the computer to TNC linkup is working fine. If you do not see anything on the screen when you type, blindly enter the following: ECHO ON (CR). If you see two of everything that you type, such as "MMYYCCAALLLL," enter ECHO OFF (CR).

You're now ready to go on the air! Tune the receiver to any odd numbered frequency between 144.91 and 145.09 that has some activity on it and set the rig up for simplex operation. Enter "MONITOR ON" (CR), then watch the screen. You should soon be seeing the packets that are being sent over the air by other stations. If you don't see anything in a minute or two, try tuning to another frequency. Watch for callsigns and jot down a few of the ones you see, including any numbers at the end of the calls.

In packet, you can have up to 16 different stations on the air at the same time using the same callsign. That's where the numbers in the callsign come into play. The calls W6PW, W6PW-1, W6PW-2, W6PW-3, W6PW-4 and W6PW-5 are all individual stations operating under the same station license. A callsign without a number is the same as -0. The numbers are used to differentiate between the various stations.

## Making Your First Packet Contact

Now it's time to make a packet QSO. As you monitor the frequency, watch for familiar callsigns, someone completing a QSO with other station or someone sending a CQ. It might be a good idea to make arrangements with another packet station that's near by to get on the air and help you with your first QSO. There are packet nodes, digipeaters, personal mailboxes and bulletin board systems that are on the various frequencies, and often it's not possible for a new packet operator to distinguish between one of these and a "regular" packet station. You can work these stations later on, but for your first QSO it's best to work a station with someone operating from the keyboard at the other end.

Choose the callsign that you want to try contacting and enter "C xxxxxx," replacing the x's with the callsign you've chosen. The C means CONNECT. "C WB9LOZ" means connect to WB9LOZ. You should soon see "*** CONNECTED TO (callsign)" on the screen. You have now entered the third level of communications, called CONVERSE mode, and this is where you communicate from the keyboard to the radio. Anything you type on the keyboard will be displayed on your screen and every time you hit a (CR) the information will be transmitted over the air as a packet. Likewise, anything transmitted by the other station will be received by your TNC and also displayed on your screen.

When you have completed your QSO, hit a CONTROL-C. This puts you back into COMMAND mode where you talk to the TNC again. Enter "D" (CR). This will disconnect you from the other station, and you'll see "DISCONNECTED" on the screen.

You're on the way now to lots of packet fun and adventure! If you are still having problems at this point, contact a friend that has some experience on packet and ask for help. The initial set up of the computer, TNC and radio is probably the biggest stumbling block in packet. Any experienced packeteer will be happy to help you get through this process to get you on the air.

## Using Digipeaters and Nodes

Digipeater is the term we use to describe a packet radio digital repeater. Unlike the FM voice repeaters, most digipeaters operate on simplex and do not receive and transmit simultaneously. They receive the digital information, temporarily store it and then turn around and retransmit it.

Your TNC will allow you to enter up to eight digipeaters in your connect sequence, but using more than 3 usually means long waits, lots of repeated packets, and frequent disconnects, due to noise and other signals encountered on the frequency.

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# Packet in Aipotu

*Robert Knapp WW6L*

Trebor appeared for a visit, if such it can be called; this time we talked about packet radio in Aipotu. For those unfamiliar with the Parallel Universe phenomenon, a few words may help in understanding the background of this visit. I think the hole between the universes was caused by the interaction of the experimental tri-helical antenna with the vectored spread-spectrum transceiver. Regardless, from time to time Trebor gets duplicated from his home universe into ours, and he says I get duplicated into his. I have no memory of being in his world. The duplicates only last about an hour, then fade away. When we talk, it is pointless to tell him anything, as he will neither remember nor take it back with him; our conversations are one-sided. He says it's the same on his side, but, of course, I don't know about that.

In Aipotu, he reports, their packet radio has a history similar to ours, but in the past three years they have deviated from the path we have taken here. They had the same problems with channel congestion and overload, but instead of diverging into various interest groups (keyboard, TCP-IP, DXSPN, BBS), they concentrated their efforts on technological developments. I will summarize the system used there, as well as his comments about ours.

In Aipout, the national amateur radio association (NCEC, North Columbia Etherwave Club) has been a leader in Amateur technology, and has coordinated the development of the continental network of packet systems. The leadership has been active in equitable redistribution of frequency allocations as technology advanced, and appears to have avoided our tendency to look forward to the past. When packet first appeared, a committee was formed to plan for future growth and improved technology. The results of that planning are evident in their present system.

Trebor has expressed surprise (as he does every time) that we use 1200 baud AFSK for packet. They have been using 9600 baud FSK, duplex XCVR-TNC-Terminal units, about the size of a portable computer. The integrated design and widespread use of the units means they cost about as much as one of our "all-mode" vhf transceivers. He estimates that they have five times as many packet users as we have. The cooperation of the local equipment manufacturers, who foresaw the packet explosion, has been an important component in the evolution of the system. Trebor is always surprised that we don't make equipment in this country, and says that they would not have been able to develop their system using equipment developed for audio use. Their "PK" units can be set to connect to each other in remote locations or emergencies, but are usually used through a network of crossband duplex linear transponders (CDLT). In CDLT use, the user unit transmits in the 480 mc (cycles, not "Hertz") band and receives in the 960 mc band. Each CDLT has one or more associated "Exchange" stations, which act like our BBSs, but also incorporate TCP-IP, DXSPN, NET/ROM and DSP (Digital SPeech) capabilities. The user's PK unit can be set for any type of use (personal mailbox at the same time as real- time keyboard contacts, while monitoring the DXSPN).

The PK connects to the Exchange on the "Calling frequency," which is the same everywhere. The Exchange then assigns the contact frequency and the PK shifts to that frequency. The Exchange can add more transceiver units (channel pairs) as needed by the user load. Each Exchange is a member of a Local Exchange Network, and a hierarchy of Inter LENs, Wide Area

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When entering the list of digipeaters in your connect sequence, you must make sure that you enter them in the exact order that your signal will use them. You must separate the calls by commas, without any spaces, and the EXACT callsigns must be used, including the SSID, if any. That means you need to know what digipeaters are out there before you randomly trying to connect. Turn MONITOR ON and watch for the paths that other stations are using.

Here are some examples of proper connect sequences:

```
C W6PW-3 v W6PW-5
C N6ZYX v WA6FSP-1,WB6LPZ-1
C W6ABY-4 v K6MYX,
 N2WLP-2,AB6XO
```

The "v" means via. In the first example the sequence shown means: Connect to W6PW-3 via W6PW-5.

Something to remember when using digipeaters is the difference between making a connection and sending information packets. If the path isn't all that good, you might be able to get a connect request through, but will have a difficult time with packets after that. The connect request is short so it has much less of a chance of being destroyed by noise or collisions than a packet containing information. Keeping information packets short can help keep retries down when the path is less than ideal.

### Packet Node Network

Net/Rom, TheNet, G8BPQ packet switch and KA-Node are names that refer to a device called a packet node, another means of connecting to other packet stations. Each node has several functions available, but for now we'll cover the basics so that you can try them out. The difference you should note here is that you connect to a node rather than using it in a connect path as you do with a digipeater.

Here's how you use the packet node network: First, connect to the closest node to you on the frequency you want to use. You connect to a node the same way as you connect to any other packet station. When you connect to a node, your TNC automatically switches to converse mode, so anything you now type is sent to the node as a packet, and the node acknowledges each packet back to your TNC. For the remainder of your connection your TNC works only with this one node.

Once you're connected to the node, enter "NODES" and you'll receive a list of other nodes available to you on the network. This list will give both an alias

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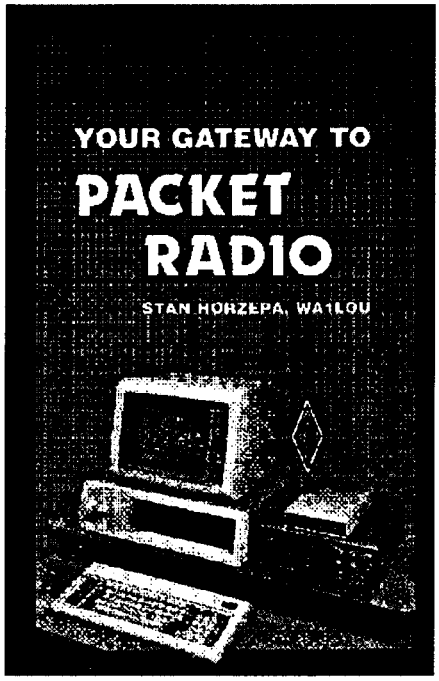
# Book Review

*Patrick Mulrooney, N6QMY*

Your Gateway to Packet Radio
by Stan Horzepa, WA1LOU
©1989 American Radio Relay League
Newington, CT 06111 USA
Softcover price: $12.00




Most books I have read on packet radio are out of date by the time they reach the stores shelves. This second edition by Stan Harzepa is a refreshing change. From the new novice to packet, to the experienced old hand, this book should contain something for everyone.

This books start out by taking the reader on a tour of packet radio. covering the first TNC using a Bell-202 compatible modem in 1978, the founding of TAPR in 1981, to the first reliable WESTNET link in 1985, through NET/ROM-TheNet controversy in 1989.

After covering a little theory of packet operation, Stan devotes a whole chapter to TNCs. Have you ever wondered about the difference between two TNCs? This is the chapter for you. Now that you have decided on a TNC, Stan covers it's installation. The installation of a new TNC for the first time can be one of the most frustrating experiences for the digital novice, and Stan covers both hooking up your TNC to your computer or terminal and making your first contact.

At this point, the book starts going more in depth into packet operations. There is a section on VHF/HF operations and differences between each. The chapter Bulletin Boards and Mailboxes, covers the history of BBSs, from the Xerox 820-1 and W0RLI to where we are today. A listing of W0RLI and WA7MBL mailbox command set is also included with instructions on how to use your local BBS. Network Communications is covered from a basic digipeator to coverage of TexNet, ROSE and TCP/IP. No up-to-date book would not be complete with out a section on packet satellites. It's there.

The appendices are also a wealth of information. The TNC command sets and messages are listed, but the best part is the description with each entry. Every wonder what that message from your TNC meant? Here is the place to look. There is also a source list of over 50 hardware and software suppliers complete with address and phone numbers. and a listing of packet radio information. Stan wraps his book up with a very complete Glossary of packet radio terms.

If you haven't been able to tell from the tone of my review, I recommend this book without reservation.

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ID and callsign for each node. The alias ID often gives you a hint as to where the node is located, but not always. Descriptive node listings giving the alias, callsign, location, frequency and other information on the nodes are available on most packet bulletin board systems.

Now that you have a list of nodes what do you do with it? Let's say you want to have a QSO with another station. You first must determine which node from this list you received is closest to the station you want to work. For demonstration purposes, we'll connect to N6ZYX, located near the W6AMT-3 node.

Once you know the call of the node you want to use, you connect to it *while still connected to your local node.* You use standard protocol: C W6AMT-3. Your TNC will send this as a packet to your local node, and your local node will acknowledge it. Your TNC is happy because the packet has been sent and acknowledged. The network will then go to work for you and find the best path between your local node and the one you're trying to reach. You'll then see one of two responses: "Connected to W6AMT-3" OR "Failure with W6AMT-3." If it can't connect for some reason, try again later. It could be that W6AMT-3 is temporarily off the air or the path has decayed and is no longer available. We're going to be positive here and say we received the first option.

Now that you're connected to W6AMT-3, enter "C N6XYZ." Again, your TNC will send this as a packet to your local node and the node will acknowledge it and send it down the path to W6AMT-3. W6AMT-3 will then attempt to connect to N6XYZ. Here again you'll get one of the two responses: "Connected to N6XYZ" OR "Failure with N6XYZ." If you get connected, you hold your QSO just as you normally would, but there's one BIG difference — your TNC is receiving acknowledgements from your local node, and N6XYZ is receiving acknowledgements from W6AMT-3. The acknowledgements do not have to travel the entire distance between the two end stations and the long path is eliminated for both TNCs. Because of this, retries are greatly reduced, and your packets get through much faster. When you're finished with the QSO, you disconnect in the normal manner — go to Command Mode using Control C and enter "D." The entire path will then disconnect automatically for you.

For more information on packet operation, check the file section of your local packet bulletin board system for my series "Introduction to Packet Radio." Most systems have the files titled PACKETxx.LOZ, where xx is the part number, such as PACKET07.LOZ. The 16-part series covers a variety of packet subjects, including TNC commands you should become familiar with, a detailed look at BBS operation, complete details on node operation, NTS message handling, the "White Pages"

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# 9600 Baud Packet

*R. Bardarson N6VUW*

Because of my activities promoting 9600 baud packet, I have been asked to write a column for the "Downlink." Since the DL is a quarterly journal, I decided against a tutorial series and plan to discuss general items instead. A copy of a 6+ page tutorial describing a 9600 baud packet station can be obtained by sending an 8-1/2" x 11" SASE (2 stamps) to R. Bardarson N6VUW, 9600 Tutorial, P. O. Box 4031, Santa Clara, CA 95054. This is a copy of a talk presented to the Project Oscar Seminar on 29 September. Additional information is available in the bi-weekly bulletins I release, which N6QMY maintains in a file section on his BBS. Finally, you can reach me via packet N6VUW @ K3MC.#NOCAL.CA and I'll be glad to assist you in setting up a station. My 9600 baud packet station is portable and can be used to help others getting on the air.

### A little history

A few months ago I got tired of always waiting to read messages from my local BBS. I remembered the days I ran a landline BBS @ 2400 baud, no waiting for another user to cease transmitting so that my info packet could be sent to me and thus true 2400 baud speed. Compared to the packet network, where the effective speed is probably below 300 bits per second when averaged over the connect session, the landline system is much better with one very important exception. That exception is that packet connects to the world, while landlines are generally isolated islands. Rather than give up packet, I decided to try to make it better and one of the first improvements was to make it faster. Looking over the history of packet, I saw that several attempts to go to higher speeds had always succeeded technically, but that interest from the rest of the amateur community had evaporated when the those fast speeds couldn't be purchased. One thing bothered me about those high speed efforts, they were generally aimed at the network backbone and I felt that the end user should be running at higher speed. With the recent introduction of the DVR2-2, off the shelf systems were completely possible. All the necessary pieces were in place for 9600 baud packet to happen, so it was time to get started....

Besides the primary advantage of higher speeds and fewer collisions, running at 9600 baud I can use the radio for a fast terminal connection to my computer system from anywhere within radio range. This means that I can remotely run programs from my 80+ Megabyte system while carrying around a lightweight floppy-only laptop and no telephone is required. While this is possible at 1200 baud, the time delays drive you nuts. Future columns may be written using this system. 9600 baud also allows the often mentioned roundtable, since the 8 times speed increase now make the 'repeat to everyone' occur in a shorter time. The Macintosh computer has numerous sound files digitized at 7.4 kHz, these could be remotely played via packet. In short, the higher speed will open new applications to the packet community.

The last "Downlink" covered the results of the meeting called to start 9600 baud, since then there has been progress noted below:

### FAX

There are a couple of FAX efforts, locally with AA6IW @ N6IIU. Generally, fax systems cost more than FSK systems and require new interfacing at the TNC. Their single potential advantage is a simple audio connection to the transceiver. If you have decided to dedicate a radio to packet, then you probably chose a simple rig, mostly likely an older crystal rig picked up thru the flea market. Those radios are ideal for FSK packet and FSK packet modems can be purchased from Pac-Comm, TAPR, and G3RUH but no one is selling fax modems for packet radio. The existing 9600 baud packet systems are exclusively FSK, so the simple audio connection (but one that requires careful adjustment) doesn't seem like an advantage after all. Contact AA6IW if you are interested in FAX.

### QRV BBSs

The KA6JLT and N6LDL BBSs have announced 9600 ports to the network. JLT is already up and running on 145.71 MHz and LDL awaits his modem (as of early September, probably active now). These BBSs are part of the great amateur packet network, going to 9600 baud loses nothing! Around the Kantronics and Pac-Comm QTHs, there are several 9600 baud BBS active. Check the latest '9600 notes' for additional activity.

### Commercial Equipment

Complete ready to run 9600 baud packet systems are available from Pac-Comm and Kantronics. Since Kantronics uses software NRZ to NRZI conversion in it's older TNCs, you must use the Data Engine if you wish to stay with Kantronics equipment. True TNC2 clones with modem disconnect ports can run 9600 baud. Contact Pac-Comm direct or call a Kantronics dealer for the latest price. Hamtronics also offers 9600 baud systems, these require a shift-register modification to be compatible with the K9NG and G3RUH systems. Someday, TAPR will release the PacketRADIO for general purchase. Finally, the ultimate solution, the DSP systems from AEA can be any of the existing packet systems you desire.

### G3RUH Modem bulk purchase

If you wish to build your station, then the K9NG modem from TAPR or the G3RUH modem are available. For my G3RUH modem, all parts were obtained locally, mostly from the surplus electronics stores. The printed circuit card can be purchased for as low as $28 in a group of 50+, $31 in a group of 10-49, and singly at $36. G3RUH EPROMs can be obtained locally from me. For a couple hours with a soldering pencil, you can have a 9600 baud modem ready to go for about $55! This offer direct to individuals from G3RUH, contact me for further details.

Send comments, questions, or column requests to: N6VUW @ K3MC.#NOCAL.CA

73 de ron.

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# ASM-9812, A V.29 TNC Board in Japan

*June Murawaki , JA3RAF*

A small group of folks in Japan started experimental V.29 operation with new TNC. It is called ASM-9812, and it was developed by Mr. Kyuushi Horiuchi (JN3ASM). Device driver for it was written by Mr. Isao Tsukagoe (JH4HQG), and merged to NOS98 by Mr. Dai Yokota (JK1LOT).

(NOS98 is a version of the KA9Q package ported by JK1LOT to the PC-9801, which is one of the most popular personal computer in Japan.)

Features of ASM-9812 are as follows:

1) ASM-9812 is a TNC board, consisting of Z80 (CPU, SIO, PIO), 27C256 (EPROM), 5256 (SRAM), YM7109C (modem), and some standard logics. Its configuration is very similar to TAPR's TNC-2, except modem LSI. The board is designed to plug into an expansion slot of NEC's PC-9801. CHECKSUM errors have never been detected during NOS98 operation, because it communicates with PC not serially via RS232 line, but via a parallel I/O port. It needs 4 contiguous bytes of I/O address space, but needs no interrupt vectors at all. The board requires few system resources, and is very suitable for multi-port operations. JA3PIU uses 3 boards driven by NOS98 in a background window of MS-window on his 20MHz 80386, while programs are running in other windows.

2) ASM-9812 uses YAMAHA's YM7109C LSI modem chip. The board is designed to change modem modes via the param command of NOS98. For example:

```
param pp0 6 1     ; V.29 9600 bps
param pp0 6 2     ; V.29 7200 bps
param pp0 6 3     ; V.27ter 4800 bps
param pp0 6 4     ; V.27ter 2400 bps
param pp0 6 11;Long training sequence
param pp0 6 13;Short training sequence
param pp0 6 15;No training sequence
```

3) ASM-9812 makes real TXD automatically. Real TXD is calculated by the length of training sequence, plus the user defined TXD value. So, there is no need to change TXD when you change modem modes. Also, the TNC detects training sequences from audio input, and delays the transmission or data to reduce collision of packets.

4) ASM-9812 does not have a NRZ/NRZI conversion circuit between the Z80 SIO and the modem LSI, because YM7109C chip has an internal scrambler. Note that ASM-9812 can communicate with another ASM-9812 only. It cannot communicate with any other TNCs, without bypassing its NRZ/NRZI conversion circuit.

5) ASM-9812 can handle large MTU and window sizes greater than 256 bytes. (Limited to 16k bytes.)

6) ASM-9812 achieves very high reproductbility. It has only one adjustment point, that is audio output level. Audio input level is automatically adjusted by an internal AGC circuit. Connection to the TRX is the easiest way. No modifications to your radio are needed.

7) ASM-9812 can take two modem LSIs simultaneously, like KPC-4. But no software support is available now. And the board supports KISS mode only, no TNC-2-like commands are available now. The hardware has the capability, but software is under development. Please wait for the future release.

We held an assembly seminar for ASM-9812 on 12-AUG-1990 at Nara prefecture. 22 boards were assembled at that seminar. We distributed 100 blank boards at Ham Fair '90 on 25-AUG. And more than 30 boards are distributed in JA3 area by hand. ASM-9812 blank board is ¥10,000 [≈$75]. Complete kit with programmed ROM is ¥23,500 [≈$175]. (Assembly seminar special price! Never available again at that price. :-) Now we are planning to distribute 100 assembled boards to the backbone sites of ampr-net in Japan.

ASM-9812 needs special ROM codes. It was distributed as an article of Terakoya news system in LHARCed and ISHed form. JH3USO's ASM-9812 assembly manual and JN3ASM's circuit diagrams were distributed by that news system, too.

I am using two ASM-9812 boards now, one for 430MHz, and the other for 1290MHz. I feel 7200 bps operation is very comfortable in my location, where we cannot avoid multipath, surrounded by some hills and lots of buildings. It took about 4 minutes to send a 100kbyte file by using FTP at 7200 bps. Our parameters are MSS=966, MTU=1006, window=1932. I am planning to add a third ASM-9812 for 50MHz or 144MHz QRV.

ASM-9812 developing staffs are JN3ASM, JH4HQG, JK1LOT. Associate staffs are JH3USO, JA3RSP, JH1FNL, JL3IBG, JA3RAF.

Thanks,
de June Murawaki, JA3RAF
murawaki%cll.melco.co.jp@uunet.uu.net

EOF

# Packet in Aipotu

*Continued from page 4*

ENs and Trans- Continental ENs, operating on the same basic principles, (but at higher BAUD rates), makes it possible to have real-time keyboarding anywhere in the country.

The "PK4" packet protocol that they use has been adapted to permit much longer packets and additional information. Real-time communication packets get priority handling. Delayed ACKs, automatic frequency assignment, the ability to shift to the use of a separate channel for all ACKs, the ability of the Exchange to "broadcast" bulletins to multiple receiving PKs or Exchanges, and the NET/ROM-like ability to back up and fill missed packets increase throughput far beyond that of our system, even if we were to switch today to 9600 baud.

The duplex crossband transponders make it possible for both PKs and Exchanges to operate without duplexers, because the PKs, Exchange units, and transponders all transmit in one band and receive in the other.

Just as we were beginning to get into the subjects of integration of the packet satellites, and packet speech, Trebor faded out. I was left with more ideas and questions than I could handle alone, so I'm passing this on. I hope it is as thought-provoking for you as it has been for me.

73, Bob

EOF

# First Impression of the Kantronics DataEngine and DVR 2-2

*Jeff Komori, KH6JUZ @ N6LDL*

### History of Kantronics

Up to now, Kantronics has developed and sold TNCs that were very limited in scope and closed in architecture. Kantronics started in the packet radio market with the KPC-1 and soon upgraded it to the KPC-2 in conjunction with the introduction of the TNC2 by TAPR. They followed this with the introduction of a multi-mode controller called the Kantronics All Mode (KAM) which incorporated the first dual port multi-mode controller which allowed simultaneous operations through both VHF and HF ports. Along those lines, Kantronics developed the KPC-4 which allowed simultaneous dual port capabilities through two VHF ports. Although the KPC line and the KAM are very nice TNCs to work with, they were very limited in upgradability. The KPC-1 and KPC-2 have no modem disconnects and thus are unable to operate with any external modems. Thus, these TNCs are stuck at 1200 Baud with no hope for compatibility with future higher speed radio links. The KPC-4 and KAM do have internal modem disconnects but only work with Kantronics released modems which, at this point only include an MSK modem and a QPSK 2400 BPS modem. Kantronics has stated that they have no intentions of releasing any other modems in the future for these TNCs, thus making these TNCs incompatible with future higher speed radio links.

### The Kantronics DataEngine

Kantronics has made a complete switch in their policies regarding the nature of their TNCs. To begin with, their new TNC, the Kantronics DataEngine, is built as a completely open architecture machine (in both hardware and software) with an industry standard CPU and modem disconnects.

At the heart of the DataEngine is an NEC V40 microprocessor which is running at 10 MHz. The DataEngine has sockets for up to a half megabyte of EPROM and a half megabyte of pStatic RAM. As shipped from Kantronics, the DataEngine comes equipped with the ARRL sanctioned AX.25 version 2 level 2 packet protocol firmware. This is the same protocol used by everyone with Amateur Packet TNCs. The distinction of the DataEngine is that its programming can be changed by either swapping out the existing AX.25 firmware or adding programming by adding another EPROM into the blank socket.

### Firmware for the DataEngine

As shipped from Kantronics, the DataEngine comes with the standard AX.25 protocol. In addition, it comes standard with a personal mailbox, KA-node, KISS mode, HOST mode and Transparent mode. The DataEngine is a dual-port TNC and if you have modems plugged into both ports, you can run both ports simultaneously and allow other stations to gateway from one port to the other. The personal mailbox allows other stations to sign onto your mailbox and leave you or others messages just like a full service Packet Bulletin Board System. The personal mailbox can even reverse-forward mail to a full service PBBS. Note that reverse-forward means that the full service PBBS must interrogate your personal mailbox for outgoing mail. The personal mailbox cannot initiate the mail forwarding hence the term reverse-forward.

For those that are interested in TCP/IP, all of the functions (now being done with an external Personal Computer) can be done internal to the DataEngine since it uses the same MPU. Since all TCP/IP functions can now be taken care of internal to the DataEngine, the attached Personal Computer does not need to be dedicated to TCP/IP anymore. The favorite buzz word amongst the TCP/IP folks is "NOS-in-a-box." Bdale Garbee, N3EUA, is presently porting over the code from KA9Q NOS, originally developed for the IBM PC, to the DataEngine. Hopefully, we should see the firmware for NOS-in-a-box by the end of the year.

Already ported over, for use on the DataEngine, is the G8BPQ switch. This is an add-on EPROM which plugs into the empty EPROM socket in the DataEngine and turned on by the AUX switch next to the power switch. This gives the DataEngine just about all of the functions of the G8BPQ switch including NET/ROM compatibility.

The fact that it uses the same MPU as PCs should make the porting of any code developed for PCs to the DataEngine easy. Since the DataEngine has space for a half megabyte of EPROM, most programs should be able to easily fit or made to fit within the program space alloted. The half megabyte of pStatic RAM should accommodate most temporary E-mail, parameter settings, and buffers. Kantronics sells a DataEngine developers manual which includes all information necessary for firmware development for the DataEngine.

### Interfacing the DataEngine

The DataEngine is designed for speed. The interface between the terminal (or PC) and the DataEngine can be set to a Baud of up to 38,400. The DataEngine can drive modems up to 56,000 Baud. This is FAST! Much, much faster than the 1200 Baud you are probably using now. However, it is not T1. I know that some of you are shaking your heads thinking that 56K Baud is still too slow. Well, for us appliance operators (yes, I will publicly admit that I am one of them), it is the only "plug and play" TNC with modems above 2400 Baud available today. When another TNC is developed for T1 and above speeds (~10 MBPS) at the "plug and play" level, I will probably get it and do a review on it at that time. :-) ;-) :-)

### Modems for the DataEngine

The DataEngine can easily interface with just about any existing modems which are available for packet radio operations; these include the Texnet, K9NG, G3RUH, HAPN, and TAPR modems. It has both internal modem disconnects and fully configurable external modem disconnects. The modem disconnects can be configured for type A through type O modems. Most TAPR modems are configured as type B modems.

In fact, Kantronics sells a modem developers kit which includes the specifications for the internal/external modem disconnects of the DataEngine. This kit also includes a prototyping

modem board which plugs into the internal modem disconnect of the DataEngine. Kantronics has developed a few modems, already, for use with the DataEngine.

### The Kantronics DE1200

The DE1200 is an internal plug-in 1200 Baud modem board. It uses standard BELL 202 tones of 1200 and 2200 Hz for compatibility with all existing Amateur Packet stations. The DE1200 can be run in V.23 compatibility mode. This mode provides a 1300 and 2100 Hz tones instead of the standard BELL 202 tones. This modem does incorporate a couple of nice features.

To begin with, the DE1200 has three methods by which it can detect a carrier on the frequency. The first method is detecting a sine wave (packet tones) in the audio received. With this method, you can run your radio's receiver unsquelched. You should not use this method if you are sharing the frequency with other modes. The second method is with the carrier detect from the on- board 3105 modem chip. With this method, any audio coming through the receiver will be construed as packet tones. This method is useful if you are using packet with other modes on the same frequency. The last method provides the TNC with carrier detect with an external device such as the radio's squelch circuit.

Another nice feature of the DE1200 is the ability to be used with most handheld VHF/UHF radios. On some radios (i.e. ICOMs, Yaesus) the PTT is applied by changing the voltage of the mic input line. The DE1200 can be configured to do this without any hardware add-on or modifications. A simple jumper on the modem is all that needs to be configured for these handhelds.

Of course, as with any modem, the DE1200's AFSK level can be adjusted to accommodate just about any radio interfaced to it. The DE1200 also has a built in audio equalization circuit which can be adjusted to no, partial, or full equalization depending on how the audio is supplied from the attached radio to the modem.

### The Kantronics DE9600

The DE9600 is an internal plug-in G3RUH compatible 9600 BPS modem for the DataEngine. It uses direct FSK with a 17 bit maximal length LFSR scrambler as defined and implemented on the K9NG system which was later improved upon by G3RUH hence its name. Because it uses direct FSK, the radio that is interfaced with it must have some sound characteristics:

The receiver must be a Narrow Band FM with a direct discriminator output. The transmitter must generate true FM. Since most VHF radios used in Amateur Radio uses Phase Modulation (PM) rather than Frequency Modulation (FM), this limits what radio you can use with this modem. (Note: Last year, TAPR announced an ambitious project of developing a radio modem using the G3RUH design called PacketRadio. Because of this announcement, most of the industry has standardized on the G3RUH direct FSK modem design for 9600 BPS packet, even though it is probably the most difficult to implement in Amateur Radio.) VHF and UHF radios which uses frequency synthesis are probably PM radios and hence incompatible with the DE9600. Crystal controlled radios are usually FM radios and will probably work nicely with the DE9600. Also, crystal controlled radios tend to be more frequency stable and lock onto frequency much faster than their synthesized counterpart. In order to make the DE9600 easier to work with (for us appliance operators :-), Kantronics does sell a two meter radio that is fully compatible with the G3RUH design.

### The Kantronics DVR 2-2

Kantronics has developed a compatible two meter radio called the DVR 2-2. This is a two channel crystal controlled two meter radio with an RF output of 2 watts. Because it is crystal controlled, it is a true frequency modulation (FM) radio. It was designed with one thing in mind; to be able to transmit high speed data. On the back of the radio is a connector with direct varactor input and direct discriminator output (for direct FSK). This is exactly what is needed for the G3RUH 9600 BPS modem (DE9600). Also, this radio uses PIN diodes for very, very fast transmit/receive turnaround. Most synthesized radios have a T/R of about 600 milliseconds. The DVR 2-2 has a T/R of 20 milliseconds.

Although the DVR 2-2 is not a fancy radio (no scanning or other fancy bells and whistles here), it is what the doctor ordered for a dedicated radio for packet use. Its simplicity is the key to packet radio. At $189, it is not too expensive to dedicate to packet radio use only. How many of you are using $350 synthesized w/bells and whistle VHF radio just for packet? Of course, those fancy radios tend to be synthesized with phase modulation that is not suitable for the higher speed radio links. I know some of you are moaning about the limited power output and the fact that it only has two channel capabilities. Well, the power output can be boosted with the addition of a power amplifier. Kantronics is developing an RF amp that will be compatible with the DVR 2-2. They do sell (through their subsidiary RF Concepts) a 20 watt amplifier that only adds about a 15 millisecond delay to the T/R of the DVR 2-2. On the question of limited number of channels, how many do you need? I don't know about you but I only use one channel for packet. Especially since I am using my DVR 2-2 with the DE9600 for 9600 BPS operations. NCPA only has one channel (145.71 MHz) allocated to 9600 BPS operations on two meters. Even so, isn't two channels sufficient? If not, oh well... Remember, this radio is designed to be for high speed packet operations. It would be a waste to use it for anything else.

### Using the DataEngine and DVR 2-2

The N6LDL Public Packet Bulletin Board System was recently fitted with the DataEngine and DVR 2-2. Our goal at the N6LDL PBBS was to be amongst the first full service packet BBS to offer users a 9600 BPS port. This project started about two months ago with the acquisition of the DataEngine. We immediately installed it in place of the KPC-2400 that was on the two meter port (144.97 MHz). At that time, Kantronics only had the DE1200 available and was still developing and testing the DE9600. We wanted to test the integrity of the DataEngine on one of the busiest ports of one of the busiest PBBSs at 1200 Baud. During the two month online burn-in period, we experienced absolutely no trouble. In fact, historically, this port has gone through 3 TNCs during its service life. We were very encouraged with the integrity the DataEngine was showing us. As soon as Kantronics announced the availability of their DE9600, we ordered it for immediate installation. Having

*Continued on page 12*

# DXPSN Corner

Welcome to the DXPSN corner! I'm going to try to cover two topics this time: TNC parameters, and DXPSN basics for the beginner.

### TNC Parameters

TNC parameter discussions and political discussions are much alike:

EVERYONE HAS AN OPINION, BUT I'M RIGHT.

While I touch on the TNC parameter issue reluctantly, the SYSOPs of DXPSN have made some interesting discoveries, received some sage advice from Ron Raikes (WA8DED), experimented, toyed, tinkered, and reached some conclusions. This information is offered only as reference material. What works for us, might not work for you. BUT, the following parameters made a substantial difference in our disconnect rate. Before I list the parameters though, I think a little background discussion is in order.

WARNING: If you are brand new to packet, and think it is all voodoo, as I used to, skip this part. When you are comfortable with packet in general, come back and read this sometime. Before I really learned my way around, TNC parameter discussions only served to confuse me more than I already was.

From my first days as a PacketCluster SYSOP (10/89), I had noticed that many users were disconnecting from the network using something other than the BYE command, which disconnects a user in an orderly fashion. What I was seeing was something like RF Mayhem. Being a newcomer to packet in general, and PacketCluster specifically, I was at a loss for what was going on. All I knew was there was A WHOLE LOTTA RETRYIN' GOIN' ON.

I talked to anyone who would listen about the problem. Invariably, they would start talking TNC Parameter Voodoo. Voodoo is the term I use when no one REALLY understands how something works, but EVERYONE knows when it is working right.

I talked to everyone but my neighbors about the problem. I would have talked to my neighbors about the problem, but they think that anyone with an antenna (on the car, house, or handheld) should be shot, drawn and quartered, then burned at the stake. Nice folks. Yeah, I got their messages through after the Loma Prieta earthquake, "but that was different." Right. I'm convinced that they would rather I make drugs in my garage (they couldn't see it), then enjoy an activity sanctioned by Uncle Sam. This, is a story for another time...

Back to parameters. Yes, it can be a yawner, but it is important.

I had looked everywhere for the cause of this disconnect problem, and had just about given up on finding a solution, when I decided to write a letter to Ron Raikes, WA8DED, the author of NET/ROM software. I was a registered owner of NET/ROM, and requested help with these disconnects, some of which I saw with direct connects, some with NET/ROM.

I did not hold out much hope of getting a reply to my letter. If I didn't, I could close the book on the problem and be satisfied that I did all I could do to find it and correct it.

The Ron Raikes/NET-ROM/TheNet story is legendary. With everything I had heard about Ron Raikes, I NEVER expected to hear from him. (Note: Don't believe most of what people tell you.)

Three days after I mailed the letter, Mr. Raikes called me (his dime), and we proceeded to have an hour and a half discussion about TNC parameters, packet, AX-25, TAPR, etc. Raikes was nothing like I expected. He was REALLY interested in the problem as I had documented it extensively, and was able to answer all of his questions about it. I wish I could get that kind of support with other amateur radio products!

### Results

The DXPSN SYSOPs had been running TNC parameters based on the best information available: "try this"... "what did it do?"... "OK, try that"... On and on...

But as a general rule, we were running PERSIST of 60-100, SLOTTIME of 30-70, and FRACK of 4 to 6. Raikes quickly zeroed in on the biggest source of our problem: The DXPSN nodes and the users were colliding with each other in a big way. If a couple users ran "aggressive" parameters, and a retry of 10, they would jam each other bigtime. One of the users would be trying to send a command to the DXPSN node, and so would the other. 10 collisions, and both users' TNCs would disconnect from the DXPSN node. But because of the riot on the frequency, the DXPSN node didn't always know the users sent a disconnect. When the node finally got around to polling the users in question, or tried to send some information, the user TNCs would send a DM frame, as they think they disconnected long ago.

### Raikes' Resolution

"Slow it down." Oh, sure, Ron. 1200 baud is like putting data into stone tablets with chisels already. Slow it down?? Ron suggested a range of parameters: PERSIST 20 to 50, SLOTTIME 20 to 40, FRACK 8 to 15. Radical, no?? Ron had a high degree of confidence that these parameters would really help solve our problem. The logic, while eluding me at the time, seems simple now—Slow things down, and give everyone a chance to access the DXPSN node. I tried it....

## Where to Find a DXPSN NODE

| Node | Location | Frequency | User Digi | Location |
|---|---|---|---|---|
| WB2CHO | Santa Rosa | 144.950 | | |
| K6LLK | Mountain View | 144.950 | | |
| W6GO | Rio Linda | 144.950 | DX3 | Pine Grove |
| K6XJ | Clovis | 144.950 | DX6 | Bear Mountain |
| KI3V | Reno | 144.950 | PCDX | Virginia City, Nevada |
| WA6IET | Santa Maria | 144.950 | | |
| N6IXX | Walnut Creek | 145.770 | DX5 | Mount Diablo |
| W6OAT | Redwood City | 145.770 | | |
| W6LEH | Modesto | 146.580 | | |
| KN6J | Santa Cruz Mtns | 146.580 | DX4 | Sugarloaf Mtn (Napa) |
| KD6AZ | Tracy | (None) | | |
| K6PBT-6 | Stockton | (None) | | |

IT WORKED!! Unwanted disconnects, both direct and NET/ROM, dropped 60 percent in the first day. Raikes emphasized that EVERYONE on the frequency would have to "slow down" in order for things to work the way they should. The one bad apple syndrome.

I shared these parameters with a couple fellow SYSOPs, and similar improvements were reported. It was really satisfying to monitor the traffic on the channel after I made the changes, and got most of my users to change as well. Prior to making the changes, if packets had bodies, there would have been a HEAP of dead packets. Head-on collisions at the speed of light. It wasn't pretty.

"FLOW"—that is the word that best describes the operation now. I wait, you talk, WE wait, he talks, you guys wait, I TALK, etc. Nice. Very nice.

Dramatic improvement. On a frequency with 20 to 25 users trying to access a single DXPSN node. Subsequent to these findings, the list of "new" TNC parameter settings was sent to all PacketCluster SYSOPs worldwide. Same story: "WOW, it is a little slower, but I now have few, if any unwanted disconnects!"

Are you having disconnect problems? SYSOP or user, these parameters are worth a try. I'm sure that these parameters won't work for everyone, but if you are having disconnect problems, and you can't find out why, TRY THEM!

I hope this information is of use to everyone. If you have any comments, or information, I would really like to hear them. Information on how to contact me is at the end of this article.

### Random Item

I have received a few inquiries as to the "official" name of our network. So, here it is, officially:

*The Northern California/Nevada DX Packet Spotting Network*

### DXPSN Basics

How to find the DXPSN if you never have, or forgot how to

This is called pick-a-node. Find a node in the list in the box that is close to you. Try to connect to it. No luck? Pick another one. If, after trying to connect to several nodes, you are not having any luck, don't despair. You probably live in an area where DIRECT connections into DXPSN nodes are not possible. Enter the user digi (NET/ROM). These things usually reside on a hilltop. They are referred to as digis, nodes, digipeaters, NET/ROM nodes, etc. Yes, it can be confusing, but what isn't nowadays?

If you strike out with various direct connect attempts to several DXPSN nodes, Mr. User Digi can be your best friend. In the box, under the column titled "User Digi," you see things like DX3, DX4, DX5, etc. These three character things are called the aliases. There is a "real" ham callsign on each of these User Digis, but, your new to this, so bag the details, right?

To get into the DXPSN using a "User Digi," find one in the list below that is close to you, and do the following:

Connect to (User Digi Alias) Example:

```
Connect DX5
```

When you see something like this:

```
DX5:N6IXX-4 Connected
to DX5
```

then enter: C (DXPSN NODE CALL) Example:

```
C N6IXX
```

*Continued on page 12*

# Abbreviated PacketCluster Command List

*(Thanks to K6LLK)*

| COMMAND | DESCRIPTION | SYNTAX |
|---|---|---|
| ANNOUNCE | Make a general announcement to all nodes | A/F |
| | Make a general announcement to local node | A/L |
| BYE | Bye, disconnect from the PacketCluster | BYE |
| CONFERENCE | Enter network conference mode | CONFER |
| DELETE | Delete mail message | DE *msg#* |
| DIRECTORY | Show active mail messages | DI |
| | Show All active mail messages | DI/A |
| | Show mail to or from yourself | DI/O |
| DX | Make a DX spotting info announcement | DX *freq call* |
| Show DX | Show a DX spotting announcement | SH/DX |
| HELP or ? | Help (displays this listing | H |
| | Display help for a particular command | HELP *command* |
| READ | Read a mail message | R *msg#* |
| REPLY | Reply to the last-read mail message | REP *msg#* |
| SEND | Send a private mail message | S *call* or S/P *call* |
| SET | Set user-specific parameters | Example: SET/Name Tim |
| SHOW | Display various PacketCluster Databases | SH/*commands* |
| TALK | Talk to specified station | T *call* |
| TYPE | Display a particular file | Example: TY/BULLETIN CMND.TXT |
| UPDATE | Update a database | UPD/Data |
| UPLOAD | Upload a general file | UPD/File |
| | Upload a bulletin file | UPD/Bull |
| WWV | Make a WWV announcement | WWV SF=*xxx*, A=*xx*, K=*xx forecast* |
| | Show WWV announcements | SH/WWV |

# DXPSN Corner

*Continued from page 11*

That's it! If everything works right, you will receive the DXPSN welcome screen in a few seconds. You're there. You did it. You are now one mean Packet dude.

Looking at the list in the box, you will see that several DXPSN nodes have "User Digis" for access. In the case above, we connected to DX5 (Mt.Diablo), then had DX5 connect to the N6IXX DXPSN node. The same principle is used with DX3 (connect to W6GO), DX4 (connect to KN6J), etc. The DXPSN node communicates with DX5, and DX5 communicates with you. Because there is a "middle man" in this type of connect, things sometimes seem to work a little slow. When compared to a direct connect, this is true. This is why it is better for EVERYONE to use direct connects wherever possible. You get your information faster, and there is more air time available for others.

### DXPSN Commands

PacketCluster uses the SHOW command in a big way. For those of you familiar with the DEC MicroVax VMS operating system, you will see many similarities. AK1A, the author of the PacketCluster software works for DEC. Makes sense, no?

The command list above covers the most often used commands. We have a BUNCH of on-line help available. PacketCluster HELP is easy to use, offers complete explanations, and if used often enough, will leave you no choice but to become an expert.

Take the SHOW command for example. You look at the command list above, and you just don't quite understand it yet. No big. H SHOW will provide you with a list off all the SHOW commands, and give you several usage examples. You want more? No big (again). H SHOW/DX will give you detailed information on the SHOW/DX command.

H SET, H SET/NAME, H DIRECTORY, H MAIL It all works the same. The DXPSN is a multi user system, and as such you can stay connected as long as you want to. Test, experiment, toy, tinker, toggle... IT IS THE ONLY WAY YOU ARE GOING TO LEARN.

When you are connected to the DXPSN, you will receive DX spotting information, WWV reports, mail, general announcements, and (maybe) talk messages from other users, all automatically. Many users simply connect to the DXPSN to receive information. They rarely make any requests of the system. Others dig deep and are not satisfied until they have done the equivalent of a SHOW/EVERYTHING/GLOBAL/NOW/COMPLETE.

Either type of operating personality is welcome on the DXPSN.

Stop by sometime and check us out! If you have questions, and you can get connected to the DXPSN, leave a mail message for N6IXX, and I'll do my level best to answer them. S N6IXX will get you started sending the message.

PACKET CAN BE FUN WITHOUT A POCKET PROTECTOR!!

May your connects be simple and your disconnects be few!

73,
Tom Wood, N6IXX
DXPSN Network Coordinator
CIS 76210,1500
N6IXX @ KA6FUB.#NOCAL.CA

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# First Impression of the Kantronics DataEngine and DVR 2-2

*Continued from page 9*

just received it a few days ago (as of the writing of this article, 9/7), we have not had the opportunity to put it online for a test run. I hope to write a follow-up article on how the 9600 BPS operations will go.

I have installed a DataEngine in place of the KAM at my station in Los Gatos. Presently, I have the DataEngine configured with the DE9600 on port 1 and the DE1200 on port 2. The DE9600 is connected to a Kantronics DVR 2-2 tuned to 145.71 MHz and the DE1200 is hooked up to a Kenwood TH-315A tuned to 223.42 MHz. I am running the DataEngine in KISS mode to allow TCP/IP operations. The computer I am using is the Atari 1040 STe with the PE1CHL's implementation of the KA9Q net package. Rob, PE1CHL, has enhanced the KA9Q net package for the Atari ST by implementing the dual port KISS mode. This allows my net station to operate through both the 9600 BPS and the 1200 BPS ports simultaneously thus taking advantage of the dual port nature of the DataEngine.

Presently, Walter, N6LDL, has set-up his PBBS to forward mail to my TCP/IP station on 223.42 MHz (South Bay LAN frequency). As soon as the 9600 BPS port is set-up on the N6LDL PBBS, Walter will set-up his PBBS to forward mail to my station at 9600 BPS on 145.71 MHz. Eventually, all low-level BBSs that he services will only be forwarded at 9600 BPS on 145.71 MHz.

It is our goal, at the N6LDL PBBS, to put up a second 9600 BPS port on 443.33 MHz and to move all forwarding to that frequency. This way, we can open up the 223.42 MHz port to users and maybe encourage Novice Licensees to become active with packet radio. This is a medium range goal and we don't expect to achieve this for at least another 6 months.

### Summary

Kantronics has departed from their philosophy of closed architecture with very limited documentation to a completely opposite philosophy of open architecture and complete documentation for third party development of both hardware and software for their new product, the DataEngine. They have also developed additional equipment (i.e. DE1200, DE9600, DVR 2-2) to work well with the DataEngine. They have taken the 9600 BPS operations to a "plug and play" level and hopefully we will see them take 56 kilobaud to the "plug and play" level.

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# All About APLINK

*Victor D. Poor, W5SMM*

For many years I have enjoyed the twin hobbies of sailing and ham radio. At first I used RTTY with some success but when AMTOR became available I quickly switched to that mode with very happy results.

For those of you not familiar with AMTOR, the acronym stands for A-Mateur Teleprinter Over Radio. The protocol is nearly identical with SITOR (SImplex Teleprinter Over Radio) defined by the CCIR for marine ship-to-shore telex operation. It uses the Baudot code and uses an error control protocol that is tuned to the needs of h.f. radio operation under difficult conditions.

The improvement in performance that AMTOR brought over RTTY under the conditions of operation from a small boat were dramatic indeed. From having to wait for nearly ideal conditions where low power and poor antenna could get through, suddenly I could work other AMTOR stations pretty much at will. If I could hear a station I could work him and 'hear' meant just about any signal at all. Only c.w. offered the prospect of better reliability.

In 1984 I sailed to Europe with my AMTOR rig and there was not a day that I could not link back to the states with reports of progress and to catch up on the news. In the meantime Packet hit the scene.

I figured that if AMTOR was good Packet had to be even better, but it was not to be. Trying to run Packet on h.f. radio under conditions of low power and a sailboat antenna proved to be an exercise in frustration, in part because path conditions have to be quite good for Packet to work and in part because the Packet 'system' is not well equipped to handle random 'pop ups' for a constantly moving user. The answer seemed to be to go back to AMTOR and find a way to interconnect an h.f. AMTOR station with the Packet network. So APLINK (for AMTOR/Packet LINK) was born.

I started out by writing and IBM-Compatible PC program that had the basic features of a Packet BBS but with its primary access port on AMTOR. A second, concurrent port, was provided to pass traffic to and from a local Packet BBS on v.h.f. No forwarding was provided on the AMTOR port since it was expected to be only an access port for end users on AMTOR. All traffic with anything in the 'at' field was sent out on Packet and the local Packet BBS and the Packet network was expected to handle all the forwarding.

This system worked quite well and for my purposes as a wandering sailor I could have stopped right there. Ed, KS5V, put the system on the air in San Antonio, TX, and soon had a goodly following of users who had no other access to the Packet system. I had my link to the Packet world and could reach KD5V pretty much at will from pretty much anywhere. Ed's 'following' were largely stations from outside of the U.S. that, like me, had no other access.

The APLINK program proved popular and several other stations began operation as well. With several sysops using the APLINK system the demand for more features began and has yet to slacken. One of the first demands was for inter-APLINK forwarding—the ability of APLINK stations to automatically pass traffic between themselves on h.f. AMTOR rather than relying on the Packet network. I added that code to the system and overnight a long-haul international network pulled itself together with "local" Packet connections in each country but using AMTOR for the circuits to the Middle-East, Africa, and Europe. AMTOR's reliability on long-haul paths proved advantageous.

In addition, NTS operators began clearing TCC traffic through APLINK stations and I was soon asked to add special features to APLINK to facilitate NTS operations. Once that was done even more APLINK stations appeared specializing in handling NTS traffic and widening the network.

AMTOR has its limitations and is not an alternative to Packet but a way to extend the Packet system until further developments in Packet (or its successor) fill in the gaps in Packet technology. The two biggest disadvantages to AMTOR are the use of the Baudot character set and the nature of the error-control protocol. The Baudot character set is limited to upper-case characters only and to a restricted set of punctuation characters. Nowhere near the full range of ASCII characters is available. Messages have a 'telegraphic' look to them once the have passed over AMTOR.

The error control used by AMTOR is not as robust as that used by Packet and can let errors through. These errors, taken in the context of a message rarely cause a problem. The addressing protocol used by APLINK protects against mis-routing due to an address error so in that regard is as robust as Packet. Within the body of a message, however, errors can occur. A new version of the APLINK forwarding protocol is in the works that will eliminate any chance of errors during the automatic forwarding of messages via AMTOR and should lay to rest that problem.

On the other hand, AMTOR, in addition to its good performance in poor conditions, offers a unique advantage with respect to frequency management and utilization. A typical APLINK BBS is not required and does not normally operate on a single frequency or band. Because of the protocol used to establish a link between AMTOR stations a BBS may continuously scan a large number of frequencies across several bands. The scanning stops when a call to the scanning station is detected and a link is then established on that frequency. The calling station only needs to pick a free channel on the band most likely to be open at that moment. All of the APLINK stations can share the same frequencies and make maximum use of the spectrum available to them. With each AMTOR channel only requiring 500Hz. of bandwidth very effective spectrum usage is achieved.

Active APLINK stations on the West Coast include WA8DRZ.#NOCAL.CA in Redwood City, W7DCR.OR in La Pine, OR, N0IA.NV in Las Vegas, NV, and K7BUC.AZ in Phoenix, AZ. A copy of the APLINK system can be obtained from TAPR ($1.00 plus SASE and formatted diskette) or can be downloaded from CompuServe. It runs on a PC-compatible with a hard disk and will run efficiently under Desqview.

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# The National Traffic System and Packet

*Steve Harding KA6ETB*

In 1949 the ARRL created the National Traffic System (NTS). Their purpose was to handle formal message traffic during emergencies. They set up a series of nets in a tree structure to move traffic from medium to long distance quickly. So, you may ask, if NTS is for emergency traffic, why are there so many active nets and how come formal message traffic is handled on a day-to-day basis on packet? Easy answer: for something to work, you have to practice at it.

Actually, our packet BBS networks are not a recognized part of NTS. NTS operators quickly saw packet's ability to move formal message traffic quickly and in large volume, so a system to move formal message traffic through the network was worked out.

Here in northern California, the manager of NTS Northern California Net saw the value in creating the position of NTS NCN packet manager. Don (NI6A) was the first packet manager. He laid the groundwork for the NTS traffic network within NCPA. I have refined Don's system (primarily by simplifying the paperwork).

The duties of the NTS NCN packet manager are:

Be sure that there is a packet manager at a PBBS *before* any NTS traffic is sent there.

Work with the BBS SysOps to route NTS traffic to the correct PBBS. PBBSs come and go. When a PBBS goes QRT, a home has to be found for the NTS traffic formally sent to that station.

Help in the education and training of NTS packet operators. Along those lines, I created a series of files that explains NTS operation, both the HF and VHF nets, and packet. These files can be found on most NCPA member BBSs. Look for the files with the .NTS extender. If your PBBS does not have these files, have your SysOp contact me and I will send a diskette.

A handbook and newsletter for NTS operators is also available. Contact me @ N6LDL.CA for information.

I mentioned above that each PBBS accepting NTS traffic has a packet manager. These are the duties of the PBBS packet manager.

Check into the PBBS at least every other day and handle any local traffic within his area.

Some PBBSs have several operators who handle traffic on a full time or sometime basis. Some PBBSs handle traffic for a wide area. Occasionally, a piece of traffic will sit at the PBBS. It is the manager's responsibility to service back to the sender any traffic that has been on the PBBS over 48 hours.

Many PBBS packet managers have SysOp privileges at their PBBS. This is at the option of the PBBS SysOp or owner.

We are always on the lookout to extend the NTS service. If you would like to help, contact me @ N6LDL.CA. I'd love to talk with you.

73 de Steve (KA6ETB)

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## The President's Letter

*Continued from page 1*

must be aware of: You get out of the NCPA what you put into it.

Another unique characteristic of packet is how an improvement to one part of our network can benefit all. A repeater group pooling their resources can provide improved services for their members, but in no other medium can such a wide range of services be tied together. If one person builds a super multi-band HF packet gateway, or another develops a fully automated packet satellite ground station, or a high-speed wormhole linking two major cities is set up, the improvements in network performance are shared by all. Mail delivery speeds up, the amount of information available increases dramatically, and special information routing and processing services become accessible to more people.

Unfortunately, we have not kept up with our counterparts in the repeater world in terms of organizing support for these shared resources. Part of the problem is that hams tend to be a thrifty bunch (you may prefer other descriptions) and that the existing network appears to work "good enough." It's always hard to sell better performance to people when they don't know what they'd do with it, but it doesn't take much looking around at what industry is doing with high-speed digital communications (digital voice, facsimile, video, information services, etc.) to see the potential.

**If you are getting started in TCP/IP, you will first need to obtain an IP address. These are issued by the IP address coordinator which, in Northern California, is Doug Thom N6OYU @ K3MC.**

Another part of the problem is that the pioneers in the packet field tend to be the rugged individual types that don't ask for help. For the most part, the network today was built entirely by individuals or small groups of two or three utilizing their own financial and manpower resources. The absence of more visible support organizations makes it difficult for the newcomer to packet who truly wants to offer his help, but has no one he can offer it to.

I personally know of several hams doing development of advanced network capabilities, but many of them prefer to keep their work under wraps, usually to avoid raising public expectations which would put themselves under pressure to produce results. The downside of this policy is that some of these projects may never obtain the critical mass of resources necessary to become practical.

It is my hope that the NCPA, possibly through this publication, can help to bring those with advanced knowledge together with those with resources that are willing to help so that we can all benefit from an improved communications network.

73, eric

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# NCXPN
# (Northern California AX.25 Packet Network)

*Phil Marcelis, KB6TKL*

A couple of months ago, Larry (WB9LOZ) brought up a few topics of discussion for the NCXPN group. Among these were: message routing, establishing a 433 MHz backbone, making the load on the NBAY and SBAY LANs a little more equal, and working out additional paths for message forwarding. With these topics in mind, I'm going to setup a meeting for the NCXPN group to be held in the San Jose area. If you have thought of a place that will be more convenient for everyone, then please EMail me your suggestion.

One of the duties defined for the NCXPN director is to keep the other members informed of progress on packet projects. At our last meeting, Eric (WD6CMU) expressed an interest in investigating 9600 baud FAX adaptation to packet radio. Apparently, this Quadrature Amplitude Modulation (QAM) modem occupies the normal FM voice bandwidth and doesn't require a true FM radio. The chips are heavily mass produced and should be reasonably inexpensive.

I have yet to hear of any other projects. Once again, it's important that you send me a piece of EMail explaining a little bit about the project you're working on so I can let other project leaders, and the rest of the packet community, know about experimentation being done. HAM radio is a hobby for all of us, and I know that it's easy to get wrapped up in your own projects, but sometimes when the darn thing just doesn't want to work right and you haven't the vaguest idea why, it's helpful to know that there are a few people who might be able to spark an idea towards a solution. Keeping everyone up-to-date on your progress let's everyone benefit.

Just as an example, I like to keep a short description of my "little pet projects" in a file on my TCP/IP station. If you finger Phil@KB6TKL with TCP/IP, you'll get a list of my current projects, what they're all about, and what percentage complete I rate them to be.

**Now, about projects...**

I recently got a message from a HAM using TCP/IP on a Macintosh in Belgium. His question was "How do you connect three serial ports to a Macintosh?" He wants to run 3 different frequencies on his TCP/IP station and therefore needs to connect 3 TNCs to his Mac. There's just one problem, the Mac only has 2 serial ports. His solution was to use a French-made AppleTalk product that tricks the serial manager into thinking the same serial port actually has more than one serial connection. Apparently, this isn't the answer because the TCP/IP software won't let the user allocate more than one connection through the same serial port.

Well, that's just a software problem, right? A swift flick of the mouse, a button click here, a keystroke there, and it's fixed. Fine. The problem of getting more than one frequency per TNC hasn't been solved, though. One of my projects is a TNC/Radio that's connected through the SCSI port. Even the earliest Macintosh can operate through the SCSI port at an easy 500 Kbps, and the latest SCSI II specification calls for a throughput of up to 16 Mbps.

The TDA7000 (Signetics Receiver-on-a-chip) runs for less than $2.50 (non-bulk price) and the Motorola Transmitter-on-a-chip probably sells for about the same price. The Signetics chip operates up to 110 MHz (RF in, AF out), and the Motorola chip operates to 60 MHz. A chip like the TDA7000 has an AF output with a data output that is simply the AF output 180 degrees out-of-phase. That chip is an FM IF and could be used with a mixer chip and an op amp to create an RF-to-FSK demodulator.

Put about 5 of the receiver chips together with downconverting mixers, add the transmitter chip in the same manner, and put them in a box controlled by an 8051 MicroController and you've got a TNC/Radio that might cost you all of $40. Add the SCSI interface and a little time and effort to make some software work with it and you've got yourself a neat little packet station that can operate at up to 500 Kbps. (Oh, did I forget to mention that the FSK demodulator is capable of 500 Kbps? All for ~$40.)

Get the schools interested. This increases the number of nodes available to the network. There are about 10,000 members of NCPA spread all over Northern California. If each of us get at least one school in our area involved in packet, then we'd have more than enough redundant forwarding paths. And, since we'd have a hand in teaching the newcomers how to operate correctly, we can make sure that every prospective packet radio operator learns how to make the system work efficiently. There're a lot of details involved in operating a packet station (ie-hidden transmitters, frequency selection, properly tuned modems, etc), and it would really help our hobby a lot not only to have new people involved, but to also have well trained people involved.

Oh, sure. You don't really know what to do to get a school involved, and it's too much trouble, and schools don't have money for HAM radio, and the kids probably aren't interested anyway. Yeah, yeah... All it takes is one teacher, you know. If you can hook a teacher into becoming a HAM (usually a science teacher, or a computer teacher is susceptible to techie type activities) then they'll tend to do all the work for you. Try sending the science department chairman a VCR tape of packet operations in progress. Maybe play up the fact that a HAM operator can talk to the world and get new perspectives on just about anything. And, that with computers and BBSs there's the ability to do this within any class schedule or curriculum. And, if they try and try and just can't get any funding for a station, there's always that SCSI TNC/Radio that NCPA could donate.

If you're interested in anything you've read here, I'll talk your ear off if you just give me a call. Or, I'll make your eyes turn red from reading the volumes I reply with if you'll write me EMail to Phil@K3MC.ampr.org.

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# BBS Operation Guidelines

*KE6LW*
*NCXPN BBS Standards Coordinator*

The following information is intended for use as guidelines for BBS Sysops in the NCXPN network. It is based on a poll of Sysops within the network and is in no way intended as a set of rules or regulations. It is merely suggested guidelines to use in order to establish some sort of continuity throughout the network.

- Carry and forward all designators approved for distribution by the NCXPN.
- Support forwarding of NTS, OES, RACES and RDCRS designators.
- Kill and do not forward bulletins over 10 days old.
- Educate users as to the use of the USA designator. Use of this designator is only for bulletins of general interest to the amateur community as a whole. Keep these bulletins brief and to the point. "FOR SALE" and "WANTED" type messages should not be sent @USA. They should be given local distribution. This is an on going education and users need to be reminded on a regular basis. A note in the HELP file under the S command regarding the use of @USA can be very helpful.
- Forward times are coordinated by the LAN gateway station.
- Forwarding on the backbone should be only to approved BBS calls. Do not forward to personal TNC mailboxes on the backbone frequencys.
- Do not beacon on the LAN frequency.
- Any change of frequency for the BBS, whether it be user or LAN, must be approved by the NCXPN BBS Coordinator.
- Balance your transceiver on the user frequency. Do not use more transmit power than is necessary. A transmitter running 100 watts can sometimes be heard 40 or 50 miles away. Most users run 10 to 25 watts and that is all you need to get back to them. Don't transmit further than you can effectively hear.
- If you are running a NET/ROM emulation software for multiple user access do not run the system as a full NET/ROM node unless you are in a position to be used as a node. Your node broadcasts will propagate into the system and can encourage BBS DXing.
- Whenever possible discourage BBS DXing. Remind users that all BBS's carry the same bulletins. Most BBS DXers have no idea how they are getting into the distant BBS and in many cases are entering through the backbone system.
- It is a good idea to have at least one person trained in SysOp duties on your BBS. You may also find it very helpful.
- Make your policies concerning your BBS available to your users. If you do not wish to carry certain types of bulletins let your users know about it.
- Although you have invested a considerable amount of time and money to provide a BBS service, keep in mind that it is a service. New packet users usually head right for a BBS. Be courteous to new users and help them when you can.

Send comments and suggestions to: KE6LW@KE6LW.

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# Pacificon '90

*Dewayne Hendricks WA8DZP*

All those with an interest in Amateur Packet Radio are invited to attend PACIFICON '90 on the weekend of October 12-14, 1990. The NCPA will be manning a booth and offering a series of technical sessions at the convention.

Hosting the convention will be the Santa Clara County Amateur Radio Association (SCCARA). Those who have attended past conventions hosted by SCCARA know the quality of the past SCCARA hosted conventions. This year should be no exception.

The location for PACIFICON '90 will be the Le Baron Hotel, 1350 North First Street, San Jose, CA 95112. Room rates will be $57.00 plus tax for one or two occupants with an additional cahrge of $10.00 plus tax for each additional person (not exceeding 2) in a room. The hotel telephone numbers are: Inside CA (800) 662-9896 and outside CA (800) 438-6818. NOTE: BE SURE TO ASK FOR THE CONVENTION SPECIAL.

One of the convention highlights will be the extensive manufacturer exhibit area. ICOM and KENWOOD are among the early purchasers of booth space. Numerous smaller companies have either purchased booth space or have evidenced an interest in doing so. NCPA will be running a booth in the exhibit area during to run of the convention to demonstrate packet radio operation and answer all questions concerning packet radio. HRO and Radio Place will be engaging in equipment sales with the usual convention special prices.

The technical session program is still being planned. Among sessions under plan are: Packet Radio programs, DX, Antennas, Emergencies, Youth forum, a Fox hunt using your HT, ARRL forums and more. ARRL/VEC license exams will be held also. The NCPA will be running a 2 hour session titled "Introduction to Packet Radio." There will also be a session on an advanced packet radio topic yet to be determined.

Registration prices are: $12.00 until October 1 and $15.00 thereafter and at the door. Spouses do not have to register. Youths 18 years old and younger are admitted free.

Send your registration fees or requests for information to: PACIFICON '90, 481 Fenley Ave., San Jose, CA 95117 or call (408) 243-8349.

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# NCPA Board Minutes

*Dewayne Hendricks WA8DZP*
*NCPA Secretary*

### NCPA Board of Directors Meeting August 5, 1990

The meeting took place at the offices of the Premenos Corp. in Concord, CA at 1100.

Present were: WD6CMU WB9LOZ N6RAL WA8DZP N6LDL KB6OWT N6QMY WA6JCW KH6JUZ N6IXX

### Old Business

WD6CMU received a letter and form from Jane Miller, Attorney, for submitting a request for a taxpayer ID number. He will submit the form so that we can satisfy the requirements of the Bank of America in regard to our bank account.

N6RAL expressed his inability to continue to perform duties as president but expressed his desire to remain on the board.

WA6ERB could not be contacted and was not present.

K3MC reported on his investigations on obtaining reduced rates for mailing the newsletter.. 2nd class permits are very difficult to get and would probably not be appropriate for our needs. Bulk rate requires IRS 501C letter or a recent audit by a CPA, plus constitution, plans and record. Minimum mailing is 200 pieces. Permit cost is $120/year. For 800 pieces per year, approx. cost would be 16.7 cents/issue. K3MC Suggests we incorporate as a non-profit organization to reduce personal liability.

### Board Actions

WA8DZP reiterated his difficulty with board members not holding up their end of the work. We've all made lots of commitments, but little real work is getting done. Specific points:

Need more dialogue with frequency and BBS coordinators.

Need to resolve organization legal liability issue.

Need to be a information source rather than an information sink.

No resolution was reached on this issue. Everyone promised to do a better job in the future.

N6QMY will take over as NCPA Treasurer, WD6CMU will be new the President, KB6OWT will be vice-president. CMU will get change of signature cards for the B of A bank account.

JCW reported on his talk with AA4RE, who appears to be making progress on various frequency coordination issues. General consensus among the board is that he is doing his job. Same for K6RAU, the BBS coordinator. CMU will check with them before next BofD meeting to obtain a full report on their activities since the last board meeting.

K3MC went to the last NARCC meeting as an unofficial NCPA representative. K3MC and WA6JCW volunteered to go to the next NARCC meeting as our official representatives.

N6QMY will investigate legal liability issue and the possible incorporation of NCPA as a non-profit organization.

KH6JUZ attended the board meeting to report that N6QMY is ready to go on 9600 baud and he would like to make sure that 145.71 is the right channel for such operations. AA4RE recommends 443.33 for 9600 baud on 70cm.

Current funds in our bank account are about $1K. The summer issue cost approx. $400 to print, the costs of the spring issue will be 80% of that, which would leave about $250 to produce the two remaining issues. K3MC proposed that we sell back-issues and memberships at next Foothill College Flea Market. KH6JUZ proposed photocopying issues to reduce costs, possibly with color printing on the title sheet used as template. K3MC will take it under advisement if our finances become critical in the future. A proposal was made that all NCPA BBSs advertise for new NCPA members. The next newsletter will go to press on October 1st, all articles and submissions are due Sept. 1st. The Newsletter Committee will hold a meeting Sept. 9th. at Apple, in Fremont.

WB9LOZ plans to publish his packet radio notes in conjunction with his proposed paid seminars. The board discussed the possibility of selling copies via NCPA. No decision was reached on this proposal.

Pacificon: We have 3 1-hour slots, 2 on Saturday, 1 on Sunday, plus a table in the exhibit area. WB9LOZ suggests having 2 slots contiguous on the same day for a packet beginner's session. OWT will bring in portable packet station to run demos at the booth. JUZ can set up 9600 baud link to his BBS.

H&W Committee Report: As KA6ETB was not present, the board did not discuss the activities of the H&W committee.

Speaker's Bureau: W6MEO is coordinating volunteers, only 5 or 6 so far. Similar number of requests for speakers. Need more volunteers for speakers who can travel outside of their immediate area.

WB9LOZ proposed giving an all-day packet radio seminar sometime in fall. He is looking for some way to amortize the cost of printing materials in order to keep the registration cost low. The Pacificon Planning Committee has turned down our proposal of having paid packet radio seminars in conjunction with Pacificon.

145.71 and 443.33 were approved by the board for 9600 baud use.

The board voted to drop WA6ERB as a director of NCPA due to his lack of attendance at all board meeting since he was elected.

N6IXX was proposed as a director and representative for DXPSN on the board. This action was approved unanimously.

The next board meeting will be on October 21st, location to be announced.

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## NCPA Directors

**Eric Williams, WD6CMU**
**WD6CMU @ WD6CMU**

**Bob Sanders, WA6JCW**
**WA6JCW @ KD6XZ**

**Chris Marley, N6RAL**
**N6RAL @ N6IIU**

**Michael Bothe, KB6OWT**
**KB6OWT @ KB6OWT**

**Steve Harding, KA6ETB**
**KA6ETB @ N6LDL**

**Patrick Mulrooney, N6QMY**
**N6QMY @ N6QMY**

**Dewayne Hendricks, WA8DZP**
**WA8DZP @ K3MC**

**Larry Kenny, WB9LOZ**
**WB9LOZ @ W6PW**

**Tom Woods, N6IXX**
**N6IXX @ KA6FUB**

## NCPA Officers

**President:**
**Eric Williams, WD6CMU**
**WD6CMU @ WD6CMU**

**Vice-President:**
**Michael Bothe, KB6OWT**
**KB6OWT @ KB6OWT**

**Secretary:**
**Dewayne Hendricks, WA8DZP**
**WA8DZP @ K3MC**

**Treasurer:**
**Patrick Mulrooney, N6QMY**
**N6QMY @ N6QMY**

**Newsletter Editor:**
**Mike Chepponis, K3MC**
**K3MC @ K3MC**

**Frequency Coordinator:**
**Roy Engehausen, AA4RE**
**AA4RE @ AA4RE**

# BBS Coordination

*Fred Moore K6RAU*
*NCXPN BBS Coordinator*

One of the primary functions of NCPA is that of bulletin board coordination. In Northern California, NCPA is recognized as the council for packet coordination by the Northern Amateur Relay Council of California (NARCC).

Some ask why the need for BBS coordination in the first place? True, amateurs with Technician Class privileges or higher have the ability to place BBS operations on any frequency allocated under FCC regulations, but without coordination soon such activity would cause utter chaos within the packet spectrum. Contrary to popular belief, even if everyone had their TNC parameters set at "optimum," several bulletin boards and the addition of keyboard to keyboard activity on the same frequency where all of it is heard by the various parties involved, just does not work. It can be likened to the interference a voice repeater would cause coming on the same frequency in the same area of an already sanctioned NARCC repeater. Neither system could function under those conditions.

Thus, NCPA facilitates packet activity within Northern California through its representation of experimenters, keyboard to keyboard, TCP/IP, BBS-NCXPN, and DX spotting network auxiliaries.

A point should be made that the BBS coordinator does not assign a frequency to a prospective bulletin board seeking sanction. It would be near impossible for a coordinator to know "what is hearing what" in an area without actually being able to monitor the proposed frequency. Rather petition information and the NCPA bandplan is sent to the prospective bulletin board. When the petition is returned to the BBS coordinator, sanction is granted based upon the approval of the NCXPN sysops. Only bulletin boards which will be involved with WESTNET forwarding are officially coordinated.

The intent of coordination, of course, is to reduce interference between sanctioned bulletin boards which in turn keeps packet commuication viable. The NCXPN bbs list indicates Northern California now is near saturation in the number of current bulletin board systems in relation to the number of allocated frequencies. With bbs activity and other amateur radio interests vying for vhf-uhf packet spectrum, the importance of NCPA as a coordinating council becomes apparent.

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# Where to Find a BBS

| | | |
|---|---|---|
| KE6BX | Hollister | 144.93 |
| KJ6FY-1 | Benicia | 144.93 |
| KI6YK | Danville | 144.93 |
| WD6CMU | Richmond | 144.97 |
| N6EEG | Berkeley | 144.97 |
| W6FGC-2 | Twain Harte | 144.97 |
| N6LDL | Los Gatos | 144.97 |
| WB6MIF | Magalia | 144.97 |
| KI6WE | Pleasant Hill | 144.97 |
| KD6XZ-1 | Sacramento | 144.97, 441.50 |
| AA4RE-1 | Gilroy | 144.99 |
| KA6FUB | Martinez | 144.99 |
| KB6DUI | Boulder Creek | 144.99 |
| N6MPW | Ben Lomond | 144.99 |
| N6OA | Lemoore | 144.99 |
| W6PW-3 | San Francisco | 144.99 |
| WA6RDH | Dixon | 145.01 |
| KI6EH | Santa Cruz | 145.07 |
| N6IIU-1 | Palo Alto | 145.07, 223.56 |
| KE6LW-1 | Yuba City | 145.07 |
| KG6XX-1 | Carmichael | 145.07, 441.50 |
| W6CUS-1 | Richmond | 145.09 |
| N6ECP | Redding | 145.09 |
| KB6IRS | Soquel | 145.09 |
| N6IYA-2 | Felton | 145.09 |
| K3MC | Fremont | 145.09 |
| WA6NWE-1 | North Highlands | 145.09, 441.50 |
| K6RAU-1 | Merced | 145.09 |
| WA6YHJ-1 | Livermore | 145.09 |
| KB5IC | San Jose | 145.73 |
| KA6JLT-2 | Menlo Park | 145.73 |
| WO6Y | Fairfield | 145.77 |
| WB6ODZ-1 | Lake Isabella | 145.79 |
| KB6OWT-1 | Sunnyvale | 145.79 |
| N6QMY-1 | Fremont | 145.79 |
| N6REB-2 | Modesto | 145.79 |

Here is the petition information sent for pending coordination:

Essentially, to become a BBS member of NXCPN (NCPA) the procedure is to petition the BBS Coordinator (yours truly) with the following information:

- Intended user frequency
- Forwarding frequency
- Specifically the BBS you will be forwarding to/from
- General geographical area served on user frequency
- Callsign of the petitioning BBS
- Name and address of BBS Sysop

When that information is received, you will be placed in a "pending coordination" status, all of the current NCPA BBS sysops will be notified giving them a chance to respond to the pending coordination and if no objections are received then after about a four to five week "probation" period you will be granted a NCPA sanction and become an official member of the NCPA BBS network.

...Fred / K6RAU
NCXPN bbs coordinator

# How The NCPA Band Plan is Determined

*Roy Engehausen AA4RE*
*NCPA Frequency Coordinator*

The primary function of the NCPA frequency coordinator is to maintain the band plan. This is the foundation upon which the whole NCPA is based. With a band plan that is respected both within the packet community and within all amateur ranks, we can avoid interference and be able to acquire new channels. Without such a plan, we revert to chaos and RF wars.

There are two aspects to the band plan: • Designating subbands for packet usage. • Allocating subband channels to specific interests.

The first is accomplished by interfacing to other users in Northern California that are interested in frequency coordination. The biggest user of ham VHF/UHF spectrum is Northern Amateur Relay Council of California (NARCC) representing repeater owners. NARCC has a long and colorful history but, more importantly, is recognized by the FCC in order to resolve repeater interference problems. As such, NARCC's opinion on frequency usage is especially valuable in the decision making process. Unfortunately, NARCC and NCPA are the only two area wide organizations representing amateur VHF/UHF spectrum users. Obviously, there are other users (ATV, ARES, RACES, Simplex, Remote Base, SSB, etc) but the coordination process is inhibited by the lack of a focal point for each user. For those whose interests are these mode, my best advice is to organize to make sure your voice is heard.

Getting new pieces of spectrum for packet is a nightmare. On 2M, 220, and 440 bands, every hertz is claimed by somebody so packet must displace other modes. Obviously, some mode is the loser and we don't win any friends for packet this way. While the frequency coordinator negotiates with the other spectrum users, in the end, the NCPA board makes the decision to use a subband for packet.

Once a subband is found, the NCPA allocates channels and assigns these to the various packet usage groupings (TCP/IP, DX Cluster, etc). It has been NCPA's policy to only assign a new channel when all the other for that group are fully utilized. This has two benefits: The other modes are displaced slowly allowing the spectrum time to absorb the relocated users; and the NCPA's credibility as a spectrum manager is enhanced with by having only fully occupied channels. In the allocation of channels, the NCPA's board is the final authority.

The important thing to remember about any band plans is that they are worthless without the support of the amateur community and that can only be obtained by listening to those who want to speak and reaching a consensus on a plan that is fair to all. That's the definition of coordination. Any amateur should feel free to contact the NCPA Directors to voice their opinion on spectrum management or problems.

The current band plan is in this newsletter and covers 50 to 1000 Mhz. There are no formal HF allocations although there are various frequencies where packet stations congregate. While there are packet operations above 1000 Mhz, there has been no formal allocations. EOF

# The Band Plan

**50MHz**

| | |
|---|---|
| 51.12 | SOCAL backbone |
| 51.14 | Experimental |
| 51.16 | Kybd to Kybd |
| 51.18 | Experimental |

**144MHz**

| | |
|---|---|
| 144.91 | keybpard-to-keyboard |
| 144.93 | LAN[1] |
| 144.95 | DX Spotting Network |
| 144.97 | LAN |
| 144.99 | LAN |
| 145.01 | keyboard-to-keyboard |
| 145.03 | keyboard-to-keyboard |
| 145.05 | keyboard-to-keyboard |
| 145.07 | LAN |
| 145.09 | LAN |
| 145.71 | 9600 baud TAPR compatible |
| 145.73 | LAN |
| 145.75 | TCP/IP |
| 145.77 | DX Spotting Network[2] |
| 145.79 | LAN |
| 146.58 | DX Spotting Network |

[1]144.93 is used by TCP/IP in the Sacramento area

[2]WO6Y remains on 145.77 as DXPSN/BBS liaison

**220 MHz**

| | |
|---|---|
| 220.80-220.89 | Experimental |
| 220.90 | Superbackbone |
| 220.91-221.00 | Experimental |
| 221.04 | DX Backbone |
| 223.42 | node uplink (SBAY) |
| 223.52 | node uplink (NBAY) |
| 223.54 | node uplink (EBAY) |
| 223.56 | keyboard-to-keyboard |
| 223.58 | node uplink ("Other") |
| 223.60 | node uplink (SACVAL) |

**430 MHz**

**100KHz-wide channels**

| | |
|---|---|
| 433.05 | TCP/IP |
| 433.15 | NET/ROM backbone |
| 433.25 | DXPSN backbone |

**20KHz-wide channels**

| | |
|---|---|
| 443.31 | backbone |
| 443.33 | backbone |
| 433.35 | backbone |
| 433.37 | backbone |
| 433.39 | backbone |
| 433.41 | LAN interlink |
| 433.43 | 9600 baud TAPR compatible (pending) |
| 433.45 | digital experimental & backbone |
| 433.47 | NET/ROM interlink, keyboard |
| 433.49 | TCP/IP |
| 441.50 | all |

**No channelization has been done for these bands. Some activity is present.**

903-905 Mhz
915-917 Mhz
1248-1252 Mhz
1297-1300 Mhz

## What is NCPA?

**NCPA, the Northern California Packet Association, is an organization formed to foster the Digital Communications modes of Amateur Radio. So far, we have defined our goals as:**

- **Education**
- **Coordination**

**Education means making information available about various Digital modes, and this newsletter is but one part of that education process.**

**Coordination activities include frequency coordination (NCPA is recognized by NARCC as the official packet radio frequency coordinator) as well as coordinating people and their various uses of packet radio, be they DX Cluster, BBS, TCP/IP, keyboard-to-keyboard, NET/ROM, Traffic/NTS, Emergency uses of packet, or even experimenting with new frontiers of various digital modes.**

**We in NCPA believe that the next revolution in Ham Radio will come about in Digital Communications Technology, and in the beneficial coordination among all users of ham Digital Communications Technologies.**

**We invite you to join NCPA! Become part of the most dynamic group of packet folks in Northern California!**

NCPA *Downlink*

Northern California Packet Association
6680B Alhambra Ave. Suite 111
Martinez, CA 94553

**First Class Mail**