NCPA Downlink

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

Spring, 1992 | **Issue number 10** | **Price: $3.50**

Going Mobile With Packet

Larry Kenney, WB9LOZ

I recently went on a 5,000 mile vacation trip through the great Northwest and the mountain states and I took my packet station with me. However, on this trip I didn't operate just from the motels and camp sites, I operated mobile packet from the car while traveling down the highways! Using my laptop computer, the new BayPac modem and my mobile rig, I had a lot of fun connecting to nodes, bulletin board systems and personal stations while I was in the passenger seat.

Bill Choisser, K9AT, and I left San Francisco on July 10, heading north on Highway 1 along the coast. The packet station wasn't hooked up until later in the day as we approached the northern end of Route 1. I was able to connect to two K7WWA nodes on 145.05, LAKE AND CAHTO, at various times, and was surprised at how well the connections held through the hilly terrain. As Route 1 ended and we travelled north on 101, I was able to connect to the Garberville node, GBV05, also on .05. No BBS activity was available in this area.

Further north on 101 as we drove through the redwoods, I connected to the WB6LYE node on Mt. Pierce. As we approached Eureka, I connected to the WB6LYE BBS there, on 145.73. I was saddened to read that Pete would be shutting down his BBS later in the week because he hadn't been able to find anyone to take over the operation.

The Grants Pass node on 145.01 had very good coverage and I was able to work it from just north of Eureka. I had very enjoyable keyboard QSOs with Art, AL7EP, of McKinleyville, and Doug, N7SHI, of Brookings, Oregon. There was quite a bit of activity between Crescent City and Grants Pass, with several BBSs and nodes being used, but it was all on 145.01. None of the other frequencies had any activity on them, something we were going to find for most of our trip.

We spent two days in Eugene, Oregon, where I worked the Eugene BBS, N7DXT, several times. It was supposed to be on 145.01, but we were never able to connect to it direct. The CBRG node on 144.99 in Coburg indicated that it was an access node for N7DXT so I used it. We saw very little packet activity other than stations accessing the BBS during the time we were in Eugene.

As our trip continued, I located WA7SHP, a BBS in Salem on 145.65, and then worked Hank's BBS, W0RLI-2, on 144.91 as we passed south of Portland on our way to the Columbia River Gorge. We did a lot of monitoring and saw activity on a number of frequencies in the Salem - Portland area.

We were in near Spokane the next time we fired up the computer and worked the SPOKN BBS (I didn't note the callsign) on 145.01. As we traveled east along I-90 we found that northern Idaho and western Montana are served well by a node on 145.01 located at about 5000' near Lookout Pass on the state line.

In Missoula, Montana, the MSO node on 145.01, located high up on a mountain to the north of the city, provides excellent coverage and access to the KD7HP-2 BBS. The BBS, located in Stevensville to the south, doesn't have a port on 2 meters, only a UHF link to the MSO node. The N7GXP node at 6,500' Mac-Donald Pass, also on 145.01, serves Helena, the Montana state capital, and the surrounding area and provides access to the WB7ETT BBS.

From Helena we headed northeast across the open ranges of Montana where we found no local packet activity. We could occasionally hear a distant node on 145.01 as we passed over a high spot, but none of the nodes and BBSs in the larger cities to the south along I-90 were strong enough to work.

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In This Issue

Editorial

Mike Chepponis, K3MC

Welcome to the Fall 1992 issue of the NCPA Downlink! We've been away for a short while, but we're back! Thanks for your continued support of this most important packet group in Northern California!

I'd like to thank our previous editor, Steve, KA6ETB. His dogged persistence through the months got all those previous issues out to fellow NCPA members. We thank Steve deeply for his contributions to NCPA and its continuing missions of Education and Frequency Coordination. Bravo, Steve!

I've volunteered to be Newsletter Editor again, because Steve has gone ahead to work hard on some other personal pursuits. This is both a pleasure and a challenge: I enjoy doing this job, but still I remain aware of the challenges of a Deadline!

Speaking of Deadlines, yes, we have dropped plans to produce the Spring and Summer 1992 issues; we were just too far behind, and so we've decided to do this Fall 1992 issue and remain on track from now on. And don't worry! Everybody will receive 4 issues for a standard one-year NCPA membership (which is still one of the Greatest Bargains Around at only $10 per year).

This issue focuses on the HF STA and the consequences of recent ARRL and FCC decisions. Plus, we have our usual features by Larry Kenney, NCPA Education Director. This time, Larry tells us about his Summer Vacation with Packet through the Northwest, and does a review of the Tigertronics BayPac BP-1 modem. N0ARY presents more info on his Internet Gateway, with complete Operating Instructions. And, we have a report from our Japanese friends on the 64k bps packet system they have developed — interesting stuff!

Next time, we'll have our usual Book Review column back, and we'll pack the next issue full of the Latest and Greatest that digital ham radio has to offer!

So, we welcome you again and trust that you'll find continued value in your membership in the NCPA. We're always interested in hearing your comments and suggestions.

And, hey, be an Elmer! Tell your packet-enthused friends about us! Our membership form is in the middle of this issue.

Until next time, keep those packets flying!

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The NCPA *Downlink* is published quarterly by the Northern California Packet Association, PO Box 61716, Sunnyvale, CA 94088-1761, for the entertainment and education of amateur Radio operators using digital modes, and those with an interest in them. A one-year membership in the NCPA, including a subscription to the NCPA *Downlink*, is $10.00 in the U.S. and its possessions.

Minutes of the ARRL Committee on Amateur Radio Digital Communications

Ed Juge, Chairman
Vic Poor, Recording Secretary
June 13, 1992

The ARRL Committee on Amateur Radio Digital Communications met at 8:30 CDT on June 13, 1992 at the DFW Marriott Hotel, Dallas, TX. Ed Juge, W5TOO, Chairman presided and Vic Poor, W5SMM acted as recording secretary. In addition the following members were present: Tom Comstock, N5TC, Craig McCartney, WA8DRZ, Paul Newland, AD71, and Dale Sinner, W6IWO. Bob Poirier, KODJ, was unable to attend.

Comstock reviewed the role of digital communications in past emergencies including the Mexico City earthquake and hurricane Hugo.

Poor reviewed the current state of the art of current and soon to be introduced digital modes and their impact on h.f. spectrum utilization.

The Committee as a whole reviewed the responses from the Digital Survey conducted by QST and RTTY Journal.

A lengthy discussion followed on all the issues raised in connection with the operation of unattended amateur h.f. digital stations. The recording secretary was directed to summarize these discussions and the unanimously approved recommendations to the ARRL Board in a separate report which is attached as a part of these minutes.

Report and Recommendation to the ARRL Board of Directors by the ARRL Committee on Amateur Radio Digital Communications

June 13, 1992

The ARRL Digital Committee has been asked by the ARRL Board of study the issues related to use of automatic unattended control of amateur stations operating digital modes in the h.f. spectrum and to recommend what action the Board should take toward establishing permanent rules for such operation, if any.

The Committee has carefully studied as many of the facts and opinions as were available within the Committee's resources. Data bearing on the question included:

- The results of the ARRL Digit Survey.
- Frequency usage and allocations in the U.S. and in other countries.
- The current state of the art for amateur h.f. digital modes.
- Potential abuse of unattended operation such as illegal third-party traffic.
- The various competing interests for h.f. spectrum, particularly between existing digital modes.
- Amateur operating practices and traditions.

The ARRL Digital Survey

The members of the Committee carefully studied the tallies of answers to the questions in the survey and read every written comment submitted by the respondents. The survey data showed that majority of respondents favored permanent authorization of unattended semi-automatic operation but limiting semi-automatic operation to sub-bands, and a substantial majority did not approve of unattended fully-automatic operation.

A wide range of opinions and proposals were made in the comments attached to the survey, all of which were discussed and weighed by the Committee. The important issues raised are discussed below.

Frequency Usage and Allocations in the U.S. and other Countries

It is no secret that available space is very limited in the h.f. spectrum. Nowhere is that more evident than in the very popular 20 and 40 meter bands. The two oldest modes of operation, voice and c.w., have the lion's share of the spectrum in those bands since they were in heavy use before there were any digital modes. The digital modes have simply "squeezed in the cracks" between already established modes of operation. Since the digital modes have become established they have expanded gradually, a little at a time, primarily into space occupied by c.w. operation. Frequencies near the edges of digital mode operation continue to be shared by both digital and non-digital modes.

Outside of the U.S., depending on the ITU region and the rules adopted by various administrations, digital operation for any given mode may not align with practice in this country and it does not seem possible to establish a sub-band plan that could be universally acceptable. It is simply inevitable that any band segment in the h.f. spectrum is going to be shared among differing modes of operation. This is not a new condition on the h.f. bands and has been accommodated for decades.

Available Spectrum Space in the H. F. Bands

Since all current h.f. band space is actively occupied by one or another mode of operation and since no current class of user is willing to give up space for another, the Committee is operating under the assumption that whatever rules are proposed there will not be a sudden significant change in the way the bands are currently used. (At least this Committee is not prepared to make any such recommendation!) The Committee believes that gradual changes will continue to occur but that these changes will be due to natural migration as a larger percentage of amateurs shift to digital from other modes of operation and from one digital mode to another.

The respondents to the survey strongly opposed the allocation of sub-bands by rule. The Committee also believes that any attempt to specify by rule sub-bands for a class of digital operation would soon grow obsolete as patterns of operation change, more digital modes are in-

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Minutes of the ARRL Committee on Digital Communications

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troduced, and more users shift to digital modes. Instead, the Committee believes that the amateur community will need to adjust itself to continued sharing of the spectrum by various modes and that such sharing should be facilitated through the publication by the ARRL of recommended sub-bands for the various modes and that such recommendations should be revised from time to time as operating patterns change.

The Committee, as a subsequent action, will propose a revised band plan for consideration by the ARRL.

In any case, the h.f. spectrum is severely limited, especially for digital mode operation, and modes of operation that improve spectral efficiency must be strongly encouraged. The Committee will undertake a study proposing, in a subsequent action, voluntary technical standards which can be promoted among amateurs and vendors to significantly improve our current frequency usage.

The State of the Art for Amateur HF Digital Operation

While the current rules allow considerable latitude in what digital modes the amateur community uses, the actual practice is somewhat limited. Current practice includes "RTTY", a non-error-protected simplex mode, usually using the baudot code; "AMTOR", a partially error-protected half-duplex mode using the baudot code; "packet", an error-protected half-duplex mode using ascii code; and "PACTOR", an error-protected half-duplex mode using ascii code. In addition, a new DSP-based system has been demonstrated but is not yet generally available called "Clover" that is an error-protected full-duplex highly spectrum efficient mode.

As currently used all of the above modes require approximately 500 to 1000 Hz. of bandwidth per channel except packet which requires 2000 Hz. per channel. Effective use of that bandwidth is terms of character throughput varies considerably as a function of the protocol used and the channel conditions. Partly because of the requirement for 2000 Hz. of space per channel and partly because of the nature of the AX.25 protocol, the performance figures for packet are the poorest per unit of bandwidth of any of the currently used modes. RTTY and AMTOR are better, and PACTOR is better still. Clover promises to exceed the throughput per unit of bandwidth of any of the above modes.

Tolerance to poor channel conditions also varies among the modes with packet having the poorest performance, RTTY next, AMTOR and PACTOR being very much better.

Digital techniques for h.f. operation are improving and newer technologies such as PACTOR and Clover promise significant near- term improvements in spectrum utilization, throughput, and performance under difficult h.f. radio conditions. The current rules do not appear to have contemplated these new modes in the h.f. portion of the spectrum and the Committee believes the rules require a modest change to encourage these and other new more effective digital modes and to promote operation in the narrowest possible bandwidth.

Potential Abuse of Unattended Operation

A few respondents to the Survey expressed opposition to any form of unattended operation because of possible illegal use of amateur bands for unauthorized third-party traffic, commercial purposes, or the support of illegal activities such as drug smuggling.

The Committee is not aware of any pattern of such abuse nor does the Committee see any reason why illegal operation is not just as likely to occur directly between two attended stations as any other. The Committee did not consider this factor in making its recommendations.

Competing Interests for HF Spectrum Space

The most difficult issue the Committee has had to deal with is the demand for spectrum space from the many different classes of users. Many of these users are sharing (somewhat unwillingly) the same space and each would like the others to vacate to other locations.

The most critical frequency bands (at the moment!) are 20 and 40 meters.

On 20 meters the frequencies above 14,100 kHz. have been traditionally used for DX voice and below 14,100 KHz. for c.w. and data. With the advent of packet, and the STA authorizing unattended packet operation, packet operations began above 14,100 Hz. and has gradually occupied the region of 14,100 to 14,125 Hz. Due in large part to the fact that data is not allowed in this sub- band in some countries, packet operation has also extended downward into the band immediately below 14,100 attracting US operation in this sub-band as well. Non-US voice operators have taken exception to the use of the 14,100-14,125 space and RTTY operators have taken exception to the use of the space below 14,100.

On the 40 meters packet operation began in the 7080-7100 Hz. region where traditionally RTTY and AMTOR operators had been active. This has forced the RTTY and AMTOR operations further down, to the dismay of c.w. operators. This picture is further complicated by the fact that outside of region 2 data operation must be confined below 7050 kHz.

The situation on other bands, especially below 21 mHz., though not as critical as on 20 and 40 meters, have similar conflicts. The informal 'sub-bands' used by the various modes are also somewhat fluid as propagation conditions change and usage shifts from one mode to another.

The Committee does not believe that any subdivision of the bands by rule will best serve the amateur community in the long run. It also seems unlikely that any subdivision of the band by mode will work on a world wide basis because of the differences in the rules between regions and between individual administrations. Any subdivision of amateur bands by rule also imposes an unnecessary potential enforcement burden on the FCC.

Amateur Operating Practices and Traditions

Except in a very few special situations it has long been the tradition (and rule)

that one amateur station must not willingly or knowingly interfere with a contract already in progress regardless of the mode of operation or the perceived importance of the communications in progress. It has also been a long standing tradition that no station or group of stations 'own' a frequency. (Frequency 'ownership' has admittedly become a practice on certain v.h.f. frequencies, but this practice has never been established on the h.f. bands and the Committee strongly rejects the concept of doing so now.)

On h.f. the use of sub-bands with various classes of operation gravitating to specific locations is largely self regulating simply by virtue of the fact that a station occupying a frequency is not driven off the frequency by deliberate interference by a station operating another mode. (There are always isolated exceptions to this but it is not condoned in the rules or by the vast majority of amateur operators.) As greater numbers of amateurs use a particular mode that part of the band becomes recognized informally as a mode-specific sub-band. There is always a significant overlap in the sub-bands between modes - packet sharing with RTTY, RTTY sharing with AMTOR, AMTOR sharing with c.w., and so on. The greatest conflicts come where the overlapping modes have significantly different bandwidth, i.e., AM vrs. ssb, packet vrs. RTTY.

Types of Automatic Operation

Two types of automatic digital operation are under consideration for use on the amateur h.f. bands. One is fully-automatic operation where messages are passed between amateur stations without any operator intervention and no operator may need be present at either station.

The other is semi-automatic operation where messages are passed between amateur stations with an operator initiating the contact from one of the two stations.

Both fully- and semi-automatic operation is permissible today under the rules provided there is a control operator present at both stations. (Stations authorized under the STA may operate unattended.)

Digital operation with one station functioning in a semi-automatic mode has long been a practice dating back to the '60s.

Fully-Automatic Unattended Operation

The proposal to authorize fully-automatic unattended operation represents distinct departure from past practices. A clear majority of the respondents to the survey opposed any fully- automatic operation on the amateur h.f. bands.

To authorize fully-automatic operation without restriction, as some of the respondents to the survey advocate, would seriously undermine the fiber of mutual cooperation that h.f. operation requires. The Committee rejects such operation as undesirable on its face.

It was also proposed to authorize fully-automatic operation with restrictions, either to the frequencies allowed, to a few privileged stations, or both. The committee saw no purpose in limiting the frequency bands alone since the number of stations that would attempt unattended operation would make the mode and allocated frequency useless to everyone. Limiting the number of participating stations was also rejected by the committee because there was no conceivable way to equitably allocate the privilege to specific stations nor was the committee willing to set aside any portion of the band to stations with special privileges.

Fully-automatic operation, by it's very nature is mode-specific and must 'own' the frequency it operates on an cannot be effectively shared by other modes of operation.

To authorize fully-automatic operation on the necessary mode- specific sub-bands raises serious problems. There are no likely sub-bands that can be used on a world-wide basis or that will not cause interference to other users under some circumstances.

The only mode of operation that is currently a prospect for fully- automatic authorization is packet, based on the AX.25 protocol, using 2 kHz. channel spacing. This mode delivers the poorest performance with respect to spectrum utilization or survivability under adverse propagation conditions of any the digital modes currently in use. j The Committee does not believe that, if a protected mode-specific sub-band is to be authorized, that it should be a mode that is as inefficient in its resource utilization as current packet practice represents. Such an authorization will discourage the development and use of a more suitable mode.

Further, the Committee does not believe that these is any service being provided by fully-automatic operation that is not also available by other means without the associated problems of fully-automatic operation. Nor does the Committee know of any reason why packet operation cannot also be operated in semi-automatic mode, thereby eliminating the need for a rule-mandated sub-band.

Semi-Automatic Unattended Operation

There are many reasons, however, why some form of automatic digital operation is desirable. It permits amateurs to exchange communications when there is a time difference between the operating times available to the two amateurs, and it permits the quick exchange of messages rather than taking air time with long calls and keyboard-to-keyboard operation. (This not a suggestion by the Committee that keyboard-to-keyboard is undesirable but simply that there are many cases where moving messages at machine speeds is more spectrum efficient and makes more frequency time available to direct keyboard operation.)

It is very evident that some form of automatic operation is highly desirable when handling NTS and personal messages between amateurs through intermediate stations. This capability forms the very heart of the amateur community's preparedness for emergency service. Respondents to the survey favored semi-automatic unattended operation over those opposed by a two-to-one ratio.

The Committee does recognize that there is some potential for interference using a semi-automatic unattended mode even as there is such potential in purely manual modes. However, so long as there is a control operator present at one end of the link, monitoring the progress of an exchange, such interference can be held to a minimum. The benefits of

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HF Packet: What Happened?

Wynne Calvert, W0IUQ
Iowa City, Iowa.

For more than a decade," according to an editorial by David Sumner in the September QST, "the ARRL has been promoting the development of packet radio." And during that decade, it has widely encouraged VHF packet and won approval from the FCC for the unattended, automatic operation which makes bulletin boards and automatic message forwarding possible. Moreover, it went on to obtain from the FCC a special temporary authorization (STA) to prove that such message forwarding would be feasible and practical on HF also, and indeed, operation under that STA subsequently developed into a worldwide network of HF packet stations capable of sending messages quickly across the US and to virtually any other country in the world.

Partly as a result of this HF network, which has performed almost flawlessly under the STA for the past six years, packet has developed almost explosively, to become the fastest growing area of amateur radio, with roughly half of all active amateurs already involved and another third intending to be. Packet now carries literally thousands of personal messages a month to all corners of the country, plus ARRL bulletins, NTS traffic, personal bulletins of all kinds and description, and sometimes also emergency traffic.

Based on repeated, glowing ARRL reports about the success and widespread benefits of HF packet forwarding, and finding none of its initial fears realized, the FCC has been expecting for years to make such automatic operation permanent and open to all.

The ARRL Board of Directors, however, in a sudden reversal which has given most knowlegable packet enthusiasts mental whiplash, has voted instead to request that such operation be prohibited! What happened? Has some faction taken over and convinced the Board that packet is no good after all? Has the Board somehow become convinced that packet is not nearly as popular as it obviously is, or is there some hidden reason why they have suddenly decided to side against HF packet?

The answer, unfortunately, seems to be yes to all three, with the anti-packet faction being the Board's own Digital Committee, and here's what happened:

In what seems to be a replay of the old-time battles between AM and SSB, the first step was to publish in QST, and in the not-very-friendly-to-packet RTTY Journal, a survey ostensibly for input on "planning automated message systems below 50 MHz". Not realizing that it would later be interpreted as a vote against HF packet and a sign of amateur apathy, only a few hams replied. In fact (in unknown proportion from the two journals), only 507 responded, scarcely more than one-tenth of one percent of all licensed amateurs. Among those who replied, 261, or 51.5% were against the fully automatic operation that HF packet forwarding requires.

Calling this "a substantial majority," the Digital Committee thus convinced the Board that there was little popular support for automatic operation. Almost in the same breath, however, the Digital Committee concluded instead that there was broad popular support for the "semi-automatic" operation which is required by the AMTOR and RTTY modes used by most of the Digital Committee members. The Digital Committee, also in its report to the Board, ignored completely the outstanding success of the STA and went on to conclude that packet was vastly inferior to all other digital modes.

Not quite believing the Digital Committee's contention that there was no popular support for HF forwarding and automatic operation, a few of us circulated our own questionnaire at the Cedar Rapids (Iowa) Hamfest in August. Sampling over 20% of the almost one-thousand hams who attended, we found a whopping 93% in favor of HF packet forwarding.

Moreover, an accompanying petition to the FCC, also circulated by others at a smaller hamfest in Ottumwa, Iowa, produced 282 signatures requesting automatic operation for HF forwarding, which is more than the Digital Committee was able to garner against it from the entire readership of two national ham journals.

In their survey and report to the Board, the Digital Committee also took pains to imply that packet causes interference. The remarkable thing about packet, however, is that it can share the same channel with up to twenty or more other stations without substantial interference, by automatically checking for a clear channel before each transmission. Although obviously an advantage in our crowded bands, this was also ignored by the Digital Committee and the interference they were referring to is with their AMTOR and RTTY modes which require a clear channel. What this amounts to, of course, is blaming packet for interference to make a case for getting packet off the frequencies they would like to use instead.

Although not mentioned in either the editorial or the Board meeting report in the September QST, this concept of interference also became the basis for spooking the Board about the potential number who might want to operate HF packet, and according to ARRL President George S. Wilson, this was the major issue which decided most of the Board against automatic HF packet.

Although obviously a substantial number will probably want to operate automatic HF packet if it is approved, the issue is really not so much interference as it is the additional frequencies they might occupy, since clearly few hams will continue to operate on the same frequency if anything like the massive interference suggested by the Digital Committee actually occurs. What it amounts to, therefore, is the old and familiar story of one group wanting to keep another off the air because they are jealous of the frequencies they might occupy — only in this case, since it was cast as interference rather than competition, the Digital Committee was successful in getting the Board to buy it.

The obvious solution of setting up sub-bands for automatic operation, either by band plan or by FCC rule, was rejected by the Committee, even though favored by a much larger proportion of their survey respondents, primarily because the Digital Committee was unwilling to make the hard decisions this requires. Such sub-bands, however, would have solved the problem, since that would have eliminated the feared interference with other modes and made the potential congestion which might

occur the concern of packet enthusiasts, none of whom seem to fear it nearly as much as the Digital Committee.

Quite understandably, the STA participants (of which I am not a member) felt betrayed and stabbed in the back by this fait accompli of the Digital Commitee, and raised an uproar at the LA Convention. In face of this predictable but unexpected oppostion, the Board ordered a meeting between the STA members and the Committee to resove the issue, the outcome of which was still unknown at the time this was written. *[See "Report and Recommendations..." on page 8 for the results of this meeting.]*

In the true tradition of political responsibility, the Board is already blaming the Committee and the Committee is blaming amateur apathy, as if the 1.5% plurality produced by their biased survey made all the difference, and QST is whitewashing the entire business as if it happened all by itself.

The important point, though, is that nobody is minding the store and genuinely protecting the interests of all amateurs. Automatic HF packet is far too important an issue to be decided in this way, since it matters so much to so many hams, and it matters greatly how room is allowed for it in our crowded HF bands. The Board and Committee, however, instead of focusing upon this, have wasted valuable time and energy on another ridiculous mode battle, and for that I think both should be admonished, if not dismissed.

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Going Mobile With Packet

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We spent two days in the Black Hills area of South Dakota, but due to frequent stops at the various sites, such as Mt. Rushmore, Rushmore Cave, the Crazy Horse Memorial, Custer State Park and Wind Cave, the computer was tucked away in the trunk. It was in Wyoming where we were active again as we headed for Frontier Days in Cheyenne.

Heading south along I-25 I was able to hear several distant nodes from Nebraska, again on 145.01, but was unable to connect to any of them. N7JJY-2, a BBS in Laramie, Wyoming, was the first station I could connect with. I was unable to locate the BBS in Cheyenne, although one was listed for the state capital.

In Colorado, we noticed several huge antenna arrays to the west of the interstate near Wellington, about eight miles north of Fort Collins. Was it WWV? Yes! In fact, it was WWV and WWVB, the very low frequency facility. We were able to drive into the site and look at all the antennas, but they did not allow visitors in either of the transmitter buildings.

We were approaching Grand Junction in western Colorado when we next turned on the packet station. The GNDJCT node was very strong even though we were still in the mountains. I was able to connect to the KB0CZV BBS with no problem. We stayed in the Grand Junction area for a day and I checked into the BBS several times while there.

Our final two days were spent crossing the wide open spaces of Utah and Nevada on I-70 and then US 50, "the Loneliest Highway in America," as noted on the highway signs. We definitely agree with that! Not only was there no packet signals to receive for long periods of time, there were very few broadcast stations to receive either. We did find a few nodes in both UT and NV that had extremely good coverage, but no one was using them while we were monitoring.

Observations

Outside of California and the major metropolitan areas of other states at least 95% of all VHF packet activity is on 145.01. Scanning the frequencies from 144.91 through 145.80 found nothing except as noted above. The nodes and BBSs are all on .01 in most areas, and I noticed a great deal of message forwarding between BBSs on .01. Things are so quiet out there that they don't need a backbone!

There are lots of excellent nodes on the higher peaks with extremely good coverage, but once you leave the "I-5 corridor" the only activity you see is occasional check-ins to BBSs. There is very little keyboard to keyboard activity. I was hoping to have more keyboard QSOs, but when stations disconnected from the BBSs they seemed to immediately disappear. While in Missoula I did see one station from Helena attempting some DX through the node network, but after reaching the ELKO node in Nevada he disconnected. He was the only station on the network for over an hour.

Except for the WB6LYE BBS in Eureka and W0RLI-2 in West Linn, Oregon, which were both RLI boards, all other BBSs I checked into were either REBBS or MSYS. I'd say the number was pretty well evenly divided between the two. Almost all of the bulletins that I listed were addressed @ ALLUS. I saw very few locally entered messages. I was surprised to see that many of the boards had my "Introduction to Packet" in their files, although many didn't have the complete series.

I was very pleased with how well my mobile packet station performed. I was able to hold connections quite well, even in some very mountainous areas. I did increase my retries to 15 in case I dropped into a low area for a minute or so, and I increased FRACK to 15 to keep from using up my retry count too quickly. I set PACLEN to 80 and MAXFRAME to 1 to help get my packets through easier. I expected more retries due to "mobile flutter" than I actually had and was surprised at some of the distant connections I was able to make and hold for long periods of time.

If you plan on using a laptop for any extensive mobile packet work, such as Bill and I did on our trip, and it doesn't operate on 12 volts, I strongly recommend that you buy a 12v to 120v interverter. If you don't, the two to three hour life of the computer battery will definitely limit your operating time. We found that if the computer battery is charged, a 100 watt inverter will keep the unit running. If the battery should get discharged, however, you will need a 200 watt inverter to handle the load. The 100 watt inverter was not enough to simply recharge the battery with the computer turned off.

Mobile packet was a nice addition to the trip. We were able to operate quietly without bothering others in the car and were able to listen to the broadcast radio and hold a conversation without interruption. I'm looking forward to more mobile activity on future trips by car!

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Report and Recommendation to the ARRL Board of Directors, from the ARRL Committee on Amateur Radio Digital Communications

September 26, 1992

At the request of the ARRL Board of Directors, the ARRL Digital Committee met today with five elected representatives from the group of amateurs operating automatic HF message forwarding stations under FCC Special Temporary Authority originally dated July 7, 1987. What follows supersedes and replaces the Committee's June 13 report.

Additional data, not available at the time of the Committee's June 13 meeting, included:

- Revised IARU Region 2 band plan resulting from the September 4, 1992 meeting in Curacao.
- Additional feedback from amateurs at large, and the STA community, received since the June 13 meeting.

The committee is revising its previous recommendation to include fully-automatic, unattended operation on the IARU "packet priority" sub-bands and semi-automatic operation in all digital sub-bands.

IARU Band Plan

The Digital Committee, at its June 13 meeting, was concerned about frequency usage and allocation in the US. and other countries, in effect at that time.

The September 4, 1992 IARU Region 2 meeting in Curacao produced a substantially revised band plan for digital modes. The new plan includes segments on all amateur bands between 80 and 10 meters for "digital modes," defined as including RTTY, AMTOR and packet (including new systems like PACTOR and CLOVER), but not FAX and SSTV. Within those segments, "packet priority" sub-bands were defined (except on 40 meters) in which digital modes other than packet are permitted, but may not claim protection from packet. It was agreed that CW remains a permitted mode throughout all amateur bands.

The Digital Committee and STA representatives believe strongly that no distinction should be drawn -- in terms of spectrum usage -- between digital modes. Technology development is advancing quickly. Any mode could be outdated and replaced with better, more efficient technologies at any time. Mode-specific plans will limit spectrum for development, and may reserve spectrum for modes soon to be obsolete.

For that reason, and in light of what follows, the Committee prefers the term, "automatic priority," instead of the IARU's term, "packet priority." The Committee believes the following recommendations will better align the US. band plan to the IARU Region 2 agreement.

Additional Feedback Received

There is reason to believe that many VHF and UHF operators overlooked the QST survey, assuming a "below 50 MHz" issue had little effect on them. The impact on message traffic between widely separated VHF and UHF packet bulletin boards was not immediately understood.

As mentioned in the Committee's June 13 report, every Committee member read every written comment submitted by the respondents. Those comments emphasized areas of great concern by many amateurs, and significantly influenced the Committee's previous recommendation. The concerns remain quite valid. The Committee believes new means are now available to address them, while, at the same time, enabling additional activities and developments that will benefit amateurs and the public interest.

A primary concern, among many amateurs is interference to stations under human control by stations under computer control. Except for a very few special situations, by tradition (and rule), one amateur station must not willingly or knowingly interfere with a contact already in progress, regardless of mode or the perceived importance of the communication in progress.

Semiautomatic operation has been defined by the Committee as requiring a local control operator at the calling station, to guard against interference to existing communications. The station being called operates automatically, but on a "speak only when spoken to" basis. Semiautomatic operation received a 2:1 majority (those favoring vs. those opposed) in the QST survey. The Committee interprets that response as a strong vote in favor of automated message handling, provided it can be a "good neighbor" to other spectrum users.

Initial survey respondents, while not favoring automatic operation, said (if automatic operation is permitted) they preferred sub-bands by a 4:1 ratio over any other proposed scheme. They did not favor the idea of exclusive sub-bands for specific modes.

The STA participants point to their commendable record in creating a nationwide network for moving hundreds of thousands of messages efficiently and without technical difficulties. Their efforts have lived up to Part 97.1 (a), Basis and Purpose of the Amateur Service, "Recognition and enhancement of the value of the amateur service to the public as a voluntary noncommercial communications service, particularly with respect to providing emergency communications."

Countless pieces of traffic have been transported in national and worldwide emergency situations. Messages of a "hobby" nature have been an important vehicle allowing the network to be developed and maintained in a state of readiness.

The technical effort required to construct this network, both in hardware and software technology has been considerable, and certainly meets 97.1(b), "Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art."

Thousands of bulletin board operators (sysops) and tens or hundreds of thousands of digital operators have learned to originate, relay and deliver message traffic by means not previously available. Part 97.1(d), "Expansion of

the existing reservoir within the amateur radio service of trained operators, technicians and electronics experts," has also been served.

There is no question of the value provided by this message network to other amateurs and to the public at large. The Committee acknowledges the success, both technically and functionally, of the STA experiment. There have been a few reports of interference to foreign phone stations where international band plans conflict. There are few if any reports of problems with other US stations. The IARU accord minimizes or eliminates the concern for interference to foreign stations.

A major concern had remained, however, that unrestricted HF automatic operation permitted to all General, Advanced or Amateur Extra class licensees, could easily result in interference to other stations on a completely unacceptable level. Subdivision of bands by rule was previously rejected, in part because, "it will not work on a world wide basis because of the differences in the rules between regions and between individual administrations." The IARU has now provided a subdivision plan which has already met with international approval.

Recommendations

I. The Committee wishes to enable as many amateur licensees as possible to contribute to, and enjoy, our service. The previous recommendation stands, to permit semiautomatic operation in any digital portion of any band. This privilege will permit a variety of experimentation and operations such as personal mailboxes and MSOs to co-exist with "live" users, on a non-interference basis.

II. By using the IARU Region 2 band plan, US operation will be in compliance with international agreement. Since the sub-bands designated by the IARU as "packet priority" will offer no protection from interference to other users of that space, including US amateurs, the Committee proposes fully-automatic operation by US amateurs within those segments of the band, using any approved digital data mode. It is recommended that those segments be dubbed "automatic priority," as a more accurate, descriptive term.

III No packet priority segment was specified by the IARU on 40 meters, yet automatic networks have been operating there since the beginning of the STA. As we approach the sunspot minimum, and the MUF lowers, 40 meters will be badly needed for many propagation paths. The Committee therefor urges approval of a small automatic priority segment from 7.100 to 7.110 MHz.

Similarly, no digital segment was specified by the IARU for 160 meters. While there is little or no digital activity on this band, developing modes show promise of improving operation in this somewhat hostile (digitally) environment. The Committee feels it would be a valuable testing ground, and requests an automatic priority segment from 1810 to 1820 KHz. Specific frequencies recommended for automatic priority are listed in Appendix B

IV. The Committee cannot overemphasize our concern for protecting other spectrum users from the potential interference of automatic stations. To this end, the recommendation for automatic operation is made on the basis that protection by rule will be provided in the form of specific sub-bands to which fully automatic operation is restricted.

There is precedent for special use, by-rule sub-bands, as in 97.203(d) for beacon stations. Any other usage plans, within digital segments, should be by voluntary plan, not by rule.

The requested sub-bands should not place an additional enforcement burden on the FCC. Amateurs have always been largely self-regulating. The committee views the requested rules not as something else the FCC must spend time monitoring, but rather tools to enforce reported infractions.

V. By current standards, AX.25 is considered the least efficient protocol in use for digital modes. The STA representatives request, and the Committee wholeheartedly agrees, that AX.25 protocol be struck from 97.109(e) as a requirement, and replaced with the ability to use any accepted digital protocol.

Because the investment in technology development is large, developers hesitate to widely publish details (competitive disadvantage) in the early stages. To address this issue, it is proposed that developers be allowed the latitude to use new protocols, during the development phases, so long as they file details of the protocol, privately, with the ARRL.

VI. Because digital technologies are developing rapidly, the Committee proposes to compile, and provide to the Board, a proposal for any desirable adjustments to Region 2 band planning, prior to future IARU Region 2 conferences.

VII. The Committee reinforces its previous suggestion that the League undertake publication of a tutorial-style operator's guide for HF digital operations clearly defining acceptable operating practices, voluntary-use band plans, DX windows and beacon frequencies.

Appendix A

The following is suggested wording for an addition to Part 97 authorizing automatic and semiautomatic digital mode operation. Note that RTTY, AMTOR, packet, CLOVER, PACTOR and future digital data modes are treated equally as "digital modes."

97.3 Definitions

( ) Unattended Digital Station — A station in the amateur service, using any accepted digital mode protocol for data or message transmission, and operated without a local control operator present.

( ) Semiautomatic operation — A two-way communication in which the control operator of a locally controlled amateur station manually initiates, monitors and controls communication between that station and an unattended digital station.

97.109 (e) No station may be automatically controlled while transmitting third-party communications, except a station retransmitting digital radio communications using an accepted protocol on the 6m and shorter wavelength bands, or on 10m and longer wavelength bands in sub-bands where automatic control is specifically authorized. The retransmitted messages must originate at a station that is being locally or remotely controlled.

97.216 Unattended Digital Station

(a) Any amateur station licensed to a holder of a General, Advanced or Amateur Extra Class license may be an unattended digital station.

(b) An unattended digital station may operate on any frequency authorized for digital transmission modes.

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Review: Tigertronics Baypac Modem and Baycom Software

Larry Kenney, WB9LOZ

Packet radio is now more affordable, very portable, and even mobile thanks to the new BayPac, BP-1, packet modem from Tigertronics in Grants Pass, Oregon. If you own an IBM compatible computer and a two meter rig, you're now able to get on packet for about $50.00. The modem is small, doesn't require any external power and comes with the Baycom Terminal Program. All you need to do is add the connector for your radio, and you're ready to go on the air. With a laptop computer, an HT, and the BP-1, you have a portable packet station that is light, compact and easy to carry with you. Tie it into your mobile rig and you have mobile packet!

I recently bought a BP-1 and have found it and Baycom to be a very versatile combination. I made cables for my rig at home, for my HT and for my mobile rig so I now have packet capability wherever I want to operate. The BP-1 is only about 2 inches square and a half inch thick so certainly doesn't take up much space. There's a DB-25 connector on one end and an RJ-11 4-wire telephone type connector on the other. A long cable with the 4-wire jack attached comes with the BP-1 for connecting the modem to your radio. You simply attach the radio connector.

The Baycom software is a self-contained terminal program and TNC emulator. It was written by DL8MBT and DG3RBU in German and then translated into English by G0KIU. The German responses are still available if you want to practice your German but you have a choice of either English or German, not both. The program provides three windows on the screen - one for keyboard entry of commands and outgoing data, one for incoming packets addressed to you and a third that monitors the frequency at all times. The window sizes are adjustable from the keyboard. Baycom allows 8 simultaneous connections, although you can change that to a lesser number if you wish. The screens are in color and you can change the colors to suit your own taste. When you install the program on your computer, it will allow you to select your serial port and enter your callsign, but any other changes must be made to a configuration file with a text editor.

I've used the BP-1 and Baycom extensively here at home as well as on my recent vacation trip with no problems whatsoever. (See a write-up of the trip elsewhere in this issue.) Since the command structure is somewhat different than on an outboard TNC, it takes a little time to get used to the changes, but once you become accustomed to them you're able to do just about anything you can with a TNC2 or clone. An extensive help file is available from the keyboard and a 58 page manual that explains all of the commands and functions of the program comes as a file on the disk. You have to print it out if you want a hard copy. I've found a couple of minor bugs in the version I have (V1.4), but neither one is any problem for me. The Beacon Text and the Quit Text are exchanged (a beacon transmits the Quit text and if you use the Quit feature nothing happens) and the first letter of the Quit text is not transmitted.

I would recommend the BayPac - Baycom combination for anyone getting into packet that has an IBM or compatible computer or for anyone looking for a second TNC for portable or mobile use. You can't beat the price and it works!

Larry Kenney, WB9LOZ

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Report and Recommendation from the ARRL Committee

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(c) No unattended digital station may initiate contact with another station or broadcast any undirected signal unless operating in a band or band segment where fully-automatic operation is authorized.

(d) The transmitter of an unattended digital station must be equipped with a functioning time-out timer that will insure no signal is transmitted for longer than five minutes in the event of the malfunction of control equipment or loss of contact with another station.

(e) Unless operating in a band segment where fully-automatic operation is authorized, the control operator initiating contact with an unattended digital station must be present at the local control point. The control operator must first ascertain that no interference will be caused to existing communications, must remain present for the duration of the contact, and must discontinue the contact if it becomes evident that communications with the unattended digital station is interfering with other amateur communications.

Appendix B

It is recommended that all stations under automatic control be restricted to the following Sub-bands:

10M:	28.120 - 28.189 MHz
12M:	24.925 - 24.930 MHz
15M:	21.090 - 21.125 MHz
17M:	18.105 - 18.110 MHz
20M:	14.095 - 14.0995 MHz
	14.1005 - 14.112 MHz
30M:	10.140 - 10.150 MHz
40M:	7.100 - 7.110 MHz
80M:	3.620 - 3.635 MHz
160M:	1.810 - 1.820 MHz

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Minutes of the ARRL Committee on Digital Communications

Continued from page 5

semi-automatic operation outweigh the risk of inadvertent interference.

The Committee believes that in view of the long successful history of semi-automatic operation that authorizing unattended semi- automatic operation is in the best interests of the amateur community.

Recommendations

I. Unattended fully-automatic operation of amateur digital stations should not be authorized below 30 mHz.

II. The FCC rules should be amended to allow unattended semi- automatic operation of digital stations on any frequency on which digital modes are authorized. Unattended semi-automatic stations may not initiate a contact, either with another station or via an undirected broadcast. An operator initiating a contact with an unattended station must first ascertain that no interference will be caused to existing communications, and must monitor the progress of communications. If it becomes evident that the communications with an unattended semi-automatic station is interfering with other amateur communications then the link with the semi- automatic station must be discontinued. An unattended semi- automatic station must be equipped with a time-out timer to insure that no signal is transmitted longer than five minutes in the event of the malfunction of control equipment or the loss of contact with the initiating station. Suggested wording for such an amendment is included in the appendix.

III. The FCC rules should be amended to allow the use of modem-dependent codes for the purpose of efficient data compression and error control on h.f. radio channels. The bandwidth of such signals should be restricted to 500 Hz, below 28 mHz, and 2000 Hz. between 28.0 and 28.3 mHz The appendix to this report suggests specific wording for the recommended rule change. A station using a modem-dependent code must still comply with 96.119 Station Identification.

IV. The League should publish a comprehensive tutorial-style operator's guide for h.f. digital operations clearly defining acceptable operating practices. Such a manual would delineate currently used informal sub-bands for the various modes and styles of operation, and the good operating practices that are required for effective mutual cooperation and coexistence. This Committee will make specific recommendations for the content of this guide.

V. The League should publish technical standards or guidelines for the characteristics of signals generated by digital mode stations for the purpose of achieving the best possible use of the h.f. spectrum. QST should be used as a forum to educate that amateur community on the benefits and means of achieving acceptable signal quality and should review the technical characteristics of digital mode products with respect to published standards. This Committee will make specific recommendations for these technical standards.

Appendix A

The following is suggested wording for an addition to Part 97 authorizing unattended semi-automatic digital mode operation.

97.3 Definitions

( ) Unattended Digital Station - A station in the amateur service using an RTTY or data emission that is operated without a control operator present.

97.216 Unattended Digital Station

(a) Any amateur station licensed to a holder of a General, Advanced or Amateur Extra Class operation license may be an unattended digital station.

(b) An unattended digital station may operate on any frequency below 30 mHz. that is authorized for RTTY or data emission for the class of operator license held.

(c) An unattended digital station may only use those RTTY or data emissions authorized by 97.305 and 97.307.

(d) No unattended digital station may initiate a contact with another station or may broadcast any undirected signal.

(e) The transmitter of an unattended digital station must be equipped with a time-out timer that will insure that no signal is transmitted for longer than five minutes in the event of the malfunction of control equipment or loss of contact with the initiating station.

(f) Any amateur operator initiating contact with an unattended digital station must first ascertain that no interference will be caused to existing communications, must be present for the duration of the contact, and must discontinue the contact if it becomes evident that communications with the unattended digital station is interfering with other amateur communications.

Appendix B

To encourage improvements in digital mode communications and especially to improved spectrum utilization on amateur h.f. bands Part 97, 97.307 (f) (3) and 97.307 (f) (4), should read as follows:

(3) A RTTY or data emission using a specified code listed in 97.309 (a) of this Part may be transmitted. The symbol rate must not exceed 300 baud, and for frequency-shift keying, the frequency shift between mark and space must not exceed 300 Hz. A RTTY or data emission using an unspecified digital code under the limitations listed in 97.309 (b) of the Part also may be transmitted. If an unspecified digital code is transmitted the authorized bandwidth is 500 Hz.

(4) A RTTY or data emission using a specified code listed in 97.309 (a) of this Part may be transmitted. The symbol rate must not exceed 1200 baud, and for frequency-shift keying, the frequency shift between mark and space must not exceed 1 kHz. A RTTY or date emission using an unspecified digital code under the limitations listed in 97.309 (b) of the Part also may be transmitted. If an unspecified digital code is transmitted the authorized bandwidth is 2 kHz.

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N0ARY/BBS Internet Gateway Operating Instructions

Bob Arasmith, N0ARY

Local Users

Local users are those that log into the bbs via the bbs's telephone modem port (408-749-1950) or via one of the 3 tnc ports (144.93, 223.62, 433.37). Each local user has a bbs account that is used to customize how the bbs interacts with the user.

Local users can set their account up so that all incoming mail addressed to their call will be forwarded via a gateway to internet and on to other networks (mcimail, compuserve, etc). All the user needs to do is enter his email address and turn the feature on.

```
EMAIL bob@hal.com
EMAIL ON
```

When the EMAIL feature is turned on the packet message will be deleted at the time of forwarding through the gateway. So care should be taken that the paths are correct prior to turning the feature on, for instance enable it, send a test message, and disable it. After a successful transfer re-enable the feature. To disable the auto forwarding feature simply type:

```
EMAIL OFF
```

Messages can be sent by packet users to the internet users via the gateway. This applies to users at N0ARY as well as users at other bbs's. Begin by sending a message to IP-GATE@N0ARY with the first line of the message being the letters "To:" followed by the internet address of the recipient.

```
N6ZFJ de N0ARY
sp ipgate@n0ary
Enter your subject:
Meeting?
Enter your message body:
To: bob@hal.com
Are you planning to attend the club
meeting on Thursday? Give me a call.
73, Connie
^Z
```

NOTE: That the recipient cannot respond to the message unless they are a ham and registered with the gateway. He becomes registered by sending a message from his internet host to gateway-request@arasmith.com.

Remote Users

Remote users are those that do not log into N0ARY directly but merely appear from the packet world to use it as home. If a packet user checks the "White Pages" for a remote user the entry comes back as @N0ARY. The packet user then address his message to YOURCALL@N0ARY and the bbs will do the translation and forwarding to internet.

It is not necessary for a person to know your actual internet address nor use the SP IPGATE method described above. From the packet network it appears that you are just another user at N0ARY.

White Pages

The "White Pages" is a distributed database of all the bbs users. Most bbs users in the US are represented in the database as well as many from other countries. When a user chooses a home bbs, that bbs generates an update that is sent to the regional servers and then distributed to all the other bbs's. An entry consists of; call, home bbs, first name, zip, city and state. When a user wishes to send another packet user a message he consults the white pages (WP) for the home bbs.

Registering:

Before a user, both local and remote, can send a message from internet into the bbs system he must register with the gateway. This is done by sending a message from the host that he intends to use to gateway-request@arasmith.com with the following information:

```
CALL:
FIRST NAME:
CITY & ST:
ZIP:
```

When a request is received the "From" field is copied directly into a file with the requesters call. Whenever the gateway receives a message bound for packet it scans this file comparing on the "From" field. When a match is found the gateway uses the associated call from then on. If there is no match the mailer bounces the message with a one-liner indicating the the user must register.

If you currently use another bbs as home this needs to be stated in the request. Otherwise you will be assigned N0ARY as your home. If you choose not to use N0ARY as your home you must make sure people know to send your message to YOURCALL@N0ARY to pass through the gate. Your WP entry will be wrong.

Executing BBS Commands Remotely

Many of the commands available to local users is also available to remote users by sending a message to the bbs. Here is a subset of the commands currently available.

LIST	listing messages
LOOKUP	look up calls in the on-line callbook
WHO *call*	dump a users account information
READ	read messages and files
USERS *n*	display the last n users to connect to the bbs
INFO	display manual pages of various topics
CD	change directories in the file system
LS or **DIR**	display the contents of a directory
WP *call*	look a user up in the "White Pages"
HELP	get help on how to use a command

The command parser for the bbs is very powerful and the user can form very complex requests. For instance the following command is valid on the bbs:

```
LIST LAST 20 BULLETINS FROM N0ARY
LIST ALL BULLETINS ABOUT KENWOOD
```

The ABOUT keyword is used to search the subjects of messages for a given pattern, in this case KENWOOD. It can appear anywhere in the subject line.

This is an example of how complex all the commands can become. They can also be abbreviated down to the level understood my most other bbs programs. Any of the following will give the same results.

```
L N6ZFJ
LIST FROM N6ZFJ
LIS  N6ZFJ
L FR N6ZFJ
```

In most cases a minimum number of unique characters is needed to distinguish a command.

You can get a list of commands and a translation chart from W0RLI to N0ARY by typing the following commands.

```
INFO COMMANDS
INFO W0RLI
```

Other commands that you may wish to execute are:

```
INFO MANUAL
HELP HELP
HELP LIST
```

Now that you know what some of the commands are this is how you go about executing them. You send a message to cmd@bbs.arasmith.com with your commands entered one per line or separated by semicolons. For example if you want to know if three of your buddies are in the white pages and if the bbs has any messages about the ICOM W2A.

```
% mail cmd@bbs.arasmith.com
Subject: you can put anything here
wp n0ary n6zfj n6une
list all about w2a
.
```

The bbs will execute the commands and respond to you via return mail.

Sending Mail To Packet

Once registered the user is free to begin using the gateway to send messages from his host through the gateway into the packet world. How much you have to specify of a users address depends on how much the bbs already knows about the user.

If the bbs knows the home bbs of the user and his home bbs is know to the the N0ARY bbs, which most of them are, you simply need to supply the call.

```
% mail n6zjf@bbs.arasmith.com
```

If the N0ARY bbs doesn't know of the user but does know where his home bbs is then you need to supply just the home bbs call in addition to the users.

```
% mail n6zjf%n6qmy@bbs.arasmith.com
```

Notice that the call and home bbs are separated by a percent sign '%' rather then the '@' which is used in the packet domain. This is because the '@' has a meaning in the internet address.

If the bbs has no knowledge of either the user or his home bbs then you probably have the wrong home bbs or it is a new bbs. In which case you will have to supply the full address so the bbs will know how to route the message.

```
% mail
n6zfj%n6qmy.#nocal.ca.usa.na@bbs.aras-
mith.com
```

This level of addressing is hardly ever needed and normally means that the home bbs is in error.

Bulletins can be sent in a similar fashion. The address is made up of a keyword, which can be any six character word and a distribution. Distributions are local to an area. For instance SBAY is valid in northern CA, it probably has no meaning at all in Topeka, KS.

Valid distributions are:

ALLUS	please avoid this one
ALLUSW	all western US
ALLCA	all California, any 2 letter state should work

So if you trying to find a cw filter for a Kenwood TS440.

```
% mail want%allca@bbs.arasmith.com
Subject: Kenwood TS440, CW filter
If you have one of these you are
willing to part with please give me a
call or leave message, thanks.
73,
N6ZFJ@N0ARY.#NOCAL.CA.USA.NA
.
```

Be descriptive, brief, and always include your full return address in the message. Also please try to limit your distributions to small regions. Using the ALLUS distribution really slows down the flow of messages.

Info On The N0ARY BBS

The bbs came into being in July of 1990 and as of July of 1992 had over 600 users, 500 registered as home. The bbs has 3 rf ports, 2 phone ports, the internet port, and a voice synthesizer port. The latter allows users to check for messages via DTMF from their handhelds.

The bbs itself runs on a Sun workstation under Unix. The code was written by Bob Arasmith to focus on the user. Great care was taken to make the bbs very forgiving to the novice user but very flexible and powerful for the old-timer. The bbs can be configured to interact with each user differently. Some examples are:

- List messages in either descending or ascending order.
- Specify a list of keywords that the user wishes not to see displayed when a list is performed, similar to a kill file.
- .signature and .vacation files.
- Specify how many lines the users terminal is capable of displaying before scrolling, the bbs will feed info this many lines and pause allowing the user to catch up and continue or abort the operation. Similar to more.
- Users can put commonly executed commands in keystroke macros that are accessible via a single keystroke.

A manual is currently available describing the commands and their permutations. This manual will be available in late 1992 as a postscript file. Run the command INFO MANUAL to learn how to get one via the post office. It is not available in an ascii format.

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Packet Nets Today and Tomorrow

Gary Coffman, KE4ZV

A little history: This started over in policy about HF forwarding, but it really belongs here. We've been talking about a VHF/UHF replacement for the automatic HF forwarding that's about to go away due to the expiration of the STA and the League's position against automatic forwarding. Let's take an overview of the packet network so we can see what we should be designing in terms of protocols and hardware for a robust network to meet our needs.

Here's a snapshot of where we are.

What are the network uses in order of current importance?

Email

The bulk of packet traffic today is Email forwarding through the BBS systems.

File transfer

Second is file transfers between individual stations and over the TCP/IP networks. Much of the Email traffic is long distance while most file transfers are restricted to LANs and MANs.

Interactive usage

Last is interactive usage. Currently this is dominated by keyboard to keyboard QSOs, but also includes some remote login activities. Keyboard chats occur at the local and regional level with multihop conversations taking extreme patience. Some national and international WAN keyboard chatting occurs on HF. Remote login activities, aside from BBS logins, are mostly restricted to high speed MANs and LANs.

What is the current scope of the network in order of increasing range?

In house LAN

In house LANs are almost all ethernet based and aren't part of packet radio per se, but are often used to link server systems to systems connected to radio.

Urban MAN

Urban MANs are duplex bit regenerating repeaters or simplex digipeaters or other simplex node technology. Many of these systems are multiported to allow connectivity to other MANs via trunks.

Regional WAN

Regional WANs are almost all half duplex node systems, either Netrom, Rose, or Texnet nodes with a considerable number of simple digipeaters still in use. A very few WANs use TCP/IP or multiprotocol switches like those in the GRAPES network.

National and International WAN

National and International WANs don't exist in a network sense, but there is a system of mail forwarding BBSs operating on HF. This system will soon go away in the US with the ending of the STA.

What hardware methods are currently available?

1200 baud Bell 202 VHF/UHF

300 baud Bell 103 HF

By far the most common hardware system is the TNC with Bell 202 1200 baud modem used with ordinary FM voice radios. Second is HF operation with Bell 103 modems through SSB transceivers. Neither of these systems is robust nor do they have good signal to noise or bandwidth performance. Their only claim to fame is that they come standard in TNCs.

2400 baud VHF/UHF

Kantronics introduced 2400 baud modems into packet. These are used in some systems, but thruput is only marginally better than the more common Bell 202 technology, not twice as good as one might naively expect. That's because turnaround delays and header overhead are a large part of simplex packet. The 2400 baud system will work through standard FM voice radios.

9600 baud VHF/UHF

Next up is 9600 baud. This was pioneered by K9NG and G3RUH's excellent modem designs. With specially modified voice and data radios, these modems offer a worthwhile step up in performance. They are not yet in wide use by users, but have found a home in some regional WANs.

19.2 kilobaud UHF

Another Kantronics introduction is the 19.2 kilobaud direct FSK system. This requires a special radio. A few of these systems are in operation.

56 kilobaud UHF

The last production system is the WA4DSY 56 kilobaud RF modem offered by GRAPES. This system eliminates the bottleneck of voice radios by being both the modem and the radio. It generates and receives RF in the 10 meter band and requires a linear transverter to 222 MHz or higher where such high speed operation is permitted by the FCC. It's in use by users, MAN, and regional WAN systems.

Experimental systems

Finally we have experimental systems. These range from Clover at HF, to 1 megabit 900 MHz systems, to so called ethernet over microwave systems using Gunnplexers. These all show promise, with the Clover system closest to production.

What major software systems are in use?

User terminal programs/TNC firmware

By far the largest number of packet stations are user stations and digipeaters operating off of TNC firmware and terminal emulation programs. The automatic network and user services provided by these systems is extremely limited. Their primary usage is interactive for remote logins and keyboard chatting. A few of these systems now have a rundimentary mailbox built into the firmware.

Mail concentrator/forwarding BBS systems

The full featured forwarding BBS systems are next in popularity. They serve nearly every packet user with automatic Email forwarding.

KA9Q's TCP/IP

Finally we have a true end to end network and user services system, Phil Karn's TCP/IP package. This system features Email, file transfer, remote login, and ordinary chat services in addition to forming part of an end to end network system capable of automated transfer and routing.

What major networking systems are in use?

Digipeaters

Digipeaters remain at the heart of many rudimentary networks. The horrors of simplex digipeating are well known and I won't repeat them here.

Netrom

Netrom, and it's freeware clone TheNet, are the dominant networking systems in use today. They are firmware ROMs that plug into ordinary TNCs. They feature a semiautomatic routing system and internally use datagram techniques. The primary advantages of this system are that it offers hop by hop acknowledgement and retries if necessary, and that it can automatically configure itself into an existing network. The primary disadvantages are that it's restricted to low performance hardware and that it doesn't offer end to end acknowledgements. Also it's automatic configuration can create bogus deadend routes.

Rose

Rose is an up and coming competitor in the low performance networking arena. It is a virtual circuit system that requires manual sysop setup at it's site as well as those of it's neighbors in order to route. It offers hop by hop acknowledgement and retries as necessary like Netrom. In addition, it has slightly less overhead due to the nature of virtual circuits. It's primary disadvantages are that it tears down entire circuit paths when an intermediate node has difficulty, and it is easily overloaded, causing it to drop circuits. It also runs as a ROM on low performance TNCs.

Texnet

Texnet is a medium performance networking system requiring special hardware. It offers a good mix of user services, automatic routing, and medium performance. It's used mainly in Texas, though it has gained adherents in other places.

Karn's TCP/IP

Finally, there is Karn's TCP/IP. It has the potential to do it all. It runs on fairly high performance PC hardware, offers end user services, routing, and network management. It's complex to setup, and is in a constant state of flux as features are added, changed, or fixed. Some versions were very prone to crashing at regular intervals. There are now a few stable versions available that serve very well as network routers. Thanks to it's being based on cheap and relatively high performance PC hardware, it's capable of supporting ethernet and 56 kb high speed links in addition to lower performance links. It's easily multiported, and versions exist that are multiprotocol, interoperating in Netrom networks and digipeater networks as well as pure TCP/IP networks.

Where are we at?

Now let's consider the state of the art in amateur packet networking, it's capabilities, and limitations. Our best LAN technology is TCP/IP over ethernet.It's capable of about 60 kilobytes/second transfer and is robust. It meets our needs for Email, file transfer, and interactive usage.

Our best MAN technology in production is TCP/IP full duplex 56 kb repeater systems. This is capable of about 1500 bytes/second. It's usable for Email, file transfer, and interactive usage.

Our best regional WAN technology in use is TCP/IP 56 kilobaud half duplex systems. Thruput is about 300-500 bytes second. It's usable for Email, file transfer, and interactive usage out to between 2 and 4 hops.

Our best national and international WAN technology is 300 baud HF BBS forwarding. It's thruput is about 15 bytes/second. It's suitable for Email.

There's about a 100:1 range spanned here over radio. If we look at typical MANs and WANs, however, we'll find that the performance is even more strikingly dismal. Most MANs still operate at 1200 baud half duplex through a central digipeater. Best case thruput is about 40 bytes/second and typical values are in the 5-10 bytes/second range. WANs are also at 1200 baud, and after 2-4 hops the thruput drops to under 1 byte/second under typical conditions. Now we're talking a 1500:1 range between best and typical thruputs.

If we switched all our systems to the best currently available sytems, we'd see thruput improvements of hundreds to one over our existing systems. So why don't we do that? Because of user inertia, cost, and the apparant complexity of establishing the best systems. The number of packet users who really understand their new toys is very low. The number of packeteers who really understand the inherent cooperative nature of packet is vanishingly small. This latter impacts network establishment, financing, maintainence, and management. To establish regional and national WANs that interconnect and interoperate with MANs requires money and manpower to establish and maintain network nodes in outlying areas. We have great areas of the country where no, or few, packeteers exist, yet we need those routes to tie our urban MANs together. Thus we've resorted to automatic forwarding systems on HF to bridge the gaps, and to wormholes taking advantage of commercial circuits. A full featured national WAN looks out of reach to current packeteers.

That's my cut at where and why we are today. Comments?

Gary KE4ZV

EOF

Northern California Packet Band Plan

50 MHz

51.12	SOCAL backbone
51.14	Experimental
51.16	Keyboard to Keyboard
51.18	Experimental

144 MHz

144.91	Keyboard to Keyboard
144.93	LAN[1]
144.95	DX Cluster
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 bps
145.73	LAN
145.75	TCP/IP
145.77	DX Cluster
145.79	LAN
146.58	DX Cluster

[1]Some TCP/IP in Sacramento grandfathered

220 MHz

223.54	Node uplink (East Bay)[1]
223.56	Node uplink (East Bay)
223.58	Node uplink ("Other")[2]
223.60	Node uplink (Sacramento Valley)
223.62	Node uplink (South Bay)
223.64	TCP/IP
223.66	Keyboard to Keyboard
223.68	LAN
223.70	Node uplink (Monterey Bay)
223.72	Node uplink (North Bay)
223.74	DX Backbone

[1]To move to .56 when SOCAL coordinates

[2]TCP/IP interlink (Sacramento) Not to interfere with node uplink.

440 MHz

441.50	All

Packet channels below 440MHz are available, but must be coordinated on a case-by-case basis as auxiliary allocations in conjunction with NARCC. Contact W6RGG for details.

900 MHz

903.500	1 Mhz wide - TCP/IP
904.500	1 Mhz wide - TCP/IP
915.500	1 Mhz wide - Experimental
916.100	200 Khz Wide - Experimental
916.300	200 Khz Wide - Experimental
916.500	200 Khz Wide - Experimental
916.650	100 Khz Wide - Experimental
916.750	100 Khz Wide - Experimental
916.810	20 Khz Wide - Experimental
916.830	20 Khz Wide - Experimental
916.850	20 Khz Wide - Experimental
916.870	20 Khz Wide - Experimental
916.890	20 Khz Wide - Experimental
916.910	20 Khz Wide - Experimental
916.930	20 Khz Wide - Experimental
916.950	20 Khz Wide - Experimental
916.970	20 Khz Wide - Experimental
916.990	20 Khz Wide - BBS links (Contra Costa County only)

900 MHz activity is on a non-interference basis to vehicle locator service. 900 MHz is not considered suitable for omindirectional systems, use for point-to-point links only.

1296 MHz

1248.500	1 Mhz wide - Full duplex with 1299.500 Experimental
1249.000 to 1249.450	Unchannelized - Experimental
1249.500	100 Khz wide - Experimental
1249.600	100 Khz wide - Experimental
1249.700	100 Khz wide - Full duplex with 1299.700 Experimental
1249.800	100 Khz wide - Full duplex with 1299.800 Experimental
1249.870	20 Khz wide - Experimental
1249.890	20 Khz wide - Experimental
1249.910	20 Khz wide - Full duplex with 1299.910 Experimental
1249.930	20 Khz wide - Full duplex with 1299.930 Experimental
1249.950	20 Khz wide - Full duplex with 1299.950 Experimental
1249.970	20 Khz wide - Full duplex with 1299.970 Experimental
1249.990	20 Khz wide - Full duplex with 1299.990 Experimental
1250.500	1 Mhz wide - Experimental
1251.500	1 Mhz wide - Experimental
1297.000 to 1298.000	Unchannelized - Experimental
1298.500	1 Mhz wide - Full duplex with 1299.500
1299.000 to 1299.450	Unchannelized - Experimental
1299.500	100 Khz wide - Experimental
1299.600	100 Khz wide - Experimental
1299.700	100 Khz wide - Full duplex with 1249.700 Experimental
1299.800	100 Khz wide - Full duplex with 1249.800 Experimental
1299.870	20 Khz wide - Experimental
1299.890	20 Khz wide - DX Packet Cluster users
1299.910	20 Khz wide - Full duplex with 1249.910 Experimental
1299.930	20 Khz wide - Full duplex with 1249.930 Experimental
1299.950	20 Khz wide - Full duplex with 1249.950 Experimental
1299.970	20 Khz wide - Full duplex with 1249.970 Experimental

Northern California Packet Band Plan

Continued from previous page

1299.990 20 Khz wide - Full duplex with 1249.990 Experimental

Definitions

Experimental — Anything goes except full service BBS or any 24 Hr/Day services (nodes, gateways, etc). This is where you can come and test new gear, programs, etc. These channels may be reassigned in the near future so no permanent activities please.

Backbone, Uplink, Interlink — No uncoordinated stations. These channels are for specific purposes as defined by the NCPA and affiliated groups. This is where the various BBS, nodes, and clusters interlink and are very high usage channels. Please use the normal 2 meter entry points of the network you want to access rather than these channels.

Keyboard to Keyboard — Anything but full service BBS, TCP/IP, or DX Cluster. Primarily chat channels. These are also the primary emergency channels. Some existing BBS systems (eg. WA6RDH) were grandfathered.

A gray area is "Personal BBS." A PBBS is one with a small number of users (rule-of-thumb: five or less). A PBBS should not be attracting general users thru beacons, etc. Bulletins should be confined to local information and not duplicate the general bulletins send to the community. That's the job of a full service BBS and we have lots of them in Northern California to use.

LAN — Local Area Network. Anything except TCP/IP and DX Cluster is tolerated. Please avoid placing high level digipeaters or nodes on these channels since they are "local." A low-level node that links into a backbone on another frequency is the preferred implementation.

TCP/IP — Stations using TCP/IP protocol on top of AX.25. Some AX.25 tolerated to communicate to TCP/IP stations if p-persistance access method used.

DX Cluster — Northern California DX spotting network. No other activity should be on these channels.

9600 Bps — Stations using 9600 Bps with direct FSK (G3RUH, TAPR, etc.) modems.

Procedure for changes

Users should contact either the frequency coordinator or the NCPA board. The frequency coordinator will then present the requests to the board at the next meeting along with suggested assignments. The NCPA board elected by you, the packet user, makes all assignments!

Electronic mail is preferred.

Note: NCPA does not coordinate individual stations, nodes, etc. The only station coordination is done by K6RAU for bulletin board systems.

EOF

Where to Find a BBS

N0ARY-1	Sunnyvale	144.93
KE6BX	Hollister	144.93
KJ6FY-1	Benicia	144.93
KI6YK	Danville	144.93
WD6CMU	Richmond	144.97
N6EEG	Berkeley	144.97
K6LY	Monterey	144.97
KK6SZ-2	Sonora	144.97
N6LDL	Los Gatos	144.97, 145.71[1]
KI6WE	Pleasant Hill	144.97
KD6XZ-1	Sacramento	144.97, 441.50
AA4RE-1	Gilroy	144.99
W6SF	Stockton	144.99
KA6FUB	Martinez	144.99, 441.50
KE6LW-1	Yuba City	145.99, 441.50
N6OA	Lemoore	144.99
W6PW-3	San Francisco	144.99
WA6RDH	Dixon	145.01, 441.50
KG6EE	Santa Cruz	145.07
KI6EH	Santa Cruz	145.07
KM6HK-1	Madera	145.07
N6IIU-1	Palo Alto	145.07, 223.56
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, 145.75[2]
WA6NWE-1	North Highlands	145.09, 441.50, 144.93[2]
K6RAU	Merced	145.09
WA6YHJ-1	Livermore	145.09
WX3K	Rohnert Park	145.73
W8GEC	Boulder Creek	145.73
WA6HAM	Pittsburg	145.73
KB5IC	San Jose	145.73
KA6JLT-2	Menlo Park	145.73, 145.71[1]
WB6LYE	Eureka	145.73
KC6PJW	Cotati	145.73
AA6QR	Orinda	145.73
N6ZGY	Clovis	145.73
WA6KTK-2	Manteca	145.79
N6MPW	Ben Lomond	144.79
N6QMY-1	Fremont	145.79, 441.50
K7WWA	Willits	145.79

[1]9600 baud port

[2]TCP/IP port

EOF

NCPA Board Meeting Minutes

Bob Arasmith, N0ARY

June 14, 1992

The NCPA Board of Directors meeting took place in Berkeley on June 14, 1992. The meeting started at 10:18. Those attending:

N6SLE, WD6CMU, KA6FUB, WB9LOZ, W6RGG, KE6LW, N6FRI, K6TAM, WA7NZL, N0ARY

Meeting was called to order by Eric (WD6CMU).

Four new members were nominated to the Board, all were elected.

- WA6JCW nominated by KA6FUB, second by WB9LOZ, representing keyboard
- K6TAM nominated by N0ARY, second by KE6LW, representing keyboard
- WA7NZL nominated by W6RGG, second by KA6FUB, representing keyboard
- N6SLE nominated by KA6FUB, second by N0ARY, representing tcp/ip

New officers were elected,

- President : WD6CMU
- Vice President : WB9LOZ
- Treasurer : N6QMY
- Secretary : N0ARY
- Newsletter Editor: K3MC

Membership

We are now sending out membership cards with each renewal. Those that do not have membership cards can see their expiration date by checking the mailing label on their "Downlink". It was suggested that postcards be sent to members that have not renewed. N0ARY will look into the cost/benefit of this.

Treasurer

Pat (N6QMY) was not present but provide info in advance. The current balance in the treasury is 1,084. We have yet to be billed for the printing of the last two copies of the "Downlink".

TCP/IP tutorial

Steve (KA6ETB) is looking for a printer.

Frequency Coordinator's report

The transition from old coordinator (AA4RE) to new (W6RGG) has not officially occurred. Although Bob (W6RGG) has been performing in the role. Eric (WD6CMU), Bob (W6RGG) and Bob (N6FRI) will contact Roy (AA4RE) on obtaining the necessary info.

Bob (N6FRI) reported that NARC will be coordinating frequencies in the 430 band on a per-channel basis. There is no block spectrum available for the exclusive use of packet.

Dennis (KA6FUB) and Eric (WD6CMU) have put up a network on 433.150 on a temporary basis. They will submit "Green Sheets" on the sites to Bob (W6RGG) who will then coordinate with Bob (N6FRI) representing NARC. The network will then be relocated to another frequency that fits into the band plan.

Bob (N6FRI) agreed to write an article for the "Downlink" on how frequency coordination works.

Bob (W6RGG) presented a proposal from K7WWA for a high speed, full duplex link on 440 to connect WX3K and WB6LYE in Norther California. In addition to the backbone function there were a number of 2 meter "personal" bbs's. The board had no problem with the proposal as long as the following conditions were met:

The personal bbs's must be coordinated through the NCXPN. George (K7WWA) should contact Brad, WA6AEO.

Both WX3K and WB6LYE have to be aware of the change and support it.

Club public relations

The board addressed the issue of how to get NCPA more visible to amateurs. The following items were brought up:

Booths at flea markets.

KA6FUB: Livermore in July
N0ARY : Foothill in August
WA7NZL: Sacramento computer swap in September

We should present a program at the general membership meeting.

Be more visible with respect to available speakers. NCPA has a list of speakers that are available to talk at club meetings on a variety of subjects. Allan (W6MEO) has the list. Eric (WD6CMU) will talk with Allan and get an up-to-date list and give this to Bob (W6RGG) for reference in his article.

We need more articles for the "Downlink".

145.01 and WA6RDH

The grandfathering of WA6RDH on 145.01, a keyboard to keyboard channel, is scheduled to expire in December 1992. At this time we are still at an impasse on this issue. George (K6TAM) will contact other node sysops to determine the extent of the bbs's interference in 145.01.

What is a BBS?

Art (WA7NZL) brought up the question because of the growing use of personal tnc mailboxes being used as mini-bbs's to pass third party traffic. Eric (WD6CMU) defined a bbs as a full service bbs that forwards to other bbs's.

Resource Database

Eric (WD6CMU) has received 70 records so far. Most have been from the bbs's. The nodes and dx spotting network still have to be obtained.

September 13, 1992

The NCPA Board of Directors meeting took place in Pleasant Hill on September 13, 1992. The meeting started at 10:06. Those attending:

WD6CMU, KA6FUB, WA6AEO, WA6CFN, N6YUB, WA6JCW, N6SLE, W6RGG, N6FRI, N0ARY

Meeting was called to order by Eric (WD6CMU).

Incorporation

Pat (N6QMY) reported trough Eric (WD6CMU) that no forward progress had been made on the incorporation issue and that the board may choose to have someone else take on the task. Chuck (WA6CFN) volunteered to take on the responsibility.

TCP/IP book

The hold up on the book seems to still be in getting it printed. The goal is to still have it available for Pacificon.

145.01 and WA6RDH

The time period for WA6RDH to move to a lan frequency expires in December. So far no progress has been made on getting this done. Bob (WA6JCW), board member representing keyboard to keyboard interests, will talk with Dennis (WA6RDH).

Resource Database

Brad (WA6AEO) will be taking up this task from Eric (WD6CMU). To date there has been good response from the bbs sysops, a fair response from the node ops and almost nothing from the tcp/ip or dx spotting groups.

70cm bandplan

Bob (N6FRI) still needs to get the green sheets on the 9600 link currently operating on 433.15. Bob (WA6JCW) also indicated that he has a link on 433.47 which is low power, 2 watts. Bob (N0ARY) is to give his call to the ATV group on Black Mountain. This frequency could be a potential candidate for their interference problems.

K7WWA/9600 link

The link system to be installed between WX3K and WB6LYE has been put on hold.

Pacificon

NCPA will be represented at Pacificon with a booth and a intro to packet seminar. The seminar is scheduled for Saturday at 11:00 and will be given by Brad (WA6AEO) and Dennis (KA6FUB). Support for manning the table is requested.

Downlink

Mike (K3MC) is the new editor (again). We have two issues to put out in the near future. The Summer issue should go to press in the next couple weeks. The Fall issue is still in need of material. Those with articles please contact Mike (K3MC).

HF STA

The issue of the pending expiration of the HF auto-forwarding STA was discussed. Brad (WA6AEO) will draft a letter stating the NCPA position. The letter was roughed out at the meeting and a final version will be distributed to all board members for review prior to publishing it.

NARC update

Bob (N6FRI) announced that the next NARC meeting will be on Oct 3 at the Contra Costa water district headquarters. The ATV and packet use in the 430 band is still an issue.

EOF

Minutes of the NCPA General Meeting

Larry Kenney, WB9LOZ

May 3, 1992
Contra Costa County Water District Conference Room

The meeting was called to order at 10:15 am by Eric Williams, WD6CMU.

Introductions were made by all present. Only 12 members and 4 guests attended the meeting.

WD6CMU reviewed the accomplishments of NCPA during the past year:

- Publication of four issues of "Downlink", the NCPA quarterly journal
- Coordination of the new 220 packet bandplan
- Sponsorship of the very successful 10th Annual ARRL Amateur Radio Computer Networking Conference in San Jose
- Presentation of several packet seminars during the year - at the annual Emergency Response Institute, Pacificon '91 and the Computer Networking Conference
- Publication of WB9LOZ's "Introduction to Packet Radio" as a 46 page bound book
- Completion of a guide to TCP/IP operation (soon to be printed)
- Distribution of several "Packet Information Bulletins" written by Larry, WB9LOZ
- Coordination of the digital communications speakers' bureau
- Mediation of several interference complaints
- Application for Incorporation with the State of California

Goals for the coming year:

WD6CMU said that we would like to continue to publish four issues of "Downlink", print the TCP/IP guide, present more seminars, etc., but lack of people to do the work is a BIG problem. We can come up with many great ideas, but we need people to accomplish them.

Ways to increase participation in the NCPA Discussion by all present included the following suggestions:

- Have beginner level and advanced packet seminars at NCPA meetings
- Sponsor breakfasts where packet users could come to discuss packet radio interests, plans, problems, etc. with others
- Continue to publish informative bulletins for packet users
- Resend WB9LOZ's "Introduction to Packet" series and information bulletins over the BBS network
- Send camera-ready information on NCPA and packet to newsletter editors for publication (Editors are always looking for new material for their newsletters.)
- Promote the NCPA and sell our packet books at hamfests and fleamarkets

Presentation by Bob Wilkins, N6FRI, NARCC UHF Voice Repeater Coordinator:

Bob reviewed the history of UHF packet, reviewed the proposed use of 433 - 433.5 MHz for packet and the rejection by NARCC, and discussed the ATV-packet interference problem and the tests conducted by NCPA and South Bay ATV folks (as presented in an article by Bob, N0ARY, in the Winter, 1991, issued of "Downlink).

Test results proved that 431 and 438 were best for packet use. At the recent NARCC meeting, members voted that NARCC coordinate 431 - 432 for auxiliary uses, including packet, with the provision that the NCPA and NARCC coordinators work together on each proposal. Use of 431 - 432 MHz cannot be assigned based on a band plan. Due to other uses of this frequency band, each individual site has to be specifically coordinated. Use of 438 MHz for packet is possible down the road. The 433 - 433.5 MHz packet users need to be recoordianted to the 431 segment.

Revision of NCPA Constitution regarding membership:

The NCPA Board of Directors recommended that the membership period be changed from the present April 1 to March 31 period to one where member- ship expires one year after a person joined or renewed. Only the general membership can vote on a change to the constitution.

Moved: (W6RGG/second KA6ETB) That in Article II, paragraph A, of the NCPA Constitution the following paragraph be DELETED:

> "New memberships run from the time of joining until the first March 31 thereafter. Renewal memberships run from April 1 to March 31."
>
> and REPLACED BY:
>
> "Memberships run from the time of joining until the same date the following year."
>
> Carried.

Election of new NCPA Board of Directors:

The following were nominated and elected by acclamation:

Bob Arasmith, N0ARY
Eric Williams, WD6CMU
Dennis Matzen, KA6FUB
Larry Kenney, WB9LOZ
Barry Barnes, KE6LW
Pat Mulrooney, N6QMY
Bob Vallio, W6RGG

The newly elected board will select the officers of the NCPA as directed in the organization's constitution.

The meeting was adjourned at 12:03 pm.

Respectfully submitted,

Larry Kenney, WB9LOZ

EOF

NCPA Directors

Eric Williams, WD6CMU
WD6CMU @ WD6CMU
510-237-9909

Patrick Mulrooney, N6QMY
N6QMY @ N6QMY
408-562-5659

Larry Kenney, WB9LOZ
WB9LOZ @ W6PW
415-821-2666

Dennis Matzen, KA6FUB
KA6FUB @ KA6FUB
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Bob Arasmith, N0ARY
N0ARY@N0ARY
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Bob Vallio, W6RGG
W6RGG@N6LDL
510-537-6704

Bob Sanders, WA6JCW
WA6JCW @ KG6XX
916-489-5631

George Fisk, K6TAM
K6TAM @ KI6EH
408-722-2060

Art Leonard, WA7NZL
WA7NZL @ WA6RDH
916-885-2388

Lawrence Renslow, N6SLE
N6SLE @ KI6YK

Barry Barnes, KE6LW
KE6LW @ KE6LW

NCPA Officers

President:
Eric Williams, WD6CMU
WD6CMU @ WD6CMU

Vice-President:
Larry Kenney, WB9LOZ
WB9LOZ @ W6PW

Secretary:
Bob Arasmith, N0ARY
N0ARY @ N0ARY

Treasurer:
Patrick Mulrooney, N6QMY
N6QMY @ N6QMY

Newsletter Editor:
Mike Chepponis, K3MC
K3MC @ K3MC

Frequency Coordinator:
Bob Vallio, W6RGG
W6RGG @ N6LDL

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
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Sunnyvale, CA 94088-1761

First Class Mail