October
1982

Packet Status Register

Number 2

Tucson Amateur Packet Radio Corporation

The first annual meeting of the Tucson Amateur Packet Radio Corporation will take place on February 5, 1983 in Tucson. We would like to see as many out-of-town members here as possible. Local members will be able to provide lodging for some visitors. If you intend to come to the meeting, please let us know as soon as possible if you want us to try to find you a place to stay. We would like at least a month's notice. Any one needing lodging or willing to provide same should contact Heather Johnson, N7DZU. Tucson is a wonderful place to visit in the winter when the snow starts drifting up around the windows in the north, and we think you would enjoy the visit. Be advised, though, that our nice winter weather is no secret, and hotels and motels will also need some advance notice.

We have had several complaints from members who have heard nothing from us except an endorsement on their cancelled checks. New members are supposed to receive an envelope containing a brief description of packet radio, a hardware description, a membership roster, and the first issue of the Packet Status Register. If you did not get anything like this, we would appreciate hearing about it. Please don't write us off -- you weren't omitted on purpose, and we are trying very hard not to be a fly-by-night organization.

By the way, the membership roster you got is probably sadly out of date. We now have about 180 members. If you want to know who they all are for some reason, send us a s.a.s.e. for an updated copy.

As a further attempt at recognition of our members, we have gotten membership cards which are being sent out with this issue of the newsletter. You should find your card in an envelope which was stapled into the newsletter. If you don't have one, let us know at once.

In addition to the tape available from the St. Louis Area Packet Radio Club, another video offering will be available soon. Den has just finished a two-lecture sequence on amateur packet radio, using the facilities of the University of Arizona's MicroCampus. The first is entitled, "Amateur Packet Radio Local Area Networks", and the second, "Amateur Packet Radio Network Linking". Please contact Den through the TAPR address for VCR or Beta copies.

New "Standard" Protocol

A number of packet radio groups sent representatives to a set of packet radio meetings held before the annual AMSAT meeting. The groups from San Francisco (PPRS), Northern New Jersey (RATS), AMSAT, and AMRAD were all represented. TAPR's contingency consisted of Lyle, WA7GXD, and Den, KD2S. Pete Eaton, WB9FLW, was doing double duty representing St. Louis (SLAPR) as well. A number of issues were discussed during the meeting, including the PACSAT proposal described in this issue. The highlight of the meeting was a truly remarkable incident -- this diverse group actually agreed on a common protocol for communicating with each other!

Based largely on a great deal of work done as a cooperative effort between RATS and AMRAD, this protocol defines the logical link level of frames sent between packet radios. The AMRAD/RATS AX.25 protocol was very close to the LIPM-type of system proposed by Hank Magnuski, KA6M, and differed from the the TAPR dynamic addressing code mainly in the form of the address field. All use a common bit-oriented protocol structure of the high-level data link control (HDLC) type. The groups all agreed to use the same seven byte address field for each link address (including intermediate repeaters), using a modified ASCII representation of the Amateur call sign of the operater. A separate seventh byte allows special control functions and an internal address code for multiple destinations with a single call sign. The TAPR implementation of this protocol is now a joint effort between Tucson and Los Angeles groups. Margaret Morrison, KV7D, is coordinating activities from Tucson, with Harold Price, NK6K, and Dave Henderson, KD4NL, working on the higher-level protocol.

Mike Parker KT7D has continued to coordinate the design of an L-band amplifier for use with the AMSAT Phase III satellite. It was found that the current crop of available (inexpensive) transistors would be best used in the class C, non-linear mode, which is quite acceptable for packet radio uses of the new 1269 MHz uplink. AMSAT has offered support for the effort, including a generous contribution of the Teflon printed circuit stock, and at the AMSAT meeting held recently, great interest was shown by many of the people involved in the Phase III effort.

TECH/notes

by Lyle Johnson, WA7GXD, and
Margaret Morrison, KV7D

As mentioned in the Hardware Happenings column in this issue, the TNCs initially had a rough time communicating at 1200 baud. We discussed the problem with other groups and found that most were using surplus MODEMs which appeared to work fine on the air. So what is the problem?

If you have a swept audio sine wave generator and oscilliscope, you can perform a little experiment with a pair of 2 meter radios. Run the output of the signal generator into the microphone input of one radio, which is transmitting on a clear frequency. Monitor the speaker output of the receiving radio with the scope. If you trigger the scope at the sweep rate, you will see a nice plot of the audio response of the radio combination as a function of frequency. (If you have an ordinary sine wave generator, you can do the sweeping yourself and acquire the same information.) Typically, the curve you see will peak around 500 hz, diving at a constant (logarithmic) rate to around 3 khz, above which it vanishes even more rapidly. Random data at 1200 baud, using 1200 hz and 2200 hz tones, fills the audio spectrum from about 600 hz to about 2800 hz.

The XR2211 demodulator IC used in the TNC has a wide dynamic range, but requires similar amplitudes for the two tones in question. If the relative voltage amplitudes of the 1200 hz tone and the 2200 hz tone are very different, the phase-locked loop may take two or more cycles to lock after a frequency change. This means that the maximum reliably achievable baud rate is about 600. Thus, we determined that a bit of filtering was needed to smooth things out.

In a commercial packet system that Mark Baker and Lyle designed a couple years ago, a similar problem came up and was solved by inserting an active filter in the repeater used by the system. Unfortunately, this fix will not work for an amateur application, as all signals do not pass through a central repeater, and the response of all radios in the system is not the same.

At this point, the Morrisons (KV7s B and D) volunteered to aid in a filter solution using a high-tech part (do we use any other?), the National MF-10CN switched capacitor active filter. Programs were written to perform audio spectral estimation under a wide variety of modulation conditions, and on the basis of these spectra, the MF-10 filter components were optimized to produce the flattest response with minimum phase distortion. The resulting design programs run quickly, and easily generate the eight resistor values yielding optimum compensation. Testing with a variety of radios indicated that the design works well. It will be on your Beta boards (Alpha testers, this is what the wire-wrap area is for.), and the eight resistors which determine the filter parameters will reside on a 16-pin DIP header. If your radio has significantly different audio characteristics from those the filter is configured for, a quick fix is thus possible. Simply send us your system response, and we will provide you with alternate resistor values. Talk about convenient!

New Products

Advanced Micro Devices has sampled us a 7910 "World Chip", which is a MODEM that runs Bell 202 standard, Bell 103/113 with auto-answer, and a couple of CCITT standards as well. All on a single 28-pin DIP. Report will be forthcoming.

The Motorola 6809 uP is now being interfaced to a Zilog Z8530 SCC (see last issue) and results should be in by next time. Also note that a version of the 6809 in high-speed CMOS has been announced by Motorola! We hope to have details soon.

Sytertek has supplied a pair of 2801 samples, a 16-pin 64 by 4 EEPROM that may be useful in lieu of the XD2210 NOVRAM in those applications that don't require the RAM aspect of the NOVRAM. The samples require 16 to 18 volts at 0.5 ma, but I am told the production parts will be 5 volt only.

National has sampled us a 5 volt only, 8 pin serial interface 256 bit EEPROM that costs only about $3! Investigations will proceed when I get a little time. It is called an NMC9306/COP494 and it looks good.

Readers who have had experience with recently introduced products of interest to the packet radio community are strongly encouraged to share such experience with this column.

The Tucson Amateur Packet Radio Corporation is a nonprofit scientific research and development corporation. The corporation is licensed in the State of Arizona for the purpose of designing and developing new systems for packet radio communication in the Amateur Radio Service, and for freely disseminating information acquired during and obtained from such research.

The officers of the Tucson Amateur Packet Radio Corporation are:

Den Connors, KD2S	President
Lyle Johnson, WA7GXD	Executive Vice-President
Margaret Morrison, KV7D	Vice-President
Mark Baker	Secretary

The members of the Board of Directors are:

Mark Baker
Marc Chamberlin, WA7PXW
Den Connors, KD2S
Chuck Green, N0ADI
Lyle Johnson, WA7GXD

The Packet Status Register is the official publication of the Tucson Amateur Packet Radio Corporation.

New Digital Rules

by Margaret Morrison, KV7D

On September 14, 1982, the Federal Communications Commission adopted a revision of Part 97, Section 97.69 affecting digital communications, effective October 28. We summarize the high points of this revision; further information on this matter may be obtained by contacting the Private Radio Bureau, Federal Communications Commission, Washington, D.C. 20554.

This paragraph permits the use of three types of digital codes in amateur radio communications. The use of such codes is permitted for radio teleprinter, voice, facsimile, television, control of amateur radio stations and other objects, transference of computer programs, direct computer-to-computer communications, and communications in various types of data networks, including so-called "packet switching" systems. The INTENT of digital codes must be to facilitate, rather than to obscure, communications. The authorized codes are:

(a) Baudot code. The code must conform to International Telecommunications Alphabet Number 2. The "figures" positions not utilized for numerals may be used for control of receiving printers, or for any other control function for which digital codes are authorized. Sending speed is limited to 100 words per minute (75 baud). The mark and space can be separated by a maximum of 900 hz. For A2 or F2 emission, the highest modulating frequency can be not more than 3000 hz.

(b) ASCII. The code must conform to ANSI standard X3.4-1968. From 3.5 to 29 Mhz, modulation must be F1 at a speed no higher than 300 baud. Above 28 Mhz, F1, F2, and A2 may be used. Sending speed is limited as follows: 1200 baud between 28 and 50 Mhz; 19.6 kilobaud between 50 and 220 Mhz; and 56 kilobaud above 220 Mhz. Furthermore, A1 may be used to send ASCII on frequencies where F1 is permitted -- in general, the CW part of the band. (Paragraph 97.7 has been rewritten to restrict Novices to using International Morse Code.)

(c) Unspecified digital code. ANY digital code is permitted above 50 Mhz, except for the A1-only subbands. Communication with such codes is permitted with stations outside the jurisdiction of the FCC only by special arrangement with the country in question. Sending speeds are limited by specified BANDWIDTH at -26 dB points, and type of modulation is not specified. These bandwidths are: 20 khz between 50 and 220 Mhz; 100 khz between 220 and 1215 Mhz. Above 1215 Mhz, no maximum bandwidth is specified, but the emission must be in accordance with 97.63(b) and 97.73(c). This means that you must keep your sidebands inside the amateur bands and reduce or eliminate your spurious emissions. You must keep a description of the digital code in your station log and provide it to the FCC on request. On the recommendation of an Engineer-in-Charge, the FCC can require you to cease or restrict transmission of such digital codes, or to maintain a record convertible to the original information of all coded communications transmitted under paragraph 97.69(c).

Correspondence

September 14

To the Editor,

Congratulations on your first issue of Packet Status Register. We would like to take this opportunity to bring you up to date with the packet activities in the St. Louis area.

In June, we formally organized the St. Louis Area Packet Radio Club (SLAPR). Over 30 folks showed up for the first meeting and since then several projects have been undertaken:

We have begun a local net to check our simplex range and determine the optimum location for our digipeater.

Bill, WD0ETZ, our V.P. and computer guru has built a Z-80 based system and developed the software for our bulletin board system which will be dedicated to the Local Area Network.

And last but certainly not least, Gus, W9OFZ, our secretary, has been publishing a monthly newsletter titled "SLAPR Protocol" which in three months time has reached a circulation of over 100! [We've been reading the SLAPR Protocol regularly. It's highly recommended, and not just to St. Louis area people! -- ed.]

One last service that SLAPR is performing is distribution of a Video Tape made in June when we visited the TAPR gang in Arizona. The presentation is an excellent introduction to PACKET and Tucson's activities. The production is 90 minutes in length and SLAPR will reproduce in for the cost of return postage if you will send us a blank VHS tape.

In the beginning, all I wanted to do was get a few local guys together to get some TNC boards and experiment. But the interest was overwhelming and people just started coming out of the woodwork. With that, a lot of undiscovered talent was exposed that may have otherwise gone unnoticed, and because of it we will all benefit. [See elsewhere in this issue for evidence of this benefit! -- ed.]

Pete Eaton, WB9PLW, President
St. Louis Area Packet Radio Club
1309 Gloucester Drive
Edwardsville, IL 62025

Proposed Amateur Digital Satellite

by Den Connors, KD2S, and Tom Clark, W3IWI

A new type of amateur satellite was proposed by Tom Clark, W3IWI, at the packet radio working group meetings held October 8 to 10, in conjunction with the AMSAT 1982 Annual General Meeting. The new satellite project, tentatively called PACSAT, would use currently available hardware and proven construction techniques to implement a digital packet radio repeater in space. This repeater, with store and forward capabilities, would provide a satellite-based Computer Bulletin Board System (CBBS) -- a virtual "flying mailbox" for amateur radio and computer enthusiasts.

The system proposed by Tom and discussed during the three days of meetings would have one or more packet radio channels, and possibly other ASCII or RTTY input/output channels. An onboard computer system would control a large amount of dynamic storage, perhaps as much as one megabyte of messages. Access to the message system would be somewhat like using a more traditional personal CBBS with telephone dialup capability. With a Phase II type of low-earth orbit ("LEO"), the satellite would be available several times a day for up to 15 minutes of message reading and writing. Although a LEO satellite is limited in its range, the store-and-forward capability could extend it to provide global coverage. The major problem that Tom discussed was that although AMSAT sees a marked rise in amateur interest in computers, packet radio represents new technology to most amateurs. Clearly, the packet radio experts attending the meeting must plan for easy user implementation if a PACSAT is to be a viable concept.

Several possible techniques and problems were discussed during the meetings. The modulation techniques mentioned were phase-shift keying (PSK) at 400 and 1200 bits/second, and minimum-shift keying (MSK), also at 1200 bits/second. The Phase III-B telecommand group has implemented state-of-the-art 400 bit/second PSK modems, and W4RI and KD2S have been working independently on MSK designs. Nonetheless, the use of either technique will require considerable work in order to develop high reliability modems usable by the amateur community. It is clear that modems for digital use of amateur satellites will be more complicated than the traditional frequency-shift keyed systems currently used for ASCII and packet transmissions.

The design Tom presented involved multiple uplinks and a single downlink, e.g., one calling uplink channel and perhaps four working channels. This was based on the idea of a typical amateur net, with the satellite acting as "NCS" on a calling frequency. An amateur calling in with uplink traffic, or for whom the satellite has a message, would be directed to QSY to a working message channel where he would clear his traffic with the onboard computer. This design is based on the use of ALOHA type protocols, where the multiple users can not hear each other, leading to possible "collisions" on the uplink channels. This, combined with Tom's assumption that "what goes up must come down", i.e., that the total message traffic up and down are about equal, led to the multiple uplink, single downlink proposal. Tom's proposal was that the uplink and downlink be full duplex (simultaneous transmission and reception) involving two bands, probably 435 Mhz uplink and 145 Mhz downlink. The design assumed that 0.5 to 1.0 megabyte of storage was available onboard which would be regarded as a "virtual disk" for planning purposes. All messages would be bit-regenerated, instead of using a transponder, and control of the communications would be by an active onboard computer. Other functions to be performed by this computer would include the management of the virtual disk storage, handling of protocols in order to allow multiple users to get their messages up and down during a single pass, and interspersing of QST bulletins in the downlink data stream during moments of inactivity.

During later informal discussions, arguments were made for and against Tom's proposal for multiple uplinks supporting a single downlink. These centered on the estimated relative traffic loading on satellite uplink and downlink. In particular, CBBS experience shows that users browse through stored information much more than generating new information. Furthermore, the QST bulletin transmissions will be a very important PACSAT function.

A proposal was made by Den Connors, KD2S, and Lyle Johnson, WA7GXD, which included a number of the above concepts. Different mechanisms for access using full duplex uplink/downlink pairs were presented. The AMSAT-AMICON (AMRAD AX.25) HDLC logical link protocol was discussed as a PACSAT standard. A number of network-related issues, including message classifications and buffer allocation and deallocation mechanisms were raised. Lyle presented a system block diagram, showing different input/output channels, multiple CPUs, and different memories for program store, file directories, buffers, and message mass storage. The tasks of the CPU were further detailed, and the different procedures needed were identified.

During this discussion, Tom Clark outlined the possibility of a truly international implementation strategy. He described one scenario in which system design and user education would be the prime U.S. responsibility. On-board hardware would be constructed in South Africa, satellite integration performed in the United Kingdom, and actual launch handled by the commercial group in Texas which has recently flown a successful test mission. Den Connors has been appointed to be the PACSAT Project Manager for the U.S. effort.

The PACSAT concept was presented at the AMSAT general meeting, and the membership welcomed the idea, with the only reservations being, "Can we afford it? Are we stretching ourselves too thin?" Tom indicated that these were AMSAT management concerns, too, but that the key individuals were very enthusiastic about the concept. Since no further opposition was raised, further development of the PACSAT concept is expected.

It is hoped that this satellite will not only give the packet radio experimenters a much-awaited international linking capability, but will also provide a new, challenging, and unique outlet to the many thousands of new hams who are familiar with computer techniques and utilization. The AMSAT team solicits your indications of interest and offers of assistance. This, as with all AMSAT projects, is a volunteer effort. Can we serve as a focus for your creative ideas?

Hardware Happenings

by Lyle Johnson, WA7GXD

There has been a lot of activity in the TAPR hardware group in spite of the long hot summer! As mentioned in our last column, there were only a couple of tasks remaining before the Alpha phase of the TNC design could be considered accomplished, and those tasks are now completed.

The major problem encountered was with the MODEM-radio interface. The TNC was content to run at around 600 baud, but at 1200 baud the system balked. Variations in the parameters of the PLL decoder were tried, such as tweaking of the received audio levels -- alas, to no avail. The problem was finally traced to the rather severe high-frequency rolloff of the audio response of our radio system. A computer aided filter design was implemented (see TECH/notes column) with the National MF-10CN switched capacitor filter chip. After a couple of passes, success was ours! (Yes, it really does taste sweet!) The modified TNC was then tested with numerous radio combinations (courtesy of WA7GXD, KD2S, KV7B, KV7D, and N0ADI) with favorable results.

WARNING! Beware of attempting to operate a packet radio station with a transceiver that has appreciable levels of second harmonic distortion. Our sampling indicates that this problem may be relatively common.

The CWID circuitry discussed in the last issue has been working well. The transmitter keying circuitry with lockout worked fine with all radios tested. A prototype EPROM programmer for the TNC is in the works. The final aspect of the hardware to be tested was the conversion to the 6809 microprocessor. A 6502-to-6809 adapter manufactured by MMS, Inc., here in Tucson, has been successfully interfaced to the Alpha TNC, and the 6809 will be the processor on the Beta TNC.

Faced with the change in microprocessor, what is the Alpha test participant to do? There are two alternatives available: First, the adapter mentioned above, including the 6809, can be purchased for about $25. Cut a couple of traces, add a few jumpers, plug the adapter into the CPU socket, and you are on the air. The alternative is conversion to Beta. As a special service to the Alpha folks, who have certainly waited longer than anyone else for this, Beta boards will be made available, to which the parts from the Alpha board can be transfered. The overall cost to upgrade will be about the same as for the adapter, and the Beta board will be a cleaner conversion, especially in view of the troublesome Alpha IC sockets.

With the revised Beta schedule (see elsewhere in this issue), it now appears that sufficient NOVRAM will be available to allow initial Beta production beyond the 75 units previously forecast.

The hardware committee is also looking beyond Beta test to other projects. Foremost among these is an RF deck for high speed packet radio. The recent changes to Part 97 described in this issue allow the use of digital encoding schemes at up to 19,600 baud on 2 meters! While this does not mean that a 1200 baud TNC is obsolete (no one is going to run much faster than 1200 baud using an unmodified communications grade transceiver), it does open up possibilities for special applications such as inter-network linking. If you have expertise in RF design or high-speed MODEM design, by all means, please step forward.

Beta Coordinators

by Dan Morrison, KV7B

Here is a current list of the Beta Coordinators who have indicated that their local groups will be participating in Beta Test. We encourage prospective Beta testers to affiliate themselves with one of these groups if that is geographically convenient. Prospective new Beta Sites should contact Dan Morrison, KV7B.

Beta Coordinator, Tucson	Dan Morrison, KV7B 4381 E. Holmes St. Tucson, AZ 85711
Chicago	Dick Gulbrandsen, WD9DBJ
Colorado Springs	Andy Freeborn, N0CCZ
Dayton	Bob Neben, K9BL
Dearborn	Jay Nugent, WB8EKL
Indianapolis	Steve Smith, call?
Little Rock	Don Reaves, KC5JH
Los Angeles	Harold E. Price, NK6K
Minneapolis-St. Paul	Pat Snyder, WA0TTW
New Jersey, Central	Keith Sproul, KA2QCW
New Jersey, Northern	Gordon Beattie, WB2CAM
New Jersey, Southern	Brian Riley, KA2BQE
Phoenix	Gavin Griffith, KB7KX
Prescott, Arizona	Jim Gere, WB7NJT
Racine	Dennis Demet, WB9SVM
St. Louis	Peter Eaton, WB9PLW
San Diego	Michael Brock, WB6KHV
San Francisco	Robert R. Reiling, W6JHJ
Schenectady	William Patmos, WZDHT
Treasure Coast, Florida	Ted Huf, K4NTA
Ventura, California	Paul Gagnon, N6MA
AMRAD	Paul Rinaldo, W4RI
AMSAT	Tom Clark, W3IWI

Alpha/Beta Report

The first phase of the TAPR TNC development is essentially complete, namely the testing of the Alpha design. Several hours of tests on 2 meters were conducted in which packets were exchanged with high reliability despite marginal signals. The CWID, MODEM filter, and power supply problems have been solved. The 6809 CPU upgrade has been accomplished on several Alpha boards. The radio and RS-232 interfaces have been verified and the parallel port exercised. The watchdog timer and transmitter keying circuitry all work well. The NOVRAM interface has been debugged and the on-board calibration hardware debugging appears complete. Calibration software has been run. Alpha testers will be able to upgrade their TNCs to Beta boards.

TAPR wishes to express appreciation to the many people who made the Alpha test possible. In particular, we would like to acknowledge help from the following.

Mark Baker
Marc Chamberlin, WA7PXW
Den Connors, KD2S
Chuck Green, N0ADI
Lyle Johnson, WA7GXD
Dave McClain, N7AIG
Dan Morrison, KV7B
Margaret Morrison, KV7D
Elio Zambrano, WB7ESQ
Modular Mining Systems, Inc.
All persons who purchased Alpha TNCs

The Beta board is being laid out by Jeff Eirvin of Interconnections, a St. Louis PC layout firm. The overall size of the board will be about 8 inches square, with the only off-board component being the custom transformer, made by Siemens, near St. Louis. All ICs will be oriented in the same direction and the wire-wrap area will have ground, +5, +12, and -12 volt busses along one side. The preliminary layout from Jeff looks great! Kudos and a tip of the hat to Pete Eaton, WB9PLW, who found both Interconnections and Siemens.

The Beta TNC will use the 6809 CPU and will come with 24k bytes of EPROM, programmed with the initial software, and 6k bytes of RAM.

A 3 foot cable, unterminated at the radio end, will be supplied for the radio interface. Another 3 foot cable will be supplied for the RS-232 serial port, with a DB-25P (male) connector at the terminal end. A bare connector will be supplied for the parallel port, and the power supply cable will be attached to the transformer. The user will probably be required to connect the line cord and fuse, which will be supplied.

The documentation supplied will include a hardware description, schematic diagrams, a board parts placement drawing, and a user's guide to the software supplied. The hardware information will include some detail both on the radio interfacing scheme, which should help Beta testers to hook up their radios, and on the user I/O port lines. The software documentation will describe both the Link Interface Protocol and the Terminal Interface Protocol, along with a description of the hooks provided for user modification (the software answer to a wire-wrap area).

All this, and it looks like the cost will be very close to the $200 mark!

Beta Test

by Dan Morrison, KV7B, and Den Connors, KD2S

The following information has been pulled out of a letter that was sent to all Beta Site Coordinators.

...

We are nearing the time when Beta Test will be in high gear, with TNCs being built, tested, and shipped. We are writing you to let you know our anticipated schedule, and to make our request for firm orders.

At present, the final layout of the Beta board is being done through the efforts of SLAPR, our affiliate in St. Louis. We expect to receive the layout by November 10. At the same time we intend to make our initial parts orders. Once this is done we are locked into a rigid schedule based on the parts invoicing. Therefore, before we make our parts order (currently anticipated to be November 8) we MUST know the true number of TNCs destined for your site. This means we need a firm order for each TNC. We also need to cover our preliminary costs (board layout could be $1300, for example).

For both these reasons we are requesting a $50 non-refundable deposit for each TNC. Checks should be made out to Tucson Amateur Packet Radio or TAPR. Alternatively, any participant wishing to pre-pay our current estimated cost of $200 may do so with the understanding that no additional cost increases will be passed along to him. (We don't anticipate significant increases, but the exact cost will not be known until we have the final count on TNCs ordered.) The cut-off date for orders is November 7, just before our parts order. Please inform your participants of this important information. As you do so, please bear in mind the following facts concerning Beta Test.

First, Beta Test is not a commercial venture. It is, rather, an experiment. For this reason, we ask that each participant ordering TNCs sign the statement below, indicating acceptance of the risks associated with participation in an experimental venture. We cannot adopt a "service what we sell" policy during Beta Test. The Beta Coordinator must ensure that there is an adequate base of technical support locally, to repair and modify the TNCs. This is why we have restricted the test distribution to sites indicating they have the local expertise to handle problems. Beta sites with fewer than four or five members may find it impossible to build a self-supporting group, and would be well advised to find more local support before getting further involved.

On the other hand, we will do everything in our power to ensure shipment of functioning TNCs. We take great pride in our work, and intend to have the fewest possible problems during Beta Test. It is our policy that we will give you, the Beta Coordinator, as much support as possible. If you run into a problem you can't handle without our help, please call us or one of the other people in the local group. But bear in mind that for us and for the rest of the group involved in getting Beta Test out the door, packet radio must remain a hobby, taking second place to making a living (sigh).

Here is the schedule we anticipate. Please note that the dates are approximate. If problems arise at some point the result will be some slippage.

(continued on page 8)

Board of Directors Election

The Tucson Amateur Packet Radio Corporation will hold its annual meeting at 10 AM on February 5, 1983, at the University of Arizona Computer Center. This is the first Saturday of February. The election of board of directors will take place at this meeting. The deadline for nominations for members of the Board is midnight November 30, 1982. A list of candidates will appear in the December issue of the Packet Status Register. Members who are unable to attend the meeting will be able to submit ballots by mail or to vote by proxy. Please submit nominations on the form which appears on the last page of this issue. You may nominate yourself. We encourage TAPR members outside Arizona to run for positions on the board of directors.

The excerpt below from the Bylaws of the TAPR Corporation describes duties and requirements of members of the Board of Directors.

Article IV, Meetings of the Board of Directors

4.1. The business and affairs of the corporation shall be managed by a Board of Directors. ... The Board of Directors shall initially consist of five members. At the first annual meeting subsequent to the Organizational Meeting, the number of directors shall be increased to fifteen members; five of the additional directors shall be elected by the existing Board of Directors; the remaining five directors shall be elected by a majority vote of the membership in good standing. All directors thereafter shall be elected by the membership in good standing.

4.2. All directors must be members in good standing and have attained the age of 18 years or older.

4.3. The initial Board of Directors shall serve for a term of three years. The five directors elected by the Board of Directors as prescribed herein shall serve for a term of two years. The five directors elected by the membership in good standing at the first annual meeting shall serve for a term of one year. All directors elected thereafter shall serve for terms of three years.

Membership Application

Tucson Amateur Packet Radio Corporation
P.O. Box 22888, Tucson, Arizona 85734

Name:_____ License
Call Sign:_____ Class:_____

Address_____
City &
State_____

Zip (Postal) Code:_____

Home Phone:_____ Work Phone:_____

If you wish not to have published in a membership list any of the above items, indicate here which these are:

_____

I hereby apply for membership in T.A.P.R. I enclose $12 dues for one year.

Signature_____

Date: _____

Supplying the following information is not mandatory for membership, but would help us to plan activities and programs.

Are you interested in operating a TAPR Beta Test site? _____

Which Beta Test area (if any) is closest to you?

_____

Are you willing to become a TAPR Beta Test Coordinator for your area? _____

At what times would you be available to participate in an HF net to discuss packet radio?

_____

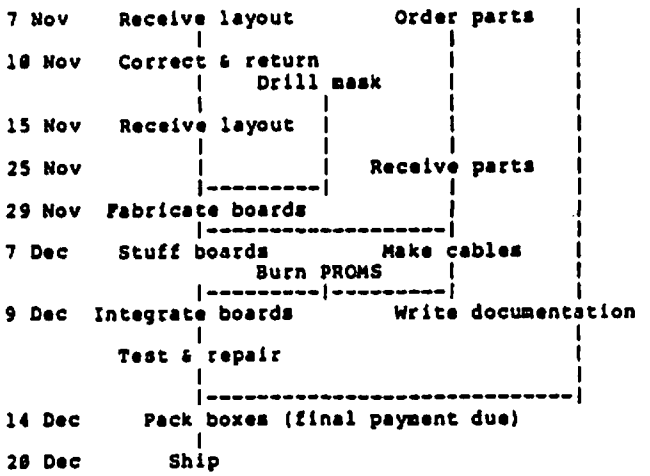
NOMINATION FOR TUCSON AMATEUR PACKET RADIO CORPORATION BOARD OF DIRECTORS

I would like to nominate the following person to one of the positions of member, TAPR Corporation Board of Directors:

It is my understanding that the above person is a member in good standing of TAPR, and is over 18 years of age.

Signed, _____

continued from page 6



Assuming parts are ordered according to this schedule, the vendors will need to be paid no later than December 15. Therefore, your participants should plan on completing payment prior to this date.

Thanks for assistance with this issue of the newsletter to

Rosemary Connors
Bill Gage, WA7PDN
Heather Johnson, N7DZU
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