The first annual meeting of the Tucson Amateur Packet Radio Corporation was held on February 5, 1963 at the University of Arizona. Den Connors, KD25, President of TAPR, called the meeting to order and discussed the group, which included many out-of-state members. Fred Heyn, WA6ZTO, Chairman of the Southwest Division of the ARRL, discussed the ARRL and its involvement in digital communications. Tom Clark, W31WI, President of ARSAT, spoke about amateur involvement with satellites and the future of packet radio with respect to the satellite service. Pete Barton, WB9KLW, President of SLAPR, spoke about his involvement in ham radio and packet radio. He presented a donation of $188 against black Thursday from SLAPR.

Den Connors presented an introduction to packet radio and discussed the FCC's commitment to packet radio communication. Chuck Green, N@AD1, gave a discussion of protocols in use and under consideration for Amateur packet radio. Following a short break, Lyle Johnson, WA7GXD, described the history of TAPR and the development of the TAPR Terminal Node Controller. Pete Barton then described the evolution of SLAPR and the St. Louis Beta Test Site.

After lunch, Den Connors discussed several network linking philosophies. Tom Clark described the ARSAT Phase III-1 digital frequency allocations. Mike Parker discussed the L-band amplifier project for accessing the Phase III-B satellite. Lyle Johnson talked about the future of TAPR and projected projects, including proposed terrestrial linking experiments. Dan Morrison, KV7B, announced the plans for distribution of the first Beta test boards following the meeting.

The results of the Board of Directors election were announced. The members of the Board are as follows.

Term expiring 1984 (elected by membership)
Tom Clark, W31WI
John Dubois, WH6DA
Pete Barton, WB9KLW
Margaret Morrison, KV7B
Harold Price, N@AD1

Term expiring 1985 (elected by previous board of Directors)
Mike Brock, WB6HHV
Dave Henderson, KD4HL
Dan Morrison, KV7B
Mike Parker, N@AD1
Bill Reed, WD8LYZ

The meeting of the Board of Directors of the Tucson Amateur Packet Radio Corporation was held on February 5, 1983, following the general meeting. John Dubois and Bill Reed were absent. Officers of the corporation were elected as follows.

President, Lyle Johnson, WA7GXD
Executive Vice President, Den Connors, KD25
Secretary, Heather Johnson, WH7IU
Treasurer, Chuck Green, N@AD1

The Board discussed various options for providing terminal node controllers beyond those produced for Beta test. Supplying boards assembled and tested beyond the test would require the corporation to handle problems associated with implied warranty, as well as type certification under FCC Part 15. The board decided that TAPR should make a kit of parts and boards available upon successful completion of Beta test in order to further Amateur Packet Radio by getting more TNCs into the hands of amateurs. Consideration of providing assembled boards was tabled. No decision regarding the improperly plated-through boards was made, since it was not clear to whom those boards belong.

Packet Radio enthusiasts from all over the world attended the Second ARRL Amateur Radio Computer Networking Conference in San Francisco in conjunction with the West Coast Computer Faire. The conference was hosted by AMRAD and the Pacific Packet Radio Society. The Proceedings of this conference contains the text of 16 papers on a variety of topics of interest to packet radio. It will be available from the ARRL for $9.

Starting with the next issue, the Packet Status Register will be edited by Pat Snyder, W8GTV, with assistance from members of the Minneapolis-St. Paul packet radio group. Contributions to the newsletter may be sent to TAPR or directly to Pat. We very much appreciate the help this group has offered, and we wish them the best of luck.

Margaret Morrison, KV7B
The President's Corner

by Lyle Johnson, WA7GXD

Tucson Amateur Packet Radio Corporation is a dynamic entity, full of surprise and change. One such change is indicated by the new byline for this column. As reported elsewhere in this issue, TAPR has both an expanded board of Directors, from five to fifteen in number, with seven members from beyond Arizona's borders, and a new slate of officers. Although I am not exactly blessed with much extra time myself, the Board asked me to assume the Presidency of TAPR, which honor I accepted. I will continue to serve us as the Executive Vice President, and I have given him explicit charge to help mold a National Field Organization, based on the existing Beta Test structure. Heath Jonnson, N7DZU, was elected Secretary and thus has the overall responsibility to organize the membership services sector. Finally, Chuck Green, N8ADI, has agreed to once again take over the financial affairs, and will be serving us as Treasurer.

Generally, a new President seizes upon the opportunity of his first communication to the general membership to extoll the virtues of his predecessor, then outline glowing plans of the new administration's hopes and ambitions. Suffice it to say that Den did an incredible job, and saw TAPR grow from six local hams to a growing group over 250 strong, spread over four continents!

As for the glowing plans, TAPR is a broad-based group with an amazing amount of talent. I see it as Priority One to spread the rewards and burdens of TAPR's role in Amateur Radio Service, and for freely utilizing this resource. However, these "gateways" are slow, supporting baud rates in the 2400 and under range. As many of you are finding out, 1200 baud can seem mighty slow, especially when one is interested in transferring large amounts of information. It gets worse when many users try to do so on the same frequency. Many of us believe that the best long-term solution in many cases is a high-speed packet system, meaning the use of UHF and/or microwave frequencies with data transfer rates of 50,000 to 1 million bits per second.

"Great!", you say. "When will you guys crank that out? I'm willing to help beta test that!" The answer is -- never. You see, TAPR is not a we/they group, TAPR is "us." The Tucson-based core cannot pull this rabbit out of the hat. The INC would not be real now if it weren't for the active assistance of the groups in St. Louis and Los Angeles. These folks realized that things were getting bogged down, and rather than worry that the TNCs might never get out the door, they stepped forward and pitched in. If each of you will pause and reflect on the fact that a handful of people put in a truly heroic effort over a period spanning 14 months, inspiring friends and employers so that you could benefit from our common belief that packet radio can be of great value to Amateur Radio, you will see it as Priority One to spread the rewards and burdens of TAPR to every Beta participant... Or typesetting, or pasteup, or printing, or... You get the idea.

"I'm no hardware guru. I can't write software. I'm no systems designer, nor RF engineer. I can't build a high-speed modem. I'm not a technical writer, nor besides I can't...", you object. Perhaps. But can you staple, or fold, or lick, or talk, or... You see, there are many things required to make TAPR tick. newsletter publication is an area that takes an amazing amount of time. With electronic mail at our disposal, members in nearly any area can assist in writing columns, or letters (I will be very disappointed if we don't get at least one letter from every Beta participant...), or typesetting, or pasteup, or printing, or... You get the idea.

So, even if you aren't a super-technical type, your skills are sorely needed. You may also try checking in on the HF net on Sunday. SLAPR tends to be very lively. Volunteer to help him. You may be amazed at what a little "non-technical" moral support can do. If you are technically oriented, please identify yourself. If you are a Beta Coordinator, identity people in your area and report them to Tucson so we can all do a little arm-twisting! Enough said? Let us hear from you. We need you, we need you to be very much part of the TAPR family, and we need you to help us move forward, push a little! Volunteer to help him. You may be amazed at what a little "non-technical" moral support can do. If you are technically oriented, please identify yourself. If you are a Beta Coordinator, identity people in your area and report them to Tucson so we can all do a little arm-twisting! Enough said? Let us hear from you. We need you, we need you to be very much part of the TAPR family, and we need you to help us move forward, push a little! Volunteer to help him. You may be amazed at what a little "non-technical" moral support can do. If you are technically oriented, please identify yourself. If you are a Beta Coordinator, identity people in your area and report them to Tucson so we can all do a little arm-twisting! Enough said? Let us hear from you. We need you, we need you to be very much part of the TAPR family, and we need you to help us move forward, push a little! Volunteer to help him. You may be amazed at what a little "non-technical" moral support can do. If you are technically oriented, please identify yourself. If you are a Beta Coordinator, identity people in your area and report them to Tucson so we can all do a little arm-twisting! Enough said? Let us hear from you. We need you, we need you to be very much part of the TAPR family, and we need you to help us move forward, push a little! Volunteer to help him. You may be amazed at what a little "non-technical" moral support can do. If you are technically oriented, please identify yourself. If you are a Beta Coordinator, identity people in your area and report them to Tucson so we can all do a little arm-twisting! Enough said? Let us hear from you. We need you, we need you to be very much part of the TAPR family, and we need you to help us move forward, push a little! Volunteer to help him. You may be amazed at what a little "non-technical" moral support can do. If you are technically oriented, please identify yourself. If you are a Beta Coordinator, identity people in your area and report them to Tucson so we can all do a little arm-twisting! Enough said? Let us hear from you. We need you, we need you to be very much part of the TAPR family, and we need you to help us move forward, push a little! Volunteer to help him. You may be amazed at what a little "non-technical" moral support can do. If you are technically oriented, please identify yourself. If you are a Beta Coordinator, identity people in your area and report them to Tucson so we can all do a little arm-twisting! Enough said? Let us hear from you. We need you, we need you to be very much part of the TAPR family, and we need you to help us move forward, push a little! Volunteer to help him. You may be amazed at what a little "non-technical" moral support can do. If you are technically oriented, please identify yourself. If you are a Beta Coordinator, identity people in your area and report them to Tucson so we can all do a little arm-twisting! Enough said? Let us hear from you. We need you, we need you to be very much part of the TAPR family, and we need you to help us move forward, push a little! Volunteer to help him. You may be amazed at what a little "non-technical" moral support can do. If you are technically oriented, please identify yourself. If you are a Beta Coordinator, identity people in your area and report them to Tucson so we can all do a little arm-twisting! Enough said? Let us hear from you. We need you, we need you to be very much part of the TAPR family, and we need you to help us move forward, push a little! Volunteer to help him. You may be amazed at what a little "non-technical" moral support can do. If you are technically oriented, please identify yourself. If you are a Beta Coordinator, identity people in your area and report them to Tucson so we can all do a little arm-twisting! Enough said? Let us hear from you. We need you, we need you to be very much part of the TAPR family, and we need you to help us move forward, push a little!
Software Update

by Margaret Morrison, KH7D

Although beta test is still just starting, and not all the boards are even shipped, there is already a new version of software out. The original plan called for the first software revisions to appear in conjunction with the EPROM burner attachments, but we had a couple reasons for jumping the gun. The primary reason was the incompatibility between different implementations of AX.25 protocol, which is discussed by Harold Price. Almost as pressing a reason was the presence of a number of fairly annoying bugs. The most obvious of these is the so-called "monster packet" problem. The monster packets resulted from the fact that the low-level software person took inadequate account of the possibility of the demodulator detecting a carrier momentarily while the radio is keying up. While we were revising things, we took the opportunity to fix several other less urgent problems, and to implement some changes suggested by some of the first beta testers.

Until the prom burners are available, we will reburn proms on request. Send your old proms, preferably in a rigid, nonstatic tube, to TAPR along with sufficient postage for us to send them back. Alternatively, you can send $18 each or $30 per set (plus postage) for new proms and we will send you your new proms burned with the latest software. In either case, we will send a set of notes keyed to the manual describing all changes.

Following is a summary of the major changes incorporated in the latest software, version 2.1.1.

* The AX.25 protocol corresponds to the description in Appendix A. For compatibility with Version 1 software, a compatible protocol remains for the time being.

* The monster packets are fixed.

* The TNC resets successfully on power-up.

* The timeout for retries of unacknowledged packets now starts after the packet has been transmitted, rather than after the packet has been formulated. This prevents transmission of several copies of one packet after a wait due to busy channel.

* A ROM checksum option has been added to the calibration routine. This was prompted by the fact that there were a few mis-burned proms in the first release.

* The calibration routine and the low-level debugger accept lower-case.

* HDLC baud rates of 480 and 800 have been added. AMSAT has chosen 480 baud as a satellite standard.

* Several diagnostic messages have been added to indicate failure to be commanded of peripheral chips at reset. In case the 8551 serial port fails, LEDs D1 and D2 blink.

* Work on the EPROM programmer attachments for the TNCs is progressing. We need to know very soon how many of these will be needed. Get your reservation in now.

Standards (sigh)

by Harold Price, KH6N

As some of you have already found out, version beta.1 of the TAPR implementation of the protocol agreed on at an October AMSAT meeting does not match the VADCG TNC TIP/LIP 5 version of that same protocol. As it turns out, neither of the two implementations match what was actually agreed on at the October AMSAT meeting. The exact reasons for this are best described late at night in smoky back rooms. For now, the important thing to know is that steps are being taken to correct the situation.

To explain quickly, the Beta.1 version of the TAPR TNC software matches the protocol as defined on Saturday, October 9. The specification in the manual contains updated notes on Saturday, October 16. The KH6N TIP/LIP 5 software matches the Sunday, October 16 version, except that some of the frame types aren't implemented and a different layout of the 16-byte is used. The expected future actions are that TAPR will release a new version of the TNC software that matches the October 16 version (as modified by KH6M). The AX.25 "specifiers" will update the specification, and the KH6N software will be upgraded to a full implementation.

While all of the above sounds bad, the overall outcome was very good. Recall that the time from ratification of the protocol to the availability of software for several sets of hardware was only five to six months. In addition to the TAPR and VADCG TNCs, software is in development for homebrew TNCs on both coasts. Two hams in San Diego have a version of AX.25 written in C for an S-190 Z-88 board. This software is compatible with the current TAPR implementation and has been used to communicate with TAPR TNCs in Los Angeles and San Diego.

This type of turnaround for protocols, specifications, hardware, and software is enviable even in industry and was achieved by a volunteer workforce distributed in various groups spread across the country. The next steps will require even more work, and even more cooperation between groups. The next big step, of course, is networking.

The "AX.25" protocol as currently defined covers only level two of the seven layer ISO model. AX.25 level two deals with point to point connections between two nodes that are closely coupled, i.e., no other nodes are in between them. Digipeaters, in the network sense, are passive devices, repeating anything sent their way. They are invisible as far as the network is concerned. The next level is the true network level where multiple node routing comes into play.

Anyone with thoughts on level 3 protocols is invited to send them to TAPR or contact me directly. We also need to hear from the user community; what features are desired, what uses are you/will you put your TNCs to? Put your ideas in the form of a technical proposal, a wish list, or a letter to the PSB editor. We'd like to disseminate information on packet radio and it doesn't say in the bylaws that we have to make it all up from scratch. TAPR would be more than happy to maintain a list of all current packet protocols, packet repeaters, level three access schemes, local area net access procedures, etc. Currently, there isn't anyone assigned to this task of maintaining such information, mainly because there isn't any. Send it in and we'll find a volunteer. Better yet, volunteer yourself. Get involved!

Packet Status Register March 1983
Proposed Hardware Modifications

by Lyle Johnson, WA7GAD

This is a collection of suggestions for updating the TNC for the next go around. Please comment, as this may become the spec for the revised TNC. Thank you!

Serial User Port

Delete JP1 and add four 6.8k-ohm pull-up resistors from U16 (1469) pins 1, 4, 13 and 16 to +5 volts dc. This will enable the serial port to function with a "three-wire" RS-232 implementation without the use of jumpers, while still allowing operation with a "full" RS-232 port.

- Add a .1-ufd bypass cap from U15 (1488) pin 4 to pin 7 and one from pin 14 to pin 7. This will effect a local bypass of the two supply lines to this part, which suppresses any tendency of U15 to oscillate.
- Make J2 a polarized connector to help prevent possible damage to equipment.

Power Supply

- Replace D13-D16 with a 3A bridge rectifier. The present quad of in4001s overheat. A bridge is less labor to install, and doesn't cost much more than the discrete approach. Possibly replace D9-12 with a 1A bridge. Again, the bridge is simpler to install and takes up less space.
- Change C24 and C41 from .1-ufd ceramic to 10-ufd electrolytic, 16-volt capacitors. The present capacitors are insufficient to suppress oscillations in the negative regulators. These caps correct this oversight.
- Change J4 to a 14-pin polarized connector, with the +5 output from the regulator routed through it. This will allow use of an off-board +5-volt source, such as an externally mounted regulator. Furthermore, the connector will not be confused with the radio interface connector.
- Optionally, change U22 to become a 7812 regulator, changing the +12-volt line to a +16-volt line. This will allow use of the original transmitters without power-line ripple.

Memory Bank

- Install a "J®-12"-style jumper at sockets L7 and U8. This will allow use of 4k and 8k byte memories in these sockets.
- Connect U9-12 pin 26 to address line A13. This will allow these sockets to support 16k byte 27128 EPROMS. The sockets will no longer be compatible with 2716 and 2732 style parts.
- Install a push-on jumper to detach U6 pin 16 (PS6) from pin 17 (PB7). A third pin on this jumper would attach to U27 pin 1 (or 17), with a 1k pullup on the U27 side. Disconnect switch S2 from U6 pin 3 (PA1) and run PA1 to U27 pin 17 (or 1). These changes will disconnect S2 and allow the U27 socket to support either the present XD2211 256-bit NOVRAM or the XD2212 1024-bit NOVRAM. The x4 increase in NOVRAM is probably more useful than the second switch.

Modem Modifications

Transmitter keying

- C8 should be increased from 100 uf to 330 uf or more. This will still provide protection for other users, but allow multiple maximum length packets to occur, as well as support lower baud rates for AX and other slow speed work.

The parallel sections of U21 used as a transmitter keyer should be deleted and replaced with a zener-protected 2N6304. This will allow higher standoff voltages, as well as provide a better approximation of a closed switch for very sensitive rigs (like most iCOMs).

- Add an LED monitor to be added to U26 pin 3 to show status of the transmitter activation line.

Demodulator

- R35 should have a 1k resistor in series with the "top" contact and the +12-volt bus. This will prevent possible damage to U25, the +12-volt regulator and/or R35 due to misadjustment.
- C18 should be a non-polarized capacitor, and R25 should be reduced to a 25k pot.

An xSK mod for the CWID has been tested at WA7GAD. R35 is removed and the XR2256A input is then grounded. The CWID signal from U6-pin19 is routed to an input of an exclusive-or gate (74LS86) mounted in the wire-wrap area. The data signal from the HDLC chip, pin 25, is routed to the other input. The output goes to the 2266 (U18-pin9). The primary problem with this method is that, often as not, the CWID is "upside-down," making copy difficult. If the CPU could determine the state of the HDLC TxD, it could then "invert" the CWID as needed to make it come out "right-side up." (Note: this is an alternate use proposed for the line now used to read switch 2.)

Radio Interface

The connector, J4, needs to be polarized. The TTL level HDLC lines should be removed from this connector due to RF susceptibility of the TNC.

The following HDLC signals should be connected to the on-board modem via a series of push-on jumpers that can be replaced with a standard IDC connector for off-board modem applications: M8250, TxD, RxD, CD, DSR, DTR, RTS, CTS, RI, TC, WA2, J24. This will probably require a 26-pin connector. This will allow maximum flexibility in custom operation of the board.

Other Suggestions

- Someone should experiment with the waveform (C14, D8) to try to find a more reliable circuit (simple, please) for calibrating the 1700 Hz VCO signal from the XR2211 demodulator.

We need some thorough investigation of the TNC's apparent sensitivity to RF, which parts are the worst offenders? What must be done to bring the tolerance to a more reasonable level?

(continued on page 8)
Feedback

St. Louis

Greetings from St. Louis. Since the release of the TAPR boards, TAPR has been busy exercising them on 14.7555. Of the 21 boards delivered, approximately 15 are on line. Very few problems were encountered in getting the boards up and running, but a few chewed on packet and then some other diversion was needed to keep interest up! Bill, WDG@ETZ, had the answer. During the past several months Bill has built up a dedicated computer for packet and had implemented a bulletin board system that could be automatically accessed. We thought it would be sort of fun to share with you some of the messages that have been left on the system in the past several weeks as some of the local Beta Testers tell you a little bit about their systems, and general comments about the TAPR TNC. Below are those comments taken directly "off the air."

It is with some sadness that I report that Bill, WDG@ETZ, will be leaving the St. Louis area to become a Texan. Bill has been instrumental in St. Louis in getting packet up and running. He will be sadly missed, but there is no doubt his enthusiasm will help get Dallas active on packet.

Bill, WDG@ETZ, will be leaving the St. Louis area to become a Texan. Bill has been instrumental in St. Louis in getting packet up and running. He will be sadly missed, but there is no doubt his enthusiasm will help get Dallas active on packet. Thanks, Bill, and good luck!

73, Pete WD9RLW

The following are messages that have been left on the St. Louis packet bulletin board system.

To: All
From: WDG@ETZ
Subject: bulletin board system

I have interfaced my TNC with a Digital Research "Big Board" single board computer and a single 8" drives. I am using CP/M and the bulletin board program from the CP/M Users Group. I had to make a few minor changes to the program to interface with the TNC. The program automatically logs the user's callsign to disk and then operates much like an ordinary CBSS. I am operating the TNC in transparent mode with ECHO OFF. My radios are an IC-22S and an IC-2984. Both radios needed the TNC VTFL on the PST line, de Bill, WDG@ETZ

To: All
From: KR9H
Subject: Kenwood TR-7400A interface

The impossible TR-7400A is possible to operate on packet. All audio from the TNC and input on the center leg of the pot. The audio in (to microphone input) and ground are connected to the other two legs. Have fun. de KR9H, Rusty, in Belleville, Ill.

To: All
From: KD9S
Subject: My system

The rig here is a Heathkit 12936A. The computer is a TRS-80 model 1, 48K, disk drive, and microline printer. Interface to the Heath was simple and the only thing necessary was the VFL on the TNC PTT line. VXDLA had to be set to 16 because the Heath's VCO takes so long to settle down. I have a problem in that the TNC parameters will stay "preseed" and about one in three times when I power up everything comes up blank. I have to turn on Switch One and then do a hardware reset. 73, aKD9S, Len
Hardware Happenings

By Lyle Johnson, WAGXGD

believe it or not, the beta TNCs have been shipped! If you are one of about 12+ TAPRites who have received their TNCs, or if you have been near a recipient, you no doubt believe it. If your ship has not yet received its shipment, hang in there. They will come as soon as possible.

In spite of every precaution, the TNCs are truly test devices. Several bugs have already cropped up, and I'm sure many more will appear before it is all over. While specific details will appear through "official" Beta channels, a summary is in order here. First the good news. Most folks have had little trouble bringing up their TNCs and interfacing them to a multitude of radios, terminals, and personal computers.

Now the rest of the news. Not all radios key properly. The 6.7-volt drop across the Darlington transistor array (United 5957/ 2N439) causes some radios to either ignore the transmit command, or light an "XMIT" light, but refuse to transmit anyway. The fix is either a reed relay (expensive) or a VR. To use the VR, connect source to ground, gate to U1 pins 4 & 5, and drain to U1 pins 12 & 13. Voila! your rig should respond, and it has in all cases tried to date. VRs are cheap, too!

Some TNCs are a bit deaf. While there are various causes, the most prevalent is ripple/noise on the +12-volt buss. This is because your VFO mas'-spec'd the transformer. The 5-volt line is fine, and should work to about 185 VAC line voltage, but if the line voltage is below about 125 VAC, the 7812 (and 7912) have insufficient drop to overcome here, such as a PC or a part kit. It is hoped that a means will be found whereby completed boards, perhaps in a case, may be supplied to those interested. Any form of distribution implies a commitment of time and money, and right now time is critical, while money...

The next question is usually, "So when does Beta Test end?" The answer to that was explicitly determined by the Board of Directors after the Annual meeting. Quite simply, beta Test ends when the President of TAPR so declares. As of this writing, it is only beginning. If all goes well, it will only be a matter of several weeks to a very few months before enough testing is done to have accomplished our primary goals. Stay tuned...

The TNC is susceptible to RE. This means you may have a problem if you use your hand-held with its rubber-ducky at the end of the radio interface cable. This one is easy. Use an outside antenna, and shield your TNC.

Many people have asked when the TNC will be available after beta test. This is not an easy question to answer. First, it can be stated rather emphatically that no TNCs will be forthcoming until beta Test has fulfilled its basic purpose of debugging the hardware and software systems. At that point, a mechanism will be announced whereby the TNCs will be made available, either to members only or to the Amateur community at large. There are a few legal obstacles to overcome here, such as FCC Part 15/97 compliance. Perhaps more to the point, TAPR lacks the manpower to mass produce TNCs. Thus, the TNC will be available in the form of bare boards and/or parts kits. It is hoped that a means will be found whereby completed boards, perhaps in a case, may be supplied to those interested. Any form of distribution implies a commitment of time and money, and right now time is critical, while money...

The Chicago Area Beta Test group would like to extend our congratulations to those persons at TCX Inc. who are responsible for the design and construction of the TAPR Terminal Node Controller. Believe me when I tell you that Chicago has ten very happy hams, all of whom are enthusiastic in extolling the virtues of Packet Radio.

The Chicago Area Beta Test group would like to extend our congratulations to those persons at TCX Inc. who are responsible for the design and construction of the TAPR Terminal Node Controller. Believe me when I tell you that Chicago has ten very happy hams, all of whom are enthusiastic in extolling the virtues of Packet Radio.

We received our boards from Pete Eaton on February 6th at the Wheaton Radio Club Hamfest. Pete flew in from Tucson to give an hour long
Thanks

Tucson Amateur Packet Radio wishes to extend its thanks and appreciation to the following commercial organizations, without whose cooperation the beta test would have been far more costly, or more difficult, or both.

Components

Manufacturers: AMD, AMI, Intel, Synertek, Western Digital

Distributors: Anthem, Marshall, Shelley, Western Microtech, Wyle

Boards and Assemblies

Assembly: Beta-TEK, K&L Engineering

PC Fabrication: Southwest Circuits

Transformers: Siemens of Illinois

PC Artwork: Interconnections (St. Louis)

Special Thanks

The St. Louis area Packet Radio Group, and especially its President, Pete Leaton, provided physical and moral support, including getting the transformer and PC layout sources.

Thanks are due to Professor Ted Williams for enabling us to use the University of Arizona Electrical Engineering Department's HP64000 development system. We especially appreciate his putting up with our sometimes heavy demands on this facility, as when the three software developers began living 24 hours a day in his lab!

Modular Mining Systems, a Tucson-based company has been instrumental in TAPR's success. MMS has allowed its facilities to be (ab)used in the design, prototyping, testing, construction, storing and shipping of the TNCs. Further, it has extended to TAPR its purchasing contacts and underwrote TAPR's purchases of components and services for the TNCs. Many hundreds of man-hours were donated to TAPR by MMS, and TAPR wishes to publicly extend its thanks and gratitude to Modular Mining Systems for its continued support of the TNC project.

Has your membership expired?
Check the address label for your expiration date and

RLNEW NOW!

Membership Application

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

Name: ____________________________
Call: ____________________________
Sign: ____________________________
Class: ____________________________

Address: ____________________________ City & State: ____________________________
Zip (Postal Code): ____________________________
Home Phone: ____________________________ Work Phone: ____________________________

Packet Status Register March 1983

Beta Test Status

by Dan Morrison, K4V7S

As of the end of March, 141 out of a total of 171 beta TNCs had been shipped. Most of them are actively on the air, and comments from the owners of some of them appear in this newsletter. The boards are being shipped as quickly as they are gotten into working condition by the Tucson twice-weekly work parties. About a third of the TNCs worked the first time they were turned on. The remainder have had a wide variety of problems including wrong parts, incorrectly installed parts, dead ICs, shorts, and bad solder joints. Most of the problems have been simple to fix -- once identified. In general, boards are being shipped one beta site at a time, in the order in which we received money. The exception to this rule is for sites willing to take a shipment including non-working boards.

We are starting to receive reports from test participants describing radio and terminal or computer interfaces. Beta participants have successfully used TAPR TNCs to communicate with Vancouver boards running both Vancouver protocol and AX.25 protocol. Bulletin boards and mailboxes are operating over packet radio in several locations, including St. Louis, Los Angeles, and Tucson.

Below is a summary showing the number of boards shipped to each Beta Site.

Shipped

<table>
<thead>
<tr>
<th>Site</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMRAD/AMSAT</td>
<td>12</td>
</tr>
<tr>
<td>Chicago</td>
<td>14</td>
</tr>
<tr>
<td>Colorado Springs</td>
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To be shipped

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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: ____________________________

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

____________________________
presentation on Packet Radio to several hundred attentive local area hams, and was kind enough to hang deliver our TNC boards. Needless to say, Pete received a very warm welcome. Those of us who had anxiously been awaiting receipt of our boards could hardly wait to scurry home and begin interfacing them to our computers and radio equipment.

One of our beta test sites was so anxious to begin testing that he spent several hour "talking to himself" while waiting for other stations to come on the air. Most sites reported that they had little difficulty in interfacing the boards. The documentation supplied with the boards was excellent, and careful reading provided most of the necessary information.

I can't really say that our initial excitement has subsided any, but we have been operating the APR boards long enough that we can now tear ourselves away from the keyboard and begin compiling the interconnect information requested by Tucson. Several suggestions have been passed to me regarding possible modifications to future terminal node controllers, but all agree that the boards are well designed.

For example, it would be nice if the PTT lead was coupled in such a way that the transmitter was not keyed in the event that the TNC board is powered down. Also, while the carrier sense feature works well in detecting the presence of modem carrier, it will not detect voice use of the frequency, thereby allowing packets to be sent on top of conversation.

As reported in other areas where packet radio was introduced, we did encounter some initial opposition from other hams who did not particularly wish to have another mode of operation added to those already in use on two meters. Some questioned the legality of what we were doing. The first evening we were on, we were treated to almost five hours of non-stop APR test patterns and pictures, this on a frequency selected because frequent monitoring indicated it was seldom in use.

This initial opposition has subsided somewhat, however, and some of our fellow hams on the frequency have been to ask questions about packet operation.

Our plans for the near future include the establishment of a bulletin board, providing an interface to the computer of a local junior college, and establishing a link to a weather net presently in operation for R1T enthusiasts.

As I mentioned earlier, everyone here is ecstatic with the TAPR boards, especially with the digipeater capabilities. We are anxiously awaiting the completion of TAPR's L-band amplifier in the hope that we might be allowed to participate in the first satellite packet network. You definitely will have our support in future undertakings.

Dick Gulbrandsen W65CO

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

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There have been suggestions that a gate be provided for ANDing the modem DCD with a radio's squelch for use with a voice repeater. While there could be problems here (some repeaters have a long hang time when packets could easily be exchanged), perhaps some sort of option to support this capability is needed.

Thank you for your feedback. It is both needed and appreciated.