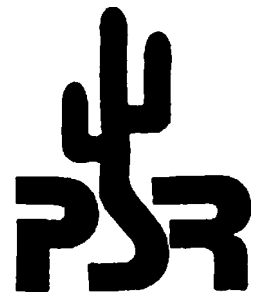


Packet Status Register Quarterly



The Packet Status Register is published quarterly for \$8.00 by the Tucson Amateur Packet Radio Corp. [As of September 1986, publication will become monthly as part of PACKET RADIO MAGAZINE and the rate will become \$10 per year.] Application to mail at Second Class postage rates is pending at Tucson, AZ and additional mailing offices. POSTMASTER: Send address changes to TAPR, P.O. Box 22888, Tucson, AZ 85734.

Vol. 4, #20 JULY 1986

TUCSON AMATEUR PACKET RADIO CORPORATION

President's Corner

Lyle Johnson, WA7GXD

Partially as a result of the survey in the April PSRQ, there are some significant alterations taking place in your packet organization. Please read the articles in this issue very carefully!

Dues are going up (and coming down!), you will hear from us on a monthly basis starting in September, you will soon be able to obtain packet software through the TAPR office, we will be starting an on-line information exchange on one of the major databases... And packet research and development will continue to be emphasized as strongly as possible.

Packet Radio Magazine and PSRQ

The TAPR Board of Directors, on motion by Andy Freeborn, voted to merge PSRQ with Packet Radio Magazine (PRM) beginning with the September issue.

What this means is TAPR members will receive a monthly publication rather than a quarterly one. Overall, you will receive more pages of information per year, with lots of news from many regions as well as technical articles.

For those of you unfamiliar with PRM, this is a monthly magazine devoted entirely to Amateur packet radio. It is published by the Florida Amateur Digital Communications Association and edited by Gwyn Reedy, W1BEL, who has been the PSRQ editor for the past year. PRM is an outgrowth of the old FADCA>BEACON, which it replaced.

In case you already receive PRM in association with your regional packet group membership, TAPR is establishing a special membership class at a reduced dues rate (see below).

The merger with PRM was voted on only after a reasonable number of questionnaires had been tallied. When you read the results of the polling elsewhere in this PSRQ, keep in mind that many of the negative votes for the merger were accompanied by comments indicating the member was unfamiliar with PRM.

Dues Changes

As a result of integrating PSRQ into Packet Radio Magazine, our publications costs are going to rise significantly. As a result, we must increase our dues from \$12 per year to \$15 per year. For the extra \$3, however, you will get three times as many issues of PSR!

For those of you who belong to a regional packet organization which already includes PRM in its membership dues, we are going to offer a supporting membership for \$5 that does not include PRM. We sincerely hope that you will take advantage of this membership to continue to support TAPR and help us pursue the goals you have endorsed for the organization.

Only with your continued support can we maintain five years of momentum in Amateur digital communications.

PSX

At the February annual meeting, Tom Clark proposed the establishment of a software exchange under TAPR auspices, somewhat akin to the AMSAT software exchange that has proven so successful for AMSAT. An informal poll of the attendees did not indicate much support for the idea at the time, so it was shelved.

However, strong support for the idea emerged from the April poll. As a result, Tom has been asked, and has agreed, to take on this project. Watch for information on the TAPR Packet Software exchange (PSX) in subsequent PSR sections of PRM.

TAPR ON-LINE

Likewise, the poll indicated support for the idea of TAPR being officially represented on some sort of database service. This task has been assigned to Pete Eaton (with help from Scott Loftness and Tom Clark). While it is too early to announce the details of such a service, the September PSR section of PRM should have full details.

Continued >>>

R and D - NNC

The first (Alpha) NNC was delivered in late June, with several more being shipped the first week of July. Progress is being made on the modem board, and we are hoping to begin a beta testing phase soon.

R and D - JAS1

The launch of JAS-1 should be history by the time this is printed. TAPR has been working on PC board layout of a modem, based on a design by JAMSAT, to allow a TNC1 or TNC2 user to access the digital store-and-forward experiment on board this spacecraft.

Note that, if all goes on schedule, it will be October or November before even limited access to the packet system on JAS-1 is allowed. With some degree of luck, we hope to be able to have modems ready for shipment by that time.

However, it is a bit of a dilemma, since we want to test the modems on the spacecraft to verify correct operation, which can't be done until the spacecraft is operational. On the other hand, folks will want modems that are known to be effective a month before the spacecraft is operational!

Thus, be assured that the early versions of the modem may not be wonderful! Then again, they may be...

New Products

TAPR has had available since Dayton a tuning indicator kit suitable for use with any properly configured XR2211 demodulator. Of course, it works very well with the TNC 1 and TNC 2 modems.

The circuit is essentially the same as the one described by Dan Vester, KE7CZ, in the October, 1985 issue of PSRQ.

(Testimonial)

I have used this device on HF at length, and I can only say that it makes HF operation extremely simple. Without a decent tuning indicator, HF packet operation is certainly more challenging.

By the same token, driving at night without headlights is also more challenging than with lights...

TAPR also has a limited number of a new introductory video tape. This video is only 30 minutes long, so it makes a great lead-in for a club presentation.

The video is available from the TAPR office for \$10 postpaid in the U.S. It is on VHS cassette only. Duplication of the video is proceeding a bit slower than hoped, so there may be a wait of a few weeks before we can ship yours. Contact the TAPR office for details.

Commercial Innovation - KPC2400 and PK-232

Kantronics has released a new packet unit called the KPC2400. It includes, in addition to the KPC2 (which, incidentally, is NOT a TNC2 clone) standard features, the ability to operate at 2400 bps using phase shift keying.

Now, the 2400 bits-per-second operation is accomplished at 1200 baud, so this unit is legal on 10 meters. Recall that baud represents "symbols per second" and in this case two bits are encoded per symbol, so we obtain 2400 bps at 1200 baud. Our more common FSK modems encode one bit per symbol, so we obtain 1200 bps at 1200 baud.

See elsewhere in this PSRQ for a look at what operation at 2400 bps may be like compared to 1200 bps. It does offer potential for increased throughput: it does not double the throughput.

We just received our KPC2400 the other day and have not yet had an opportunity to test it. The manual includes no schematic, so I can't report on whether or not a watchdog timer has been added to the transmitter PTT line. I certainly hope one has been added, however. I understand that the KPC1 and KPC2 do not have such a watchdog timer and are thus illegal for use as unattended digipeaters.

AEA has announced the PK-232, a digital controller that operates packet, AMTOR, CW, RTTY and ASCII with any computer or terminal that has a standard RS-232 compatible serial port.

Pac-Comm has announced a plug-in board for the IBM PC that will offer two channels of HDLC communications, using the AMD 7910 modem chip. At present this is a developer's tool; when suitable software becomes available it should provide an interesting alternative for packet operation using the PC and clones.

Like the song says, "See you in September..."

9600 BPS Ready

If you are an incurable experimenter, have a Midland 13-509 or Hamtronics FM-5 or ??? available for local surgery, TAPR has what you need!

Steve Goode, K9NG, designed a 9600 bps baseband filter system that, when combined with an FSK-able transmitter, can be used for packet work at 9600 bps.

TAPR has available a PC board, state machine EPROM and several of the hard-to-find capacitors along with printed instructions to get you started. The total package cost is \$25 postpaid in the U.S.

Note that this is considered an experimental project and is not supported other than to provide the materials listed above.

Order through the TAPR office.

Packet Through FO -- 12

Harold Price. NK6K

JAS-1, the Japanese amateur radio satellite, is in orbit and on the air. It is now called Fuji-Oscar-12, or FO-12 for short. All Japanese satellites are re-named after flowers once they are in orbit, and amateur satellites usually have an Oscar number added as well. FO-12 was called JO-12 (Japan-Oscar-12) for a few days after launch until the official word came out.

FO-12 has been written up in QST, AMSAT's various journals, and in the August all-packet issue of 73, so I won't go into detail here. The short summary is that it has two transponders: a standard analog transponder (repeater), two meters up and 70cm down, called mode JA; and a digital transponder with four uplinks on two meters and one downlink on 70cm, 1200 baud AX.25, called mode JD.

The mode JA transponder is on now, the mode JD transponder will be checked out in a few weeks. To get an idea of what packet might be like on the JD transponder, I sent some packets through the JA transponder during the 5:20 - 5:40 and 7:20 - 7:40 utc passes on 8/18/86. I used a downlink frequency of about 435.890 in case anyone wonders what the funny noises were.

The equipment used was probably worst case, in no way was it optimized for FO-12.

TNC:

- I used a stock TAPR TNC 2 that I put together. I used the standard 1200 baud tone set on the internal modem. I ran at 1200 baud with standard parameters except for: FULLD ON, FRACK 1, DWAIT 0, PACLEN 40.

Downlink:

- An unmodified IC-451a (not known for its sensitivity). No pre-amp.
- A KLM-22C which is too sharp to point at a fast-moving satellite by hand, so I lost some dBs there on the average. Circularity was switched by hand based on ear-detected s/n.
- 60 feet of 9913 (fancy RG8) coax.
- Upper sideband.

Uplink:

- An IC-251a, either barefoot at 10 watts, or at less than one watt into a Mirage 81016 for about 12 watts out.
- 60ft of 9913 coax.
- KLM 18c. EIRP was 100 watts or less. Circularity was set at right hand all the time. The antennas were pointed by hand. Probably less than 7 moves were made.
- Lower sideband.

Doppler:

- I left the transmitter where it was, and tuned for doppler by ear, no tuning indicator was used. I have a good ear, I started college life

as a music major. On the other hand, the tuning step was 100hz, so the frequency was off most of the time.

The test:

I connected to myself through the satellite, and using the TNC parameters described above, I moved 8727 bytes of data in about 20 minutes. That works out to 58 bps, or close to standard telex speed. Taking a 2:00 a.m. guess at the maximum data you might expect to get through this type of link if you never dropped a bit, say 20 minutes x 1200 bits/sec x 1/8 characters/bit * 60 sec/min * 60% efficiency (loss due to frame overhead, bit stuffing, acks, keyup delay, etc.) = 108,000. Thus, I got 8.1% of the maximum without optimizing anything. With a 1 watt PSK downlink that is generated on the spacecraft instead of a shared analog repeated downlink, PLL steered frequency, computer pointed antennas, and a pre-amp, any one of which would give a big improvement, I think the JD transponder is really something to look forward to.

Here's hoping for a quick checkout on the digital transponder and a long life.

New TAPR Introductory

Video Available!

Many of you got your first glimpse at Amateur packet radio by viewing the now-(in)famous WB9FLW Packet Video, also known as Pete's Packet Primer. If you have seen it lately, you know it is pretty well out-of-date.

Many of you have suggested changes, including updating the material presented and shortening the running time.

TAPR is now pleased to announce that the famous writing team of WA7GXD and WB9FLW (who gave new meaning to POOP!) have written a new script and Pete coerced a local St. Louis TV station into producing a new, updated, shortened "Introduction to Packet Radio" video tape.

The new video is 30 minutes in length (compared to about an hour for the old one), and provides a fairly complete introduction to the whys and wherefores of Amateur packet radio, circa 1986.

The new video is available in limited quantities from the TAPR office for \$10 postpaid. If you know someone with a copy, you may duplicate it so long as you don't sell it or charge for seeing it.

It is also available from the ARRL lending library.

2400 BPS Packet - Some First Thoughts

Lyle Johnson, WA7GXD

Kantronics has recently announced the KPC-2400, a 2400 bits-per-second TNC.

Why 2400 bps? Is it twice as fast as 1200 bps? The answers may not be obvious, so please read on!

At first blush, running 2400 bps makes a lot of sense. It should be about twice as fast, allowing twice as many users on a given channel and generally aiding in relieving the congestion on packet during prime-time.

Let's take a closer look.

First, let's consider how fast 1200 bps really is on a typical packet channel. Make that a typical two-years-ago channel; we are going to assume light loading and close to zero retries for our first pass.

A typical keyboard message consists of about 80 characters. If no digipeaters are used, the packet overhead consists of two flags, a CRC, source and destination call signs (AX.25 Level 2 assumed), a control byte and, for the message packet, a PID byte. That makes a total of 100 bytes in the message packet and 19 bytes in the ACK.

Let's also assume that TNC defaultmings are used.

A timing diagram for this transaction would look like this:

DWAIT:TXD:PACKET: dead time :DWAIT:TXD:ACK

```

DWAIT    = 180 mSec
TXD      = 300 mSec
PACKET   = 670 mSec
dead time = 200 - 500 mSec
DWAIT    = 180 mSec
TXD      = 300 mSec
ACK      = 130 mSec
    
```

TOTAL = 1920 - 2220 mSec, or about 2 seconds to get 80 characters of data through. This corresponds to about 40 chars/sec.

If we operate with the same radios, but at 2400 bps, we have the following situation:

```

DWAIT    = 180 mSec
TXD      = 300 mSec
PACKET   = 335 mSec
dead time = 200 - 500 mSec
DWAIT    = 180 mSec
TXD      = 300 mSec
ACK      = 65 mSec
    
```

TOTAL = 1520 to 1820 mSec, or about 1 1/2 seconds to get 80 characters of data through. This corresponds to about 54 chars/sec. This is about 33% better.

Now, 33% is 33%. But it isn't 100%, which is what you might think if you didn't consider the channel and, more importantly, the radio characteristics.

Suppose we want to do a file transfer to another station that is in direct connect range with very good signals. Assume retries are nil and we are using typical radios. By setting MAXFRAME to 7, PACLEN to 128 and DWAIT to 0, we might see something like this.

| | 1200 bps | 2400 bps |
|----------|--------------|-----------|
| DWAIT | mSec 0 | 0 |
| TXD | mSec 300 | 300 |
| PACKET | mSec 6100 | 3050 |
| deadtime | mSec 200-500 | 200-500 |
| DWAIT | mSec 0 | 0 |
| TXD | mSec 300 | 300 |
| ACK | mSec 130 | 65 |
| Total | 7030-7330 | 3915-4215 |

In this case, the 2400 bps unit is 1.7 to 1.8 times as fast as the standard 1200 bps operation. This is very close to the theoretical maximum of 100% improvement.

In summary, then, the 2400 bps modem may provide as much as 80% improvement in throughput in certain circumstances and probably somewhere between 20% and 40% under more typical circumstances.

As with any benchmark, all of this should be taken with a large grain of salt.

Now, what would happen if we could get our hands on radios that turned around and stabilized in 10 mSec?

Looking again at the numbers for a typical, shared channel, DWAIT would go down to around 20 mSec and TXD would drop to 60 mSec at 1200 bps and 35 mSec at 2400 bps. The throughput on our channel would become about 60 chars/sec at 1200 bps versus 100 chars/second at 2400 bps. This makes 2400 bps almost 50% better than 1200 bps, and makes 1200 bps 50% better than it now is.

If we could get the dead time out of the system, we get about 80 chars/sec at 1200 bps and around 130 chars/sec at 2400 bps.

The TXD factor doesn't drop to the radio spec because we have to allow for transitions to be received to synchronize the HDLC decoder on the receiving end. DWAIT is simply a factor that allows a digipeater to look at the channel and grab it long enough for another station to determine that the digi is transmitting.

The "dead time" may be due to many factors. In a TNC 2 or look-alike, the RESPTIME (protocol T3 timer) defaults to 500 mSec. But the dead time allowance also includes a fudge factor to compensate for the occasional retry, noise burst, or what-have-you that may (and will!) occur on a radio channel.

I think that the above, while simplified, indicates that we need to make real progress on digital radios. TAPR and others are looking at this problem now and trying to come up with fast, inexpensive RF hardware designed specifically for packet use.

Continued >>>

HF Packet Operation

Lyle Johnson, WA7GXD

Some recent inquiries via the TAPR mailbox have expressed confusion about HF packet operating frequencies. Allow me to take this opportunity to help clear up (cause ?) some misunderstanding.

First off, if you are used to RTTY conventions, forget them! Packet is a different method of communication. Mark and/or space frequencies aren't particularly meaningful since packet presently uses NRZI (non return to zero - inverting) encoding as opposed to RTTY's use of NRZ (non return to zero) encoding. Thus, while mark and space frequencies have meaning for RTTY (and other NRZ encoding schemes), packet only concerns itself with transitions between frequencies.

Suppose you hear that HF packet operation is on 14.105 MHz. What does 14.105 MHz mean?

It isn't the mark or space frequency, it is the suppressed carrier frequency of your LSB transmitter ASSUMING YOU ARE USING TAPR STANDARD TONES FOR YOUR MODEM.

Accordingly, if I use a TAPR TNC 2 and a Kenwood TS430S in my HF packet operation, I simply set the Kenwood display to 14.105.00 MHz and, if my HF transceiver is properly calibrated (don't count on it unless you have verified it recently), I should be able to copy packet signals.

Alas, if I am using a Kantronics or Packeterm IPT or AEA PK-64, this won't cut it.

Why not?

The TAPR recommended modem tones for 200 Hz shift 300 baud operation are 1600 Hz and 1800 Hz. The "decision point" or average frequency is 1700 Hz. At 14.105.00, my signal is centered on 14.103.30 MHz.

If I am using a Kantronics TNC, 1070 Hz and 1270 Hz (Bell 103 originate) tones are used so its signals will be centered 1170 Hz below the dial setting, or at 14.103.83 MHz. This is 530 Hz higher than the TAPR unit and no communication is likely!

Hence, if you use a Kantronics TNC on HF, set your dial 530 Hz lower than the "normal" frequency.

The AEA PK-64 and PK-232 use a tone pair of 2110 Hz and 2310 Hz. This yields a center frequency of 2210 Hz and resulting in a signal centered at 14.102.79 Hz, or 510 Hz low. Like the Kantronics case, we won't communicate (and an AEA to Kantronics attempt will fare even worse, with an error of 1.04 kHz!).

If you use an AEA PK-64 or PK-232, you should set your dial 510 Hz above the "normal" frequency.

To summarize, then, the packet frequencies published for HF indicate the suppressed carrier frequency of an LSB transmitter being fed TAPR-standard audio tones. AEA PK64 and PK232 users should set their dial 510 Hz higher and Kantronics and

Packeterm users should set their dials 530 Hz lower.

Here is a tabular example:

| TAPR | AEA | Kantronics |
|-----------|-----------|------------|
| 14.105.00 | 14.105.51 | 14.104.47 |
| 7.093.00 | 7.093.51 | 7.092.47 |

Of course, the surest way is to preset your dial, then use a tuning indicator, like the TAPR tuning indicator kit for XR2211-based modems, or the built-in AEA tuning indicator for the PK64 and PK232. For AMD 7910 "World Chip" modems, an external device independent of the modem itself is necessary. See the August, 1986 issue of 73 Magazine for a tuning indicator that may be suitable for such modems.

HF Packet Tuning Aid

Tucson Amateur Packet Radio has available for only \$25 a tuning indicator kit. This unit is patterned after the KE7CZ article in the October 1985 issue of PSRQ.

The kit comes complete with PC board, instructions, and all parts except a few common resistors. No case is included.

The TAPR HF Tuning Indicator makes tuning HF packet stations a breeze, and is highly recommended. It will work with any properly configured XR2211-based modem.

Get yours today!

2400 BPS continued from page 4

At the TAPR annual meeting in 1985, Steve Goode, K9NG, demonstrated his 9600 bps modem with some modified radios. A TXD of 20 mSec was used, and I timed a long file dump. The throughput on the channel was more than 7,700 bits per second, or over 950 chars/sec! Compared to our present "typical" 40 chars/sec, I think it is obvious that there is much to be gained AND WE HAVE THE TOOLS TO DO IT NOW! Experimental 9600 bps modems based on Steve's design are available from the TAPR office. See elsewhere in this PSRQ for details.

One area that the new Kantronics modem may prove interesting in is satellite operation. OSCAR 10 has spectrum allocated that is used for packet, but it is used very little. Our present FSK modems just have a hard time cutting through the noise and spin modulation.

PSK can do much better. If the Kantronics modem design is close to optimum, it may be useful on this or similar channels. It would be nice if the modem could be used at slower speeds (400 bits per second has been demonstrated to work very well on OSCAR 10), but it appears that the Kantronics design is specifically designed for Bell 201 style operation. The noise margin for encoding with "dibits" used on Bell 201 is a lot less than straightforward PSK, so some testing and measuring will have to be done.

Summary and Analysis of Comments on TAPR

Membership Questionnaire

Compiled by Gene Piety, KH6PP

The comments received from the 139 members who took the time to submit any can be classified into 6 different categories.

1. Congratulatory and laudatory remarks: 25% ranging all the way from a simple "Thank you TAPR" to "The greatest thing that ever happened to amateur radio".

2. There were two rather negative comments (probably from Tucson amateurs) that can be absorbed without damage.

3. Comments directed towards PSRQ and PRM :

- Give us more beginners articles-down to earth stuff.
- Give us more technical articles advanced type.
- Do not merge with PRM unless it is of benefit to TAPR.
- Have a table of contents in PSRQ.
- Provide a wider margin on PSRQ so it can be punched for binder.
- Publish more technical information.
- Provide more international news (from Australia).
- More technical articles in PSRQ.
- Information on the video tape was in 73. Why not in PSRQ?
- Get PRM to answer their mail.
- Publish monthly
- Expand the newsletter

4. Comments of a general nature:

- Establish a telephone BBS somewhere devoted only to Packet Radio.
- Establish a database for BBS sysops only.
- Survey was an excellent idea.
- Get regular bulletins on every BBS in the country.
- Publish results of the questionnaire.
- Establish a wish list for projects.
- Do a questionnaire every year.
- Have a fund raising manager to get donations and grants.
- Stay with pure R & D.
- TAPR needs a business manager.

5. Comments directly to TAPR:

- WHERE THE HELL IS V4? (10%)
- Where is the NNC?
- Get off DRNET!
- Don't aim too high.
- Develop digital radios.
- Keep advancing the state of the art.
- Don't trust the ARRL.
- TAPR should act as a clearing house for regional projects and grant developmental funding.
- Don't restrict info on kits to members only.
- TAPR needs to be more open to its members regarding financial dealings and product development.
- Move on to spread spectrum, digital signal processing, etc.
- Work on high speed radio equipment.

- Always offer a small run of new products before licensing.
- Provide for multi-year memberships.
- Establish local representatives.
- Keep control over modifications made to licensed products by mfgs.
- Establish a TAPR SEAL OF APPROVAL.
- Keep the annual meeting in Tucson.
- Have a board meeting in Los Angeles.
- TAPR should split into two parts. One group to do only R & D and the other to do Production.
- Answer your mail promptly. Never mind you are just volunteers.
- Next time you do a survey don't load the questions.
- Publish an up-to-date list of primary and secondary sources for parts, such as chips, special capacitors, resistors etc. Be sure the sources are reliable and honest.

6. General not readily classifiable:

- Standardize pinouts and nomenclature for RS-232.
- What comes after PACKET?
- Initiate a national emergency only frequency plan usable at local, regional and national levels for disaster operations.
- Also plan for back-up freq (secondary) in case primary is overloaded, as well as a tertiary frequency for practice.
- Wonder how much trouble it is to add an outboard (kit) EPROM with a bunch of canned messages to cut down on typing time?
- If any kind of help is needed let the membership know PRONTO.

7. EXTRA:

- Three members took the time and effort to write long, thoughtful letters that merit separate consideration and are not abstracted in the above comments.
- A list of suggested names if Tucson Amateur Packet Radio were to find it expedient to change the name of the organization.
- Tucson Digital Radio
- PACKUSA
- (Definitely not TOKYO Amateur Packet Radio)
- AMPAC = Amateur Packet Radio Corporation
- TAPR INTERNATIONAL
- American Amateur Paket Radio Corporation
- Technology for Amateur Packet Radio
- TAPR, Inc.
- Tech Advancement of Packet Radio
- American Packet Radio
- (you can do better than I can)
- T-APR
- (unprintable. do you people have an identity crisis?)
- AMATEUR PACKET RADIO
- Totally Amateur Packet Radio
- Technical Amateur Packet Radio
- TAPR TAPR INT'L
- (----Have a contest----)
- Tri-partite Amateur Packet Radio

- TAPR
- T = THE A P R
- TAPR
- TRANS-AMERICAN PACKET RADIO
- PACRAD
- APRA (amateur packet radio association)
- National Amateur Packet Radio Corp.
- Totally Awesome Packet Radio
- National Amateur Packet Radio Association
- Trans-America Packet Radio
- Amateur Packet Radio
- AMPAC (Amateur Packet Radio Corporation)
- Talisman Amateur Packet Radio
- Digital Radio Relay League

7. Same question but reduced dues:

| | | |
|-----------|-----|----|
| yes | 136 | 55 |
| no | 78 | 31 |
| no answer | 35 | 14 |

8. I plan on renewing membership if things remain as they are:

| | | |
|-----------|-----|----|
| yes | 235 | 94 |
| no | 5 | 2 |
| no answer | 9 | 4 |

9. PSRQ should merge with PRM:

| | | |
|-----------|-----|----|
| yes | 117 | 47 |
| no | 45 | 18 |
| no answer | 87 | 35 |

10. Should advertising in PRM be an issue in deciding to merge:

| | | |
|-----------|-----|----|
| yes | 64 | 26 |
| no | 147 | 59 |
| no answer | 38 | 15 |

11. Should TAPR establish a packet software exchange:

| | | |
|-----------|-----|----|
| yes | 222 | 89 |
| no | 18 | 7 |
| no answer | 9 | 4 |

12. Should TAPR institute a packet conference on a major database:

| | | |
|-----------|-----|----|
| yes | 125 | 50 |
| no | 86 | 35 |
| no answer | 38 | 15 |

13. If yes which database:

| | | |
|------------|-----|----|
| Compuserve | 64 | 26 |
| Source | 6 | 2 |
| Peoplelink | 9 | 4 |
| Genie | 13 | 5 |
| DRNET | 5 | 2 |
| Other | 21 | 8 |
| no answer | 131 | 53 |

14. Access to TAPR members only:

| | | |
|-----------|-----|----|
| yes | 58 | 23 |
| no | 69 | 28 |
| no answer | 122 | 49 |

15. TAPR members should get a discount or credit for access:

| | | |
|-----------|-----|----|
| yes | 91 | 36 |
| no | 29 | 12 |
| no answer | 129 | 52 |

16. TAPR should publish on a regular basis the membership list:

| | | |
|-----------|-----|----|
| yes | 150 | 60 |
| no | 83 | 33 |
| no answer | 16 | 7 |

Tabulation of TAPR Membership Questionnaire

249 completed questionnaires received
 139 with comments
 110 without comments

QUESTION TOTAL PERCENTAGE

1. I joined TAPR to:

| | | |
|----------------------------|-----|----|
| receive PSRQ | 13 | 5 |
| support packet development | 15 | 6 |
| both | 211 | 85 |
| no answer | 10 | 4 |

2. I already receive PRM:

| | | |
|-----------|-----|----|
| yes | 52 | 21 |
| no | 179 | 72 |
| no answer | 18 | 7 |

3. If PSRQ were to merge with PRM I would remain a TAPR member:

| | | |
|-----------|-----|----|
| yes | 219 | 88 |
| no | 11 | 4 |
| no answer | 19 | 8 |

4. To receive PRM with my membership I would pay higher dues of:

| | |
|-----------|----|
| \$ 0.00 | 16 |
| 5.00 | 20 |
| 10.00 | 30 |
| 15.00 | 21 |
| 20.00 | 25 |
| 25.00 | 15 |
| 45.00 | 1 |
| ? ? | 55 |
| no answer | 66 |

5. I view the info in PSRQ as:

| | | |
|-------------|-----|----|
| important | 242 | 97 |
| unimportant | 1 | - |
| no answer | 6 | 3 |

6. I would remain a member of TAPR if there were no newsletter:

| | | |
|-----------|-----|----|
| yes | 116 | 47 |
| no | 125 | 50 |
| no answer | 8 | 3 |

17. TAPR should sell the membership list to advertisers:

| | | |
|-----------|-----|----|
| yes | 159 | 64 |
| no | 82 | 33 |
| no answer | 8 | 3 |

18. When TAPR makes a kit it should be a complete kit:

| | | |
|-----------|-----|----|
| yes | 183 | 73 |
| no | 41 | 17 |
| no answer | 25 | 10 |

19. TAPR should make available in kits simple devices and accessories:

| | | |
|-----------|-----|----|
| yes | 205 | 82 |
| no | 25 | 10 |
| no answer | 19 | 8 |

20. Complex devices should be left to manufacturers to produce:

| | | |
|-----------|-----|----|
| yes | 157 | 63 |
| no | 66 | 27 |
| no answer | 26 | 10 |

21. TAPR should do R&D in packet but stay out of production:

| | | |
|-----------|-----|----|
| yes | 113 | 45 |
| no | 109 | 44 |
| no answer | 27 | 11 |

22. TAPR should license its technology on an EXCLUSIVE basis:

| | | |
|-----------|-----|----|
| yes | 16 | 6 |
| no | 227 | 91 |
| no answer | 6 | 3 |

23. TAPR should continue its present policy of NONEXCLUSIVE licensing:

| | | |
|-----------|-----|----|
| yes | 234 | 94 |
| no | 8 | 3 |
| no answer | 7 | 3 |

24. Tucson Amateur Packet Radio is too regional. Change the name:

| | | |
|-----------|-----|----|
| yes | 46 | 18 |
| no | 180 | 72 |
| no answer | 23 | 10 |

25. If the name changes should initials "TAPR" should remain:

| | | |
|-----------|-----|----|
| yes | 157 | 63 |
| no | 24 | 10 |
| no answer | 68 | 27 |

(37 suggestions for name changes were received)

26. TAPR is an organization whose time is past. CLOSE THE DOORS:

| | | |
|-----------|-----|-----|
| yes | 0 | 0 |
| no | 247 | 100 |
| no answer | 2 | - |

27. TAPR is vital to the continued growth and future of packet radio development and should stay in existence:

| | | |
|-----------|-----|-----|
| yes | 246 | 100 |
| no | 0 | 0 |
| no answer | 3 | - |

28. TAPR should be active in matters concerning packet in petitions to the FCC:

| | | |
|-----------|-----|----|
| yes | 234 | 94 |
| no | 4 | 2 |
| no answer | 11 | 4 |

29. TAPR should be active in matters peripherally concerning packet in petitions to the FCC:

| | | |
|-----------|-----|----|
| yes | 160 | 64 |
| no | 72 | 29 |
| no answer | 17 | 7 |

GOALS

A. TAPR will take an active role in participating in FCC rulemaking procedures on issues relating to packet radio. Further, TAPR will coordinate such activities with other Amateur organizations.

| | | |
|-------------------|-----|----|
| strongly disagree | 11 | 4 |
| disagree | 7 | 3 |
| no opinion | 14 | 6 |
| agree | 55 | 22 |
| strongly agree | 157 | 63 |
| no answer | 5 | 2 |

B. TAPR will seek better and faster ways of providing information to the Amateur packet community.

| | | |
|-------------------|-----|----|
| strongly disagree | 10 | 4 |
| disagree | 6 | 2 |
| no opinion | 17 | 7 |
| agree | 66 | 27 |
| strongly agree | 150 | 60 |
| no answer | 0 | 0 |

C. TAPR will encourage and support hardware and software projects to advance the state of the art in Amateur packet communications.

| | | |
|-------------------|----|---|
| strongly disagree | 15 | 6 |
| disagree | 0 | 0 |
| **** | | |

Xerox 820 FAD

The venerable FADPAD PC board with instructions is still available from the TAPR office. If you have a Xerox 820 and are a confirmed hardware and software hacker, this is for you!

Software to operate this board may be available through FADCA; it is not presently available from TAPR.

The price of the FADPAD PC board is \$25 postpaid in the U.S.

NNC Project Update

Lyle Johnson, WA7GXD

The first Alpha NNC was delivered in late June to KE7CZ followed the next week by shipments to most of the other "Alpha" software developers.

The first units are experimental in nature. No "real" software has been written for them, and the hardware, while suspected of working well, hasn't proven it yet! The modem boards were not included in the first shipments; there were layout problems and they will be following soon.

The NNC has been called "The silliest thing I ever heard of" by one packeteer; others keep asking when they can get one.

While most of you probably already know what the NNC is for, bear with me while I introduce it to any newcomers that may be reading this column.

The Network Node Controller is a sort of super TNC. It has up to four radio ports (compared to 1 for a standard TNC) and two serial user ports. It also supports parallel interfaces (Centronics compatible printer port and the Small Computer Systems Interface, or SCSI, bus). It includes 64k to 256k bytes of battery-backed RAM and 32k bytes to 256k bytes of other EPROM and/or RAM memory. It uses an HD64180 processor for Z80 compatibility. It is small, rugged and made almost entirely out of CMOS parts. It can be fastened to the side of a standard 5-1/4" floppy disk drive, and an optional floppy controller board turns it into a high-performance stand-alone development system for software.

By using a Z80-compatible processor, the wide range of Z80 development tools (languages like C, debuggers, etc.) and text editors (like WordStar) become available for it. In addition, software developed for the Xerox 820 may be easily converted to run on the NNC.

So why make another Z80 system when Xerox boards are around for \$50?

The Xerox 820 is designed for an office, has lots of parts and limited memory. The NNC is much smaller, uses far less power, should be more tolerant of noise, easier to clean up for remote sites and should be much more reliable -- as well as much faster in operation.

Why not use an 8088?

The HD64180 represents similar processing power to the 8088, but at a higher level of integration. This means fewer parts, smaller boards, reduced cost and better reliability.

Why not use a Taiwanese PClone motherboard?

For the same reasons that the Xerox 820 board is not recommended for remote use. Power drain, complexity and in the case of the PClones, card edge connectors.

Remember, the NNC is not intended to be your shack computer; it is intended to sit on mountaintops (in the West), Farmer John's corn silo (Midwest), TV channel X's tower (East) or ??? You get the idea.

Hopefully, there will be some serious packet application software (networking, including AX.25 Level Three switches and datagram TCP/IP switches) running on the NNCs in a few months and Beta test can begin.

Stay tuned!

TAPR Announces New Membership Dues Rate!

Since 1981, TAPR has had only one change of dues (that was from \$25 to \$12). Well, the times they are a changin' and the dues are too!

Largely because of the merger of PSRQ with PRM, to bring you direct information from TAPR on a monthly basis rather than every three months, our costs to support membership services have risen. The new dues rate, which is effective immediately, is as follows:

Standard Membership: \$15/year in US and Canada
Associate Membership: \$ 5/year worldwide

A Standard Membership includes a year's subscription to Packet Radio Magazine (PRM), with a section set aside as the Packet Status Register (PSR).

If you live overseas and want Air Mail delivery of PRM, add \$10 to annual dues.

The Associate Membership does not include any newsletter or magazine at all. It is intended for folks whose regional packet organization already provides PRM. However, since all PRM subscribers will now be getting PSR, TAPR recommends that non-TAPR members become Associate Members to help support TAPR and packet radio.

PSR Index

Andy Freeborn, NOCCZ, has compiled a handy annotated index to all the previous PACKET STATUS REGISTER issues. This is the last independent issue of PSRQ and a fitting place to tie together the history of this fine publication. The early issues were rich in reports of technical experimentation and many interesting articles in the earlier issues are worth referencing from time to time. The index on the following six pages is printed sideways to allow easy referencing of the annotations without resorting to 'fine print.'

| ISSUE/PAGE | AUTHOR | TITLE |
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| PSR #1. JULY 1982 | | |
| 1/1 | KV7D | WELCOME TO THE FIRST ISSUE OF PSR |
| 1/1 | KV7D | TAPR GENERAL MEETING |
| 1/2 | KD2S | PRESIDENT'S CORNER |
| 1/2 | WA7PXW | SOFTWARE UPDATE |
| 1/3 | WA7GXD | HARDWARE HAPPENINGS |
| 1/4 | KV7B | BETA TEST STATUS |
| 1/5 | KT7D | MICROWAVE NEWS |
| 1/6 | WA7GXD | TECH/NOTES |
| 1/7 | KD2S | FIRST TAPR PACKET QSO |
| PSR #2. OCTOBER 1982 | | |
| 2/1 | KV7D | FIRST ANNUAL MEETING ANNOUNCED |
| 2/1 | KV7D | NEW "STANDARD" PROTOCOL |
| 2/2 | WA7GXD/KV7D | TECH NOTES |
| 2/2 | WA7GXD | NEW PRODUCTS |
| 2/3 | KV7D | NEW DIGITAL RULES |
| 2/3 | WB9FLW | CORRESPONDENCE |
| 2/4 | KD2S/W3IWI | PROPOSED AMATEUR DIGITAL SATELLITE |
| 2/5 | WA7GXD | HARDWARE HAPPENINGS |
| 2/5 | KV7B | BETA COORDINATORS |
| 2/6 | KV7D | ALPHA/BETA REPORT |
| 2/6 | KV7B/KD2S | BETA TEST |
| 2/7 | KV7D | BOARD OF DIRECTORS ELECTION |
| PSR #3. DECEMBER 1982 | | |
| 3/1 | TAPR STAFF | ANNOUNCEMENTS AND INFORMATION |
| 3/2 | WA7GXD | TECH NOTES |
| 3/3 | WA7GXD | B L A C K T H U R S D A Y |
| 3/4 | NK6K | A MID-SUMMER NIGHT'S PROTOCOL |
| 3/5 | NOADI | BETA TEST MANUAL |
| 3/6 | KD2S | PACSAT PROJECT |
| 3/7 | WA7GXD | HARDWARE HAPPENINGS |
| 3/8 | WB9FLW | ST. LOUIS AND THE BETA TEST |
| 3/9 | KV7D | SOFTWARE UPDATE |
| PSR #4. MARCH 1983 | | |
| 4/1 | TAPR STAFF | ANNUAL MEETING |
| 4/2 | WA7GXD | THE PRESIDENT'S CORNER |
| 4/3 | KV7D | SOFTWARE UPDATE |
| 4/3 | NK6K | STANDARDS (sigh) |
| 4/4 | WA7GXD | PROPOSED HARDWARE MODIFICATIONS |
| 4/5 | TAPR STAFF | FEEDBACK |
| 4/5 | NK6K | LOS ANGELES |

ANNOTATION

prepared by NOCCZ

Margaret Morrison (then KC7MA), editor of PSR, announces it.
Next meeting July 17, 1982 in Scottsdale AZ...
Den Connors discusses the role expected to be played by TAPR.
Marc Chamberlin describes FORTH programming for new TNC.
First TAPR TNC packets transmitted on June 9 and June 18 1982.
Dan Morrison (then KB3UC) is overall Beta test coordinator for TAPR.
Mike Parker discusses I band linear amplifiers.
CWID in the Alpha TNC. New component products are discussed.
Lyle Johnson, WA7GXD, initiates first TAPR TNC packet QSO with KD2S.

To be held in Tucson on February 5 1983. TAPR membership now 180.
Amateur reps meet and agree on common packet radio protocol.
Filtering problems, KV7's B & D solve with high tech MF10.
Several samples of new chips received for evaluation.
New FCC rules permit use of certain digital codes by amateurs.
Pete Eaton describes SLAPR, the St Louis packet group.
W31WI proposes new PACSAT satellite at AMSAT general meeting.
Modem-radio interface problems discussed. CWID circuitry working well.
Twenty two Beta test coordinators listed.
Alpha test essentially complete. Beta board described.
Portions of a letter sent to all Beta test coordinators.
Excerpt from Bylaws concerning board membership and election.

HF SSB net. 2nd Networking conf. KOPFX working on custom enclosure.
Beta test to start. Filtering problem. New products.
Beta PC boards are defective. TAPR presses on, bloodied but unbowed.
Harold Price chronicles the earliest days of the AX.25 protocol.
Chuck Green discusses the forthcoming Beta test manual.
More details on the planned spaceborne "flying mailbox".
A discussion of the Beta effort from a hardware standpoint.
A blow-by-blow account of how Pete got wrapped up in TAPR Beta test.
Every design goal achieved (this is not a paper TNC).

A report and election results of the first annual TAPR meeting.
Stresses the need for widespread participation to get the job done.
Software changes/fixes in the mill at an early stage.
Programmers problems. The impossible we do right now!
A collection of suggestions for the next TNC go around.
Letters/msgs from WB9FLW, WDOETZ, KR9H, KD9S, NODVS, WAOKGU, WDOCZI.
Getting the new Beta boards on the air in Southern California.

ISSUE/PAGE AUTHOR TITLE

4/6 WD9DBJ CHICAGO
4/6 WA7GXD HARDWARE HAPPENINGS
4/7 TAPR STAFF THANKS
4/7 KV7B BETA TEST STATUS

PSR #5. MAY 1983

5/1 KV7D TAPR AND LOCAL/REGIONAL PACKET CLUBS
5/2 WA7GXD THE PRESIDENT'S CORNER
5/3 KV7D/NK6K SOFTWARE UPDATE
5/4 WA7GXD HARDWARE HAPPENINGS
5/5 KV7B BETA TEST STATUS

PSR #6. JULY 1983

6/1 TAPR STAFF NEWS NOTES
6/2 WA7GXD THE PRESIDENT'S CORNER
6/3 WA7GXD TNC KITS
6/3 WA0TTW PACTivities
6/4 KDOBY HARDWARE HAPPENINGS

PSR #7. OCTOBER 1983

7/1 TAPR STAFF NEWS NOTES
7/2 WA7GXD PRESIDENT'S CORNER
7/3 TAPR STAFF ANAHEIM
7/3 NK6K BORING

PSR #8. NOVEMBER 1983

8/1 TAPR STAFF NEWS NOTES
8/2 WA7GXD PRESIDENT'S CORNER
8/3 WB6UUT BBS CONNECTION
8/4 NK6K SATELLITE SPACE
8/5 TAPR STAFF JAMSAT
8/6 KA9Q PACSAT MODEM PROJECT
8/8 W3IWI AO-10 PACKETS
8/8 WA7GXD BOARD ELECTIONS
8/9 NOCRN REV.2 REVIEW
8/9 TAPR STAFF PACKET BIBLIOGRAPHY

PSR #9. JANUARY 1984

9/1 TAPR STAFF NEWS NOTES
9/2 WA7GXD PRESIDENT'S CORNER
9/3 KV7D BETA UPDATES
9/4 NOADI THANK YOU
9/4 NOADI THE STORK?

ANNOTATION

prepared by NOCCZ

Dick Gulbrandsen describes receipt of first TNC's in Chicago area. All Beta TNC's shipped. Some radio problems are popping up. TAPR extends its thanks to several commercial firms for their help. 141 out of 171 Beta boards shipped. Reports coming in from testers.

Club affiliation with TAPR, mutually beneficial. Plus short items. Packet at Dayton '83. New TNC kits planned for Beta testing. Work begins on Ver 3. Space problems encountered. Changes listed. Hardware team meets. Revisions announced for production kits. Feedback from the Beta test sites is discussed.

Ham Radio cover. Software approach. No more CWID. MAPR edits PSR, etc. Planning for high speed terrestrial linking begins. TAPR to produce TNC kits. Distribution & availability announced. Pat Snyder, PSR editor, discusses packet activity in Twin Cities area. Clay Bartholow talks about audio input sensitivity & new TNC hardware.

Revised board. Prototype kits built. TAPR BOD nominations. Oscar. Magazine articles of note. TNC Rev 2. TAPR growth. A discussion of activities at Sept. SW Div Convention. Packet QSO's get boring. much work needed to perfect the system.

An HF BBS. Packet Pete video. PACSAT. KE3D reports from South Africa. Kit assembly test completed. Cabinets. EPROM kits. Kudos to KOPFX. Lynn Taylor describes the development and operation of a packet BBS. TAPR members in PACSAT work. OSCAR 10. Bug in Ver 2.1. A description of JAS-1. Planned for 1986 launch. Phil Karn gives a tutorial & progress report on modem design project. Tom Clark describes some packet firsts via AO-10. Nominees announced: W3IWI, W1HDX, WB9FLW, KV7D, NK6K, WA0TTW, WB6UUT. Paul Barnett reviews the assembly of the new TAPR TNC kit. Noteworthy articles in Amateur press.

Annual meeting. Write don't call. Death of Vic Clark, W4KFC. Packet on the move. Ranks swell. Information deluge. Much yet to do. Beta 3.1 available. Protocol upgrades. User interface upgrades. Manual editor identifies 'movers and shakers' who get the job done. The proud parents watch their first 100 kits go out warehouse door.

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| 9/5 | WA7GXD | REV. II TYPOS |
| 9/5 | TAPR STAFF | PART PRICES |
| 9/6 | KV7B & D | HF PACKETS |
| 9/6 | KDOBY | 1700 HZ CALIBRATE |
| 9/7 | WA7GXD | HARDWARE HAPPENINGS |

PSR #10. MARCH 1984

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| 10/1 | TAPR STAFF | NEWS NOTES |
| 10/2 | WA7GXD | PRESIDENT'S CORNER |
| 10/3 | WORPK | CENTRAL IOWA BBS |
| 10/5 | WA0TTW | BBS WATCH |
| 10/7 | K5JB | COMPARISON SHOPPING |
| 10/11 | WB8TKL | VIC-20 TERMINAL |
| 10/12 | K9NG | TNC CALIBRATION |
| 10/12 | W3IWI | GDC MODEM |
| 10/13 | KA9Q | PACSAT TRACKING |
| 10/14 | G3VJO | UoSAT-2 STATUS |
| 10/15 | W6EJJ | BIG EARS |
| 10/15 | KA9Q | Uo-B TELEMETRY |
| 10/16 | NK6K | GET AWAY SPECIAL |
| 10/16 | KA6M | SATELLITE INTERCONNECTION |
| 10/17 | TAPR STAFF | BOARD MINUTES |
| 10/19 | TAPR STAFF | ACKnowledgements |
| 10/22 | W9TD | HF LINKS |

PSR #11 JUNE 1984

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| 11/1 | TAPR STAFF | NEWS NOTES |
| 11/2 | WA7GXD | PRESIDENT'S CORNER |
| 11/3 | G3VJO | UOSAT-2 STATUS |
| 11/3 | N0CRN | FROM THE EDITORS |
| 11/4 | WA7GXD | KIT OSCILLATOR PROBLEM |
| 11/4 | NK6K | BINARY FILE TRANSFER |
| 11/5 | WA7GXD | PETE EATON RESIGNS |
| 11/6 | W3IWI | OSCAR-10 LINKING |
| 11/7 | W3IWI | HF LINKING |
| 11/8 | WA7GXD | 3rd ARRL COMPUTER NETWORKING CONF. |
| 11/9 | NK6K | CA BBS ACTIVITY |
| 11/9 | WB6HHV | MESSAGE HEADERS |
| 11/10 | WA7GXD | TNC MODEM TUNING INDICATOR |
| 11/12 | WA7GXD | MODEM SENSITIVITY MODIFICATIONS |
| 11/13 | K9NG | MODEM MODIFICATION TESTS |
| 11/14 | K9NG | BER PERFORMANCE OF TAPR TNC MODEM |
| 11/16 | K9NG | MODEM COMPARISON |
| 11/16 | WA1GRC | DEVIATION ADJUSTMENT |
| 11/17 | K4GFG | TAPR MODEM MEASUREMENTS |
| 11/18 | K5JB | DAYTON REPORT |

Some corrections to the manual.
A replacement parts list with part numbers and prices.
Team Morrison describe the re-configured MF-10 for HF and satellite.
A procedure for setting the 1700 Hz center frequency on Beta TNC's.
A look at new kit TNC. Some Beta mods. New TNC design versus Beta.

LoSAT-B launched. JASNET.BAS program. 3rd networking conference.
New BOD. Cabinet status. Beta upgrade. The DCE project. Conventions
Ralph Wallio describes the CITS BBS, costs, system features.
A discussion of the needs, considerations and outlook for BBS's.
Joe Buswell compares the TAPR TNC and the GLB PK1.
Jay Nugent describes how to operate from a VIC-20.
Steve Goode on setting deviation for all TNC's within a LAN.
Modifications and switch settings for the General DataCom 202A modem.
A method of detecting subtle orbit changes when using low thrust.
Successful launch then leads to apprehension for UO-11.
Jay Holladay tells of EME antennas listening for UO-11.
Telemetry was within limits. No clues to the problem.
A GAS experiment. Helping an El Paso high school.
Hank Magnuski tells of mixed satellite and ground station contacts.
Details of the 4 Feb, 1984 BOD meeting.
Letters and messages from the packet community.
Gary Kaatz tells about initial successes with HF packeteering.

Cabinets. Glossy brochures. Dayton Tech Achievement Award to TAPR.
Dayton. Award. Possible approaches to linking.
After exhaustive efforts, command re-established.
All the news that fits, we print.
Oscillator failures reported, fixes recommended.
How to run binary data thru the TNC.
Outstanding accomplishments listed by TAPR President.
West coast BBS worked from Clarksville MD via satellite.
A report on HF packet gateway activity.
A report on the activities at the Trenton conference.
West coast activity picking up, list of BBS users.
Mike Brock tackles the standardization of message headers.
Description of a simple tuning indicator for use on non-FM modes.
Performance improved about 2 db under weak signal conditions.
Details of results of tests on modem modification.
Bit Error Rate test results presented.
Comparing the BER of the Beta to the new TNC.
A simple method of setting deviation from Gary Field.
Radio and TNC audio response curves discussed by Tom Kneisel.
Joe Buswell talks about the different TNC's seen at Dayton.

ISSUE/PAGE AUTHOR TITLE

PSR #12, SEPTEMBER 1984

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| 12/1 | TAPR STAFF | NEWS NOTES |
| 12/2 | WA7GXD | PRESIDENT'S CORNER |
| 12/3 | WA7GXD | PACKETING IN THE FAST LANE |
| 12/4 | NK6K | SOFTWARE BUG PATCH |
| 12/4 | NK6K | SOFTWARE BUGS |
| 12/6 | WB4JFI | VADCG UPGRADE |
| 12/6 | WA7GXD | RS-232 PROBLEMS |
| 12/7 | WB6HHV | CROSSBAND DIGIPEATER |
| 12/8 | K1HTV | METEOR SCATTER CONNECTIONS |
| 12/10 | NK6K | 23CM BANDPLANNING IN CA |
| 12/12 | NK6K | TAPR's FUTURE |
| 12/14 | TAPR STAFF | PACTivities |
| 12/16 | W3GEY | A FUEL FOR THOUGHT |
| 12/18 | WB6UUT | THOUGHTS ON LEVEL THREE |
| 12/20 | TAPR STAFF | SATELLITE COORDINATION |
| 12/21 | TAPR STAFF | HAMS IN SPACE |
| 12/21 | TAPR STAFF | JAS-1 UPDATE |
| 12/22 | W4UCH | PACKET - A SOFTWARE APPROACH |
| 12/23 | N6IIU | TAPR-SUPPLIER OF TNC's TO 84 OLYMPICS |

PSR #13, JANUARY 1985

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| 13/1 | TAPR STAFF | NEWS NOTES |
| 13/2 | WA7GXD | PRESIDENT'S CORNER |
| 13/3 | WB6CYT | A PROPOSED NETWORK...PACKET RADIO.... |
| 13/7 | TAPR STAFF | BOARD OF DIRECTORS ELECTION |

PSR #14, MARCH 1985

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| 14/1 | TAPR STAFF | NEWS NOTES |
| 14/2 | WA7GXD | PRESIDENT'S CORNER |
| 14/3 | WB8TKL | PACGRAMS |
| 14/6 | WA6ERB | THE DC TNC |
| 14/7 | KA9CAR | TEACHING OLD DOGS |
| 14/8 | K9BL | DAYTON EVENTS |

PSR #15, MAY 1985

| | | |
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| 15/1 | TAPR STAFF | STOP PRESS: IMPORTANT INFORMATION |
| 15/2 | WA7GXD | PRESIDENT'S CORNER |
| 15/4 | EDITORS | THE PACKET RADIO REVOLUTION CONTINUES |
| 15/5 | EDITORS | TAPR NEEDS YOUR HELP TODAY! |
| 15/5 | EDITORS | THE BUCK STOPS HERE |
| 15/6 | EDITORS | HOW TO ORDER A TNC 2 |
| 15/7 | WB6FSK | COMMODORE 64 AS A PACKET TERMINAL |
| 15/8 | EDITORS | NOVRAM HINTS |
| 15/10 | EDITORS | TNC-1 MANUALS AVAILABLE |

ANNOTATION

prepared by NOCCZ

Dec. 2 TRN. 220 Mhz endangered. BOD nominations open. Packet on CBS.
TAPR opens office. TINC LINC. K9NG working on 9600 bps modem.
Experimenting with high-speed. 19.2 kb with 2xclock speed on TNC.
RETRY counter & AX25 OFF mode patched. Now ver 3.3.
Asks for bug reports. Lists known bugs.
Terry Fox describes Vancouver daughter board.
Flow control problem. Different chip makers, different results.
How 2 meter/220 MHZ digipeating was implemented.
Richard Zwirko describes first meteor scatter packet QSO.
A paper describing the digital mode's point of view on higher freqs.
What about level 3? Will TAPR keep selling kits?
TSARC meeting. Oahu group meets. RMPRA activity. MRC & JA3 news.
Jan King on water electrolysis/steam propulsion for satellite use.
Two routing algorithms discussed. A catalyst for further discussion.
Describes activities of international amateur satellite group meeting
Space Amateurs selected. To carry amateur gear on space flights.
A discussion of components, tests, problems, schedules.
Bob Richardson, the development and background of the software appch.
Ted Harris tells how packet was used at Olympic soccer events.

Minnesota, Florida, Georgia news. Annual meeting info.
Digital Committee on AX.25 level 2 mods. CITS conference.
Brian Kantor proposes a packet interconnection system.
Nominees are: NOCRN, WB6HHV, NOCCZ, WB6YMH, KD4NL, W9TD, KV7B, WDOETZ.

Dayton. Digipeater paths. GRAPES. SACPAC. Alabama. HF. New York.
Election results. RMPRA DC PS. Heath HD 4040. 9600 BPS modem. network.
A proposal for a uniform packet message format.
Bob Gobrck, RMPRA members innovate an inexpensive TNC DC supply.
John Dewey on adapting the Varitronics IC2F Deluxe to packet use.
Bob Neben provides Dayton packet speaker schedule.

Membership. Office problems. New TAPR TNC. New PSR
TNC close-out, why? Heath cabinets. New PSR. TNC-2. TAPR HF net.
The new TNC-2 announced and described.
TAPR asks member help in updating member database.
Administrative office problems, actions to solve them.
A plan for fair distribution of a limited number of TNC's.
Steve Hall provides aid for the C64 users going into packet.
How to correct a forgetful NOVRAM.
Complete information on the TNC-1 and packet radio in general.

| ISSUE/PAGE | AUTHOR | TITLE | ANNOTATION | prepared by NOCCZ |
|------------------------|--------------|---------------------------------------|--|-------------------|
| PSR #16, JULY 1985 | | | | |
| 16/1 | WA7GXD | PRESIDENT'S CORNER | W1BEL new PSR editor. TAPR people, talents, limitations. 'Call-In'day. | |
| 16/2 | W1BEL | EDITOR'S COLUMN | Gwyn Reedy describes contents. Status of TAPR projects. TNC-1 & 4.0. | |
| 16/3 | WA7GXD | THE TAPR TNC-2 - WHY? | Why the TNC-2 was needed as a follow-on to the TNC-1. | |
| 16/3 | N2WX | AN OVERVIEW OF TNC-2 SOFTWARE | Howard Goldstein, the author, describes his TNC-2 software. | |
| 16/4 | AD7I | AN OVERVIEW OF TNC-2 HARDWARE | Paul Newland, designer, describes the TNC-2 hardware. | |
| 16/5 | KOPFX | 2764 EPROM PROGRAMMER FOR THE TNC-1 | The information needed to construct the programmer. | |
| 16/8 | KA9CAR | HF OPS WITH THE TAPR/HEATH/AEA TNC | Change from wide to narrow tones with a flip of the switch. | |
| 16/9 | W3IWI | BULLETIN BOARDS/HOSTS/GATEWAYS/GLUE | A 9 month historical perspective of packet BBS's. | |
| 16/10 | N4ZQ/KB4LLO | PACKET MADE EASY | A review of the Kantronics KPC. | |
| 16/11 | N5EG | AN INTRODUCTION TO NETWORKS | T.C. McDermott describes the what & why of networks. | |
| 16/15 | KE3Z | THE TWO PORT DIGIPEATER | Jon Bloom explains the problem & how this machine solves it. | |
| 16/18 | WBORUS | ANOTHER VIEW OF LINKING/2 PORT DIGIS | Jerald Morris takes a different approach to SSID number decoding. | |
| 16/19 | WB8WGA | TAPR TNC MODFIFICATIONS FOR 12v USE | Robert Ball uses a Power-General DC/DC converter for +/- 12v. | |
| PSR #17, OCTOBER 1985 | | | | |
| 17/1 | WA7GXD | PRESIDENT'S CORNER | Some packet history. TNC-1. TNC-2. Ver 4.0. WA8DED code. NNC. 9600 bps | |
| 17/2 | TAPR STAFF | TNC-2 MANUAL MISPRINTS | Corrections to TNC-2 manual. | |
| 17/3 | EDITOR | EDITOR'S COLUMN | Future of Amateur radio. Profile of a "doer". Historic firsts | |
| 17/4 | TAPR STAFF | TNC-2 OEM PACKAGE AVAILABILITY | TAPR TNC-2 OEM kit available for industry. | |
| 17/5 | W3IWI | BBS NEWS AND VIEWS | Questions/answers on RLI system. The Xerox 820. BBS computers. | |
| 17/7 | FROM QEX | 5th ARRL AMATEUR NETWORKING CONF. | To be held 7-9 March in Orlando. Papers sought. | |
| 17/8 | TAPR STAFF | EPROM PROGRAMMING ADAPTER | Limited supply of kits available at TAPR. | |
| 17/8 | TAPR STAFF | MODIFICATIONS TO THE TNC-2 | Modifications for TNC-2 Rev 1 to Rev 2. | |
| 17/11 | WA7GXD | THE TAPR NETWORK NODE CONTROLLER | Why it is needed, how it evolved and what it will look like. | |
| 17/12 | W3IWI | TNC-2 PUSH-TO-TALK INDICATOR | The power LED will serve double duty. How to do it. | |
| 17/13 | TAPR STAFF | BOARD OF DIRECTORS NOMINATIONS | A call for nominations. | |
| 17/13 | TAPR STAFF | AEA AND HEATH TNC OWNERS | Manuals in limited supply but still available. | |
| 17/13 | TAPR STAFF | ANNUAL MEETING ANNOUNCEMENT | Next annual meeting in Tucson on February 8 1986. | |
| 17/14 | WB2OSZ | A DIGITAL TUNING INDICATOR FOR HF PKT | John Langner departs from the analog approach. Uses digital approach. | |
| 17/15 | TAPR STAFF | PK 80 UNIVERSAL PACKET CONTROLLER | AEA announces its version of TNC-2 in assembled form. | |
| 17/16 | WB6UUT | A REVIEW OF THE WA8DED TNC FIRMWARE | A description of how Ron Raikes new TNC system operates. | |
| 17/17 | WA8DED | AX.25 VER 2 MULTI-CHANNEL FIRMWARE | A command description of the various features of the new firmware. | |
| 17/19 | N2DSY | THE RATS NETWORK INFORMATION BULLETIN | Plans for the Radio Amateur Telecommunications Society RATSNET. | |
| 17/21 | KE7CZ | TNC MODEM TUNING INDICATOR #2 | Dan Vester provides information for another type HF tuning indicator. | |
| 17/24 | TAPR STAFF | 9600 BPS MODEM KITS | Semi-kits available at TAPR. | |
| 17/24 | N2FVN | TNC-2 RADIO HOOKUP TIP | How to hook up to a Kenwood TH-21. | |
| 17/25 | K8KA | HAMTRONICS FM-5 SHIELDING | Jeff Ward describes W81DNL's shielding modifications to FM-5. | |
| 17/26 | WB6UUT | SWITCH SELECTABLE FIRMWARE FOR TNC-1 | Using the "bank select" feature for either TAPR or WA8DED firmware. | |
| 17/26 | N5EG | AN INTRODUCTION TO NETWORKS | A continuation of the article begun in the July 1985 PSR. | |
| 17/27 | WA4FIB | USING THE MACINTOSH WITH THE TNC-2 | Jack Brindle describes using CTS instead of Xon/Xoff for the Mac. | |
| PSR #18 - JANUARY 1986 | | | | |
| 18/1 | WA7GXD | PRESIDENT'S CORNER | Looking back on 1985...and ahead to 1986. | |
| 18/1 | W3IWI/WA8YBT | SAREX 2-PACKET RADIO FROM THE SHUTTLE | The story of putting together a packet station for use in space. | |
| 18/4 | WA7GXD | USING THE RF DCD FEATURE OF THE TNC-2 | Putting the TNC DCD feature to work for you on voice channels. | |

| ISSUE/PAGE | AUTHOR | TITLE | ANNOTATION | prepared by NOCCZ |
|------------|------------|---------------------------------------|--|-------------------|
| 18/5 | TAPR STAFF | NNC DEVELOPMENT AND TESTING | The current status and need for Alpha and Beta testers. | |
| 18/6 | TAPR STAFF | IMPORTANT: TO ALL TNC-2 OWNERS | A couple of potential problems and their suggested fixes. | |
| 18/6 | TAPR STAFF | TAPR ANNUAL MEETING | Meeting set for Feb. 8 1986 is announced. | |
| 18/6 | TAPR STAFF | TAPR TNC-1 MANUAL SALE | Closeout of the final few copies remaining. | |
| 18/7 | KA9Q | TCP PROGRAMERS MANUAL | "advance information" to implementers considering writing applications | |
| 18/8 | WA7GXD | BEGINNERS'S CORNER | Using the IBM PCjr on Packet. | |
| 18/10 | WA7GXD | BEGINNERS'S CORNER | Interfacing the Commodore 64 and VIC 20 computers. | |
| 18/11 | N7CL | TS-430S RX IF MOD FOR PROPER AGC | Eric Gustafson tells of rapid turnaround problem and the fix. | |
| 18/13 | W3IWI | BBS NEWS AND VIEWS | Explosive growth. Real networking. IBM-PC efforts. Software distr. | |
| 18/15 | TAPR STAFF | NEW PRODUCTS FROM TAPR | Tuning indicator. LSC-10. | |
| 18/16 | NK6K | DEPT. OF PROGNOSTICAION:FUN W/NUMBERS | How many TNC's are there? (And how many will there be?). | |
| 18/17 | KA9Q | ENGINEERING A PACKET SWITCH | How much memory is likely to be needed in a packet switch? | |
| 18/17 | TAPR STAFF | REPLACEMENT PARTS PRICE LIST TNC-2 | TAPR offers a "convenience" parts service. | |
| 18/18 | TAPR STAFF | PACKET CHANNEL CONGESTION | A series of suggestions to help reduce the channel load. | |
| 18/19 | W5YR | TNC64: PACKET TERM PROGRAM FOR C-84 | George Baker describes program distributed by Texas PR Society. | |
| 18/20 | N5EG | AN INTRODUCTION TO NETWORKS | Part three in a series of articles. Earlier ones in Jul. & Oct. 1985 | |
| 18/22 | STONER | PUBLIC DIGITAL RADIO SERVICE PETITION | A proposal to FCC to create new radio class & allocate spectrum. | |
| 18/25 | TAPR STAFF | TNC-2 UPGRADE INFORMATION | CMOS components available at TAPR. | |
| 18/25 | TAPR STAFF | PACKET ADAPTER | Highly touted ALJ-1000 leads to development of LSC-10. | |
| 18/26 | W3IWI | PTT MOD FOR TNC-2: CORRECTIONS | An amendment to the earlier mod description. | |
| 18/26 | TAPR STAFF | NOTICE TO TNC-2 OWNERS | Radio Shack Mod 1-4 users, handshaking protocols, HF operation. | |
| 18/26 | KA9Q | AMATEUR PSYCHOLOGY - FOOD FOR THOUGHT | Let the amateur pay for networking in his own shack. | |
| 18/26 | EDITOR | EDITOR'S COLUMN | Kind words for new PSRQ. Kudos to writers. Packet Radio Magazine. | |
| 18/27 | TAPR STAFF | DIRECTOR CANDIDATES | Nominees are: Mark Baker, K9NG, W3VS, WA7GXD, N7CL, W1BEL. | |

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| 19/1 | WA7GXD | PRESIDENT'S CORNER | TAPR income curtailed.Overhead cost cutting. Pressing on with R&D. | |
| 19/1 | WA7GXD | TAPR GOALS - 1986 | Board of Directors sets three goals. Some immediate action. | |
| 19/2 | WB9FLW/WA7GXD | ELIMINATING POOP FROM PACKET | Much POOP found on packet channels. Offensive? | |
| 19/5 | W3IWI | BBS NEWS 'N VIEWS | IBM-PC BBS. Xerox 820, FCC 85-105. networking/forwarding. DoubleDos. | |
| 19/7 | NK6K | TAPR & THE FCC - PR DOCKET 85-105 | A TAPR petition to the FCC to reconsider PR 85-105. | |
| 19/10 | TAPR STAFF | MINUTES OF THE TAPR BOARD MEETING | The Feb. 9 1986 Board of Director meeting minutes. | |
| 19/12 | TAPR STAFF | PROJECT PROPOSAL GUIDE | A guide for preparing a project proposal for TAPR. | |
| 19/13 | WA7GXD | BEGINNER'S CORNER: STATE MACHINES | The beginning of a series on what a state machine is & how it works. | |
| 19/15 | KV7B/N7CL | NOTICE TO ALL TAPR/CLONE HF USERS | Improving demodulation to near optimal performance. | |

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