



# T·A·P·R

## PACKET STATUS REGISTER

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### In This Issue...

- President's Corner by Andy Freeborn, NØCCZ
- Board of Directors Election
- TAPR Annual Meeting  
Upcoming in late Feb.
- Improved DCD Performance for TNC's
- Thoughts on No-Code Entry Level Amateur Radio Licenses
- TNC-1 Hardware Upgrades
- AA4RE's "In the Mailbox" Column on Packet Radio Bulletin Board Systems
- Hardware Happenings - DSP 1 Project Update
- Review of "Digital Digest" - a new Amateur Radio Publication

Next Scheduled PSR Issue:  
May 1989  
Editorial Deadline: 04/07/89

### PRESIDENT'S CORNER

by Andy Freeborn, NØCCZ

About 5 years ago the FCC proposed a class of amateur license which provided that entitlement to that class of license did not require a knowledge of Morse code.

Maybe it was the sentiment of the time, maybe it was the manner in which the proposal was presented, maybe it was the phase of the moon; any number of things may have affected, and likely did affect, the reaction of amateurs at that time.

That was five years ago. Five years can be an eternity in today's rapidly changing world. At the beginning of 1983 there were just a few hundred amateurs worldwide who were experimenting with packet radio. Observe the change.

The reaction of many amateurs and the ARRL to the FCC proposal was sufficiently strong that the FCC took no action to implement no-code licensing.

Much has happened in the interim. There have been many technological advances in amateur radio. Many of these advances are geared to the use of the higher amateur frequency bands that are now underutilized. The FCC has demonstrated that our frequency bands are vulnerable if not utilized. One need only look back a few months to see what happened to our 220-222 MHz segment.

Should we have been surprised at the the outcome of the 220 battle? Read the following quote from a no-code discussion on CompuServe and judge for yourself.

".....I would like to make you aware of a public statement by Robert Foosaner, then Chief of the FCC's Personal Radio Bureau, while addressing the FCC Forum at the 1984 ARRL National Convention in New York City:

"Amateurs have made it abundantly clear that there is no room within amateur radio for a code-free license. THEREFORE [emphasis his], we are forced to consider the 220 MHz band as a possible candidate for reassignment to the Land Mobile Service". He then repeated himself for emphasis. I know what was said; I was there, in the front row."

It is time again to evaluate where we stand on the no-code issue. It is time to set emotions aside. It is time to take a hard nosed look at the future of amateur radio with respect to our recent spectrum losses. It is time to evaluate past growth of amateur radio. It is time to take a businesslike look at our assets (the

Continued from page 1...

amateur spectrum).

Larry Rice, W4RA, and David Sumner, K1ZZ, President and Executive Vice President of the ARRL respectively, have opened the no-code discussion in the January issue of QST with their editorial in the "It Seems to Us..." column. If you have not seen it already I commend it to you.

The Directors of Tucson Amateur Packet Radio have voted to support an amateur initiated no-code proposal. Your Board feels that the proper approach to attain this objective is to work with and through the ARRL.

If you have been opposed to no-code in the past now is the time to open your mind, listen to new ideas and thoughts on the matter, consider recent amateur history and trends and THEN inform your ARRL Division Director of your views.

## NON-TECH TOPICS

by Andy Freeborn NØCCZ

### 1989 FINANCIAL REPORT

The deadline for this issue of PSR was too early in January to have the financial report for 1989 back from the accountant. Expect to see a report at the annual meeting in February and in the next PSR.

### WHAT TAPR ISN'T

TAPR is not a factory. It does not have large warehouses. It does not have executive suites. It does not have a service and repair department. It does not operate a TNC, it doesn't even operate a radio.

So what is TAPR then? TAPR IS PEOPLE and they span the continent from coast to coast.

So when visiting Tucson don't expect a guided tour of the TAPR plant. TAPR has a small one person office operating 4 days per week. It is manned by Cris Kurz. She is the pleasant voice you hear when you dial the TAPR number. Cris is not a ham. Don't try to communicate a problem to TAPR via packet. TAPR doesn't operate a packet station. Packet messages addressed to SP TAPR (and this actually happens) are certainly destined for someone's bit bucket.

### CAST YOUR VOTE

Elsewhere in this issue of PSR you will find a ballot and some comments concerning each of the nominees. Voting will be by mail only and ballots must be received at the TAPR office before noon on Tuesday, 21 February 1989.

### COUNTING THE VOTE

In the earlier years of TAPR we held our annual meeting on Saturday and the Board of Directors met on Sunday. Many members felt that more time was needed at the annual meetings to present more speakers and permit more discussion of the various developments. As a result the annual meeting was changed to a two day affair, Saturday and Sunday. This then prompted the Board to hold its meeting on the Friday prior to the annual meeting. As a result there is a need to determine vote results earlier so that newly elected Directors can be informed and arrange to attend the Friday meeting.

### NNC PARTICIPANT IN GERMANY

Hans Georg Giese, DF2AU, living in Braunschweig West Germany, is now a participant in the TAPR NNC development program. Georg is also a member of the West German NORD<>LINK group.

## THE 1989 TAPR ANNUAL MEETING

The annual TAPR Membership Meeting will be held in Tucson on Saturday and Sunday February 25th and 26th. For those of you attending last years meeting you won't have any trouble finding the meeting place. It will be held at the same location as last year, The Inn At The Airport. The Inn is located a short distance (more than comfortable walking distance while lugging a suitcase, however) from the airport terminal, at 7060 South Tucson Boulevard.

The Inn At The Airport offers us special rates of \$49.00 for either one or two persons in the room. Breakfast is included in the rate and there is a late afternoon cocktail hour free to those staying at the Inn. Reservations may be made by calling 1-800-772-3847. In Arizona call (602) 746-0271.

There will be the traditional Pizza bash and the Malibu Grand Prix on Friday night. On Saturday night we will have our customary get-together, probably another Western affair, details of which have not yet been worked out.

In light of all the development work now in progress you can expect that there will be many interesting presentations. Something you won't want to miss is to see a full scale model of MICROSAT, four of which are scheduled for orbit a few months after the meeting.

Those wishing to be on the speaking agenda should advise the TAPR office as soon as possible. The Sunday session should be concluded near or shortly after noontime for those planning afternoon departures.



CHECK YOUR MAILING LABEL FOR  
MEMBERSHIP EXPIRATION DATE! YOUR  
RENEWAL COUNTS!

## "THE VIEW FROM THE PEAK"

by George Hinds, N8CIX

*(From the December 1988 edition of Zero Beat, the Pikes Peak Amateur Association monthly newsletter. George Hinds, N8CIX, is a regular columnist for the PPRAA Zero Beat newsletter)*

"CHANGES — THEY ARE A'COMING IN THE AMATEUR RADIO SERVICE.. and it's on the move in our neighbor to the north: Canada. There they are preparing to start a "no-code" entry-level class of amateur radio operator. This, of course, is consistent with the practice of many other nations. At this time, it looks like entry-level licensees will be given access to all ham bands, all modes and emissions, above 30 MHz. Those who choose to take a 5 w.p.m. code test will additionally receive limited privileges on HF.

Must the Amateur Radio Service in the U.S. take similar action? No, say many - code is still essential in radio. Keeping code will, they say, keep out the operator problems inherent in CB radio. It also will serve to limit congestion. And, I suspect, it springs from one's natural feeling that, if they had to study and pass a code test, so should every other would-be amateur.

A growing number of amateurs, however, are citing inescapable facts: the Amateur Radio Service is on a down- hill slide in numbers. Commercial services are "ganging up" against amateurs to grab more and more of what they see as the huge amount of spectrum allocated to us, a fact already visible on 220 MHz, where in essence the League and many amateurs won the battle against no-code licenses, but now have lost the war and part of the band; in reality, code actually is no more essential in this day and age than is spark gap (the maritime

service has set a mandatory deadline to terminate use of code); potential amateurs, well-qualified in electronics, having no interest in a fading art like code, are kept from entering amateur radio because of their personal disinterest in, and refusal to waste time learning, the code.

As I've noted in a previous column, perhaps the fear of trying something new in amateur licensing should be subjugated to the very real danger of losing more and more of our presently allocated spectrum unless we act soon to create a surge in new amateurs entering the service and using the bands. As senior amateurs pass on, and newcomers decline in number, the end of amateur radio service in U.S. as we know it today will arrive — not, perhaps, in my lifetime or yours, but it will be as inevitable as time itself. Just as our numbers decrease, so will successful attacks upon the amateur radio spectrum increase. It's time to advance with the power of positive thinking, rather than to run away from reality because of age-old fears and prejudices. Henry Ford was quoted as saying, "Nobody can really guarantee the future. The best we can do is size up the chances, calculate the risks involved, estimate our ability to deal with them, and then make our plans with confidence."

*(Continuing...from the January 1989 edition of Zero Beat, the Pikes Peak Amateur Association monthly newsletter.)*

**MORE THOUGHTS ON A NEW "NO-CODE" AMATEUR LICENSE CLASS:** In this column last month I offered some reflections on the U.S. following Canada and many nations around the world by establishing a "no-code" class of amateur license so as to create an increase in the number of amateur radio operators. As you should know, amateurs are steadily declining in numbers despite recent at-

tempts to encourage growth.

Remember: international radio regulations still require CW knowledge for operation above 30 MHz, so there should be no concern by HF'ers that they would be overwhelmed by a new class of "no-code" licensees on 10 thru 160. With no-code, applicants and other amateurs who wish to use CW are free to do so as provided on VHF-UHF; and to upgrade as desired.

Neither is the FCC seeking to limit the growth of amateur radio. In fact, the commission has said on more than one occasion words to the effect that unwarranted requirements restricting the entry of applicants to the amateur radio service should be eliminated; for example, the drying-up of applicants is seriously limiting the capability of the service to perform in the public interest, convenience and necessity.

A commission spokesman once said before an ARRL convention that since hams reject "no-code" licensing (to populate the 220 MHz band), the commission must look to reconsider allocating the 220 MHz band to land mobile services. Now that's been done - we've lost part of 220. Old-timers can remember that's the same method that brought about loss of 27 MHz to hams - lack of use! What band will be next?

Perhaps an example many of us can relate to is the decreasing traffic on our repeaters. More and more we hear less and less. To make it even worse, more and more we hear complaints from amateurs who, when confronted with a highway or traffic emergency and calling for assistance, have their calls go unanswered. As you travel cross-country today, the chance of striking up a casual contact is less and less, as is the chance of getting a response for a priority or emergency call. Our ability to serve is down from what it was a few years ago.

No-code licensing has not caused significant problems in other nations - it has increased the number of amateurs as witness Japan: more than 4 times the number of amateurs as the U.S. but less than half our population!

My purpose in writing is to provoke thought among the readers. Perhaps a way to put one's brain in gear on this issue is to pretend that there is today no amateur radio service - it is only now to be created. Cast aside emotion, fear, ideas and modes of years gone by. On the verge of entering the 21st century, in the age of digital electronics, satellites, packet, RTTY, AMTOR, ACSSB, and youngsters raised on computers and high-tech gadgets, would you mandate that before being licensed to use packet, satellite and VHF-UHF, an applicant for this new radio service must be proficient in telegraphy? I think not, if one is ruled by reason and logic.

In closing, let me say that there are those who are now planning to file with the FCC to create a no-code license. To do so, they are creating a new group - the National Amateur Radio Association. Personally, while I appreciate their stated objective to increase the growth of the service, and I am not opposed to no-code above 30 MHz that requires testing in theory, regulations and good operating practices, I do not support further fragmentation of this service by going outside of the ARRL; we are now so numerically small in number today (and getting smaller daily) that we are suffering from lack of strength in fighting restrictive antenna rules, in fighting to hold our allocated spectrum space, and in performing public service as contemplated with the creation of this amateur radio service. Amateurs will not gain strength, or even maintain our current position, by further division in our ranks.



## SOFTWARE AND HARDWARE AVAILABLE FROM TAPR

### HARDWARE

Hardware kits that are currently available from TAPR are shown below.

PSK Modem (Incl. S&H) \$110.00  
K9HG 9600 Baud Modem 25.00  
TNC2 Tuning Indicator 25.00

### FIRMWARE

The TNC2 software version 1.1.6 is available with KISS. If you have been using version 1.1.4 or 1.1.5 with the 32k RAM you will be able to upgrade directly to 1.1.6. For those still using 1.1.3 it will be necessary to install the 32k RAM at the same time that you upgrade to 1.1.6. Installation instructions are provided with the 32k RAM.

TAPR will program your EPROMs for \$2 per TNC-worth plus a pre-paid return mailer. If you choose to buy EPROMs from TAPR we will include the mailer and postage in the purchase price of the blank EPROM.

Prices as follows:

32k RAM (includes update doc)(ppd) \$20  
Blank EPROM (27C256) (add \$2 for programming) \$10  
Blank EPROM (2764) (add \$2 for programming) (may be 27C64 if available) \$5

### PROGRAMMED EPROMs

TNC-2 WR8DED (27C256)  
TNC-1 WR8DED (2 x 2764)  
TNC-1 KISS (2764)

TNC-2 KISS (27C256)  
TNC-2 1.1.6 w/KISS  
(27C256)

(each of the above is \$12 including EPROM, programming, mailer and postage)

### SOFTWARE

W0RL1/VE3GYQ C BBS (ver 9.03) (1 diskette)  
KA9Q TCP/IP (3 diskettes)  
INTRO to TCP/IP (2 diskettes)  
TNC-1 Source code (1 diskette)

The current major release of TCP/IP is 871225.1. When a later major release is available it will be substituted.

All diskettes are \$2 each including diskettes, mailer and postage. Please do not send blank diskettes, mailers or postage. For orders outside North America please add \$2 for airmail delivery.



## WRITING FOR PSR

by Scott Loftness, W3VS

PSR welcomes contributions from TAPR members and non-members on the subject of Amateur Radio Digital Communications.

If you're involved in writing software or designing hardware for amateur radio projects, please share your work - and think about PSR as one of the "best" places to do so.

We don't pay - so the only thanks you'll get is the thanks of the many amateurs who will read your work.

If you'd like to submit an article, please send it (hardcopy or electronically) to the editor's address on the front cover of this issue.



## DSP HARDWARE UPDATE

by Lyle Johnson, WA7GXD

The TAPR/AMSAT DSP 1 hardware is moving right along, behind schedule as predicted.

The DSP320 Processor board has been checkplotted several times and the artwork turned over to a PC prototype house for initial production for the alpha boards.

The rear panel I/O board has also been checkplotted and released to alpha production.

These two boards are four-layer boards and the most complex attempted yet by TAPR. Chuck Green, N0ADI, gets the credit for these layouts!

The double-sided power supply board (done by N0ADI and WA7GXD) is also in alpha production.

At this writing, the DSP loader board, being designed and laid out by WA7GXD, is in final design stages. It should be at the PC house for prototype fabrication by late January (this is being written in early January).

As promised in the last PSR, we'll explore the DSP320 processor board this issue. This discussion will cover the alpha prototype version of this board.

### PROCESSOR AND MEMORY

The processor used in the DSP320 processor board is a Texas Instruments TMS320C15. It is an enhanced version of the original TMS32010, but has nearly double the data RAM space (256 words instead of only 144 words) and is CMOS for lower power consumption. It is clocked at 25 MHz, for a typical cycle time of 160 nSec.

The 320C15 has a program memory space of 4k words. All 4k words are filled with high-speed static RAM (70 nSec or faster).

To allow the processor to boot, a special interface section is on the board which allows an external loader (or processor) to idle the 320C15, reconfigure the 4k words of RAM to appear as 8k bytes, and write (or read) data to (or from) the DSP memory. Upon completion of a load, the 320C15 is activated and runs whatever program is loaded into RAM.

This RAM is NOT battery backed - the RASM must be loaded whenever power is removed and then restored to the unit.

### MEMORY AND I/O MAPPING

The memory configuration (4k words or 8k bytes), as well as I/O mapping, is handled by a CMOS "Generic Array Logic" (GAL) device. This 24-pin chip provides all memory and I/O control signals for the entire DSP320 board.

The 320C15 allows 8 I/O addresses. The GAL device is assisted by a pair of 74HC138 decoders to map the entire I/O space. The I/O map is shown in Appendix A at the end of this article.

Channel 0 A/D and D/A are the primary analog input and output devices on the DSP320. These are 8-bit converters, and are expected to be used as modems to accept audio from a receiver, and provide audio to a transmitter.

The 8-bit I/O In and Out are the digital signals to/from the modem function of the DSP320. These lines include such things as DCD, TxData, RxData, TxClock, RxClock, PTT, etc.

The 8-bit I/O to/from the General Purpose Processor (GPP) form the handshaking port through which the DSP320 and the V40 GPP com-

municate.

The 16-bit I/O port is an option for high-speed digital information transfer. There are handshaking latches associated with this port, as well as the GPP port, which are readable from the Status Register.

Channel 1 analog I/O (A/D and D/A) is an option, and is configured exactly as Channel 0, with the same capabilities and limitations.

The Status Register, as mentioned above, serves to assist in synchronizing communications between the DSP320 and external devices. It tells if data written out has been accepted, if data has been written to the DSP320 and is awaiting service, and whether the incoming or outgoing FIFOs need service.

The sample clock generator provides four independent clocks (two standard for Channel 0, two optional for Channel 1). Typically, the D/A clock will be different from the A/D clock, and the A/D clock has the ability to be phase shifted with respect to an incoming signal. This feature allows the DSP320 to sample incoming data more slowly than might otherwise be the case, allowing more complex algorithms to be implemented.

The FIFOs are 512 words deep (or deeper, up to 4k words with present devices) and are an option. These will typically be used to slave a DSP320 to a master DSP320. In this way, the first DSP320 can act as an analog front end, and pass smoothed data to the second unit for serious number crunching.

The analog filter control sets the parameters of the AMI S3528 low-pass filters used between the A/D and D/A converters and the outside world.

In addition, I/O channels 6 and 7 may be configured to act as software-controlled input and output clocks for the A/D and D/A con-

verters.

### ANALOG I/O

Incoming signals are filtered by an AMI S3528 multipole low pass filter before being applied to the A/D converter. The cutoff frequency of the input filter is software controllable for application specific needs.

The filtered signal is then applied to the A/D converter, which has a conversion time on the order of 2 uSec or less. A sample clock initiates conversion. At the end of conversion, the data is latched and an interrupt (or "BIO") is generated to inform the 320C15 chip that a sample is ready.

D/A data is latched and read from the latch by the sample clock. The D/A output is filtered by an AMI S3528 filter, again software controllable.

The voltage range of the A/D and D/A stages is +/- 2.5 volts (5 volts peak-to-peak).

A second, identical, analog I/O channel is available. Simply plug in the chips into the provided sockets.

### SAMPLE CLOCKS

The sample clocks are based on an 8254 timer chip. This is a three-channel, 16-bit timer counter. It is driven by the system clock at 6.25 MHz, giving a resolution of 160 nSec.

One channel of the 8254 is typically sent to synchronize the D/A con-

verter. The remaining two channels are set up in such a way as to allow one channel to drive the A/D sampling, with the third timer selectable on a one-shot basis to shift the phase of the A/D sample clock. With appropriate software, this feature becomes very powerful and sets the DSP320 apart from any other low-end DSP processor board.

A second 8254 socket is provided in case a second analog channel is being used.

### OTHER DETAILS

FIFO buffers for asynchronous communications to a second DSP processor board are available as an option. The sockets are included.

Separate analog +5 volt and -5 volt regulators are provided to minimize noise coupled into the analog subsystem.

The DSP320 can operate with or without a separate processor. At a minimum, a bootstrap loader is required to boot the DSP320 memory at reset.

### CONCLUSION

The DSP320 board is an integral part of the TAPR/AMSAT DSP 1 project. It has features not otherwise available on a low-end DSP product (FIFO buffers, phase-shiftable clocks).

The project is entering a very exciting phase with the first alpha units to be shipped soon!

## NEW PUBLICATION - "DIGITAL DIGEST"

by Scott Loftesness, W3VS

A new publication arrived in my mailbox a couple of weeks ago. It's titled "Digital Digest" and is devoted entirely to the subject of digital communications via Amateur Radio. Published by Tom Arvo, WA8DXD, "Digital Digest" is planned for publication six times a year and printed in high quality newsletter format on 8-1/2 by 11" paper.

The initial issue, dated Nov/Dec. 1988, was 20 pages long (3 of the pages contained full page advertisements) and contained the following articles:

- "Packet Primer: The Basics of Connecting" by Lynn Taylor, WB6UUT
- "HF Packet...or Excedrin Headache Number 5" by Norm Sternberg, W2JUP
- "The APLink Connection (AMTOR)" by Paul Newland, AD7I
- "Net-Rom / Protocol and More!" by Lacy McCall, AC4X
- "RTTY Today - Something Old - Something New" by Jonathan Mayo, KR3T
- "A Microcomputer in your Shack?" by Jonathan Mayo, KR3T

In addition, this inaugural issue contained several miscellaneous news articles and a product review of N6RJ's computerized "Second OP" software for the IBM PC.

WA8DXD appears to have lined up an elite corps of editorial contributors to add some real meat to the publication.

Subscription information: \$16/year (6 issues) USA / \$20 Elsewhere. Digital Digest, 4063 N. Goldenrod Road, Winter Park, Florida 32792. Tom can also be reached on CompuServe at userid 73330,1335.



### Appendix A

ADDRESS	READ FUNCTION	WRITE FUNCTION
0	Channel 0 A/D	Channel 0 D/A
1	8-bit I/O In	8-bit I/O Out
2	8-bit In from GPP	8-bit Out to GPP
3	16-bit Port In	16-bit Port Out
4	Channel 1 A/D	Channel 1 D/A
5	Status Register	Sample Clock Gen
6	FIFO from 2nd DSP	FIFO to 2nd DSP
7	(UNUSED)	Analog Filter Control

## IMPROVED PERFORMANCE IN YOUR LOCAL AREA (AND HF, TOO!)

or "Inexpensive Upgrades for KAM,  
PK232, and a Host of Others!"

by Lyle Johnson, WA7GXD

### BACKGROUND

Proper operation of Data Carrier Detect (DCD) is imperative for efficient sharing of a packet channel. Many TNC's don't provide optimum DCD operation, and the current version (2.0) of AX.25 Level 2 protocol compounds the problem.

However, an inexpensive solution is now available to combat the former case - and progress is being made in the latter case with the proposed changes to AX.24 Level 2 Version 2.1.

### THE PROBLEM

The Tucson LAN operates via a mountaintop repeater dedicated for packet use. With a radius of coverage approaching 200 miles, it is essential that all stations be able to properly detect use of the channel by other stations and defer their transmissions until the channel is clear.

Over time, it has become apparent that most modems are lacking in proper DCD operation. Some are much worse than others. Some are OK, but allow improper operator adjustment without letting the operator know the "Threshold" adjustment is incorrect. (TNC 2 code release 1.1.6 alerts the operator by not passing along packets that are received if DCD was not activated. This encourages the operator to properly set any DCD threshold control that may be on his TNC.)

Eric, N7CL, has done extensive

investigation into this problem and presented his findings at the 7th ARRL Computer Networking Conference last fall. Most of the same information has also been presented in the most recent PSR's.

Please refer to N7CL's articles for an in-depth discussion of the problem.

### SOLUTION

If the DCD decision could be made on the basis of "information coherence" rather than "is there some sort of signal or noise present?", LAN operation will improve. This premise has been demonstrated in a number of locations where modifications to TNCs have been made.

Unfortunately, the modifications involve wire-wrapping a fair bit of circuitry, and this has prevented widespread adoption of the mods.

The TAPR Board of Directors approved funding a project in early January of 1989 to provide inexpensive kits to make it a trivial matter to upgrade most TNCs to improved DCD operation.

**NOTE THAT THESE MODS ARE EXTREMELY USEFUL FOR BOTH VHF AND HF OPERATION.**

### 2211-based Modems

TNCs using the XR2211 demodulator (TAPR Beta Board, TNC 1 and TNC 2, Heath HD-4040, AEA PKT-1 and PK-80, GLB PK-1 and TNC-2A, PacComm TNC-200, MFJ 1270 and 1274, DRSI HF\*MODEM, etc.) may be upgraded by obtaining the "2211 DCD UPGRADE" kit from TAPR (price and availability at the TAPR Annual meeting in February - it will be CHEAP).

The PC board is tiny, less than 2 inches on a side and shaped to fit into a TNC 1 or TNC 2. After building it, you simply unplug the XR2211 chip from its socket, insert

it into the socket on the upgrade board, then plug the upgrade board into the IC socket vacated by the XR2211 chip on the TNC.

If you are into HF operation, provision is made to connect a "Threshold" control onto the demodulator.

The result will be fast-attack, slow-decay DCD with a hang time to compensate for temporary fades due to multipath. When all stations sharing a channel have proper DCD action, data flows more efficiently.

### TNCs with Other Modems

TNCs such as the Kantronics KPC-1, KPC-2, KPC-2400, KAM; AEA PK-87, PK-88, PK-232; PacComm TNC-220, Tiny-2; DRSI PC\*PA Types 1 and 2; AIWA APX-25, APX-25M; TASCOS TNC-20, TNC-20H; Heath Pocket Packet, etc., fall into this category.

The upgrade adaptor for these TNCs adds an EPROM-based State Machine to derive DCD based on lockup of a digital phase-lock loop. It is a PC board less than 2 inches square, and mounts easily inside the cabinet of most any TNC (NOT the Heath Pocket Packet/TASCOS TNC-u21).

This upgrade will DRAMATICALLY improve DCD operation, even allowing you to run your radio unscathed which reduces other stations' TXDelay requirements, further improving throughput on the channel.

This upgrade kit "DCD ADAPTOR" will be available at the TAPR Annual meeting in February. Pricing information will also be available then (it won't be much!).

### CONCLUSION

TAPR is moving ahead to improve operations on packet channels for all users, regardless of the brand of their TNC. These adaptors will improve TNC performance, improve multi-

user channel sharing, and do so at a very minimal cost.

They will be "unveiled" at the TAPR Annual Meeting in February. See you there!



## AX.25 V2.0 UPGRADE FOR THE TAPR TNC 1

*or "It's only hardware..."*

by Lyle Johnson, WA7GXD

### INTRODUCTION

When TAPR introduced the TNC 2, plans were afoot to develop software for the TNC 1 which would, at a minimum, be every bit as capable as the TNC 2. Unfortunately, the software development tools which the TNC 1 software team had used became unavailable for TAPR's use. After extensive effort, it became apparent that the TNC 1 software development period had come to an end.

The author decided to see if a hardware upgrade could be worked out for the estimated 8,000 TNC 1s and clones in the Amateur community.

This article describes the results of this effort. (For those of you who always read the back of the book first, the answer is yes!)

### OVERVIEW

The TNC 1 Upgrade adds an enhanced TNC 2 to the TNC 1 chassis. When the upgrade is completed, the TNC will have all the capability of the TNC 1 coupled with all the capability of the TNC 2.

Looking at it from the TNC 2 perspective, the upgraded TNC 1 provides all TNC 2 features plus the following new ones:

(a) Software selectable serial port (ABAUD) and radio port (HBAUD) speeds.

(b) Two sets of default parameters in battery-backed RAM (optional).

(c) Two sets of EPROM-based software (optional).

(d) Complete TNC 2 firmware capability (NET/ROM, for example). This also "ensures" availability of firmware for the upcoming AX.25 V 2.1, etc.

(e) Two modem disconnect headers (one for the TNC 1, one for the TNC 2).

(f) Front panel RESET switch.

(g) A TNC 1!

### UPGRADE DESCRIPTION

The upgrade is a kit that can be built in an evening or two, depending on the builder's skill, experience and manual dexterity (had to get at least one four-syllable word in here).

It consists of a PC board measuring about 4 1/2 inches by 5 1/2 inches, 17 to 19 ICs (depending on options), a couple of connectors and a lithium battery.

After construction, the unit installs in the TNC 1 by removing the UART chip from the TNC 1 (6551, U14) and the push-on jumpers at the modem disconnect header (J5). The upgrade PC board plugs into U14's socket and J5. U14 is then installed on the upgrade board and the push-on jumpers installed in the new TNC 1 modem disconnect (T1).

A four-wire harness is installed on the TNC 1 and plugged into the upgrade board.

Operationally, the front panel has some new functions as shown in the table at the end of this article.

In the case of the Heath HD-4040, if you elect to not install front panel switches, the system will default to

the TNC 2 operating from BANK 1.

Oh, yes, for those of you who own early TAPR "Beta" TNCs, the upgrade will work with these, too! Installation is a little trickier, but not overly difficult.

Baud rates are set by selecting the TNC 1 and setting the rates by issuing the ABAUD and HBAUD commands (or <ESC> B and <ESC> H if running WA8DED firmware in the TNC 1). The TNC 1 baud rate generators then control the TNC 2 baud rates.

Like the latest TNC 2s, the upgrade accepts 27256 EPROMs for firmware, and uses a 32k byte static RAM chip for all RAM functions.

A second RAM chip (8k bytes) may be installed to allow selection of two sets of default parameters (two call signs, or HF and VHF settings, etc.). Since the TNC 2 uses the lower part of memory for parameter storage, a smaller (cheaper!) RAM is used as the second RAM. The remaining 24k bytes of the 32k byte RAM space is then "borrowed" from the primary RAM chip.

Of course, you may elect to install a 32k byte second RAM chip, in which case the upgrade unit will use the entire 32k bytes of it. The second RAM chip, regardless of size, is an option.

A second 27256 EPROM may likewise be installed to allow two sets of firmware to run in the TNC 2.

A local reset the the upgrade processor automatically occurs when you switch between banks (the TNC 1 is not reset in this case - you must manually press the RESET switch on the front panel).

### PROJECT STATUS

The TAPR Board of Directors funded this project early in December, 1988. By mid-December, the first proto-

type was operational at WA7GXD. At this writing, it is late December, and revised artwork (to add the automatic RESET when bank select is activated, and to separate the incoming serial port data streams between the TNC 1 and the TNC 2 based on which is selected) is being turned into PC boards.

Upgrade kits are scheduled to be available at the TAPR annual meeting in late February of 1989. Pricing information will also be available at that time.

See you there!



Function	TAPR TNC 1	AEA PKT-1	HEATH HD-4040
<b>SWITCHES</b>			
<b>TNC Select</b>	<b>RAM/ROM</b>	<b>PARAM SOURCE</b>	
<b>TNC 1</b>	<b>ROM</b>	<b>FROM</b>	
<b>TNC 2</b>	<b>RAM</b>	<b>NOVRAM</b>	
<b>Bank Select</b>	<b>BANK1/BANK0</b>	<b>NOVRAM BANK</b>	
<b>BANK 0</b>	<b>BANK 0</b>	<b>0</b>	
<b>BANK 1</b>	<b>BANK 1</b>	<b>1</b>	
<b>LEDS</b>			
<b>CON</b>	<b>RESET</b>	<b>TXD</b>	<b>RESET</b>

## INSTANT HEROES

by Andy Freeborn, NØCCZ

Picture this situation.

You are at a disaster site. You have the only packet station there. You have a good path to the "outside". The disaster is of much greater magnitude than anticipated. There is a lot of traffic to be moved. Most of it needs to be moved with the accuracy of packet so voice is not a good alternative. Some of the on-site disaster officials do not speak English. Some of the handwritten messages are not only in a foreign language but also contain characters that are not even available to your keyboard. As if these weren't problems enough, they are now asking you to send a sketch of the surrounding terrain which they have prepared. Via packet. Ridiculous.

Pretty uncomfortable spot you're in huh?

Not really. You just reach into your magic tricks bag, pull out your micro FAX machine, plug it into your packet gear and start sending to the FAX machine on the "outside". Voila, you're an instant hero.

"OK" you say, "TAPR where's the

FAX interface for my packet rig."

Well, TAPR doesn't have one. But you'll have to admit it's a helluva good idea. It's also a good idea to come up with some inexpensive "plain Jane" RF gear for the 900 MHz band. It's also a good idea to ....etc etc.

What is needed to get things like this done is just a few competent, self starting technical types that are willing to commit to a project and see it through. The TAPR techies are already up to their eyeballs in projects. TAPR has the project expertise, the know how and the resources to support valid projects. All that's needed is a few more TAPR techies willing to make a dedicated contribution to amateur radio.

Anyone for exploring the FAX idea?

(FAX idea suggested by Phil Karn, KA9Q, a TAPR techie who is also up to his eyeballs).



*Editor's Note: Andy makes a very good case for their being lots of worthwhile projects needin g good people to help get things done. Volunteer! Your help can make a difference - in the most exciting area of Amateur Radio!*

*Board of Directors*

*Continued from page 11*

to packet, Lyle designed the Oscar 11 C Digital Communications Experiment processor and is the primary hardware designer for the MicroSat Flight Computer, scheduled for launch on four Amateur satellites later this year.

Lyle serves on the ARRL Digital Committee, is a life member of AMSAT and ARRL. He is happily married to Heather (N7DZU) and, in his spare time, assists her in raising their six children. Professionally, he is in charge of Hardware Engineering at Modular Mining Systems in Tucson, Arizona.

Lyle believes that packet radio, while ushered in by technical people, is at heart a social phenomonom. His focus is in working to bring the benefits of digital technology to Amateur radio, rather than transforming a segment of Amateur radio into a simple extension of commercial telecommunications systems. If returned to the TAPR Board, he will continue to work towards this end.



**SEND YOUR BOARD OF DIRECTORS' BALLOT TO THE TAPR OFFICE TODAY! YOUR VOTE COUNTS AND IS IMPORTANT TO THE FUTURE OF TAPR! VOTE & MAIL TODAY!!!**

## TAPR BOARD OF DIRECTORS ELECTION

Tucson Amateur Packet Radio is a non-profit corporation licensed in the State of Arizona as a scientific and educational institution. It is recognized by the IRS as a 501(c)3 tax-exempt organization for these same purposes.

TAPR is governed by a 15 member Board of Directors. Each member of the Board serves a three year term, hence there are 5 positions to be filled each year. Board members are expected to attend the annual Board Meeting, normally held in Tucson. They participate in the decision making process and provide guidance to the officers. They receive no pay and they must defray their own expenses to attend meetings. Board members should be prepared to be active in the continuing board deliberations, which are conducted privately in a special conference section on Compuserve.

The officers and the Executive Committee of TAPR are elected by the members of the Board at the annual Board of Directors meeting.

The current members of the Board and the expiration dates of their terms follow:

Mike Brock WB6HHV	1991
Tom Clark W3IWI	1990
Pete Eaton WB9FLW	1990
Andy Freeborn N0CCZ	1991
* Steve Goode K9NG	1989
Bob Gregory KB6QH	1990
* Eric Gustafson N7CL	1989
Skip Hansen WB6YMH	1991
* Lyle Johnson WA7GXD	1989
Phil Karn KA9Q	1991
* Scott Loftesness W3VS	1989
* Bob McGwier N4HY	1989
Dan Morrison KV7B	1991
Harold Price NK6K	1990
Dave Toth VE3GYQ	1990

This year's board election is for the five seats shown expiring in Febru-

ary 1989 (marked with an asterisk). The seven candidates for this year's election are:

Franklin Antonio N6NKF  
 Mike Chepponis K3MC  
 Roy Engehausen AA4RE  
 Bdale Garbee N3EUA  
 Steve Goode K9NG  
 Eric Gustafson N7CL  
 Lyle Johnson WA7GXD

Your ballot is included in this issue of PSR. Please vote for the five candidates of your choice on the ballot and mail it immediately to the TAPR office in Tucson. The ballot can be torn out of this issue of PSR, folded, sealed and stamped for ease of mailing to TAPR. Since the Board will meet in Tucson the day before the annual meeting, all voting must be done by mail. Ballots cannot be accepted at the meeting. Election results will be announced at the annual TAPR meeting in Tucson on 25 February 1989.

Here are the candidates' background and qualifications as submitted by them:

### Franklin Antonio, N6NKF

I was a member of the PS-186 Packet Switch design team (with KA6IQA & WB6HHV), and co-authored the paper describing the PS-186 in the ARRL 6th Computer Networking Conference. My writings can also be found in various issues of PSR, and Gateway. I've been Exec V P of the San Diego Packet Radio Association (SANDPAC) for 2 years, and editor of the SANDPAC Newsletter.

I worked at MACOM-LINKABIT for 13 years (1972-85) on all aspects of digital satellite communications systems. I was project engineer for the world's first software digital-signal-processing satellite modem (the Air Force MD-1035, circa 1974), worked on the development of the VideoCipher video scrambling sys-

tem (later sold to General Instruments), and taught the company's internal VLSI design course. I was Asst V P of Engineering when I left in 1985.

Since then, I've been V P of Engineering at QUALCOMM Inc., developing OmniTRACS, a two-way satellite communications system for long-haul trucks.

Goal: Making higher-performance digital communications available to the amateur radio community.

I have tremendous respect for the things that TAPR has accomplished, and I want to see that magic continue.

### Mike Chepponis, K3MC

Mike Chepponis, K3MC is 34 years old, and a Senior Engineer at Apple Computer's Manufacturing R&D group in Fremont, California. Licensed since 1966, he is a Lifetime member of both the ARRL and AMSAT. His current interests include packet radio of all flavors, with special concentration on Phil Karn's TCP/IP. He has been operating a BBS since 1984. He wrote the first KISS TNC implementation, for the TNC-2, in 1986. Recently, he has designed and built a high-speed I/O card that plugs into an IBM XT/AT/386 backplane. He can be reached on the Arpanet as k3mc@apple.com, on uucp as ..!sun!apple!k3mc or on the land line at 415/438-9492. Mike currently lives in Fremont, California. He holds a B.S. in Electrical Engineering and Computer Science from M.I.T.

### Roy Engehausen, AA4RE

A packeteer since 1984, Roy Engehausen, AA4RE, was first licensed as WA2UIL in 1961 and obtained his Extra license (as well as commercial) in 1965. He holds a BSEE from Carnegie Mellon University and spent four years in the Army

studying Soviet Bloc electronics. Currently employed by IBM as the VM system manager at the Almaden Research Lab, his amateur radio interests have included CW, DXCC and the construction of several voice repeaters as well as emergency communications having served as both an EC and a RACES Radio Officer. The author of MBBIOS (I/O routine for most BBS programs) and a multiconnect mailbox program (BB), Roy is also a founding member of the Norcal SYSOPs Group, a director of the Northern California Packet Association and chairperson of the Garlic Valley Packet Society. His other "hobby" is officiating football for local high schools in the area around his home in Gilroy (Garlic Capitol of the World), California where Roy lives with his wife and teenage daughter. He can be reached via Internet as ENGE@IBM.COM, CompuServe: 76064,2107, BITNET: ENGE at ALMVMA or via packet to AA4RE @ AA4RE.#NORCAL.CA.USA.NA.

### **Bdale Garbee, N3EUA**

Bdale Garbee, N3EUA, is a graduate of Carnegie-Mellon University with a degree in Electrical Engineering and Mathematics, now working as a Design Engineer at Hewlett-Packard's Colorado Springs Division. Bdale is a member of the ARRL and AMSAT, and serves as a director in both the Rocky Mountain Packet Radio Assn. (RMPRA), and his local club, the Pike's Peak Radio Amateur Assn. Bdale has attended the last three TAPR annual meetings, and made presentations at the last two. He has presented papers at the last two ARRL Digital Networking Conferences. He authored the 'BM' mailer used with Phil Karn's TCP/IP package, and has handled integration, documentation, and distribution of the package to the amateur community worldwide. He is currently involved in the design of multi-

megabit-per-second packet radio gear for 10Ghz, and is actively working on a high-speed packet switch design. Bdale operated a PBBS in Pittsburgh, PA, before moving to Colorado. In addition, he has for 4 years operated a phone-line BBS system dedicated to supporting packet radio, including distribution of BBS and TCP/IP software. You can reach Bdale as bdale@hp-col.hp.com on the Internet, or as 76430,3323 on CompuServe.

### **Steve Goode, K9NG**

Steve has been involved with TAPR since the Beta testing of the TAPR TNC1. During that time he performed Bit Error Tests of the modem. He was involved in the modem design of the TNC2. Steve also designed the 9600 bps modem which TAPR offers as a semi-kit. Steve has served as Vice-President and President of the Chicago Area Packet Radio Association (CAPRA).

Steve hopes to continue helping TAPR advance the state of the art for Amateur Packet radio.

### **Eric Gustafson, N7CL**

Address: 2018 S. Avenida Planeta, Tucson, AZ 85710 Phone: (602)-747-1410

License: Originally licensed in 1959, currently hold Extra Class  
Affiliations: Member TAPR since 1982, Board Member since 1986, Member AMSAT, Member ARRL

Profession: Senior Design Engineer for Modular Mining Systems, Tucson, AZ. Primarily responsible for board level design of digital radio communication interface and radio communications systems design.

I have been actively involved in packet radio since 1983. I am primarily interested in the hardware aspects of the mode but have re-

cently been looking at protocol simplification / optimization for use on HF.

My recent amateur activity includes participation in the beta test phase of both the TNC-1 and TNC-2 design. I have done extensive work on optimizing modem characteristics for radio application both for amateur radio and professionally. I recently published a paper on modem DCD characteristics in the proceedings of the 7th ARRL Computer Networking Conference.

Until my recent illness prevented extensive active participation, I was a member of the AMSAT Microsat design team and participated in the initial design of the VHF uplink receivers to be used on that bird.

I am now about 50 percent recovered from my Guillain Barre Syndrome paralysis and feel that I can continue with my activities as a member of the TAPR BOD.

### **Lyle Johnson, WA7GXD**

Lyle, a licensed Radio Amateur since 1964, has been active in TAPR since day one. He is one of the two co-founders of TAPR, and holds membership number 2. He has served on the TAPR board since that time. Lyle was TAPR's Executive Vice President from the beginning until February, 1983, when he was elected President. He served as TAPR President until February, 1988.

Lyle's visible contributions to packet radio have largely been in the hardware area. He led the Alpha, Beta and TNC 1 hardware design effort, and participated in the TNC 2 effort. He also worked on the NNC and PSK modem projects. His most recent design work has been the TNC 1 Upgrade and the joint TAPR/AMSAT DSP Project.

In other Amateur endeavors related

*Continued on page 9*

## IN THE MAILBOX

by Roy Engehausen, AA4RE

Keep those cards, letters, and packet messages flowing. I can use all the news especially on the non-IBMPC based systems. Please drop me a quick note and share this information with us all.

### HIERARCHICAL ADDRESSING

Hierarchical addressing (discussed in the last PSR) is starting to catch on from what I can tell. Several of the HF packet gateways have told me that it will save them hours of work.

Find out what your local mailbox's address is and start using it in your mail!

### X820 MAILBOX VERSION

Version 12.4 of the Xerox PBBS code is now available. The main enhancement of this version is a multi-user configuration allowing several Xerox 820 machines to be linked together over the PRINTER serial ports. The system may be configured as it was originally, if so desired. The release also contains a fix for a nasty bug in BID forwarding which, under certain conditions, would forward previously flagged-as-forwarded BID items.

If you would like a copy of the code which includes the December 1988 W9ZRX BBS list, please send TWO 8" disks with an addressed, stamped mailer to the following address:

John Bennett  
5805 Whitethorne Drive  
Evansville, IN 47710

Those of you who want EPROMs blasted for the auto-boot code should send them as well.

As in the past, due to the customized CBIOS used, this code will only run on Xerox machines.

KA9LQM is no longer handling distributions. This was previously reported in PSR in error.

### THEBOX

You never heard this name TheBox? TheBox is a multiconnect mailbox software, made by NORD><LINK and features:

- 9-channel multiconnect
- speaks up to 6 different user-selectable languages
- up to 4 TNCs with up to eight channels on each TNC
- store & forward compatibility with WA7MBL and WORLI mailboxes
- Lifetime management for every message
- Channel monitoring on all mailbox channels
- AMTOR usage (with some modified hardware)
- will run on any XT/AT/386
- you don't need a multitasking operating system
- takes about 350 Kbytes of memory
- Source code (Turbo-C 1.5) is available
- runs with TNC1 or TNC2 or mixed
- Password for remote users (new password after every login)
- selectable exclusive channels for store & forward and remote sysops
- completely configurable from remote

TheBox gives best performance with TheFirmware on your TNC-2s, a WA8DED host mode compatible software (made by DC4OX, NORD><LINK). The distribution disk contains one 4-channel and one 8-channel version of TheFirmware for the TNC2. The TNC1 and TNC2 may also be used with the original WA8DED host mode.

Release 1.5 is now available with an English sysop-manual (thanks to Don, DJ0HC). If you want a copy of TheBox, please send one disk 360K/

IBM and return postage to

Reinhard Ruediger, DF3AV Breite Strasse 20 D-3150 Peine West-Germany

If you send two disks, you will also get the source code for TheBox.

### WORLI SOFTWARE

WORLI is up to version 9.04 of his BBS software. The newest feature is "Archive by Bid." This allows you to store an incoming message in a file automatically and is very handy for things like the ARRL bulletins, Gateway, ARRL Letter, etc. As an example, an incoming message with a bid of ARLB010 can not only be handled as a message but stored somewhere at a file called ARLB010. WORLI 9.04 is available from the usual sources.

### AA4RE SOFTWARE

By the time you read this, the AA4RE mailbox program "BB" version 2.4 should be available. The program features multiple ports and multiple connects per port.

The new version has over 50 new features (many suggested by SYSOPs using BB) and a bunch of bug fixes. Highlights are:

- Reduced storage utilization
- Added multiple read / kill on one command with ranges
- Added LO, KO command (List/Kill old messages)
- Added GC, GW commands for capturing sessions and windows into a file
- Added code to permit only send of certain types
- Added NETROM Node broadcast decipher
- Added support for more than 2 DRSI PC\*PA ports
- Improved logging for forward and connect
- Improved search path for forward to cut down time
- Improved monitor display —

shorter prefix and better breaks  
- Improved ability to talk to user

The program requires a "HOSTMODE" TNC. Currently supported are the TNC-1, TNC-2 (and clones). Either **NORD**<<LINK's or **WA8DED's** hostmode software must be installed. In addition, the AEA PK-87, PK-88, and PK-232 (without modifications) are supported as well as the **DRSI PC\*PA** and the **PAC-COM PC-110/120** cards.

You can get this programs thru **COMPUSERVE** or send a **FORMATTED** diskette with **SASE**:

West of the Mississippi:

Frank McPherson KB7TV  
16410 South 46th Place  
Phoenix, AZ 85044  
(602) 759-1854

East of the Mississippi:

Gary Mitchell, WB9TPG  
220 East Eagle St.  
Versailles, KY 40383  
(606) 873-8329  
WB9TPG@WB9TPG.KY.USA.NA

Source is also available. Source code requires another 360K diskette except for the mailbox program which needs two 360K diskettes alone. Gary can handle the standard 5 1/4" 360K disks while Frank can write on 5 1/4" or 3 1/2", single or double density (360K, 1.2MB, 720K, 1.44MB). Please don't send diskettes to AA4RE.

The software can also be obtained by downloading from the **WA6RDH** BBS at 916-678-1535 at 300/1200/2400 N81.

#### FEEDBACK WANTED

I would love to hear from you. Send any suggestions, comments, new tibits, and hate mail (in good taste of course) to:

PACKET: AA4RE@  
AA4RE.#NOCAL.CA.USA.NA

CompuServe: 76064,2107

Internet: ENGE@IBM.COM

BITNET: ENGE at ALMADEN

USMail:  
8660 Del Rey Court,  
Gilroy, CA 95020.



### "NO-CODE" - IS IT WORTH THE HASSLE?

by Scott Loftesness, W3VS

Back in the early 80's when the FCC initially proposed a no-code license for Amateur Radio, the FCC staff thought they had the "blessing" of the ARRL. Once the proposed rule-making went public, however, the amateur community reacted so violently to the notion of a no-code license that an pre-arranged support from the ARRL staff or directors evaporated. It became very clear that the amateur community at large simply didn't support a no-code license being part of Amateur Radio.

#### Why?

Reactions at the time would seem to indicate that most amateurs simply didn't see any valid reason for loosening the criteria required to gain admittance to the amateur radio fraternity. In fact, many felt that since they had to learn the code when they got their license that any newcomers to the hobby should have to pass the same (or more stringent) requirements! Seems that newcomers who don't know Morse code are viewed as somehow less than the rest of us.

Another common reaction is that folks **MUST** know Morse code to be effective in times of severe communications emergency - when that voice message just won't get

through. However, even the international maritime authorities are now abandoning any requirement for CW proficiency among on-board radio officers. Satellite communications and HF voice/data communications are simply replacing CW. In fact, having a larger cadre of licensed amateurs (some of whom don't know Morse code) is much more valuable in time of emergencies than having a smaller group who **ALL** know Morse code.

A lot of the current thinking about proposing a new entry-level, no-code amateur radio license is based upon Amateur Radio's failure to retain the 220-222 MHz frequency allocation that we've had (although on a secondary basis) for many years. There are a number of interest groups who would love to have even more of the Amateur Radio spectrum - particularly in the VHF and UHF regions. In fact, there are some in Washington who advocate that the best way to deal with frequency allocation decisions is to simply let the free market decide. Here's an article from the January 10, 1989 Wall St. Journal that you might find interesting:

#### RADIO SPECTRUM BIDS ARE PROPOSED BY U.S. AS REVENUE SOURCE

By a Wall Street Journal Staff Reporter

WASHINGTON-Using a new approach to an old proposal, the Reagan administration figures the government could fetch \$2.3 billion in fiscal 1990 and \$1.1 billion the following year by putting unused portions of the radio spectrum up for competitive bidding.

Last year, the proposal was estimated to bring in only \$250 million. The plan designates six megahertz, and calls for the Federal Communications Commission to end assigning frequencies through costly lotteries or lengthy competitive hearings.

The new evaluation of revenues is based on a cash-flow analysis that takes into account actual sales of cellular properties, such as Metromedia

Inc.'s \$1.2 billion sale of most of its cellular business to Southwestern Bell Corp. two years ago. Previously, budget officials used a 1985 engineering study.

Whether the big, new figures can entice Congress to ride the wave is uncertain. In the past, the proposal has met with stiff opposition from broadcasters who fear the plan could lead to charges on frequencies they currently receive for free and from some lawmakers who say it would limit the auction process to the rich.

Of course, there are many other considerations behind this issue. Looking to the future, Ray Kowalski, former FCC staffer and now a communications attorney in Washington, DC has made the following comments in a recent letter to Fred Maia, W5YI:

To gain a proper perspective on such a project, it is necessary to understand that this subject is not about logic, merit and practicality; it is about politics, emotion and personalities. To see that this is true, one need only examine the remains of the last such initiative.

At the 1979 World Administrative Radio Conference, the United States secured a little-noticed change in Number 2735 of the international Radio Regulations. The change permitted Amateur operations on frequencies above 30 MHz without a demonstrated telegraphy proficiency.

With this underpinning in international law, the FCC opened PR Docket 83-28 in 1983, proposing a class of license with limited Amateur operating privileges and no telegraphy requirement. This prompted an all-out defense by the American Radio Relay League, which portrayed the proposal as the total abolition of Morse code. The debate on the record centered on the value of Morse code, ending in the finding that Morse proficiency is still essential to all phases of Amateur radio operation.

You know that is not true; I know that is not true. I suspect that most ama-

teurs, in their heart of hearts, know that is not true. So how and why did the decision come out that way? Politics, emotion and personalities.

**Politics.** The ARRL has its very roots in Morse traffic handling. The telegraphy point of view is so ingrained in the League that it is powerless to digress from it. To do so is to risk the wrath of the membership, all of whom survived their Morse hazing. Moreover, the FCC has enough controversies on its hands in the Fairness Doctrine, Access Charges and the like. The ARRL is very good at stirring up Congressional inquiries, so why take on another controversy over so trivial a matter?

**Emotion.** In this case the emotion is fear. Fear of the unknown. An undercurrent running through the debate was that a codeless class of license would mean the reincarnation of the Citizens Band radio service. I personally think that this was of paramount concern to most amateurs who protested the proposal.

**Personalities.** Here I cannot go into much detail out of respect for confidences reposed at the time. Suffice it to say however, that I personally believe that had there not been a change in bureau chiefs between the time that PR Docket 83-28 was begun and resolved, the Amateur Radio Service would have had a no-code class of license.

When no-code was killed, I was accurately quoted in the press as saying that this Dracula had a stake in its heart and only the ARRL could pull it out. That may still be the case, but now some things have changed.

**Politics.** There is going to be a complete change of administrations in the fall, regardless of who wins the election. The new administration will want to "hit the ground running" when it takes office. It will be looking for initiatives. In my view the time is propitious for a no-code proposal. In fact there will never be a better time for such a proposal, provided it is shown to have substantial popular support as the action that is needed to revitalize the Amateur Radio Service. Moreover, the ARRL leadership that "won" the

no-code battle in 1984 badly mishandled the recent re-allocation of the 220 MHz band. There are those who believe that if no-code had been enacted in 1984, the ranks of amateurs operating at 220 MHz would have swelled enough to have prevented the loss of 2 MHz of the band. The ARRL may not now have the support on this issue that it had four years ago.

**Emotion.** Again the emotion is fear, but this time the fear is for the future of the Amateur Radio Service. The question is not whether the Service dares to change, but whether it dares not to change. The Amateur Service is fresh from its worst defeat on the only battleground that really matters: frequencies. It has shown its vulnerability and year from now analysts may look back to 1988 as the beginning of the decline of the service. Under the unrelenting pressure for spectrum for commercial uses, the amateur service may well end up as merely a remnant of its former self, with a few frequencies in each band suitable to support the activities of the relative few who are licensed in the service.

**Personalities.** Here is the big question that cannot be answered until after the inauguration. Nevertheless it is safe to say that the success of a no-code proposal will depend entirely upon the Private Radio Bureau Chief's commitment to it and ability to persuade others to his or her view.

What do YOU think? Where do you come out on the notion of a no-code license and its future importance to preserving Amateur Radio's existing frequency allocations?

The TAPR Board is interested in hearing your comments on a new entry-level, no-code license proposal. You can send your comments via mail to the TAPR Office or via packet or CompuServe.

Either way, be sure your thoughts are heard! Many of us believe a new license class is important to the survival of Amateur Radio.

Yes, No-Code is worth the hassle!  
— W3VS

# OFFICIAL BALLOT

## **1989 TAPR Board of Directors Election**

Please vote for five (5) of the following candidates:

<input type="checkbox"/> Franklin Antonio, N6NKF	<input type="checkbox"/> Steve Goode K9NG
<input type="checkbox"/> Mike Chepponis K3MC	<input type="checkbox"/> Eric Gustafson N7CL
<input type="checkbox"/> Roy Engehausen AA4RE	<input type="checkbox"/> Lyle Johnson WA7GXD
<input type="checkbox"/> Bdale Garbee N3EUA	

*Please fold at line, staple and mail immediately. Ballots must be received by February 22nd to count!*

---

Place  
Stamp  
Here

**TUCSON AMATEUR PACKET RADIO  
PO Box 12925  
Tucson, AZ 85732**

## NEW and RENEWAL MEMBERSHIP APPLICATION

Tucson Amateur Packet Radio Corporation  
PO Box 12925, Tucson, AZ 85732

Name: \_\_\_\_\_

Call License  
Sign: \_\_\_\_\_ Class: \_\_\_\_\_

Address: \_\_\_\_\_

City & ZIP  
State: \_\_\_\_\_ Code: \_\_\_\_\_

Home Work  
Phone: \_\_\_\_\_ Phone: \_\_\_\_\_

If you wish to have any of the above information deleted from publication in a membership list, please indicate which items you wish suppressed:

\_\_\_\_\_

I hereby apply for membership in TAPR. I enclose one year's membership dues (\$15 US, \$18 Canada/Mexico, \$25 Outside North America).

Signature: \_\_\_\_\_

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

The officers of the Tucson Amateur Packet Radio Corporation are:

Andy Freeborn, NØCCZ President  
Tom Clark, W3IW1 Executive Vice President  
Scott Loftesness, W3VS Secretary/Treasurer

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