PACKET STATUS REGISTER

Tucson Amateur Packet Radio Corporation

President's Corner

by Bob Nielsen, W6SWE

Hello again! Things at TAPR have been moving right along since the last issue, and although there are no earth-shattering new developments, progress has been made on many fronts.

The "alpha" METCON-1 kits were made available at Dayton and have sold quite well. Of the 50 units kitted, only a few were left at the time I was writing this. If you are interested, please call Heather at the TAPR office. We expect to have the first run of production kits available very soon. See the announcement elsewhere in this issue. TAPR is offering to license the METCON-1 design to OEMs and letters have been sent out to those who have expressed interest.

Beta boards of the joint TAPR-AMSAT Digital Signal Processor (DSP) are now in the hands of several software developers and as soon as we have some experience with operating the boards with representative software, the final hardware design will be completed and this, too, will go into production. Likewise, the DSP design will be made available to OEMs when it is completed.

In answer to many requests we have received, TAPR is now offering a package consisting of the bare TNC-2 p.c. board accompanied by a printed schematic plus disks containing the EPROM code and the text of the assembly and operating manuals. These have been updated to cover the current 1.1.7b firmware. A reduced-price OEM package for the TNC-2 is also now available.

TAPR now offers name badges. These are 3.5 by 2.5 inches, with the TAPR logo and name in blue plus your name and call sign engraved in black. It's just what you always needed to wear to hamfests and swapmeets. See the insert form in this issue if you are interested in a badge.

Finally, the TAPR "Packet Radio" video mentioned in the last issue is now available. Greg Jones, WD5IVD, has updated the 1985 tape. This is very introductory and would be suitable for presentation to non-ham groups as well as to your local ham club.

In other matters, with the impending loss in this country of 220-222 MHz, where much of the packet activity on the 1.25 meter band takes place, it is good to note that in the ARRL Letter the League has petitioned the FCC for the use of the 216-220 segment for fixed point-to-point communications. If granted, this could have a beneficial impact in providing new spectrum for network backbones.

A Brief Look at the RAMSEY 2-meter Transceiver

by Lyle Johnson, WA7GXD

At Dayton this year, the TAPR booth was across the aisle from the RAMSEY booth. Having an extra 30 seconds on Sunday morning, I dashed across the aisle and what did I see? A synthesized 2-meter FM transceiver kit for $129!!! Or, $149 with cabinet (must have been a Dayton special, right?)

Well, I hadn't left home without my American Express card, so I whipped out the plastic and took home a kit.

I hope to provide a decent "First Look" for you next issue -- I haven't even had this thing on the air on packet yet -- but here are some first impressions.

The kit documentation is fairly complete. Someone went to a lot of effort to make the assembly process fairly painless. There are various tests you perform as you assemble the kit to prevent you from getting into so much trouble that you can't dig your way out.

There are, however, a number of disturbing aspects of the kit. Some I can attribute to "it's gotta be ready for Dayton!" and others I suspect run deeper.

On the positive side, the kit was nearly complete. There was a part missing, about which I wrote to RAMSEY and they replaced quickly and without question.

On the negative side, the parts used in the kit appear to be largely surplus

or "floor sweepings" perhaps used to keep the price so low. Example: ceramic disc capacitors are used extensively in the kit. Several values of these parts had the covering removed or incomplete, so the white substrate and silver-colored plates were partially exposed. I am worried about the long-term reliabiliy consequences of using such parts. Example: the ICs are date coded as long ago as the late 1970s!

The PC board has no solder mask (no big deal) but this makes the white silkscreen lettering hard to see (low contrast). Black lettering might be better.

The PC board lacks thermal relief at ground connections. This makes soldering a proper joint nearly impossible. The solder takes OK on the solder side of the board, but doesn't wick up properly due to the thermal gradient across the plate-through region. A "bonus" is that this makes desoldering a ground connection very difficult as well. I think this needs attention in the PC layout department.

The cases are a bit of a problem. They were delayed in shipment and the rear panel is a bit hacked up as a result of a misalignment. This is probably, again, due to the Dayton syndrome.

There were several errors in the instructions, but most of these are covered by an errata sheet that was sent with the replacement part. It was too late in my case (the unit was built except for that one part) but it looks like they found most of the problems.

Upon completion, I tuned the unit up (there is a place on the PC board where some traces merged and the factory cut them apart with a knife. They didn't completely cut them, so the unit was dead until I re-cut the area).

I measured 2-3 uVolt sensitivity for quieting below the "popcorn" noise level. Most radios are under 1 uV for this sensitivity. I measured 2 to 2.5 watts output from the transmitter. I haven't put it on the air yet on packet, nor run SINAD measurements.

In the next issue of PSR, I'll try and have this all done and also try to run it at 9600 bps and see what happens!

Caveat emptor!

10th ARRL Amateur Radio Computer Networking Conference

27-29 September 1991 Radisson Airport Hotel San Jose, CA

The Northern California Packet Association (NCPA) is hosting this year's ARRL Computer Networking Conference and invites you to attend. Glenn Tenney, AA6ER, is the local conference chairperson.

Hams from around the world will be presenting papers on what they're working on in packet radio. The presentations and papers might cover any subject from satellites to spread spectrum, from protocols to hardware, or any other topic related to how hams are, or will be networking.

In addition to the usual presentation of papers all day Saturday, this year's conference will be surrounded by other interesting and informative activities. You won't want to miss any of this.

How to Submit Papers
The deadline for receipt of camera-ready papers is 12 August. If you're going to submit a paper, you should contact Lori Weinberg at ARRL, 225 Main Street, Newington, CT 06111, telephone 203-666-1541, fax at 203-665-7531. Lori is handling the arrangements for the proceedings.

How to Register for the Conference
Please use the attached conference pre-registration form to register for the tutorials, main conference, and the dinners. We are working with a VERY tight budget and would appreciate receiving your registration and check at the earliest possible date. We have already had to make quite a commit-

ment to the hotel, and catering is asking for a commitment which requires a close attendance count. Make your checks payable to "Fantasia Systems Inc." and mail them to AA6ER at: Glenn Tenney, AA6ER; Fantasia Systems Inc.; 2111 Ensenada Way; San Mateo, CA 94403 (the address is also on the form).

Hotel Reservations

We've arranged an attractive room rate of $69 per night, plus tax, for single or double occupancy. You'll have to make your hotel reservations early as the number of rooms blocked out for us is limited. Call the Radisson Hotel directly at (800) 333- 3333 to make your reservation. You'll need to tell them your reservation is for the "ARRL CNC" to access our block of rooms. The way hotels work, it will help us meet our budget if our block of rooms is used up.

Transportation

The conference hotel is located near to the San Jose International airport which supports both commercial and general aircraft. The Radisson Hotel offers shuttle service to and from the airport. Be sure to ask about the shuttle service when you make your hotel reservation.

In an effort to save you money, we've selected American Airlines as the official airline for the conference. What this means is that you can receive discount air fares (eg. from within the U.S., 5% off the lowest published applicable fare). You'll have to contact American Airlines directly for details. Call their Meeting Services Desk at (800) 433-1790 and refer to Star #S47Z14A. Since San Jose is an American Airlines' hub, you should find it very convenient.

The Agenda

We're still improving and tweaking the agenda, but here's the agenda as it stands right now:

Friday, 27 September

13:00 - 17:00: In-Depth Tutorials

Three concurrent in-depth technical sessions will be available. These planned "tutorials" are expected to include: Digital Signal Processing; Spread Spectrum and Part 15; and

Packet Satellites. The speakers selected will be those currently working on the leading edge of these technologies. These sessions will allow the subjects to be covered in depth and right down to the bits and bytes level. These sessions are priced separately, and will include handouts and a mid-afternoon break.

19:00 - 21:30: Dinner

Instead of everyone trying to find a pizza place that can handle fifty or a couple of hundred people, we've decided to have a very special group dinner. As an option you can sign up for the Friday evening dinner and join everyone for a LUAU! Yes, a real honest to goodness luau! This should be an ideal time for everyone to relax. We expect that most of you will join us, even if you aren't attending the tutorials. This will be right at the hotel, so you won't have to drive anywhere. After dinner we expect to have some informal BOF sessions.

Saturday, 28 September

08:30 - 17:00: Presentation of CNC Papers

This is the traditional part of the conference. As in past years we'll be gathering up all of the papers submitted for presentation, and divide them into the time available. Everyone will have a chance to present a paper. The published proceedings and lunch (at noon) are included in the conference fee.

18:30 - 21:00: Dinner

The CNC doesn't stop at dinner. We've arranged an optional dinner at the hotel complete with a guest speaker. At this time, we don't know who will be the banquet speaker, but based on some of the names we're discussing, you won't want to miss this!

21:00 - 24:00: BOF sessions

Ten or fifteen minutes per paper really isn't enough, so we've planned break-out rooms for "Birds Of a Feather" sessions. During the day we'll have sign-up sheets so that discussion groups can form and really get into topics of greatest interest.

Sunday, 29 September:

As usual, the digital committee will have their business meeting Sunday morning from 09:00 until 12:00. But that's not all...

We're going to have a demo room available from about 09:00 until 13:00. We're hoping that you'll be able to bring a rig with you to show off your latest work. We may also have some exhibitors. But wait, that's still not all...

We're going to present various newcomer tutorials from 10:00 until 13:00. These tutorials may be for the first-time packet user, while others might be for the first-time TCP/IP user. These tutorials will help folks learn more about various aspects of packet radio. The demo/exhibit room and newcomer tutorials will be open to all hams and prospective hams whether signed up for the rest of the conference or not.

And finally, the San Jose Technology Center is a short light-rail ride away and they have a fantastic high-tech museum called The Garage. Although a trip to the garage isn't an official part of the CNC, we're sure a large group will be planning a visit on Sunday. We'll try to help plan this outing during the conference. We'll likely work out a late morning trip and an early afternoon trip.

73, Glenn Tenney,
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Bits in the Basement

by Bdale Garbee, N3EUA

Welcome to the last installment of Bits in the Basement. This time, I'll talk a bit about the Packet Racket meeting in Grand Junction, CO., convey my impression of Dayton this year, talk a bit about the state and future of TAPR, and wrap up with some thoughts on what I'll be working on for a while.

Packet Racket 1991

On Friday, March 29th, Karen and I travelled west to Grand Junction, CO, near the border with Utah, for the annual Packet Racket meeting organized by hams on the "western slope" of Colorado. It was an interesting trip for several reasons. It snowed on us on the drive out. The meeting itself was very well organized, and represented significantly more enthusiasm and activity than I'm aware of on the "eastern slope" of Colorado. And some interesting brain-storming occurred on the linked voice repeater system driving back towards home on Sunday.

The meeting itself was on Saturday, with presentations on a variety of subjects, from new user fundamentals, to NET/ROM node operation, to amateur satellites. I consumed a big chunk of the afternoon talking about packet "on the bleeding edge," and we had a live demo of several high speed link technologies, and the Gracilis PackeTen switch in operation.

I really enjoyed this meeting, and Karen and I may well try to drive out again next year if the folks in Grand Junction put the show on again! My thanks to everyone at the meeting for making us feel welcome, and particularly to Al WA4HND and Don N0LEU who talked me into being there despite other commitments.

One of the questions I've pondered since the meeting, and which I don't yet have an answer for, is what was so different in Grand Junction from the Front Range in Colorado that caused folks to all seem to have so much more enthusiasm. Maybe the folks involved are newer to packet, and just fresher, and less burned-out? Maybe there's something about not being able to talk to the next packeteer down the line without being active enough to climb a mountain or two and install the intervening nodes? Dunno...

Dayton 1991

To start off with the summary, the Dayton Hamvention seemed sort of weird to me this year. Several factors probably contribute to this impression. For one, I spent almost the whole weekend in the booth run by Gracilis, Inc., formerly known as Grace Communications. These are the folks who build packet switches based on the Motorola 68302 processor that I've talked about in previous columns. I arrived with "one each" modem and radio combinations from 1200 baud, through 9600 baud, to 56kb. I also dragged along an HP 9000/400t workstation equipped with name server and callsign database server to use, showing off my favorite model for providing packet radio applications. We put all of the gear on the air, and had a fairly interesting network running in the booth for the weekend, demonstrating everything from 56kb access to the Unix box, to a 1200 baud AX.25 station connecting to the "terminal server" built into a Gracilis switch, and from there to everything else on our "network."

Probably the most fun I had all weekend was making all the RF pieces work! No, really, it was fun! We put big Kenwood dummy loads on the two 430Mhz transverters hooked to the 56kb modem, with enough RG-58 between the transverters and dummy loads to get the two dummy loads next to each other. The silly dummy loads were tight enough (much better than the cruft I use at home!) that I ended up twisting the coax runs together 7.5 turns and taping them in place to inductively couple the two units. It worked great! We ran thousands of packets through the weekend, and dropped less than 10... This seems like a near-perfect way to survive the RF hell at Dayton, because the dummy loads meant we were neither contributing to, nor susceptible to, what must be one of the more intense electromagnetic field situations ham gear ever encounters. I offer this as my "free tip of the day" to folks trying to run demos of RF gear at Dayton...

A special thanks to my wife Karen N1FED, who located a 24-hour grocery store and made sure we didn't have to eat any "arena-food" all weekend...

A second contributor to the weekend was the rain on Friday morning. I understand there was a flood of sorts in the flea. Inside, the organizers came on the PA just before the interior exhibits opened at noon... saying that there were thousands of soaking wet people pushed up against the doors waiting for noon so they could come in out of the rain. With a metal-roofed building and the ventilation fans all turned off, the humidity right after noon went asymptotically towards infinity. It was not a pretty sight, particularly since I live in and love the high country of Colorado where real humidity just doesn't exist. Ah well, reminds me of college in Pittsburgh...

I did leave the Gracilis booth on Saturday afternoon and again on Sunday morning for just long enough to hit the booths of all the other packet vendors and pick up some literature. It was disappointing that no one seemed to have anything new to offer the high-speed packet afficiando other than Gracilis... for the second year in a row.

Here's a quick rundown of what I found interesting at packet vendor booths: AEA had "released" the DSP-based PK-232 replacement, but according to a spokesperson at the booth, was "a month or two away from shipping." I'm not sure what that means exactly. Maybe by the time you read this the unit will be available, maybe not. I won't try to predict AEA's shipment plans, I've made that mistake before.

Kantronics was showing the DVR4 radio. This is a UHF, 10 watt derivative of the DVR2-2 I've talked about before. It apparently fixes some of the complaints folks had about the DVR2-2, and obviously moves to a band more available to many packeteers for 9600 baud and faster operation. Kantronics supposedly has a DE-19200 modem that couples up painlessly with this radio.

PacComm had nothing new from a technology standpoint at their booth this year that is available to hams. I've lost track of the number of TNC,

G3RUH modem, and software variations that they're selling now. It makes for an impressive, if somewhat repititious, display. The most exciting thing at the PacComm booth, quite frankly, was the prototype 900Mhz spread spectrum hardware they were showing that resulted from a commercial contract. See my column in the last issue of *PSR* in the section regarding part 15 operation for more thoughts on this subject.

The TAPR booth highlighted the METCON-1 telemetry and control system, built around 8051 microcontroller hardware. This is an interesting item for TAPR, being the first purely "application" product that I remember. There was also news of the packetRADIO and DSP projects (which I'll leave to other TAPR folks to report), and the usual brisk sale of DCD mods, TNC upgrades, and packet software on floppies.

I missed the GRAPES crowd's flea market space this year, but did manage to buy another 56kb modem kit thanks to their excellant "delivery service" to the booth... thanks guys! The Ottawa crowd was much in evidence, with bright blue "PI card" shirts (blue seemed to be the "in" shirt color this year!), and a backpack full of boards for sale. It was fun seeing everyone again...

But, overall, Dayton 1991 wasn't as exciting for me as some I remember.

Field Day 1991

It has been a tradition for several years (but not last year, when Karen and I were on the way to Paris!) for a variety of folks from Hewlett-Packard and other companies in Colorado Springs and Denver, to arrive in the Bit Basement for a laid-back stab at Field Day, Bdale-style. This year was no exception!

John Conner, WD0FHG, once again volunteered his Honeywell motor-generator widget that takes nominal 12VDC in one side and puts out up to 500W of 120VAC on the other side. My wife Karen N1FED graciously loaned us the use of her 1980 VW Rabbit for the duration. We ran class "1E", for one simultaneous transmitter at a home station on emergency power. We just crank up the Rabbit, wire-tie the throttle cable to

maintain 13.5V or better at full load, and let it run for 24 hours! With the hood up, and the garage door open, the radiator fan ran about 40% duty cycle this year, and we got almost the full 24 hours on one tank of fuel before we had to refill.

We ran about 50w from my TS-430S as NE0V. If you worked us while we were calling CQ on 20m SSB early Sunday morning, you talked to me without knowing it! If I allowed myself to get interested in HF, contesting would consume all my time. As it is, this was my first time on HF since Field Day two years ago!

A special thanks to Dave N0IPQ who stuck it out all night, catching a couple hours sleep on the futon in the guest room before morning, and hanging on until noon Sunday. And congrats to Bob Sterrett from HP, who made a few contacts on 80m SSB in the wee hours for us, and who just might get his license someday, if we keep needling him! (nudge, nudge... wink, wink...)

The down side of having Bob around, however, was that he started razzing me about not having a packet station on the air at all. I should never have given him a copy of the Field Day rules to read! The second time he said "of all people, Bdale, you ought to be able to get us the 100 bonus points for a packet contact!," I relented. The problem was, what to put on the air? I traded the PK-232 for 48 feet of freestanding Rohn tower. I sold my HD-4040 to some college kid in Maryland. The Kenwood 2600 I used to use with my Tasco pocket TNC (and for which I had a cable made up) now belongs to N0IPQ, and he didn't have it with him. I didn't have a cable for my one remaining KISS TNC-2 for any radio I still own... and no one else in town would be running Field Day on 430.15 at 56kb!

Fortunately, my digging around in the boxes from Field Day brought up a brand new Gracilis PackeTwin PC plug-in board. I'd brought one back from Dayton to play with "when I had time." It was still in the box, with a floppy and a manual. I found a cable I'd made to hook my Kantronics DVR2-2 and a Kantronics 1200-baud modem board I plan to use on my Gracilis PackeTen switch fanout

card... that had never been tested. To make a long story short, the docs were good enough for us to have the card in a PC in about 10 minutes, most of which was spent figuring out which interrupt to use and attaching the 1200 baud modem card to the PackeTwin with the two provided screws. The software installed in a subdirectory in no time flat, and there was an example config in the docs except for the interrupt vector we'd chosen for the card. Start to finish, in under an hour, Bob (who had never seen a working packet station) and I had the PackeTwin on the air running the Gracilis windowed version of NOS, and had made our first contact with KE9S to get the 100 bonus points! We worked WA0VTU, the local club Field Day station, and tried to leave a message for our section manager to snag more bonus points, then called it a night.

As much as I heard Don N4PCR talk about providing a complete solution for packet at Dayton, and as often as I'd seen Dan or Don stuff a PackeTwin in a PC and make it work, this was my first experience with the card solo, and I really was impressed at just how easily it all went together. My past experiences with PacComm PC-100 and DRSI PCPA PC plug-in cards, and all manner of regular TNCs, were a lot more frustrating...

Why This Is My Last Column

I'm sure you've been wondering since the first paragraph of this column why I say this will be the last... There are two main reasons.

I'm finding that I have less time to work on packet things now than I used to, mostly because of circumstances at work. That makes it hard for me to "do enough neat stuff" to write a column just about what is going on around here, and doubly hard to do a good job of keeping up with what other folks are working on well enough to talk about it without making a fool of myself. Frankly, I'd rather spend the few hours each week I've got for my hobbies these days hacking on hardware than writing...

The second reason is one that I hesitate to mention, but which I believe the TAPR membership is going to have to deal with at some point anyway. I now have a small financial interest in

the future of Gracilis, and expect to work on a number of projects relating to enhancement of the PackeTen standalone switch product. I talked about a lot of my ideas to many of you at Dayton. What has changed since then is a building commitment on my part to do some of the things I want to do anyway as products for Gracilis, instead of on my own as a simple user. The win for you is that I won't be the only one to benefit from my efforts, since anyone will be able to buy the results off the shelf.

Overall, it no longer seems appropriate to me to try and be TAPR's "packet gossip columnist." I feel less strongly about the appropriateness or lack thereof, of continuing to serve on TAPR's board, but my evolving work situation makes it unlikely that I'll run for re-election when my term expires this year... I just can't commit to another three years at this time, regardless of how I feel about the conflict of interest issue.

Take this as early encouragement to think about who you'd like to nominate and elect to the board next time! TAPR desperately needs new blood at all levels of the organization to survive.

The End...
Writing "Bits in the Basement" has been, for the most part, a neat experience. I would especially like to thank those of you who have taken the time to write, or call, or even better... send me email! I apologize if I'm cutting this short before taking time to use all your suggestions for things to write about, but I suppose that's just how the world works.

I'm not going to disappear completely from the pages of *PSR*. I suspect that every couple of issues I'll try to put in a short article about one or another project I'm working on. I had hoped to talk this time about a widget I've designed to provide power and an RS-422 interface for WA4DSY 56kb modems, but a corporate audit at work stole enough of my "spare time" that the prototype isn't finished yet. Maybe I'll try my hand at a real construction article for next time? Who knows...

I will continue to be reachable by all the usual means. I'm still

bdale@col.hp.com at work, bdale@gag.com will reach me at home, and I still check Easyplex mail on Compuserve every week or so at 76430,3323.

73, and CUL!

METCON-1 Now Available

Following the successful introduction of the METCON-1 in "alpha" form at the Dayton HamVention, TAPR is pleased to announce that production of kits has begun. The operation of METCON-1 is described in the January issue of *PSR*.

METCON-1, a simple teleMETry and CONtrol system for packet radio, operates by connecting the main MET-CON-1 system board to the RS-232 connection of a TNC (Terminal Node Controller). The remotely located packet TNC and METCON-1 system are then accessed by connecting to the TNC. The METCON-1 system acts like a remote computer connected to the TNC, much like a BBS operates. The system uses an 8751 microcomputer to allow a connected user to read and write on/off levels at the microcomputer's I/O port using a command line oriented command language. Outputs are dry relay contacts so you can hook up anything you want, within reason. A good upper limit is 24VAC/VDC at 1/2 amp. There are 6 outputs possible with the standard METCON-1 PC Board.

There are several ways that input signals can be detected by METCON-1. The standard input to METCON-1 consists of a 74HC14 inverter, protected by a series and pullup resistor to +5 volts. The other input terminal is system ground. The microcomputer can read the value at the input terminals and pass it along to the user via the serial port. There are 6 inputs possible with the standard METCON-1 PC board.

An added feature of each standard input is that METCON-1 can measure the frequency of an input signal (0-10KHZ) in addition to simply indicating if the input is an open or closed circuit. The advantage of this type system is that an external Voltage-to-Frequency converter board configured to

read either temperature or frequency can be placed right at the source to be measured. An opto-isolator is used to allow isolation between the V-to-F board and the main system board. To measure temperature, some additional parts are required and we are offering the board in both configurations.

Although METCON-1 is a simple system, it does have a number of nifty features. These features include a time-of-day clock that can be used to time stamp output, the status table can be dumped on predetermined intervals (0,1,15 minutes), block reads and writes are supported for fast memory transfers, notification can be set at different states, and other additional features are available.

Some of the applications described so far by beta-testers include using the METCON-1 board during a balloon ascent for sending telemetry regarding height, temperature, and other balloon status to the ground control station as the mission proceeds. Many other applications dealt with control and monitoring of remotely located sites. Many of these remote sites included mountain top stations and other difficult access areas. Applications for the METCON-1 system are endless.

The basic METCON-1 kit is priced at $85.00, with voltage-to-frequency boards at $25.00 each and temperature-to-frequency boards at $30.00 each. A/D converter boards are planned to be available soon. Please contact the TAPR office for further information.

BYLAWS
OF
TUCSON AMATEUR PACKET RADIO CORPORATION
(rev. March, 1991)

ARTICLE I
Identification

1.1 Name. The name of the corporation shall be Tucson Amateur Packet Radio Corporation, and it is sometimes referred to in these Bylaws as the "corporation".

1.2 Principal Office. The principal office of the corporation shall be at Tucson, Arizona, and additional offices may be maintained at such other places within or without the State of Arizona as the Board of Directors may from time to time designate.

1.3 Seal. The seal of the corporation shall be circular in form and mounted upon a metal die, suitable for impressing on paper. The name of the corporation shall appear about the outer periphery of the seal, and the words "Corporate Seal Arizona 1982" shall appear in the inner portion.

1.4 Fiscal Year. The fiscal year of the corporation shall be as determined by the Board of Directors.

ARTICLE II
Purposes

2.1 Purposes. The purpose for which the corporation is formed is that set forth in its Articles of Incorporation as from time to time amended; namely, for scientific and educational purposes within the meaning of section 501(c)(3) of the Internal Revenue Code. In the pursuit of that purpose the corporation will perform scientific testing and research into development and improvement of technological systems for use in the amateur radio service, including, but not limited to, digital packet radio communications; research and testing of systems, hardware and software, for packet radio local area networks and computer network systems; and disseminating to the public information obtained as a result of such research and testing. The corporation is not formed for a pecuniary gain, and no part of the assets, income, or profit of the corporation is distributable to, or will inure to the benefit of its directors or officers except to the extent permitted under the Not-for-Profit Corporation Laws of the State of Arizona.

ARTICLE III
Membership Classes - Dues, Voting Rights and Annual Meetings

3.1 Membership. (a) Any individual who subscribes to the purposes and basic policies of the corporation may become a member subject to compliance with the provisions of the Bylaws. (b) Persons may be admitted to membership at any time.

3.2 Classes of Membership. There shall be two classes of members, designated as CHARTER MEMBERS and MEMBERS. CHARTER MEMBERS are those persons who became members of Tucson Amateur Packet Radio prior to formation of the non-profit corporation and paid an initiation fee of $15.00. MEMBERS are those persons who joined Tucson Amateur Packet Radio prior to its incorporation having paid no initiation fee and those persons who became members subsequent to incorporation. Both classes of membership in existence prior to incorporation are herewith transferred to Tucson Amateur Packet Radio Corporation by these Bylaws.

3.3 Annual Dues. The annual dues for all members shall be as determined by the Board of Directors and shall be posted in the Corporation Newsletter.

3.4 Payment of Annual Dues. The dues for the first year of membership for all members are payable upon admission to membership in the corporation. The annual dues thereafter of all members are payable on the first anniversary of admission to the corporation. Members who fail to pay their dues within thirty days of such anniversary shall be dropped from the membership rolls and thereupon forfeit all rights and privileges of membership.

3.5 Membership Rights. Only members in good standing shall be eligible to exercise their right to cast their votes for directors as set forth in this Article and in Article VI herein.

3.6 Certificates. The corporation will issue certificates evidencing membership.

3.7 **Annual Meeting.** An annual meeting of voting members will be held once per calendar year as determined by the Board of Directors. Notice of the annual meeting will be included in the Corporation Newsletter sent to all members in good standing at least one month preceding said meeting.

3.8 **Chairman.** At all membership meetings, the President of the corporation shall serve as chairman and in his absence a Vice President shall preside.

3.9 **Election by Mail.** Elections of directors by the membership may be conducted by mail.

ARTICLE IV
Board of Directors

4.1 **Number.** The business and affairs of the corporation shall be managed by a Board of Directors. The Board of Directors shall have the sole voting power except as delegated to the Executive Committee and as allowed to the membership in good standing as provided in Article III herein. The Board of Directors shall consist of fifteen members. All directors shall be elected by the membership in good standing.

4.2 **Requirements to Serve on the Board of Directors.** All directors must be members in good standing and have attained the age of 18 years or older.

4.3 **Terms.** All directors shall serve for terms of three years.

4.4 **Vacancies.** In the case of any vacancy among directors through death, resignation, or other cause, the remaining directors may elect a successor to hold office for the unexpired portion of the term of the director whose place shall be vacant, and until election and qualification of his successor.

4.5 **Annual Meeting.** The annual meeting of the Board of Directors shall take place in the city of the corporation's principal place of business. Additional meetings of the Board of Directors may be held without notice.

4.6 **Special Meetings.** Special meetings of the Board of Directors may be held when called by one tenth of the members of the Board of Directors upon a minimum of five days written notice to each member of the Board, any and all business may be transacted at a special meeting. Special meetings may be conducted by way of telephone conferencing or by the use of telecommunication systems. When telecommunication systems are used, special meetings may remain in continuous session.

4.7 **Quorum.** A majority of the directors shall constitute a quorum for the transaction of business. All acts of the Board of Directors shall require the affirmative vote of a majority of the directors present.

4.8 **Chairman.** At all meeting of the Board of Directors, the President of the corporation shall serve as chairman and in his absence a Vice President, as designated by the Board of Directors, shall preside.

4.9 **Committees.** From time to time the Board of Directors may appoint committees for any purpose, who shall have such power as specified in the resolution of appointment.

4.10 **Removal of Directors.** At any special meeting of the directors called for such purpose, any then serving director may be removed from the Board of Directors, for any reason, by an affirmative vote of a majority of the directors present.

ARTICLE V
Executive Committee

5.1 **Number.** There shall be an Executive Committee consisting of the officers of the corporation and such other directors as the Board of Directors may from time to time designate, but not to exceed six members.

5.2 **Responsibility.** The Executive Committee shall be responsible for overseeing the implementation and execution of the plans and policies expressed by the Board of Directors.

5.3 **Terms.** Officers of the corporation shall serve on the Executive Committee for the term of their office. Directors shall serve on the Executive Committee at the pleasure of the Board of Directors.

5.4 **Conduct of business.** The Executive Committee will be guided by the rules established for the Board of Directors in connection with Special Meetings, Quorum, Chairman and Committees.

5.5 **Limits.** The Executive Committee shall have a maximum spending authority of $5,000.00.

5.6 **Reporting.** The Executive Committee shall report its actions and expenditures to the Board of Directors on a monthly basis.

ARTICLE VI
Officers

6.1 Officers and Qualifications. The officers of the corporation shall be a President, one or more Vice Presidents, a Secretary, a Treasurer, and such other officers as the Board of Directors may determine. Any two offices, except the offices of President and Secretary, may be held by the same person.

6.2 Election. All officers of the corporation shall be elected annually by the Board of Directors at its annual meeting.

6.3 Term of Office. All officers shall hold office until their successors have been duly elected and have qualified, or until removed as hereinafter provided.

6.4 Removal of Officers. Any officer may be removed either with or without cause by a vote of a majority of the Board of Directors.

6.5 Duties of Officers. The duties and powers of the officers of the corporation shall be as follows and as shall hereafter be set by resolution of the Board of Directors:

6.5.1 President.

6.5.1.1. The President shall preside at all meetings of the corporation and of the Board of Directors at which he may be present.

6.5.1.2. He shall present at the annual meeting of the directors a report of the condition of the business of the corporation.

6.5.1.3. He shall appoint, discharge, and fix the compensation of all employees and agents of the corporation other than the duly elected officers, subject to the approval of the Board of Directors.

6.5.1.4. He shall sign and execute all contracts in the name of the corporation.

6.5.1.5. He shall designate, subject to the approval of the Board of Directors, those individuals, in addition to the Treasurer, who shall be responsible for executing notes, drafts or other orders for payment of money. Individuals so designated shall execute this authority under the direction of the President, Executive Committee, or the Board of Directors.

6.5.1.6. He shall cause all books, reports and statements to be properly kept and filed as required by law.

6.5.1.7. He shall enforce these Bylaws and perform all the duties incident to his office and which are required by law, and, generally, he shall supervise and control business and affairs of the corporation.

6.5.1.8. The President shall have a maximum spending authority of $1,000.00.

6.5.2 Vice Presidents.
During the absence or incapacity of the President, a Vice President, as designated by a majority of the Board of Directors, shall perform the duties of the President, and when so acting, he shall have all the powers and be subject to all the responsibilities of the office of President and shall perform such duties and functions as the Board may prescribe. The duties of the Vice Presidents shall be designated by the Board of Directors prior to their election. A Vice President, as designated by a majority of the Board of Directors, shall perform the duties of the Secretary in the absence of the Secretary.

6.5.3 Secretary.

6.5.3.1. The Secretary shall keep the minutes of the meeting of the Board of Directors in an appropriate book.

6.5.3.2. He shall attend to the giving of notice of special meetings of the Board of Directors of the corporation.

6.5.3.3. He shall be custodian of the records and seal of the corporation and shall affix the seal to corporate papers when required.

6.5.3.4. He shall attend to all correspondence and present to the Board of Directors at its meetings all official communications received by him.

6.5.3.5. He shall perform all the duties incident to the office of Secretary of the corporation.

6.5.4 Treasurer.

6.5.4.1. The Treasurer shall have the care and custody of and be responsible for all the funds and securities of the corporation, and shall deposit such funds and securities in the name of the corporation in such banks or safe deposit companies as the Board of Directors may designate.

6.5.4.2. He shall make, sign, and endorse in the name of the corporation checks, drafts, notes and other orders for the payment of money, and pay out and dispose of such under the direction of the President, the Executive Committee, or the Board of Directors.

6.5.4.3. He shall keep at the principal office of the corporation accurate books of account of all its business and transactions and shall at all reasonable hours exhibit books and accounts to any director upon application at the office of the corporation during business hours.

6.5.4.4. He shall render a report of the condition of the finances of the corporation at each regular meeting of the Board of Directors.

6.5.4.5. He shall further perform all duties incident to the offices of Treasurer of the corporation.

6.5.4.6. If required by the Board of Directors, he shall give such bond as it shall determine appropriate for the faithful performance of his duties.

ARTICLE VII

Amendments

These Bylaws may be amended, repealed or altered in whole or in part by a majority vote at any regular or special meeting of the Board of Directors of the corporation.

Notes from the TAPR Office

Greetings to you!

The TAPR phone has been relatively quiet lately. I hope that the reason is that you're all having a splendid vacation with your families -- somewhere far away from telephones!

Talking about "families," Harold and Terry Price just had a beautiful baby girl! Rebecca Lynn. Also, in case you didn't hear the good news, Steve and Lynn Goode had a boy, David Steven. Congratulations!

Dayton was a lot of fun this year. I always enjoy working with fellow TAPRites, and meeting so many of you that I talk to throughout the year. I would like to particularly thank Peter Eaton and his Dad, James Eaton, for all of the planning and work that they have consistently put into our booth each year. Your efforts are appreciated by us all.

Have a wonderful summer!

73s from your TAPR Office,

Heather Johnson, N7DZU

Deviation Meter Project

by Lyle Johnson, WA7GXD

It looks like the TAPR Board is giving the nod to go ahead with a simple deviation meter project.

This will probably (can't say for sure until the first prototype is fully functional) be a synthesized 2-meter receiver with a microprocessor and either (a) built-in digital display and buttons or (b) serial RS-232 compatible interface.

It will include everything you need to calibrate it, and will then perform self-calibrations automatically when you turn it on to make accurate deviation measurements for your 2-meter FM gear (like packet, for example).

The problem is that many folks run their deviation too hot. Most folks lack the gear to easily determine this, so they go on operating and cursing the mode when they can't connect to that station they hear loud and clear at their QTH, or wonder why others can't copy them very well even though they're putting out 50 watts.

This should be a simple-to-assemble kit. My target is to have the price be well under $100 (I'd love to

get it below $50, but I doubt that can be done).

I want to have the prototype running by Labor Day so we can fully report on it next issue. Stay tuned, and start looking for your transmit level adjustments. You'll want to know ahead of time, so you can get things tuned up as soon as you build your deviation meter kit!

packetRadio Update

by Greg Jones, WD5IVD

The project has been continuing smoothly the past few months. A number of design changes were undertaken in June in order to make the radio simpler. Currently the radio consists of 3 boards: Receiver, Exciter, and Power Amplifier. Both the receiver and exciter are being redone and layout should be finalized soon. With TAPR approval, the pR group will send the new receiver and exciter boards off to the board shop and we will finally be able to determine if the radio is going to really work or not. More next issue!

Israel and Packet Satellites

by Lyle Johnson, WA7GXD

In late May I was on a business trip in Africa and decided to stop by and visit some of my ham friends in Israel. Even though I came in the back door, someone found me and I wound up at an informal meeting with some of the guys heading up Israel's TechSat project.

This promises to be an interesting project! The basic idea is to get the Technion (the Technical Univeristy in Haifa) to design and build an Amateur Radio satellite which will be funded by industry in Israel and launched by the Israel space agency in a sun-synchronous orbit sometime in 1994 or so.

As I understand it, this will be a packet store-and-forward satellite with a unique "beginner's mode."

What's unique about this mode? Glad you asked!

This will be a Mode B mode (70-cm uplink, 2-m downlink) using 1200 bps AFSK/FM. In other words, you can monitor this one with your standard 2-meter packet station, nothing else is required! To transmit, a 70-cm FM transmitter will do. Again, standard stuff for most hams!

Purists may scoff, but their point is that others have already launched PSK-based satellites. They have the power budget to allow the link margin hit taken by using 2-meter FM. The Shuttle and MIR packet experiments use 2-meter FM from space, and have shown that it works.

Finally, remember the early days of DOVE? Anyone with a 2-meter FM radio could copy the telemetry. So, why not make the satellite do the same thing?

And a higher-speed mode will likely be a 9600 bps direct FSK like UO-14 (can't stay in beginner mode all the time!).

I think this satellite will be an interesting bird to look for and use. Should be simple, no?

Surplus Inventory for Sale

TAPR has accumulated a large inventory of surplus parts over the past several years. These are left over from TNC-1, TNC-2 and various other projects. The Board of Directors has decided to offer this for sale as a complete lot. It is in several large boxes, which take up valuable office space. In addition to the items below, which were carried in inventory, there are quite a few additional parts (ICs, components, sockets, etc.) not included in the inventory (you tell us where they came from!) which will be thrown in for the lucky buyer. The quantities shown are believed to be accurate, but TAPR assumes no responsibility for correctness. The cost to TAPR of these parts was in excess of $5000. The entire lot will be sold to the highest bid over $500 received by July 31, 1991. *[Editor's note: Since this issue went to press late, the deadline will probably be extended. Contact the office for more information.]* In case of a tie, the earliest postmark will prevail.

Bids do not include any shipping costs. The lot will be sold F.O.B. the TAPR office in Tucson, Arizona.

Item	Quantity
	Integrate Circuits
1458	108
1488	15
1489	34
4023	75
4024	14
4029	97
4066	50
555	8
6264	299
6821	10
7406	320
7407	157
7660	71
74C244	56
74HC157	14
74HC158	180
74HC240	250
74LS00	23
74LS10	151
74LS86	102
74LS393	215
84C42	112
LT1032CN	71
P5164	4

Sockets	
64 PIN	82

Diodes	
1N270	500
LED, RED (TNC2 STYLE)	400

Voltage Regulators	
7812	37
7912	14
LM309	5

Crystals	
9.216	68
DS800	30

SIPs	
150	80
220	141
330	140
4.7K	68

Miscellaneous	
9 Pin "D" (Female)	17
housing (9 pin "d")	78
insulator (to3 style)	400
connector (amp, 4 pin male)	150
connector (amp, 4 pin female)	150
pins, amp	600
plug, idc (36 pin)	8
plug (40 pin, female pc mount)	11

Tuning Indicator

The TAPR TNC-2 Tuning Indicator is being discontinued; when the current stock is depleted, it will no longer be available. TAPR does have a limited number (about 35) of bare boards; these will be sold at a discounted price.

The complete kit was priced at $25. One bare board is available for $10, or two boards for $15; this is just the board only.

The Tuning Indicator is designed to operate with any XR2211-based FSK demodulator. Its primary use is for HF packet, where precise tuning is mandatory. With this kit, exact tuning is simple and fast. The bar graph indicator tells you how far to tune and in which direction.

FT736 and 9600 Baud Operation

by James Miller, G3RUH

These notes tell you where to get FM RX audio direct from the discriminator, and where to modulate the FM TX varactor directly. These mods are non-destructive and take no more than a few minutes. The signals bypass the "DATA SOCKET" for high grade FM operations.

The RX mod is suitable for:
- UOSAT-D 9600 baud downlink and terrestrial links
- 1200 baud AFSK/FM Standard Packet - BUT IT'S UNSQUELCHED.

The TX mod is suitable for:
- FO-20/PACSAT uplink (1200 bps Manchester FM)
- UOSAT-D 9600 baud uplink direct FSK and terrestrial links
- 1200 baud AFSK/FM Standard Packet.

FT736 - FM Direct from Discriminator

Detected FM direct from the receiver discriminator is available from the ᵖᵡ UNIT at the junction of R91 and ᴵ These components are shown in ᵗʰᵉ top right-hand corner of the schematic.

Proceed thus:

1. Disconnect FT736 from the mains electricity. (Safety).

2. Remove top cover only.

3. RX Unit is the vertical module on the left.

4. Locate R91 which is about 25mm from the top, 50mm from the radio rear. the resistor is "on-end", and near a couple of glass diodes.

5. Scrape any paint off R91's free end and wet with solder.

6. Your RXaudio lead should be a fine screened cable; connect the inner to R91, and the outer braid to a ground point (e.g. can of TO09)

7. Route the cable out though any convenient aperture in the case.

8. The discriminator sensitivity (FM Normal) as about 6 kHz/volt.

Important note on 9600 Baud Use

Most FT736 receivers are fitted with an LFH12-S IF filter for FM. (CF01 at the top front of the RX Unit). This is a 12 kHz bandwidth filter which is a little narrow for 9600 bps FSK operation. It is recommended you change this to 15 kHz or better still for UOSAT-D use, 20 kHz bandwidth which will allow more tolerance for doppler shift, and give a far better "eye". Suitable filters are: LFH-15S or CFW455E, and LFH-20S or CFW455D. The first of these is a Yaesu spare part, and is often already fitted. Try the standard first and see what happens; these filters have moderate part to part variations.

FT736 Direct Varactor FM Modulation

Refer to the circuit diagram; inject your TXaudio at the junction of R32/C29 on the TX Unit. The signal level at this point should be 800 mV peak-peak, and will give +/- 3 kHz deviation. DO NOT EXCEED THIS LEVEL. Set Mic Gain to min.

Modulating the FM transmitter this way you get an LF response down to 18 Hz (at which point the associated synthesiser PLL begins to track the modulation), and an HF response which is flat to some 10 kHz.

Proceed thus:

1. Disconnect FT736 from the mains electricity. (Safety).

2. Remove top cover only.

3. TX Unit is the module flat on the left (not the one tucked down the side vertically).

4. R32 is just to the left of the rectangular shielded enclosure. The resistor is "on end". Scrape any paint off the free leg.

5. Your TXaudio lead should be a fine screened cable; connect the inner to R32, and the outer braid to the adjacent enclosure.

6. Route the cable out though any convenient aperture in the case.

7a. 1200 BAUD G3RUH PSK MODEM: TXAudio of 800 mV pk-pk can be obtained by adjusting the components C9= 1uf, R3=47k, R5=infinity (i.e. remove). C10 stays at 10nf (0.01uf).

7b. 9600 BAUD FSK MODEM: Adjust TXAudio level with VR1

Modifying the Motorola MOCOM 35 UHF Series FM Transceiver for 9600 Baud Packet

by Ron Kramer, VE3MX

[From a Technical Bulletin from the Great Lakes International Digital Association (GLIDA)]

NOTE: Start with a operational tuned up radio on the frequency you are going to be using it on.

1. Remove DC power cord, Antenna cable, and take the radio out of the case.

2. From the component side of the radio, remove jumper from pin #40 and #41 located with the front of the radio facing you just to the left of the center partition, about an inch and a half from the back. NOTE.. keep this jumper.

3. Remove the ends from the jumper in previous step. Obtain a 1.1 uH RFC and place insulating covers on leads, (note do not cut the leads on the rfc use full length), solder the jumper ends to the ends of the RFC.

4. Install this RFC on Pins #40 and #3, note #3 is located to the right of T101 and the left of Variable resistor. on the left side of the radio.

5. Remove capacitor C119 to the right of T102.

6. Remove capacitor C117 to the right of T101.

7. Turn radio over front facing you solder side up.

8. On the right hand side locate T101 and T102 near the rear of the chassis.

9. Cut trace to the right of T101 alignment hole, between the first and second componet holes on trace going from front to back of set, (this trace has three component holes) see figure 1 below.
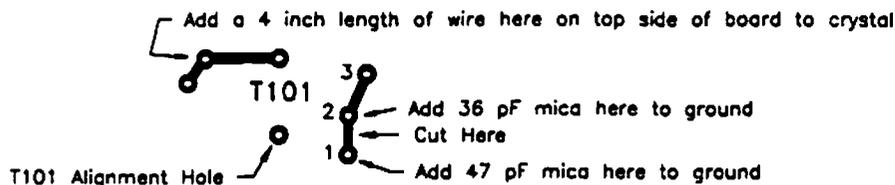

Figure 1

10. Solder a 47 pf Mica capacitor from hole 1 of foil you cut in step 9, to ground. See figure 1.

11. Solder a 36 pf Mica capacitor from hole 2 of foil you cut in step 9, to ground. See figure 1.

12. See Figure 2 and cut trace to front right of T102 between hole 2 and 3 of trace.
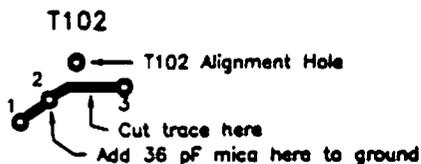

Figure 2

13. Connect power cord, antenna and turn on and retune T101 and T102 before continuing with modification, once tuned, remove power cord and antenna.

14. Locate the Transmit Crystal channel element and remove from board. Open up the element and remove the fixed capicitor approximately 25 to 32 pf that is in parallel with the variable capacitor.

solder a 4 inch lenght of small hookup wire to the junction of the variable capacitor, crystal and thermistor, on the foil side of this pc board. Re-install the crystal circuit in the plastic element case, and file a notch on the side of the plastic case for the jumper wire to exit between the plastic cover and the main chassis when reinstalled.

15. Reinstall the channel element on the main chassis. Solder the jumper wire from the crystal element to the rear hole where C117 was removed

next to T101, (see figure 1). This is the junction of CR102 and R112.

16. Locate the mic jack on the left side of the chassis component side front facing you. There is a 10 pin terminal strip running along the left side rail, number these terminals from front to back (1 to 10).

17. Disconnect the wire running from the mic connector to terminal strip pin 5. Solder this wire to blank terminal pin 7 on this strip.

18. Using a length of RG174 or teflon equiv. coax, prepare one end, and solder the center conductor to pin 7 of terminal strip on left side. Solder the shield to terminal 9 of same strip.

19. Feed this coax between the face plate and the pcboard near the speaker from the top to the bottom of the chassis.

20. Turn the radio over with the face toward you and the solder side up. Locate the metal shield in the shape of a trapezoid, near the front right side of the pc board (this shield has a 3/8 inch hole in it for alignment of the Discriminator). Along the front left angle side of this shield is a

jumper wire connecting the shield to the pcboard. Just to the rear along this side, the very next foil trace is the discriminator output. There is possibly a printed triangle with the number 15 pointing at this foil pattern. This is the junction of CR2, R35, C48, R37, R38. Using the Free end of the RG174 you just installed in step 18, measure, cut to length, and prepare the end so that it can be soldered to the above described discriminator trace. Solder the center conductor to the trace described above and solder the shield of the cable to the metal shield.

21. Connect the DC power cable and antenna to the radio, align the transmit crystal to frequency.

22. Pinout of terminal strip on top left hand side is:
    front pin 1 - PTT
        pin 2 - Transmit audio
        pin 3 - ground
        pin 4 - ground
        pin 5 - wire from speaker
        pin 6 - unknown
        pin 7 - new discriminator
    output pin to mic connector
        pin 8 - jumpered to pin 10
        pin 9 - ground
        pin 10 - + 12 volt DC input
    to radio

23. Microphone connector 6 pin Din plug
        pin 1 - rx discriminator
    audio output to tnc
        pin 2 - ground
        pin 3 - ground
        pin 4 - 9600 baud tnc audio
    input to radio
        pin 5 - PTT line

24. That completes the modification. Hook up your 9600 baud PacComm Tiny 2 TNC, set the TX audio level in the 9600 baud modem as per instructions from PacComm, and you're away to Happy Packeting.

I hope that this Bulletin is of some help to others working on System development.

73 for now and Happy Packeting from the Niagara Peninsula, Ron VE3MX.

Software Library Update

by Bob Nielsen, W6SWE

Here are the current versions of all the disks in the TAPR software library, as of June 17, 1991. In response to many request, TAPR is finally offering a version of the KA9Q NOS TCP/IP package. We have held off until now because of the frequent changes to the software, and lack of complete documentation for the beginner. The demand has forced us to reconsider and we now have the G1EMM version as part of the TAPR software library. Additionally, it appears that NOS will not run reliability on some computers (my Compaq DeskPro, for example), so we will continue to carry the older NET version. This does not have some of the features of NOS, but is compatable for networking. For ordering information, see the order form enclosed in this issue.

Disk No.	Name	Version	Date
1.	APLINK	VER. 5.04	05-30-91*
2.	AA4RE BBS	VER. 2.11	03-06-91
3.	CBBS	VER. 6.6	03-09-90
4.	EZPAC	VER. 1.1	01-09-89
5.	MONAX		10-30-87
6.	PACKET SHARE		08-22-90
7.	W9ZRX BBS LIST		04-24-89
8.	R95		09-01-89
9.	ROSERVER PRMBS	VER. 1.47	11-05-90
10.	ROSE SWITCH	VER. 901111	11-15-90
11/11A	KA9Q NET	VER. 890421.1	05-08-89
12/12A	KA9Q NET SOURCES	VER. 890421.1	05-08-89
13.	TNC1 CODE		05-30-84
14.	TNC2 NOTES		03-28-90
15.	WA7MBL BBS	VER. 5.14	02-11-90
16.	WRLI BBS	VER. 13.00	05-08-91*
17.	YAPP	VER. 2.0	12-18-86
18/18A	INTRO TO TCP/IP		09-09-87
19.	LAN-LINK	VER. 1.58	09-28-90
20.	ARESDATA	VER. 1.5	01-20-91
21/21A	MSYS	VER. 1.11	04-04-91*
22	G8BPQ NODE	VER. 4.03a	03-16-91*
23.	UTILITIES		
	PKARC	VER. 3.6	06-01-88
	PKZIP	VER. 1.10	03-15-90
	LHA	VER. 2.11	03-03-91
	ZOO	VER. 2.01	08-25-88
24.	THS	VER. 2.50	11-11-89
25.	VE4UB NTS	VER. 012891	01-28-91
26.	NM1D DOSGATE	VER. 1.14	11-29-89
27.	SV7AIZ BBS	VER. 3.24	04-05-90
28.	TEXNET	VER. 1.6	02-05-91*
29.	INTRO TO PACKET RADIO		11-04-90
30.	MICROSAT GROUND-STATION SOFTWARE		01-09-91
31/31A	KA9Q/G1EMM NOS	VER1-1991	

Revisions since the last issue are indicated by an asterisk (*) above. Where a double entry is shown (i.e., 11/11A), two disks are required in 5-1/4 in. DSDD format (1 disk in 3-1/2 in. format). TAPR attempts to supply the latest version of all software, however we cannot distribute what we do not have. Authors are invited to send updates to their software (and new offerings) to the TAPR office. The office can provide disks and mailers for updates upon request.

TNC-2 Bare Boards; New OEM Terms Offered

In answer to many requests, including much overseas interest, the TAPR Board of Directors has decided to make available the printed circuit boards which were used in the TNC-2 kits; these have not been available from TAPR for several years. The package includes, in addition to the board, the text of the assembly and system manuals, plus the EPROM code (Intel hex format) for both the state machine and 1.1.7 EPROM, all on disk. The system manual has been updated to contain the 1.1.7 commands, and the assembly manual includes the incorporation of the 32K RAM upgrade, which is required for the recent firmware versions. A printed schematic diagram will also be supplied.

The price of this package is $30.00, including postage for orders shipped to U.S. addresses. Both the 1.1.7 and state machine programmed EPROMs are available from TAPR for $12.00 each. No other parts are available from the TAPR office. The 1.1.7 EPROM includes the printed 1.1.7 commands booklet, which is available separately for $5.00. For further information, including shipping charges outside the U.S., please contact the TAPR office.

Additionally, the Board voted to offer the TNC-2 OEM licensing package at a reduced price of $500 with royalties of $5.00 per unit produced for a period of five years. Any firms wishing to obtain a license or needing additional information should contact the TAPR office.

Membership Application

TAPR is a non-profit, volunteer operated amateur radio organization. Membership in TAPR, including a subscription to *Packet Status Register*, the TAPR newsletter, is $15 per year in the U.S. and possessions, $18 in Canada and Mexico, and $25 elsewhere, payable in U.S. funds only. VISA and Mastercard accepted. Membership and *PSR* subscription cannot be separated. $12 of the dues is allocated to *Packet Status Register*.

Name:		New:
Address:		Renewal:
City:	State:	
Country:	Zip:	Check:
Call Sign:		Credit Card:

VISA / MasterCard only		Expiration Date:	
Card Number			
Signature:			

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ORDER FORM – Kits – Firmware – Software
(All prices are payable in U.S. funds and include shipping and handling except foreign air)
Please allow six to eight weeks for your order to be shipped

KITS and FIRMWARE

Qty.

_____	PSK Modem	$115.00	....
_____	Cabinet for PSK Modem	8.00	(5.00 when ordered at same time as modem) ......
_____	K9NG 9600 Baud Modem	35.00	....
_____	XR2211 DCD Mod.	15.00	....
_____	State Machine DCD Mod.	20.00	....
_____	State Mach. DCD w/Internal Clock	25.00	For KPC2 or any other TNC w/o 16X or 32X internal clock ......
_____	PK232 Modem Disconnect Upgrade	20.00	....
_____	METCON-1 Telemetry/Control	85.00	....
_____	Voltage-to-Frequency module	25.00	....
_____	Temperature-to-Freq. module	30.00	....
_____	TNC-2 bare PC board	30.00	(Includes schematic plus assembly/operating information and 1.1.7 EPROM code/commands on disk) ...
_____	TNC-1 Upgrade to TNC-2	60.00	....
_____	• TNC-1 Upgrade Memory kit	20.00	....
	• When purchased w/TNC-1 upgrade. Includes 32k RAM and 1.1.7b w/KISS EPROM		
_____	32K RAM w/TNC2 update docs	15.00	....
_____	TNC-2 ver 1.1.7b w/KISS (27C256)	12.00	(includes 1.1.7 Commands booklet) ......
_____	TNC-2 WA8DED (27C256)	12.00	....
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_____	1.1.7 Commands booklet	5.00	(The full TNC-2 command set for 1.1.7) ......
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_____	TAPR Packet Radio videotape	15.00	....

SOFTWARE - Please circle disk numbers requested.

1.	APLINK - W5SMM - Runs MBO & BBS		17.	YAPP - WA7MBL - Terminal program
2/2a	BB - AA4RE - A multiconnect Mailbox*		18/18a	INTRO TO TCP/IP - Much info on TCP/IP*
3.	C-BBS - K3RLI/AG3F - BBS w/sources		19.	LAN-LINK - G3ZCZ - Terminal program
4.	EZPAC11 - M. Imel - NTS formatter		20.	ARES/Data - WN6I/N6KL - Emergency data system
5.	MONAX-NK6K/WB6YMH - Gathering system stats		21/21a	MSYS - WA8BXN - BBS/TCPIP/node System using KISS*
6.	Packet S/W - WB6UUT - for PK 87,88,232		22.	NODE - G8BPQ - Packet switch/BBS networking pkg.
7.	PBBS Lists - W9ZRX - Master PBBS lists		23.	COMPRESSION/ARCHIVING Utilities, .ZIP, .ARC, .ZOO & .LHZ
8.	R95 - WD5IVD - Binary conversion utility		24.	THS - HB9CVV - Term. program for TNCs w/WA8DED firmware
9.	ROSESERV - KA2BQE - BB and server for ROSE		25.	NTS Traffic Generator - VE4UB
10.	ROSE Switch - W2VY - The ROSE executables		26.	NM1D DOSgate - NM1D - Remotely operate PC via packet
11/11a	TCP/IP Plug & Play - KA9Q (NET)*		27.	SV7AIZ BBS - SV7AIZ - Multiuser, multiport BB system
12/12a	TCP/IP Sources - KA9Q (NET)*		28.	TEXNET Applications - Software for use with TEXNET packet switch by Texas
13.	TNC-1 Source code - TAPR - TNC-1 Sources			Packet Radio Society
14.	TNC-2 Software notes - N2WX - 1.1.0 thru 1.1.7		29.	INTRO TO PACKET RADIO - WB9LOZ - Tutorial
15.	WA7MBL BBS - WA7MBL - BB system		30.	MICROSAT Ground Station Software - NK6K/K8KA
16.	W0RLI BBS - W0RLI - BB system		31/31a	NOS - KA9Q/G1EMM - TCP/IP*

* Indicates two-disk package (one disk in 3-1/2 in. format). We attempt to provide the latest versions of all software.

Total disks circled - 5-1/4 in. MS-DOS format (2, 11, 12, 18, 21 & 31 are 2 disks ea)   _____ x $2.00 =   _____

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