PACKET STATUS REGISTER
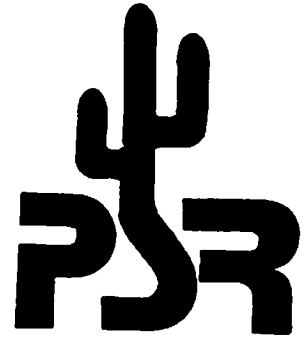
Tucson Amateur Packet Radio Corporation

STOP PRESS! IMPORTANT INFORMATION!

This issue of the Packet Status Register contains some very important information. Please pay special attention to the articles inside dealing with:

o   Membership Update   —   we are trying to ensure that our membership database is accurate and we need your help.

o   Office Problems   —   if you have unresolved business with the TAPR office, or know someone who does, please read this article.

o   A New TAPR TNC   —   TAPR announces a new, low-cost packet controller, TNC 2.

o   A New PSR   —   Starting in July, PSR will become a quarterly, technically oriented publication under new editorship.

Everyone who is presently listed in the TAPR membership database, whether expired or not, will receive a copy of this issue of PSR. If you know of someone who is a member and does not receive a copy, please contact us or, better yet, have them contact us with the information requested under the membership database article mentioned above. Thank you!

PRESIDENT'S CORNER

by Lyle Johnson, WA7GXD

The winds of change are at work in the Amateur packet radio arena.

As you may be aware, TAPR held a close-out sale on the kit TNC, now called TNC 1. Within 48 hours of the announcement via electronic mail and packet bulletin boards, we sold out our entire inventory of nearly 200 TNC kits and 100 cabinets. For those of you who participated in this sale, we extend our thanks for your support. For those of you who may have missed out, we apologize. Quantities were limited and we simply had no way of getting the word out via mail or telephone to all members.

There has been some disillusionment regarding our action in holding this sale, so I am taking this opportunity to explain what we did and why.

As you know, TAPR is primarily a research and development organization dedicated to the advancement of Amateur packet radio. In order to accomplish some of our goals, it is necessary for us to participate in the marketplace to raise funds for further development of this mode.

We started selling the TNC kit in late 1983. In the 1-1/2 years we produced the TNC kit, more than 2200 were sold.

We removed TNC 1 from the market in late April of this year.

Why?

We entered the market to prove that there was significant interest in the Amateur community in packet, and demonstrate that Amateurs were willing to pay a fair price for quality equipment. In this manner, we hoped to entice commercial manufacturers to join in the fray, contribute their expertise and, through advertising, help spread the word about packet. We sold non-exclusive rights to the TNC design for only $500 to anyone who wanted them.

This quest was enormously successful.

AEA and Heath are now selling clones of the TNC 1. AEA added a +12 volt power supply for portable operation and found a cure to the sometimes

unreliable NOVRAM storage system (see elsewhere in this PSR for two NOVRAM memory aids). At Dayton, HAL introduced a rack-mounted version of TNC 1 for the commercial and military markets.

Kantronics announced their Packet Communicator with deliveries commencing at Dayton. This is a new hardware design with the user interface patterned around the TAPR TNC 1.

With Heath's purchasing power and low-cost cabinet approach, they are able to offer their HD-4040 for about $300. This is less than the price of a TAPR TNC 1 with cabinet. Thus, it seemed apparent that the sales of TNC 1 would drop significantly at the time Heath was able to ship.

This expected drop in sales did in fact occur, and we simply reduced the sales price on our remaining TNC 1s to clear them out and make way for TNC 2.

We intend to continue software support for TNC 1, and will continue to report on hardware mods and other timely information. Parts support will continue while spare parts are available to us. In the event we cannot supply you with spare parts, contact AEA or Heath as their units are current production items.

If you need a cabinet for your TAPR TNC 1 and missed out for whatever reason, Heath has indicated they will be stocking extra cabinet parts in anticipation of helping to meet this need. Your TNC 1 PC board will fit inthe HD-4040 cabinet with no problems, as the Heath PC baord is an exact replica of the TNC 1, even to the cropped corners!

Unfortunately, we are still in need of revenues to pursue the Networking Controller design and development. We intend to produce higher speed RF modems as well as a powerful digital controller for Level 3 and Level 4 applications. The TAPR Board of Directors indicated that this was to be the thrust for 1985 at the BoD meeting last February.

TNC 2 is the means by which we hope to achieve the influx of needed funds.

TNC 2, covered elsewhere in this PSR, is a challenge to industry to produce a low-cost, full-performance TNC.

TAPR will produce them in limited quantities -- watch your local packet bulletin board station for word on availability on this new TNC.

I might point out that TAPR is NOT taking orders for TNC 2 at this time, and won't take orders until we have product to ship. We are not maintaining a list of people to contact for the simple reason that the office lacks the manpower to do so.

Speaking of the office, TAPR devoted the last two weeks of May as well as early June to getting the backlog of work updated. Pete Eaton, WB9FLW, flew out from St. Louis at TAPR's request to help in this effort. Hopefully, we will have gotten the last of the problems cleared up by the time you read this.

If you have had any sort of problem regarding an order or membership transaction, please contact the office (the answering machine is disconected)

and have available any details that might help us solve the problem you have experienced -- such information as date of order, check number, credit card number and the exact nature of the problem will help us help you.

Watch for the new PSR Quarterly that will be coming your way in July! Gwyn Reedy, W1BEL of the FADCA gang in Florida will be editing the new TAPR newsletter. Gwynn has lots of enthusiastic help and we anticipate great things. PSR Quarterly will be technically slanted with information of long-term significance.

I want to take this opportunity to thank Pat Snyder, WAØTTW, and Paul Barnett, NØCRN, for their faithful service as editors of PSR over the last two years. They have done a great job for us all.

Finally, we are sending this issue of PSR to everyone for whom we have any record in our database. PLEASE check the address label for your expiration date. If this date does not agree with your records, please write to us on an 8-1/2 by 11 sheet of paper and clearly and legibly indicate your name, current address, call sign, membership number and the nature of your disagreement. If you have renewed and it isn't reflected on your mailing label, we have probably lost the record of your renewal. Please

send us a copy of your cancelled check or credit card bill along with your letter. Please do not do this by telephone!

PSR QUARTERLY

Tucson Amateur Packet Radio will enter a new phase of newsletter production starting in July of this year.

Pat Snyder, WAØTTW, and Paul Barnett, NØCRN, of the Minneaplois area, have been editing and publishing PSR for the past two years. Increased vocational and family responsibilities have made it impossible to meet the demands of PSR on a rigid schedule. Thus, they have stepped down from editing PSR.

We owe them a debt of gratitude for a job well done.

Gwyn Reedy, W1BEL, of the Florida packet group (FADCA), has agreed to take on the task of putting out TAPR's newsletter on a regular basis. The new publication, to be called PSR Quarterly, will have an emphasis on technical and other less time sensitive material.

The publication schedule calls for issues every July, October, January and April. Send your submissions to the TAPR PO Box or directly to

    Gwyn Reedy, W1BEL
    Editor, PSR Quarterly
    812 Childers Loop
    Brandon FL 33511

In addition, if you or your local packet group has access to DRNET, you may submit material electronically to Gwyn at DRNET W1BEL.

We want to thank you for your support and hope you like the new format and slant of your newsletter.

TAPR HF NET

As you may have noticed, propagation on HF is in the doldrums. So is the list of volunteers to handle the weekly TAPR HF voice net.

Therefore, TAPR is announcing the cessation of the Sunday UTC HF net on 20 and 15 meters effective immediately. We want to thank those of you who have joined us in the past on the net.

THE PACKET RADIO REVOLUTION CONTINUES!

TAPR ANNOUNCES TNC 2

In 1982, TAPR embarked on development of a packet radio Terminal Node Controller (TNC) that was to become the standard of the industry. Indeed, the TAPR TNC (now called TNC 1) has become the controller of choice by the majority of the world Amateur packet community.

When it became apparent that industry was moving into the Amateur packet marketplace, TAPR set out to design a low-cost TNC that would meet the needs of the majority of Amateur packet radio operators. A TNC that would be an evolutionary step in the growth of the mode. A unit following in the footsteps of TNC 1, offering virtually the same performance and capability.

If the reaction at the 1985 Dayton Hamvention is any measure, TNC 2 is destined to set a new standard in the Amateur packet arena. Consider the following features.

TNC 2 - low cost, low power, small size

TNC 2 - uncompromising performance

TNC 2 - fully compatible with existing TAPR and TAPR-compatible TNCs

TNC 2 - ready for hill-top operation, mobile communications, host or mailbox service, in the shack or in the field

TNC 2 - ready to run on HF (300 baud/200 Hz shift) or VHF (1200 baud/1000 Hz shift) with its standard, built-in modem

TNC 2 - a result of design and testing by amateurs for amateurs, using the knowledge gained by supplying packet radio equipment to nearly 2500 of the world's most demanding users

The new TNC 2 is based on a CMOS version of the popular Z80 microprocessor. It will be released initially with 16k bytes of EPROM program memory and 8k bytes of battery-backed CMOS RAM.

The unit comes complete with an extruded aluminum cabinet. It runs on 12 volts dc and consumes under 300 mA with a normal complement of parts. A special CMOS option reduces the current drain to about 130 mA with available parts and, when the CMOS HDLC controller is available (projected for July of this year), the current drain may be as low as 100 mA.

TNC 2 measures a mere 1.75" by 5.75" by 10". It weighs only 36 oz. It runs on a single 10 to 15 volt dc source.

The serial port to the terminal or computer is a standard 25-pin D style connector. Due to space limitations, the radio interface connector is a 5-pin DIN.

Terminal baud rates of 300, 1200, 2400, 4800 and 9600 are selected by a rear panel DIPswitch. Radio baud rates of 300, 1200 and 9600 are likewise switch selectable on the rear panel.

Four LEDs are located on the front panel. POWER is illuminated whenever the TNC is turned on and power is applied. DCD tells you when the unit senses other activity on the channel. CONNECT illuminates when the TNC is in the connected mode with another station and STATUS indicates unacknowledged traffic in the TNC's buffers.

At this writing (late May), TNC 2 is in field testing at nearly 20 sites across the US. If all goes well, the first production run of 300 units should be available for sale in late June or early July.

TAPR is **NOT** maintaining a list of requests for TNC 2. We are **NOT** taking orders. When we have units packed and ready to ship, we will open the ordering lines and sell them on a first-come, first-served basis. For the first 300, quantities will be restricted to one per customer.

9600 Baud Modems in Testing

Steve Goode, K9NG, has designed a 9600 baud modem designed for use with the Hamtronics FM-5 220 MHz transceiver. Details of this design are presented in the Proceedings of the Fourth ARRL Computer Networking Conference.

TAPR has designed a printed circuit board for this modem design. In late May, several boards were sent to test sites in Chicago, Los Angeles and Florida for beta testing.

TAPR NEEDS YOUR HELP TODAY!

(or, be sure you get your PSRs!)

Some errors have crept into the TAPR membership database. We need your help to be sure your entry is correct!

Please check the mailing label on the back of your PSR (in the United States) or on the envelope in which your PSR came (if outside the United States).

A sample label is shown below:

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WA7GXD              02-86      260
Lyle V. Johnson
5971 S. Aldorn Drive
Tucson, AZ          85706
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The sample label above indicates an expiration date of 02-86, or February, 1986. (The number after the date, "260" in this case, has to do with the computer database. Ignore it. It is NOT your membership number!)

If your expiration is earlier than 07-85, this is the last PSR you will receive!

Please check your expiration date now. If it does not agree with what you expect, please do the following.

Make a photocopy or other clear and legible copy of your mailing label as it appears on this issue of PSR. Jot your mmebership number on the paper just above the expiration date.

Write (clearly!) any changes of address, name spelling or other correction on the same piece of paper.

Include a statement of what you feel your membership expiration date should be, and enclose a copy of the check or credit card slip to verify your claim, if possible. If you renewed by cash, or if the check or credit card slip is unavailable, please tell us when you renewed and for what period of time.

Finally, indicate the last PSR you received prior to this one. This will help us ensure that you haven't missed any issues that you were entitled to.

We will take it from there.

Thank you for your assistance in helping us clear up any problems, and accept our apologies if yours is a membership account that has been mishandled.

THE BUCK STOPS HERE

(or, have you had problems communicating with the TAPR office?)

We are embarrassed. We are still trying to scrape the egg off of our faces. We offer no excuses.

The TAPR office was opened late last summer in response to volunteer worker overload in handling the TAPR mailbox and TNC orders. The office was staffed by one person, who was (and is) TAPR's only paid employee.

Unfortunately, our employee was overloaded and preferred to handle difficult problems by denying they existed. Occasional checking at the office showed the expected minor problems, but your officers weren't fully aware of the problems that were buried a little deeper.

By mid-May, it was apparent that something was very, very wrong. TAPR flew its VP, Pete Eaton, to Tucson to work in the office until the overload could be handled and problems cleared up.

The planned two-week help session revealed a nightmare of -- well, let's be frank -- incompetence.

We have been trying to pick up the pieces. The telephone is now manned during normal business hours by people, not a machine (although during lunch or a trip to the Post Office, the machine may be turned on). Calls are being returned promptly. Information given from the office is now believed to be as accurate as humanly possible.

The voice you hear when you call the TAPR office will be a new one.

Please, if you have outstanding business with TAPR -- kits paid for but not shipped, kits received but not paid for, membership renewals improperly reflected on your mailing label (see the article elsewhere in this PSR for detailed instructions on interpreting your mailing label) -- in short, any non-technical problem at all, please call or write the office. The phone number is (602) 746-1166.

Include in your communication any helpful details -- date of renewal or order, credit card information, check number and date, if and when the check

HOW TO ORDER A TNC 2!

The new TAPR TNC 2 should be available for delivery in early summer. While we are not promising any dates, we have seen considerable interest in this device and expect the initial production run to be sold out in short order.

The initial batch of TNC 2s will be a limited run of only 300 units. More will follow, probably four to eight weeks later.

Because of the very limited supply, we have tried to devise a method of ordering that would be as fair as possible to everyone. The rules are simple.

1) We will not take any orders until we have product to ship.

2) We will not take lists of names to contact when TNC 2 is ready.

3) TNC 2's availability will be announced via electronic means (DRNET and Compuserve) which will help us get the word out fast.

4) While we will accept orders from the mailbox, we expect the first units will be sold out before a letter could reach us, so your best bet is by telephone to the TAPR office at (602) 746-1166.

5) At the time your order is accepted, you will be given the sequential number of your order. This means that if your order is the 179th, you will be told as much. This will give you an idea of any delays to expect in shipping, and gives us a cross-check to verify that we haven't oversold the allotment of TNC 2s.

6) We will only accept one order per person and one order per phone call. In other words, we will not allow you to call in with a list of 20 friends and take 20 seperate orders from you.

7) When you place a call, please have the following information available:

    a) Your name and UPS shipping address.
    b) A telephone number you can be reached at during daytime hours.

    c) Your VISA or MasterCard number and expiration date.

8) No COD orders nor purchase orders will be accepted.

9) After the initial batch of TNC 2s are sold, the answering machine will be placed on the line with a brief message explaining that TNC 2s are sold out for the present. As before, no lists will be taken nor orders accepted for more TNC 2s until we have more to sell. Therefore, the answering machine will not record messages.

10) Please don't try to get the person at the TAPR office to bend the rules for you. They will not be bent.

If you want to get on packet without waiting for TNC 2, and we encourage you to not wait for TNC 2, by all means investigate the offerings of the commercial manufacturers in the field and...

Join the Packet Radio Revolution - Today!

EPROM PROGRAMMER

The TAPR TNC EPROM Programming attachment mentioned in the TNC 1 manual will not be produced by TAPR.

However, we will publish a schematic of the adapter in an upcoming issue of PSR Quarterly for those of you who desire to have programming capability for type 2764 and 27128 EPROMs. Operating instructions for release 3.x software will also be published at that time.

The high cost of entering production of this device versus the anticipated benefit to the packet community forced us to make this decision. Cost in this case is measured more in terms of taking valuable time from Networking research and development than in actual dollars.

We hope the publishing of the circuit diagram and brief operating instructions will provide enough information for you to produce your own adapter.

COMMODORE 64 AS A PACKET TERMINAL

by Steve Hall, WB6FSK

I recently assembled TAPR board #1427 without any noticable difficulty and all LEDs blinked as predicted by the assembly instructions. What follows may aid the next Commodore 64 owner who wishes to use a C64 as a packet terminal.

The first area to be addressed is the voltage level requirement of the RS-232 line between the TNC and the C64. The TNC needs level shifts of at least 3V DC either side of zero, so any available plus and minus 5 to 12 volt DC supplies will work just fine. I used the article by WB8TKL, "Vic 20 Terminal" that appeared in the March, 1984, PSR as a starting point. After building the described RS-232 adapter using MC1488s and MC1489s purchased from a local Radio Shack, I found that my C64 required one modification to WB8TKL's design. The signal input to the C64 required both pin B and C of the Commodore user port to be connected to pin 3 of the MC1489.
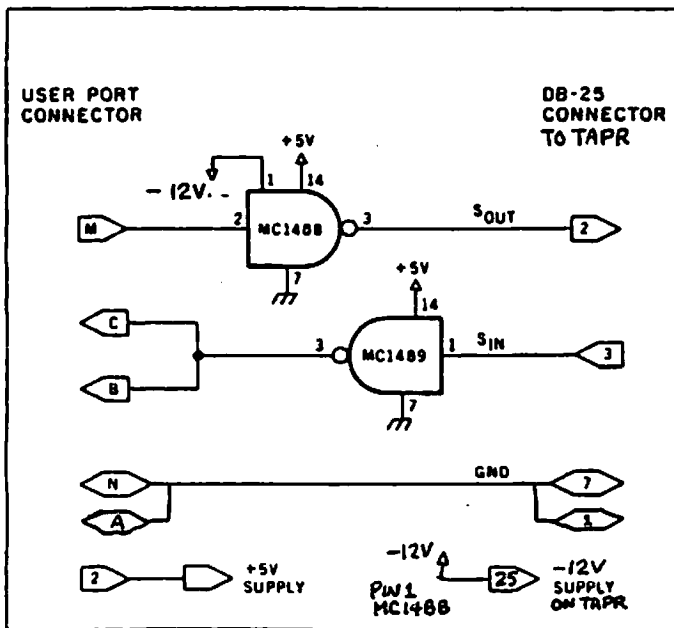
The use of pins B and C is detailed in an article "The Enhanced VIC-20, Part 4: Connecting Serial RS-232C Perpherals to the VIC's TTL Port," Joel Swank, May, 1983, BYTE magazine.

I obtained the required positive voltage from pin 2 on the C64 and have taken a negitive voltage from the TAPR

board. I've used pin 25 of the TNC's RS-232 line to connect the -12V to pin 1 of the 1488. This requires a one inch jumper on the TNC from the -12V, found on the wire wrap area, to pin 25 of the serial connector.

Pin 25 is normally unused with RS-232, but be sure to check any other terminal you might use in the future to determine if pin 25 is used for any other purpose.

A second method of getting a negative voltage would be to rectify the 9V AC available at the C64 user port edge connector. This way any RS-232 device could be used with your C64.

As the size of the 1488, 1489 and associated circuity are small, I built the adapter circuit within the edge connector shell plugged into the Commodore. If you are unable to get a connector shell with enough space this small circuit could be put on the TAPR board wire wrap area or within the Commodore.

The second area to be dealt with is the terminal program to allow the C64 to send and receive true ASCII characters. If you don't wish to purchase a program, the one listed in the Commodore 64 Programmers Reference Guide on page 357 can be used. One modification is required though. The statement "100 OPEN 5,2,3 CHR$(6)" sets up the program for parity disabled, none generated/received and 8 bit word length. This needs to be changed to "100 OPEN 5,2,3 CHR$(38)+CHR$(224)" which gives the required space parity and 7 bit word length. The Programmers Reference Guide gives a semi-cryptic explanation of the opening and use of an RS-232 channel on pages 348-351. The format for the open statement allows selection of a number of options needed for TNC operation.

The open statement needed contains CHR$(38) for the control register which is 00100110 in binary. This sets up a 7 bit word length and 300 baud data rate. The CHR$(224) puts binary 11100000 into the command register which selects space parity as needed by the TNC using default selections.

With the terminal programs I have tried the Delete OFF option should be selected for proper backspace operation.

NOVRAM HINTS

Have you ever been plagued by the NOVRAM in your TNC 1 forgetting? If you have, and if it is a problem for your station operation, read on!

While the NOVRAM in the TAPR TNC 1 is well-isolated from the 6809 microprocessor (by virtue of being interfaced solely through the 6522 VIA, U6), there are times when the 6809 may "scribble" on the NOVRAM, causing it to lose the parameters you have so carefully stored in it. When this happens, you usually have to reboot the TNC by selecting the "ROM" default and going through the autobaud routine to restore restore the data lost by the NOVRAM.

In order to understand the nature of the two fixes that are presented below, some understanding of the cause of the problem is necessary.

Why the NOVRAM Sometimes Forgets

The only way to change the contents of the NOVRAM in TNC 1 is to write new data to the RAM portion of the chip (XD2212, U27) via lines PA4 through PA7 of U6, then toggling the !WE line to the NOVRAM by line PA2 of U6.

Then, the !STORE line must be toggled by way of line PA3 of U6.

This can all be accomplished by an incorrect write to the "A" port of U6 by the 6809 microprocessor, U5.

It turns out that, when power is turned off to the TNC, the +5 volt line decays slowly in terms of microprocessor time. Thus, the 6809 has time to continue to operate as the voltage decays. One nasty characteristic of the 6809 (and the Z80 for that matter) is that it will begin to misinterpret instructions as the voltage is lowered below its operating specifications. This may allow it to accidentally write incorrect data to 6522 U6 and thus to NOVRAM U27.

Fix #1

The simplest fix to this problem has been submitted by several TNC owners. It consists of isolating the !STORE line of the NOVRAM from line PA3 of U6.

Examine the schematic of your TNC 1, page A-3. You will note that there is

a 10k pull up resistor, R5, from the !STORE line of U27 to the +5 volt bus. Further, switch S4 is used to disconnect the ARRAY RECALL line of the NOVRAM from the reset bus of the TNC.

If you have never used the "soft" reset feature of your TNC (and the vast majority of you would never use it), you can use this switch to protect your NOVRAM. If you have the TNC cabinet, it is especially convenient to do this modification.

The procedure is simple.

First, carefully cut the traces to switch S4 pins 4 and 5 (switch position 4). Next, add a small jumper wire from U27 pin 10 to U6 pin 34. This will enable the reset bus from the TNC to force the NOVRAM to recall its permanently stored contents.

Now, cut the trace going from U6 pin 5 (PA3) to U27 pin 9 (!STORE). Cut this trace so that resistor R5 (10k) is still connected to U27 pin 9, but not to U6 pin 5.

Add a small jumper wire from U6 pin 5 to S4 pin 4. Add another jumper wire from S4 pin 5 to U27 pin 9.

This completes the modification.

When you operate your TNC, leave switch 4 of S4 in the open, or off position. If you have the cabinet, leave S4 open and leave the "soft/hard" switch in the "soft" position.

Whenever you wish to change the "permanent" contents in either bank of your NOVRAM, place the switch in the close dposition (S4 switch 4 on or "soft/hard" in the "hard" position). Issue the PERM command, then return S4 to the off position (or place the "soft/hard" switch in the "soft" position).

Fix #2

For those who desire an "automatic" method of ensuring NOVRAM integrity, the following modification has been engineered by AEA and is part of their PKT-1 packet controller. TAPR extends its thanks to AEA for permission to publish this information.

First, ensure that your TNC is board Rev 3. If it has the TAPR logo on it, it is Rev 3. If your TNC is Rev 2, perform the oscillator modifications listed in PSR number 11 (June, 1984).

Then modify your circuit board to make the changes shown below.

This modification is more complex than Fix #1 and detailed instructions are not provided here. Basically, you have to cut the power traces going to U1 and U3 and jumper around these ICs to provide power to other ICs that are powered by the +5 volt bus after it passes through ICs U1 and U3. Then, add the resistors, capacitors and diodes called out in the parts list below. These are labelled R100-R103, D100-D102 and C100 in the schematic above.

(If you have a Rev 3 TNC, remove R87 and install diode D100 in its place. Remove R88 and replace it with R102.)

This circuit senses when the +5 volt bus is falling and asserts the reset line to the 6809 at that time. With reset held low, the 6809 will cease operation, thus preventing it from "scribbling" on your NOVRAM. The reset capacitor, C12, provides power to ICs U1 and U3 through diode D101 to ensure that the these TTL ICs perform properly until after the +5 volt bus has fallen sufficiently to ensure that the 6809 will do no further damage to the NOVRAM contents.

Operate your TNC as before.

Parts required for Fix #2

D100	1N4148	Silicon Diode
D101	1N270	Germanium Diode
D102	1N270	Germanium Diode
C100	10 uF 25 volt	Electrolytic Cap
R100	4.7k 1/4 W 5%	Resistor
R101	2.7k 1/4 W 5%	Resistor
R102	27k 1/4 W 5%	Resistor
R103	1k 1/4 W 5%	Resistor

Note: These parts are not available from TAPR and no upgrade kit for this modification will be made available.
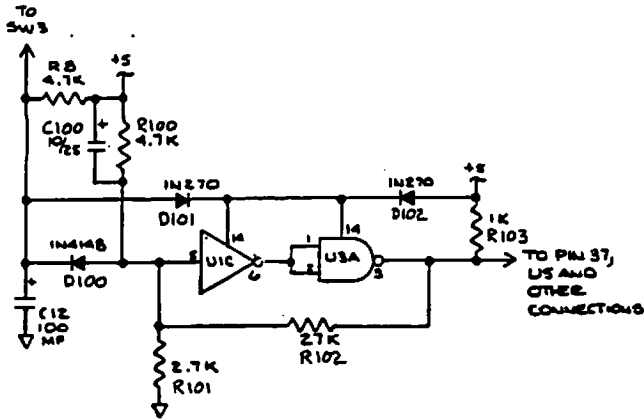
SOFTWARE AND INTERFACING FOR YOUR TNC

TAPR continually receives requests for recommending software packages for various computers, or for detailed interfacing information for specific computers.

TAPR cannot recommend any software packages. We would be happy to publish lists from time to time, however, of packages that have worked for you. If you would like to get involved in helping out your fellow packeteers, please write to PSR Quarterly with a brief review.

Please include the name of the software package, the manufacturer's or publishers address, approximate price and briefly describe your experiences. Include such details as whether or not you can simultaneously run a printer, log communications to disk, if a disk is required, if the package supports type-ahead buffers, split-screen or other enhanced features. How easy is it to operate? What special commands do you have to issue to make it work with the TNC? What baud rates seem best?

We look forward to hearing from you.

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was cashed or the credit card billed by TAPR, membership number, a telephone number you can be reached at during normal Arizona business hours -- anything at all that may help us track down your problem.

We apologize for the difficulties we have caused you. It is our fault.

We only ask one more chance to get it right.

And, please remember, the person you will be speaking with on the phone this time is not the person who mishandled it in the past.

Thank you for your patience with us in this difficult situation.

TNC 1 MANUALS AVAILABLE

TAPR has a stock of approximately 100 TNC 1 manuals, collated and complete with 3-ring notebook covers. This manual contains complete information on the TAPR TNC 1 system. More importantly, it contains a wealth of information on Amateur packet radio in general.

Packet protocol is explained in general, with specific information on the complete VADCG and AX.25 Level Two protocols provided. The AX.25 protocol described in the manual is pre-Version 2.0.

Operating practice, extensive command documentation, troubleshooting information, radio and computer interfacing - it's all there.

Note that this information is applicable to the AEA and Heath TNCs as well as the TAPR TNC 1.

While they last, these manuals may be obtained through the TAPR office at $25 plus $2 shipping and handling.

Get yours today!

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

The officers of TAPR are:

Lyle Johnson   ... WA7GXD ... President
Peter Eaton   ... WB9FLW ... Exec V.P.
Dan Morrison   ... KV7B   ... Treasurer
Pat Snyder   ... WA0TTW ... Secretary

The Packet Status Register is the official publication of TAPR. Explicit permission is granted to reproduce any material appearing herein, providing credit is given to the author and TAPR.

This issue of PSR was edited and prepared by Lyle Johnson and Peter Eaton.

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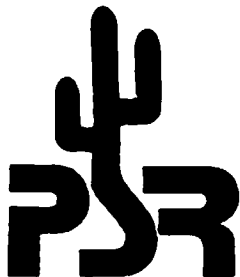
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