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Tucson Amateur Packet Radio Corporation

President's Corner

by Lyle Johnson, WA7GXD

The ARRL Digital Committee met in Newington, CT, over the weekend of 23 May. Several issues were discussed, including packet frequencies for HF and VHF, the automated message handling STA for HF, changes to the AX.25 Level Two specification, message handling protocols, and progress reports on networking protocols.

Many of the above-mentioned items are under study by various subcommittees.

One point agreed upon is the means of identifying an HF packet frequency. In the past, many of us have simply used the display frequency when operating lower sideband with the "TAPR standard" HF modern tone pair of 1600/1800 Hz.

In the future, we will be referring to the center frequency of the actual transmitted energy.

Thus, 14.109 MHz of yesterday becomes 14,109,000 - ((1600 + 1800)/2) = 14.1073 MHz.

The disadvantage is that very few rigs have an FSK mode such that the dial reading corresponds to the energy being transmitted. The Great Social Equalization Factor (GSEF...) is that now everyone can be confused; there is no bias in favor of using "TAPR standard" 300 baud tones for a convenient dial reading!

To add fuel to the fire, yet another set of suggested frequencies has evolved for message forwarding use. (Especially on 20 meters, folks are encouraged to move their QSOs to the standard RTTY area, below 14.1 MHz.)

Message forwarding frequencies of 14.1023 and 14.1083 MHz are suggested in North America. A move to these frequencies will probably occur at the time of the HF STA. Please do not use these frequencies for casual QSOs — they are intended for message handling.

A number of inputs were received regarding modifications to the AX.25 Level Two protocol. They are currently under study and will be reported to the Committee at its next meeting, scheduled for the weekend of August 29 in Los Angeles in conjunction with the 6th ARRL Computer Networking Conference.

(That meeting took place at the Torrance Marriot Hotel. A special meeting is to be convened in early October in the Washington, D.C. area to work on AX.25 Level 2 Versions 2.1 and 3.0. 2.1 will likely be a "bug fix" interim specification, while 3.0 should provide an opportunity to add a whole slew of new bugs... Keep those suggestions coming in!)

Please note that the Committee meetings are open to observers. In fact, the May meeting had only 6 committee members present along with 10 observers!

On to other topics.

The first 200 units of the TAPR PSK Modem kit are in the hands of their builders. The complete kit costs \$100 plus \$10 Shipping and Handling in North America. Bare board sets with instructions will be available for \$30. The second bot of 200 kits is now being

Continued on page 2

President's Corner

Continued from page 1 produced and should be in stock at the office by the end of September,

Naturally, there is no cabinet included in this kit...

TAPR Director Tom Clark proposed a joint AMSAT/TAPR project for Digital Signal Processing (DSP) applications back in February. Tom requested some seed money to get a number of Amateurs equipped with DSP co-processors for their PCs and clones to begin to develop some serious software for Amateur use. AMSAT has approved some funding for this enterprise and the TAPR Board is currently (mid-June) considering it.

DSP holds a lot of promise for Amateur packet radio, as well as other weaksignal digital modes, digital voice, etc. Please see the "Beginner's Corner" in this PSR for an introduction to hs technology.

Speaking of tutorials, several of you have contacted the TAPR office asking for the next installment of the State Machine article presented in PSR some months back. The follow-on is now being written. It may not make it in time for this issue, but should be done in time for the next PSR.

Finally, please check your mailing label. If your TAPR membership expires soon, please take a moment to renew now. Your membership is important.

See you on packet. Lyle

An Introduction to TCP/IP

Millions of folks have used it in conventional commercial, military and government telecommunications applications. Few of them ever realized *it*, or really cared.

Since the introduction of TCP/IP into the packet radio world by Phil Karn, KA9Q, we are hearing it discussed more and more frequently. Being the type of folks that Amateurs are, they want to know more about it. Unfortunately up until June 1987 there was little easy-read material available on the subject, unless of course, you were a networking engineer, designer or writer of networking code. In June Mr. Charles Hedrick at Rutgers University wrote a paper describing TCP/IP in terms that most of us can understand. For those wishing to dig deeper into TCP/IP Hedrick makes many references to documents (called RFC's) which permit one to explore as far as wanted.

Apackage of two diskettes "Introduction to TCP/IP" (MSDOS, 360K) is now available. They contain Hedricks paper (about 92k) and most of the RFC's he refers to. (as many as will fit in compressed format on 2 disks, unARC utility also provided).

To augment the Introduction paper Bdale Garbee, N3EUA, has prepared a Preface which introduces the reader to the amateur packet radio version of TCP/IP. Bdale is one of the writers of code for the packet radio application of TCP/IP.

In keeping with the Rocky Mountain Packet Radio Association charter of providing "information and education in amateur digital communications", one of the RMPRA founders is providing this service.

Send: Two dollars to cover costs (foreign add appropriate additional for foreign mailing costs, 2 oz., IRC ok).

A mailing label with your address on it.

To:

Andy Freeborn NØCCZ 5222 Borrego Drive Colorado Springs CO 80918

DO NOT send mailers, diskettes or postage. But DO send the completed label.

Update on the the KA9Q TCP/IP Software

Announcing an update to the KA9Q TCP/IP software package release of 870526.0, bringing the current release date up to 870829.0. This update adds fixes bugs, and adds some minor functionality. A new release will occur in a couple of weeks with support for 4bsd and sysV unix machines, this version still supports only the PC and PC clone class of machines.

The changes:

Improved KISS bits for the TNC1 from



Gerard, PA0GRI.

- the ASCII text at the top of one of the TNC2 hex files is gone now.

- Minor tweaks to BM from Gerard, PA0GRI, Phil KA9Q, and yours truly. Biggest noticeable differences are that BM no longer looks at the hosts.net file at all, but instead passes symbolic hostnames to the smtp client in net... and we once again changed the text entry code. It's more like bsd Mail now. Default is a silly text entry routine, a "~e" gets you into your favorite editor, and a "~p" shows what you've typed so far.

- NET.EXE understanding of symbolic hostnames ala the hosts.net file has been extended. You now need to wrap numeric IP addresses in square brackets, as in "[44.32.0.16]", as you can use symbolic names anywhere you need to use an IP address (including in the autoexec.net

fil**e!)**

- Since BM no longer deals with IP addresses, a "gateway" command has been added to NET.EXE, so that it knows where to send mail that fails the lookup in hosts.net.

- Internal changes and a fix to the ftp server so that it now handles NLST command properly, all from Phil, KA9O. Bugs that were in the 870526.5 interim release that was only distributed in a limited fashion apparently disappeared with the latest tweaks...

- documentation has (as usual) been updated somewhat.

- some other random tweaks I'm sure I've forgotten...

What to do once you have software, aka "getting an IP address":

Users of this software package become part of the "global IP internet", and as such need to obtain unique IP address assignments for each host they plan to put on the air, or "on the wire". Major metropolitan areas in the US, and countries with active TCP-using groups probably already have blocks of addresses in amateur radio 44.X.X.X block assigned to them. Ask around locally before you go any further.

If there is no local address block in your area, and/or no one is coordinating address assignments for your local net, contact Wally Linstruth WA6JPR. Wally is the global top-level address administrator for the ham radio 44.X.X.X





subnet. Wally may be reached by email at

wally%net1.ucsd.edu@sdcsvax.ucsd.edu or wally@net1.ucsd.edu

or ...IsdcsvaxInet1Iwally

or via the new forwarding mechanism I have set up for those sites who know how to reply via mail to this message, butcan't reach Wally's machine directly:

winfree!wally or wally@winfree.uucp or

waily%winfree.uucp@flash.bellcore.com

How to obtain the KA9Q Internet software:

- Via uucp, the files are on winfree in tar archives as:

/usr/spool/uucppublic/pub/ ka9q_all.tar.Z 16 bit Compress 4.0

/usr/spool/uucppublic/pub/ ka9q_all.t12.Z 12 bit Compress 4.0

For Anonymous UUCP login, use phone number 303/593-0696, at 2400 baud (it will do 1200 if you send a return to rotate it down), "standard Unix login sequence", username of "Uanon", password of "notFTP". An example Lsys entry ala winfree's uucp would be:

winfree

Any ACU 2400 13035930696 login: Uanon password: notFTP

I've never run an anonymous login for uucp before, so let me know if I got it wrong!

A reasonable command to issue to pick up the 12-bit distribution would be

uucp winfree!~/pub/ka9q_all.t12.Z/usr/ spool/uucppublic

My BBS is currently down with a dead hard drive. If anyone has a spare drive they would be willing to donate to the cause, "please" get in touch with me ASAPI Cashflow around here is a joke... :-(

Normally,

Via Opus, log in to my BBS and download from the appropriate files area. There are several .ARC files for the full distribution, one for each of the directories. SeaDog file requests are ok. I have configured my BBS to allow first time users ample resources to download the full distribuion at 1200 baud. The phone number is 303/593-0766.

If you have any trouble downloading from the BBS, please let me know. Speeds that are supported include 300, 1200, and 2400.

-Via US Snail, Andy Freeborn NØCCZ has agreed to make floppy copies. To get a copy from him, send \$5 AND a completed return address mailing label (orders without a mailing label will be considered contributions to the BBS hard drive fund, see above... :-) to:

> Andy Freeborn, NØCCZ 5222 Borrego Drive Colorado Springs, CO 80918 USA

What you get for the \$5: 5 floppies, including two of RFC's and IEN's that relate to the code, two that include the actual release, and one that is intended to be a sort of "plug and play" disk for getting on the air immediately...

For those who just want the RFC/IEN disks, Andy will send you just those two disks for \$2 and a mailing label. If you want any particular RFC or IEN, contact Andy to find out what archive it is in (we have them all packed up, one ARC per 360k pc disk), and he will send you that RFC or IEN, along with many others, on a floppy for \$1/disk. You can't mix and match, you get the block of documents that are in a given archive.

DO NOT SEND floppies, mailers, postage, etc... but DO send the mailinglabel!

Andy is also reachable as winfreelandy or andy%winfree.uup@belcore.com

If you need more information (?). Andy is within an on-air FTP of me, so we should be able to keep his bits up to date!

on the ARPAnet, or attached portions of the Internet, look on louie.udel.edu

via anonymous FTP for the files in the directory

pub/ka9q

-Within a day or two of a new release, the code should also be available from the following additional secondary distribution points:

from Doug KD4NC in Atlanta, GA uucp: winfreelkd4ncldug



from Bob Hoffman N3CVL in Pittsburgh, PA arpa: rbh@cadre.dsl.pittsburgh.edu uucp: pitt!hoffman

from Wally Linstrugh WA6JPR in Santa Barbara, CA arpa: wally@net1.ucsd.edu

from Brian Kantor at UCSD. (via anonymous FTP?) arpa: tcp-grouprequest@sdcsvax.ucsd.edu uucp: sdcsvax.tcp-group-request

Unreleased (read: under development) versions are often available on louie.udel.edu, generally alongside official releases...caveat emptor...

If anyone has any trouble getting hold of a copy of the code, please let me know!

How to contact me:

Bdale Garbee, N3EUA 1433 Territory Trail Colorado Springs, CO 80919 303/590-2868w, 303/593-9828h

*** go easy on the phone calls please, I'm not getting much sleep! ***

uucp:

belicore,crash,hplsd,ncc,pitt,vixie}!winfree!bdale arpa: bdale%winfree.uucp@flash.beliccre.com bdale@net1.ucsd.edu

fido: Bdale Garbee at 128/19, 303/ 593-0766, 300/1200/2400 baud, 24hrs (*DOWN*)

packet: n3eua @ k0hoa

Note from the Editor

<u>I need your help</u>. With PSR back on its own, I need material from packet groups around the country for sharing in PSR. If you've got news to share, articles to contribute, or just want to comment pro or con on something we're doing right or wrong, please send your material to me directly:

> Scott Loftesness W3VS 16440 Rustling Oak Court Morgan Hill, CA 95037

or send it to me via electronic mail:

Packet: W3VS@AA4RE CompuServe: 76703,407 MCI Mail: SLoftesness AT&T Mail: SLoftesness

July 1987



Beginner's Corner: Digital Signal Processing

by Lyle Johnson, WA7GXD

Digital Signal Processing, or DSP, is a hot topic in the world of analog circuit design these days. And its becomin a ht tpic in he Amateur world (meaning that the costs are finally getting realistic).

This article is intended to be a very brief overview of DSP - what it is and how it may prove useful to packeteers and other segments of the Amateur community.

DSP - WHAT IT CAN DO

DSP is simply a means of processing a signal by digital means.

Analog processing applications that you may be familiar with include Audio CW filters, speech processors, two-tone generators for SSB transmitter testing and the 1200 baud modem in your TNC.

Some recent modem integrated circuits (ICs) include on-chip DSP. The AMD 7910/7911 "World Chip" modems, such as those used in the Kantronics Packet Communicators and the Pac Comm TNC-220, is an example of applying DSP to packet problems.

In general, anything you want to do to an audio signal, whether it be generation, modulation or filtering, can be done using DSP techniques.

The advantages of DSP include (1) uniformity and repeatability of a design and (2) one general-purpose hardware design can be reconfigured under software control to do many different tasks.

Software???

Yes, DSP allows software hackers to mess around with traditional hardware areas. Is nothing sacred?

Some of the guys playing with the AMSAT/TAPR DSP seed project (notably Tom Clark, W3IWI and Bob McGwier, N4HY) have already done some pretty amazing things. How about a PSK modulator to test the TAPR PSK modem demodulator? Or a PSK demodulator to check the PSK modem modulator? Or an audio spectrum analyzer? Or a weak signal detector so an OSCAR-10 class station can detect its own MOONBOUNCE signals! These applications have already been tested in at least a preliminary form by these two

Want a tracking, adaptive HF modem? How about a WEFAX demodulator? Or a 2400 baud telephone modem? Or a 9600 baud packet modem that will work on your current voice radio?

The list of applications goes on and on.

DSP - WHAT IT IS

A DSP system design consists of an input filter, usually quite simple to perform a function called "anti-aliasing." This is simply to protect the following circuitry from signals far out of the design passband.

Following the filter is an analog-to-digital converter (ADC). This device samples the input signal and converts the amplitude to a digital number. While accuracy requirements of the ADC vary from application to application, a 10-bit ADC driven at about a 20 kHz sampling rate will probably suffice for the majority of Amateur DSP applications.

The output of the ADC goes to the microprocessor (uP). In this case, however, a standard, generalpurpose uP won't do. DSP requires the rapid execution of a small set of instructions.

What do I mean by rapid?

Well, the 6809 in a TNC 1 runs at a clock of 3.6 MHz and takes an average of about 4.5 microseconds (uS) to execute a typical instruction. The Z80 in a TNC 2 runs at 2.5 MHz and takes about the same amount of time to do something.

The Texas Instruments TMS32010 DSP runs at a clock of 20 MHz and can execute a complex multiply-and-accumulate instruction in 200 nanoseconds (nS). This is about 20 times faster than the general-purpose chips, and even faster when you consider the amount of work done in that special DSP instruction! The next-generation TMS320C25 does even better, taking only 100 nS, or 0.1 uS, to do the same thing.

Of course, like any other microprocessor, the DSP chip needs program and data memory. In your TNC, the program memory resides in EPROM (2764 or 27256, typically) while the data resides in RAM (8k, 16k, or 32k bytes in a typical TNC). The difference with the DSP chip is that it needsFAST memory to keep up with its fast clock.

The DSP system also needs a means of outputting the digitally massaged input

information. This is usually in the form of an analog output via a digital-to-analog converter, or DAC. Like the ADC, a DAC with 10 bits of accuracy and outputting data at a 20 kHz rate (200 kilo-bits/sec), will probably suffice for most Amateur applications.

In addition, an Amateur DSP system should have some sort of serial or parallel I/O to interface with TNCs, computers, etc.

CURRENT PROJECT

The DSP seed project, being sponsored by AMSAT and TAPR, will provide about 20 or 25 Delanco-Spry PC cards. These cards plug into an IBM PC or compatible, and include a TMS32010 processor, 48k bytes of high-speed, dualported memory, an input ADC and output DAC, and support circuitry. Normally nearly \$1,000 each, Delanco-Spry is making us a special deal for between \$500 and \$600 per unit.

This project will, hopefully, serve as a software development bed. Tom Clark likens it to the early days of using 8080s in an S-100 bus computer runing CP/M. It isn't the Itaest or the greatest, but it is useful and the algorithms (approaches to solving a problem in software) developed should be useable in later-generation Amateur DSP devices.

Moving towards the front burner is a project to develop an Amateur DSP "engine" tailored to Amateur needs. Instead of expensive 16-bit ADCs and DACs that can clock at 50 kHz, 10-bit ADCs and DACs running at 20 kHz may suffice, saving many dollars. Likewise, including enough, but not too much, fast memory, will save more dollars. Finally, using volunteer engineering, we hope to develop a useful, general-purpose DSP device suitable for a broad spectrum of Amateur applications.

No details are yet available as to cost or exact configuration. My personal goal is to have a TMS320C25 with the aforementioned ADC and DAC capability, a minimum of 64 kbytes of memory, expandable to 128k bytes (the limit of the TMS320C25), sitting on a IBM PC card for about \$500. Maybe less. This is about 1/5 of the cost of a comparable commercial DSP card.

This would be followed by a stand-alone box, with serial ports or perhaps a SCS1 bus, probably for less.

Of course, I am a dreamer, and others tell me it would cost closer to \$1,000.



As the technology progresses, the prices will drop.

Watch this space for further developments...

Digital Signal Processing and Amateur Radio

by Bob McGwier N4HY 15 Cherry Brook Lane, East Windsor, New Jersey 08520

In the past several years, digital signal processing and related areas have made a significant impact on the telecommunications industry and govern-ment communication facilities. To date amateur radio has not participated to the fullest possible extent in the benefits made possible by the techniques of digital signal processing mainly because it has been too expensive to include the techniques in our cache of communication tools. In the past few years, the silicon revolution has overtaken digital signal processing and have made it too inexpensive to let it pass us by without using it. Arguably, the most popular family of digital signal processing chips are those produced by Texas Instruments and are the TMS320 family but there are several others, most notably the DSP56000 family by Motorola.

These techniques and chips make possible a wide range of exciting capabilities. Changing modems is as quick as changing the software program you are running on board your computer. A JAS-1 PSK modern is only a software program on the TMS32010 rather than a couple of dozen IC's (TAPR/JAMSAT PSK modem). This same software with a minor modification can be made a mary PSK modem[1]. The major win in digital signal processing for modems comes in the ability to do adaptive equalization. This means that we can do something to ameliorate the bad things being done by our unconditioned radios and the path the signal takes in getting to our demodulator. In analog/ oscilloscope parlance we can "open up the eye pattern". This process is independent of the radio as it will tune itself to the best pattern it can to clean up the bits being sent to our TNC's (for example).

This magic sounds so good that AMSAT/TAPR have again teamed for the benefit of amateur radio and packet. Tom Clark, W3IWI and I have been appointed chairmen of a project underwritten by AMSAT and TAPR. The project is to arrange a group purchase at a greatly reduced price of a board for PCclones that allows digital signal processing software/hardware to be tested and to plan what we will need for the future.

The board we have selected is the Delanco Spry[2] Model 10. This board has a TMS32010 as its DSP "engine". This processor has a 160ns cycle time and has many features that are especially nice for the implementation of digital processing algorithms. This board has a small amount of very fast memory (8K), Analog to Digital and Digital to Analog conversion hardware capable of sampling at greater than 40000 times a second, and sits on a card that fits into a standard expansion slot on PC-clones.

The project is looking for a few proven producers who do not mind spending \$525 for these boards to help the project produce nifty new things for amateur radio. You do not have to be a signal processor or a TMS320 assembler code hack. We would like those types of people to sign up for this project but we are also looking for people who can write applications software in "C" and assembler for the PC. We are currently emphasizing MSC, Turbo-C, and MASM as the development tools for the PC environment. We are even looking for a few proven "beta test" types. If you are one of the types who signed up for beta test packet boards without really understanding what was in them, we also need help from you.

The long range goals are the involvement of TAPR/AMSAT and some amateur industry leaders in the production of a digital processing product for amateur radio. We envision software that will run on this product to include (but not be limited to) modems of many varieties, optimal WEFAX-APT demodulation, voice encoding (LPC-10 and ADPCM for example), weak signal work, and test equipment. We are leaning towards a board with the TMS320C25 on board but the final decision has yet to be made and will probably be put off until we have more from those of you who "join up". We have already been approached by A.E.A. and Kantronics, who are expressing support and a desire to participate and more are sure to follow.

To date we have had some initial but very exciting success with these boards. Tom and I have seen each others echo's off the moon running Fast Fourier Transforms on these boards. Each of us was running an AO-10 class station without a lot of aluminum in the air. I have written a demodulator which locks to and tracks the JAS-1 PSK downlink quite well. I am putting a remodulator into the code so that JAS1 can be decoded by a stock TNC without modification. The FFT software also acts as a very valuable piece of test equipment, a spectrum analyzer. None of these things are completed and the others haven't even been started. DSP NEEDS YOU! Contact us via callbook address for W3IW1, AMSAT office, TAPR, or myself.

[1] "DSP Modems", Robert W. McGwier, N4HY, 6-th ARRL Computer Networking Conference, Los Angeles, August, 1987.

[2] Delanco Spry, Suite 241, 2900 Connecticut Ave, N.W., Washington, D.C. 20088

[3] "Digital Signal Processing and Amateur Radio", Thomas A. Clark, W3IWI and Robert W. McGwier, N4HY, 6-th ARRL Computer Networking Conference, Los Angeles, August, 1987.

(4) AMSAT-NA, Inc. P.O. Box 27, Washington, D.C. 20044

[5] TAPR, Inc. P.O. Box 22888, Tuscon, Az. 85734

In the Mailbox by Roy Engehausen, AA4RE 780 Lisa Court Gilroy, CA 95020

I saw a definition of a "committee meeting" as one where the attendees figure out who is absent and assign the work to them. I guess that's what happened in my case when I was asked to provide some news on BBS happenings.

Latest Software/Hardware

New releases of code have been made recently by WORLI/VE3GYQ (Version 3.3), KA2BQE (95c), and WA7MBL (3.20). All three systems now support forwarding thru the various level 3 systems. The executable program and source code for the first two are available from the authors while K7PYK distributes the executable MBL system. All are free with a diskette and SASE mailer. The WORLI/VE3GYQ program is also available from CompuServe (in the DL9 Data Library).

An interesting footnote is the fact that a feature has been removed. The current MBL code and the next WORLI release

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will have the fixed portion of the forward header built in. Too much software is now trying to deduce the origination point of a message via the headers to allow changes to the fixed fields. A header is shown below with just the fixed filed shown. Additional information such as frequency can follow these.

R:870903/0235z@:W0RLI Santa Cruz. CA #:8843 O:YB1BG

The TEXNET people are about to start distributing a combined Level 3 node and BBS system suitable for remote site installation. This is both hardware and software. A complete and thoroughly tested layer 3, 9600 baud network nodes is expected to cost about \$650 to \$700 for the entire node, radios (2), the NCP, parts, power supply and antennas excluding feedline. This cost does not include the BBS. Contact WD5HJP for details.

Developments

One of the biggest complaints I hear these days about BBS operation is that the mailbox is always busy. With forwarding every hour, multiple ports, etc, the availability of a BBS for a given user has been steadily decreasing. Both the WORLI and KA2BQE systems have attempted to supply some relief by running two copies of the software using a multitasker like DoubleDos but this has always been a kludge.

On the West Coast, two multi-connect systems have been in operation. Mike, W6IXU (of NETROM fame) has had a system on a MacIntosh for several years while Eric, WD6CMU has been running one under OS/9 (a 68000 based UNIX cione) for a year or so. Needless to say, the hardware cost involved as compared to a Taiwan PC/XT clone has prevented wide spread acceptance of these mailboxes.

This is about to change. Using the MINIX operating system, Bill, N6FOR. has successfully adapted most of the WD6CMU program to the PC 8088 hardware family. This software will support both multiple ports and multiple connects per port. I have watched W6IXU and WD6CMU forward mail to each other (thru NETROM) simultaneously. The mailbox is not yet in production use nor is it ready for distribution but should be by year end.

Under the current implementation, the TNCs must use the WA8DED (also of NETROM fame) host mode protocol. This is available for both the TNC-1 and

TNC-2 either from the author or CompuServe.

The MINIX Operating System is a variation of UNIX and was written by Andrew S. Tanenbaum as a teaching aid for his text book "Operating Systems: Design and Implementation" (ISBN 0-13-637406-9) published by Prentice Hall, Route 59 at Brook Hill Drive, West Nyack, NY 10995. The book sells for about \$35. Both the executable code and source are also available from Prentice-Hall for another \$80. Yes... I did say the source is available. The package also includes a simple "C" compiler. Updates to MINIX are free via USENET.

There is a dark lining in our silver cloud however. Unfortunately MINIX is its own operating system and will not run MS-DOS applications without extensive rewrite. It uses its own disk format and you will have to take care on how you organize your fixed disk if you wish to switch back and forth between MS-DOS and MINIX. In addition, Tanenbaum used direct interface to the hardware instead of BIOS so MINIX will not run on all the clone variations. This is being slowly rectified.

Food for Thought -One Man's Opinion

The most controversial issues facing BBS operators today is the universal addressing scheme both for regular inter-amateur mail and for NTS traffic. There seems to be two camps of thought: Telephone area codes and Postal zip codes.

One thing seems to be clear though: A separate system is needed for NTS traffic. It is an unfortunate fact of life that amateurs who are interested in NTS are few. Many mailboxes do not have someone who checks in regularly to deliver NTS messages in the local area. Thus the target mailbox for NTS to my home city of Gilroy and the mailbox used by the local hams are different. However we route inter-ham messages we must make provision for routing NTS differently.

At a meeting this summer attending by both packeteers and NTS people in the ARRL's Hudson Division, the scheme of NTSxxx (xxx = area code) was pro-Discussion of this idea has posed. taken place in many media: voice, mail, packet, and electronic conferences and alternatives of xxxxxN (xxxxx = postal zip code) and NTSxxx (xxx =

first 3 digits of zip code) have appeared.

I think the first conclusion is also obvious: whatever is selected for NTS should be used for a general scheme and vice versa so let's discuss a general scheme.

Let's square off zip code versus area code.

First: Zip code is a lot more selective. A single zip can contain a maximum of 30,000 to 50,000 people which would probably fall out to about 100 hams. That would be coverage for one or two BBS. Area codes can cover whole states. If you add the telephone exchange number (e.g. 408847) then you equal zip code's efficiency. The same addressing problem exists if you only use the first 3 characters of the zip code.

Second: Zip code is fairly logical. A station on the East Coast will simply have to know to route everything starting with "9" to the other coast. Both the WA7MBL and WORLI BBS programs accept "wildcards" to allow this to be done efficiently.

Third: Zip code is in the Callbook. If you wanted to route a message to me, you would simply look up my address in the call book and send the message to AA4RE @ 95020. Thus we have our own "directory". In addition, you can purchase the zip code directory from the Postal Service which shows city and zip code. To find what Gilroy's telephone area code and exchange prefix are is not as easy.

The major disadvantage to zip code is the difficulty of addressing areas outside the US. It can be said that adding the telephone country prefix to the area code, we can address the world. I just tried to look up the prefix for Japan. My phone book says to call the operator for that information. I don't even know what the US prefix is so how can I give it out.

If we put an indicator on the front of the address to show the country, then it will be up to the hams there to decide on how they want to address messages. Lets see what a typical address would be:

W-95020

The W indicates the US. We all know and understand the amateur call sign system both for US and for DX. Lets use it. A Canadian address might be VE-6K7P1M. Some may argue that this exceeds the present day 6 character maximum limitation on the @BBS field but I am sure that the software experts

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we have now can solve this problem given a few months.

This then is my opinion: a ten character @BBS field consisting of two parts: a country code and (for the US) a zip code. Country codes should be taken from the ITU amateur radio prefix list. Each country would select an internal addressing scheme. For the United States, we would use the postal zip code. The letter "N" would be appended to indicate that the message is NTS traffic.

Feedback

I would appreciate any comments regarding this article contents or suggestions for future articles. Send them to packet: AA4RE @ AA4RE, CompuServe: 76064,2107 or USMail: 780 Lisa Court, Gilroy, CA 95020.

TAPR PSK Modem Kit Preliminary Manual Errors

by Lyle Johnson, WA7GXD I can't understand it! There are actually some ERRORs in the TAPR PSK Modem Kit Preliminary Documentation (dated 05 July 1987). Shucks, a lot of that manual was gathered together and edited at 2 AM. The sun wasn't even in my eyes! Presented below is a list of the most blatant, confirmed errors. Please correct your manual to reflect these changes! Page 2 Change quantity of 0.01 COG capacitors from 10 to 9. Change quantity of 22k ohm resistors from 02 to 03. Page 7 The 2-pin header may interfer with mounting the board. You may want to use a wire jumper rather than a push on one here. Page 14 The two regulator ICs are oriented opposite each other. Page 18 S2 is upside down. S2 "pad 2" applies to TNC 1. For TNC 2 use "pad 3."

"All Switches Front View" refers to

the keyway diagram immediately below.

Page 29 UHF Port DIN pins 1 and 3 are swapped. Pin 1 is Common and Pin 3 is Step Down. Page 36 Pad 2 is for TNC 1.

Pad 3 is for TNC 2.

ADDENDA

Page "3" Replace switch table with the following:

Switch Manual Ref Label **Transmit Mode** JAS/PSK MAN/PSK **S2** AFC **UP/DOWN S3 USB/LSB** Modem PSK/FSK **S4** ON/OFF

Receive Mode S1 VHF/UHF JOINT/ SPLIT

SCHEMATIC

Sheet 1 of 3 J4 - 1 is COMMON. J4 - 3 is DOWN. J4 - 5 is UP.

Sheet 2 of 3 No errors reported!

Sheet 3 of 3 See Sheet 2 of 3.

I want to thank the many Amateurs who wrote, called or got onto CompuServe and brought these errors to our attention. The new manual is being compiled and edited as this is written, and everyone who helped point out the errors in the preliminary one will get a courtesy copy.

I am sure there are more errors, but these should be enough corrections to get you on the air with PSK!

Thank you!

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Coming Next Issue: A Letters to the Editor column. Be sure to send your comments on PSR, pro or con, to the W3VS at the address listed on the first page. We really do want to hear from you and to share your opinions with the TAPR membership.

B

Reducing HF RFI from the TAPR TNC 2

by Lyle Johnson, WA7GXD

A number of packeteers have reported interference from their TNC 2s, especialy on HF. The problem manifests itself as an unstable, buzzing sort of noise every several kHz throughout the spectrum.

This noise has been investigated and a number of possible solutions proposed. Many of these sugestions have been tried out and this article is a report on the more effective measures.

Even if you haven't had RFI problems, some of these suggestions may result in dropping your TNC's current consumption by several mA, perhaps as much as 20 or so! Read on!

FIRST STEPS

Check that all portions of your station are bonded together and grounded with a low-impedance grounding system. This can have dramatic results, and is just good engineering practice.

While doing all this grounding, be sure to electrically connect the TNC 2 case to the ase of your radio.

Use a large toroid and wrap the end of your power cable through it for a few turns just as before it enters the TNC 2.

Similarly, wrap your RS-232 cable through a toriod at the TNC end.

A good toroid to use is the MFJ-701. This is an open-frame, square unit that can simply slip over your cable.

INSIDE THE TNC

Add bypass capacitors of 330 or 470 pF from serial port connector J1 to ground at the following pins: 3 (Rx Data), 5 (CTS) and 8 (DCD). This can be conveniently done on the bottom of the PC board.

Replace R1 (47 ohms) with a 10 uH inductor.

Add a 0.01 uF bypass capacitor from -V (negative terminal of C8) to normal TNC ground (C8 and C9 return to a special "8" ground, as shown on the TNC 2 schematic, page 3 of 3).

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Page 7

556 CHARGE PUMP MODS

Cut the trace joining U2 pin 5 to U2 pins 8 and 12 (pins 8 and 12 must still be joined). Add a 10 ohm series resistor from U2 pin 5 to U2 pins 8 and 12. Apparently, the 556 sections turn on simultaneously for a brief period of time, and this is the major cause of the noise heard at HF. The series resistance seems to delay the slave section enough to prevent this from occuring. The resistor value appears to be critical - much more than 10 ohms and the charge pump doesn't work properly, much less and the noise isn't reduced. Thanks to Eric, N7CL, for discovering this characteristic of the charge pump, as well as this cure.

If not already present, add 0.01 uF capacitors from U2 pin to pin 7 and pin to pin 7.

These mods will dramatically reduce RFI and also reduce current consumption by about 10 mA.

ALTERNATE TO 556

As an experiment, I replaced the 556 charge pump with a Siliconix Si7661 CMOS charge pump. Before you plunge in with this mod, be advised that the resulting current drain is about the same as the modified 556, presented above. And, a 7660 charge pump won't work; you must use the Siliconix part, as it is rated to operate at the input voltage range of the TNC 2.

The circuit is that contained in the Siliconix Data Sheet. I simply rewired some of the socket at location U2 and patched in the Si7661. It works fine, but I haven't been able to verify its performance in a side by side test with Eric's 556 mods. If it turns out to be better, I'll supply the details here in PSR. Right now, the 556 mods look to be the best bet. The Si7661 current drain is about the same as the modified 556!

Caveat Emptor!

CONCLUSION

These mods are generally simple and inexpensive to perform. The results are dramatic. If you have experienced any sort of RFI from your TNC 2 on HF, these mods should fix it!

See you on a non-forwarding HF frequency!



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TEXNET NEWS!

The Texas Packet Radio Society is very pleased to announce the availability of the TexNet Node Control Processor version 2.1 pc board. We're offering the pc board at our cost to the amateur radio community for non-commercial uses only. This pc board is the unique and primary hardware component for the TexNet 9600 baud layer 3 network system. The Texas members of TPRS will be installing this version of the board in TexNet nodes throughout the state. We have been operating 4 nodes on the air since October, 1986 using the same circuitry as this version 2.1.

Other groups and individuals who desire to install a layer 3, 9600 baud network system can order the pc board and documentation, and an EPROM set containing he system image software by mail. Order information is listed below.

The TexNet node is a stand-alone, totally pre-programmed-in-EPROM system. It is designed to be installed in remote tower locations. There are no user programmable parameters necessary to operate the network nodes. Nobody wants to climb a tower in the dark to replace a dead lithium battery!A local terminal connection to the node is not necessary. The design is of a fail-safe oriented system. A UPS allows the node to operate independently of AC mains for a limited period of about an hour. If the system batteries fail before AC power is restored, all operations return intact after power is restored. If the node software fails thru a fault due to a power circuit glitch (like a near lightning strikel), the node can be forced into a hardware reset via the network link. The only requirement for network link reset is that the network link radio still work and the modern section of the PC board still beoperational. A TexNet node will automatically re-build its routing table after power-on system reset.

The system components that are available include:

A> Node Control Processor version 2.1 pc board.

This NCP printed circuit board is offered without parts, it has been silkscreened and soldermasked with plated holes. It has the circuitry traces for a discrete CPU oscillator circuit, Z-80A CPU, 40K of static RAM(84256 & 6264), 24K EPROM (system `software, 27C256), 2 Z-80A SIO-0's for three synchronous radio ports and one async terminal port, one 9600/ 4800 baud modem with state machine (2716 EPROM), one 1200 baud modem with state machine (2716 EPROM), a Z-80A CTC, network trunk hardware reset circuitry (2732 EPROM), modem connector pads and five control points.

Use of the third sync port requires the addition of another modem. Please note that each port can be strapped for 1200, 2400, 4800 or 9600 baud operation. From what we know of the system loading tests, the node can effectively support one 9600 baud network port and a number of slower speed user ports. The other two ports can be a combination of the other three speeds, 1200, 2400 or 4800 and can support either user or network connections.

We will NOT be offering a set of parts. All parts used are standard logic family parts, Z-80A, 74HCmos, 74LS, and CMOS static rams and EPROMs. Included with the pc board is documentation to assemble the board, tune the modem sections and interface the NCP modems to the RCA series 700 UHF transceiver and the 2m FM transceiver.

- B> An EPROM set containing:
 - 1) an un-coordinated network system software image (27256)
 - 2) state machine image (2716), this is for both the 9600 and 1200 baudmodems.
 - 3) reset logic image (2732)
 - 4) documentation that describes procedures for: coordinating network nodes, programming node features, nodenames, node numbers, Packet Message Server routing, timing parameters, system digipeater access limits, aliases, connection responses, hardware reset programming procedure and greeting banners and prompts.

The EPROM set purchased by a system installer is registered with TPRS and support is granted only to registered system installers. System installers who have purchased the registered EPROM sets



from TPRS receive update information. Included with the purchase is a license to make as many copies and coordinate as many nodes as is necessary for their system. Again, the constraint is this: the system must be installed and used non-commercially in an amateur radio operated and owned packet network system.

PLEASE NOTE!!! This is NOT source code. The code in the EPROM kit requires a central coordination effort by a group or club. To successfully use the TexNet system software requires the facilities of a personal computer equipped with an EPROM programmer, disk file utilities to read and edit EPROM images. Then software to program the coordinated EPROMs.

C> A daughter pc board containing circuitry for the Packet Message Server interface and 8 more control points. This board uses a Z-80A PIO, a 74LS244, a 74LS245 an a 74LS138 as an address decoder. It plugs into the Z-80 socket and the Z-80 is placed on the daughter board. This separate pc board comes with separate documentation.

Prices-

NCP version 2.1 pc board—\$44 plus \$4.00 shipping & insurance

Interface daughter board-\$10 includes shipping

EPROM set & documents—\$50 plus \$4.00 shipping and insurance

These prices are subject to change. Shipping and insurance is First Class and insured for \$50 via U.S. Mail. No UPS. Cashier's check, money order, or certified check made out to TPRS are all acceptable forms of payment. Personal checks will delay filling your order until they clear. To avoid undue delay, please order via the PO Box listed below, do not use the membership P.O Box number on the newsletter. Allow 6 to 8 weeks for delivery.

TPRS P.O. Box 835136 Richardson, Texas 75083-5136

The Texas Packet Radio Society, Inc. is a non-profit charitable organization incorporated in the state of Texas. These printed circuit boards and software are offered only for use in other non-commercial, amateur radio owned and operated packet switching communica-



tions network systems. The buyers of the printed circuit boards and software are hereby notified that the system's performance is dependent on the assembly and installation expertise of the buyer and or installer and is therefore an experimental system and is offered "AS IS". No license for commercial use is implied or granted through purchase of any of the system components.

System Support

The Texas Packet Radio Society will be publishing notices of updates, modifications, or TexNet related components through the TPRS Quarterly Report. A subscription is \$12 per year for at least four issues annually, some supplemental mailouts are made irregularly. Please address your subscriptions to the address listed below:

TPRS P.O. Box 831566 Richardson, Texas 75083-1566

NET/ROM version 1.1 released 10 July 1987

Version 1.1 incorporates no new features, but corrects three relatively minor problems that were found in version 1.0. We do not feel that it is necessary to update nodes presently running 1.0, except for the relatively few places where one or more of these problems are causing significant difficulty.

Following is a description of the three problems fixed in 1.1:

(1) Destination table entry counter:

When a destination node is deleted from the routing table (either manually or by the automatic obsolescense mechanism), the destination list entry is not deallocated immediately, but rather just marked as a deleted destination entry available for re-use. However, such deleted entries are deallocated when the node is warm-started (for example, if there is a power failure, or if the SYSOP issues a RESET). Version 1.0 has a "bug" whereby the destination table entry counter is not decremented when entries are deallocated during a warm-start. This can cause the count to become incorrect (too large). The count is used to limit the size of the destination table in accordance with PARMS parameter #1. Consequently, the "bug" can result in premature "Routing table full" messages, or failure to incorporate new nodes from a neighbor node's routing broadcast. WORKAROUND: this problem can be avoided either by (1) not warm-starting the node, or (2) setting the PARMS parameter #1 to a high value.

(2) RNR during deferred disconnect

When two stations are connected via NET/ROM and one of them disconnects, NET/ROM's "deferred disconnect"logic causes any in-transit information frames to be delivered to the still- connected station until all such frames have been delivered or until a given period of time elapses (by default, 15 minutes) with no forward progress. Version 1.0 has a "bug" that causes this protective timeout to be ineffective if the connected station's TNC is refusing the information by returning a RNR status.

(3) Fast-learn of paths with two digipeats

> NET/ROM incorporates new nodes into its routing table by monitoring the source callsign field in the layer 3 header. Version 1.0 has a "bug" whereby layer 3 frames that arrive via two digipeats cause a routing table entry to be constructed with the digipeater list in reverse order. Version 1.1 fixes this problem, and checks for the existence of the entire path, not just the source callsign.

Clearly, these are rather eacteric problems, and have not caused significant operational problems. We do not feel that any wholesale updating of 1.0 nodes to 1.1 is warranted.

NET/ROM version 1.2 released 14 August 1987

Version 1.2 adds two important new features to the automatic routing system. There are no incompatibilities between version 1.2 and prior versions of NET/ROM. However, the new features in version 1.2 are significant enough that operators of nodes using prior versions may wish to consider upgrading to the latest firmware.

A new command, ROUTES, allows



node control operators to fine-tune the automatic routing system by assigning explicit path quality values for individual neighbor nodes. (In prior versions, only a global channel quality value could be assigned by the control operator, and that value was assumed to apply universally to all neighbors on the channel.) A detailed description of the ROUTES command follows this summary.

NET/ROM's automatic routing algorithm has also been enhanced to prevent a node from getting stuck using a sub-optimal path for long periods of time. The enhancement is most easily explained by giving a specific example:



Suppose user X wants to connect to user Y. He uplinks to his local node A, requests a circuit to destination node D, and then downlinks to user Y. Node B has two alternate routes to D...via node C or via node E. The route through node C has higher quality than the route through node E. NET/ROM prefers to use the optimum route through C; however, if that route fails for some reason, it will use the alternative route through E.

In versions of NET/ROM prior to 1.2, once B starts routing D-traffic through E, it will not even attempt to try the path through C again until the crosslink between B and E is deactivated...which happens when there has been no traffic on the crosslink for (nominally) 15 minutes. In high- traffic areas, however, such a period of no activity might not happen for hours or even days! Thus, node B would become "stuck" using a sub-optimal route for long periods of time.

In version 1.2, the following enhancement has been made. When node B receives a routing broadcast from node C (typically once each hour), it takes a look at all destinations whose optimum (highest-quality) route is through node C. (In this case, node D is such a destination.) If node B discovers that it is using some other (sub-optimal) route to one of these destinations, it deactivates the sub-optimal route and tries the optimal route (through C) once again. Naturally, if the optimal route fails for any reason, it will try alternative routes in descending order of quality, as usual.

The following addition has been made to the NET/ROM manual (following

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page 38):

ROUTES Command

The ROUTES command is used to display or modify the neighbor list of the node's routing table. To display the node's neighbor list, use ROUTES without any parameters:

ROUTES LAS:K7WS-11} Routes: > 1 K7WS-11 255 5 > 0 WA7GTU-1 192 17 0 WR7GTU-2 0 15 ! 0 KR6ANT-3 vio K7WS-4 144 2 0 WB7BN1-1 192 6 0 AA6TN-1 192 7

For each neighbor list entry, the following items are displayed in sequence:

- ">" if an active crosslink exists to this neighbor
- port number (0=HDLC port, 1=RS232 port)
- path to this neighbor (callsign + any digipeaters)
- path quality to this neighbor (255 is best, 0 is worst)
- use count (number of routes via this neighbor)
- "!" if this neighbor list entry is locked

To display this information for just one particular neighbor list entry, use ROUTES followed by the port number and path:

AOUTES O AR6TH-1 LRS:K7HS-1] Routes: > D AR6TH-1 192 27

Neighbor list entryies may be created automatically as the result of receiving an automatic routing broadcast, or manually by means of the NODES+ command. When a neighbor list entry is first created, it starts out unlocked and with a path quality equal to the default channel quality (see PARMS command). However, the control operator has the ability to "fine-tune" NET/ROM's automatic routing by modifying the path quality values for specific neighbors and by locking these modified entries.

The ROUTES command supports manual modifications to neighbor list entries, but this capability is available only to a control operator who has previously validated his credentials during this connection by successfully executing the SYSOP command. To modify neighbor list entries, the commands are:

ROUTES port nodecall [digicall...] +

pathquality

ROUTES port nodecall (digicall...] - pathquality

The "+" version locks the neighbor list entry specified by the port, nodecall, and digicall parameters, and sets the path quality of that entry to the value pathquality (255 is best, 0 is worst). If there is no entry in the neighbor list that matches port, nodecall, and digicall, a new entry is created, locked, and initialized with the specified pathquality and a use count of zero.

The "-" version unlocks the specified neighbor list entry. If its use count is zero, the entry is deleted immediately. Otherwise, the entry remains in the neighbor list and its path quality is set to the value pathquality. If the use count of an unlocked neighbor list entry ever becomes zero, the entry is deleted.

The path quality for a neighbor is used by NET/ROM in its calculations of route qualities for all routes through that neighbor. By modifying the path quality using the ROUTES+ command, the control operator can encourage or discourage a node from using paths through a particular neighbor. By setting a neighbor's path quality to zero, the control operator can cause the node to ignore the existence of that neighbor altogether, even to the extent of disregarding the neighbor's routing broadcasts.

The Radio Amateur Telecommunications Society Information Bulletin 20 August 1987

To: All Radio Amateurs Fm: N2DSY @ KD6TH-4/201 Sb: COSI-Switch and RATS Update

The delays in getting out the COSI-Switch have been long and somewhat frustrating for everyone. Things are finally coming together.

What should be clear to everyone by now is that the originally announced X.25 Level 3 code has not arrived.

Something had to be done...

The project has been started from scratch by Tom Moulton, W2VY. He is



The revised delivery scedule is as follows:

Oct - Alpha testing of a completed COSI-Switch Level 3 module

Nov - Beta testing of a completed COSI-Switch machine - TNC-2/DR-200 (Any other hardware suggestions ?

Jan - Production shipment begins

All individuals and clubs that contacted RATS regarding this project will receive MS-DOS Disks and EPROMS with the code during each phase of the testing cycle. We got a good deal on diskettes and EPROMs so we will include everyone I The production version will include SOURCE in "C".

As with all the SOURCE we distribute, it is free for non-commercial use.

Support contributions are accepted and commercial licensing arrangements can be made. Contact RATS for details. ALL proceeds go to the enhancement of the Packet Network.

Other happenings:

John Howell N2FVN has produced an implementation of the "Asynchronous Framing Technique (AFT) in "C". This is useful for providing error-checked, transparent HDLC links through asynchronous interfaces. AFT can be run over seven or eight bit networks and handles HDLC frames transparently. It is a nice building-block for the network.

This AFT is a generic implementation (accompanied by a "DOC" file) that includes code that runs under MS-DOS. Distribution of this code, in compressed form, will be via Amateur Packet Radio, Usenet and CompuServe HAMNET. The file name(s) will be based on the string "AFT10" for AFT version 1.0. It will be distributed in compressed form. We'll send it out with the first COSI-Switch test code.

John is working on a matching capability for the TNC-2. This would provide a error-checked link between PCs and

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TNCs. Harlan Worchel, KB2CNL (yes, a NOVICE I) is working on porting the code to the Commodore 64.

Brian Riley's (KA2BQE) latest release of the Packet Radio MailBox System, version 95c, supports forwarding through COSI-Switch, GatorSwitch and NET/ROM. It also has the "KT" (kill traffic) feature that will automatically generate a service message when a traffic message is removed from the packet network. It is available from RATS, with the "C" SOURCE CODE. Send a message to N2DSY @ KD6TH-4/201 or KA2BQE @ KA2BQE-4/609 to get a copy of the code.

RATS is currently beta-testing the GLB Netlink 220 19.2 KBps modem/radios. So fast I Soco goood I We are also burning-in eight PAC-COMM DR-200s. These will be deployed shortly.

RATS wishes to thank you for your patience. We're not real happy with how we got into the Level 3 COSI-Switch delay, but we think the effort is on the right track. If you have any questions call or send me a message.

Hang tough. We think you'll like the output !

Next update will be sent on or about 15 September.

Vy 73, J. Gordon Beattie, Jr.

MAIL Unix: ihnp4lhouxmlhou2dln2dsy Amateur: n2dsy@kd6th-4/201

TELEPHONE

Office: 201-615-2506 Home: 201-387-8896

NNC Project Update

by Dr. David Toth, VE3GYQ

It has been quite a while since members were brought up to date regarding the NNC (Network Node Controller). I think a brief recap of the project is in order.

It became obvious to many people that the packet revolution had arrived, and that we might become victims of our own success. What I mean is that we were likely to see packet fall apart because it was so popular. With the increase in activity, it was obvious that we needed two big things to build the network successfully: 1) HIGH SPEED RADIO MODEMS.

2) A DEVICE TO ROUTE PACKETS AROUND OUR MYSTICAL (MYTHI-CAL) NETWORK.

Where are we as of this moment in 1987? Well, we have 56 kilobaud modems. Everyone won't need one, but some of the bearded wonders (do Phil Karn and Bob McGwier have beards? nawwwwwl oh well!) are reproducing the modem designed in Georgia, and you will be hearing big things about it soon.

That brings us back to the NNC. Well, Jay Nugent WB8TKL and his squad in Michigan (including N8BJX and WA1LRL) have got the SCSI interface working and talking to a hard drive. They also gave us a communications program, and that brought us the next major breakthrough. Bob McGwier, N4HY, has been porting the TCP/IP code over to the NNC and we hope to have something to test by the end of October. Our major stumbling block is the C compiler that Bob has to use. It was designed for a Z80, and is limited to the 64k architecture of that chip. The 64180 of the NNC can address more memory, so Bob is hand-patching the assembly code produced by his C compiler so that he can work with the larger memory.

So, if anyone has a lead on a cheap, and good, C compiler for the 64180 that does not use overlays, but indeed does support the 64180 completely, we would love to hear about it.

Bob feels that this can all be married with NET/ROM feeder links so that we can interface to existing parts of the network. Howie is taiking with Phil Karn and Bob as to what can be accomplished with a melding of the Virtual Circuit technology with the Datagram stuff of TCP/IP and NET/ROM.

I think that we can safely say that we are beyond the days of squabbling as to whether datagrams are better than virtual circuits, etc. If one looks at the commercial world, one sees a happy smattering of both, and they co-exist. After talking to Howie, Phil, and Bob, I am assured by them that such will be the case in the amateur network.

And while I am discussing the network, I should advise you that the various BBS programs written by WORLI/ VE3GYQ, WA7MBL, and KA2BQE are all being modified (constantly) to integrate them into an enhanced network. I am presently meeting with Chris Sullivan VE3NRT, who has extensive network design experience, in order to design a specification for the next generation of BBSs. This specification will be presented to the software types for scrutiny and criticisms/comments. 1

So, if there is one message that I can leave you with, it is to go out and line up RF sites so that we can press onward with establishing connectivity. Dust off your copies of Tanenbaum's "Computer Networks" and see what constructive comments you can add.

73,

David B. Toth, M.D. VE3GYQ NNC Project Manager

New WA8DED Firmware Available

Ron Raikes, WA8DED, recently uploaded the following new versions of his popular TNC firmware to the CompuServe HamNet DL9 Data Library.

TNC1FW.ARC: version 1.3 user firmware for the TAPR TNC-1 and clones. This version adds a full duplex command and a patchable location for 8-bit character sets in terminal mode.

TNC2FW.ARC: version 2.1 user firmware for the TAPR TNC-2 and clones. This version adds a full duplex command and a patchable location for 8-bit character sets in terminal mode. DWAIT channel arbitration has been replaced by P-persistence.

PK87FW.ARC: version 2.1 user firmware for the AEA PK-87. Changes are identical to those in TNC2FW.ARC.

Support TAPR! Renew Your Membership!

With Packet Radio Magazine no longer publishing, PSR is the <u>only dedicated</u> <u>source of packet radio-related material</u>. And PSR is only available as part of <u>your</u> <u>mambership</u> in TAPR. Please check your membership expiration date (on the mailing label for this issue) and, if it's 7/87 or earlier, <u>please RENEW</u>! Use the membership renewal form on the back page.

Keep PSR coming to you! <u>TAPR thanks</u> you for your support!







NET/ROM Mini-Directory as of September 1, 1987

					FL Gainesville	K4DP 8-1		Peterson, Richard N.	NAKEA	MS Vicksburg	MB55XK-4		Ford, Bill	WB55 X.K
Locat ion	Call	Ident .	Owner's Name and Calls	ign	FL Bollywood FL Bollywood	MA4WED-2 MA4WED-3		Webb, Ed Webb, Ed	N4FOM	MS Vicksburg NC Cary	WB55XK-5 K4ITL-1		Ford, Bill Stephenson, Ed	MB55XX AB45
AK Anchorage	ALTCH-5		Pierce, Malt	AL7CH	FL Bomestead (N. Keys)	AN4TH-1	BST	Bertrand, William G.	AA4TH	NC Charlotte	M48FB-1		Mecklenburg ARS Inc.	MABEB
AK Anchorage AL Birmingham	ALTCH-6 K4FUH-1		Pierce, Malt Sandidge, Jere T.	AL 7CH KAFUM	FL Somestead (N. Keys) FL Lake Males	AA47M-2 MB4PGB-1		Bertrand, William G. McKenzie, William A.	NB4PGB	NC Charlotte	N4BFB-2		Mecklenburg ARS Inc. Chilcote, Robert L.	MABEB MAAFLR
AL Birmingham	K4FUM-2		Sandidge, Jere T.	K4FUH	FL Hiani	KB4VMA-1		Figueroa, Edward R.	KBAVWA	NC Fayetteville NC Fayetteville	WA4FLR-8 WA4FLR-9		Chilcote, Robert L.	NA4FLR
AL Birmingham AL Birmingham	K4BAL-1 K4BAL-2		Wingate, Benry A., Jr.	K4BAL K4BAL	FL Hiami	KB4VNA-2		Figueroa, Edward R.	KB4VWA	NC Fayetteville	WAS BEV- 1		Edington, Ray J.	MASHFV MB4NOR
AL Birmingham	K4BAL-4		Wingate, Benry A., Jr. Wingate, Benry A., Jr.	KABAL	FL Naples FL Naples	NC5YD-2 NC5YD-3		Voltaire, Paul Voltaire, Paul	KC5YD KC5YD	NC Greensboro NC Greensboro	NB4NOR-5 NB4NOR-6		Layno, J. Charles Layno, J. Charles	NB 4NOR
AL Birmingham	K4BAL-S		Wingate, Benry A., Jr.	K4BAL	FL Naples	KCSYD-4		Voltaire, Paul	KC5 YD	NC Lumberton	KB4NOZ-1		Insco, Ron	KB 4NOL
AR Evening Shade AR Evening Shade	RF5TL-1 RF5TL-2		McKenzie, Charles L. McKenzie, Charles L.	NF5TL NF5TL	FL Orange Park FL Orlando	W58UQ-2 K4ABO-1		Moore, John R. Diggs, James M.	NSEUQ K4ABO	NC Lumberton	NANEV-1 MBSOUE-6		Macleod, James B. Cain, Tom	MANEV MESOUE
AR Evening Shade	RESTL-3		McKenzie, Charles L.	NT STL	FL Orlando	KAABO-2		Diggs, James M.	K4ABO	NC Morrisville NC Morrisville	NBBOUE-7		Cain, Tom	MBBOUE
AR Evening Shade AR Little Rock	KESTL-4 KCSJB-1		McKenzie, Charles L. Reaves, Donald E.	RESTL	FL Orlando	ND48IN-1		LaPointe, Bruce	WD481M	NC Morrisville	WBBOUE-B		Cain, Tom	MBBOUE
AR Little Rock	KC5JB-2		Reaves, Donald E.	NC5JE NC5JE	FL Orlando FL Orlando	ND481M-2 ND481M-7		LaPointe, Bruce LaPointe, Bruce	ND4BIM ND4BIM	NC Morrisville NC Wilson	NE4J-1		Cain, Tom Evans, Tommy	NE4J
AI Dewey/Hingus Mt .	RE7CS-1	DEWEY	Oliver, Joe	NB7BNI	FL Sarasota	W41E-0		Sarasota ARC	MAIL	NC Winston-Sales	KB4NBB-1		Marren, Bob	KB 4N BB
AI Gilbert AI Gilbert	NB7QGN-1 NB7QGN-6		Schroeder, Mark S. Schroeder, Mark S.	1037QCN 1037QCN	FL Sarasota FL Stuart	M41E-1 K4NTA-1		Sarasota ARC Buf, Ted	W41E K4NTA	NC Winston-Salen NC Winterville	KB4NBB-2 ND4JPQ-1		Narren, Bob Ross, Nayne	KB 4N BB
AZ Kingman	KB7AG-1		Bannan, Joe	KB7AG	FL Stuart	K4NTA-2		Buf, Ted	K4NTA	NC Winterville	ND4 JPQ-2	PGV	Ross, Mayne	ND4JPQ
AI Phoenix AI Phoenix	MB78NI-1 MB78NI-11	PBX	Oliver, Joe Oliver, Joe	ND 7BN I ND 7BN I	FL Tampa	KB4LBX-1 KB4LBX-2		Evonosky, Alex	KB4LBX KB4LBX	ND Cathay	NBOVEN-1		Ockert, William R.	MBOVEN
Al Prescott/Mt. Unfon	MB7BN1-15	BNI	Oliver, Joe	MB7BW1	FL Tampa FL Tampa	KB4LBX-3		Evonosky, Alex Evonosky, Alex	KB4LBX	ND Mayville ND Rocklake	NOKIU-1 NOGUV-1		Lindans, Elroy M. Kurtti, Erling	NOCUV
AL Prescott/Ht. Union	WB7BN1-4 WB7BN1-6		Oliver, Joe	WB7BHI	FL West Palm Beach	MA4EXE-1		Felton, Joshua H., Jr.	WA4BXI	NE Lincoln	MBOQIY-1	LNK	Buhrman, Douglass	MBOQIY
AI Prescott/Mt. Union AI Show Low Greens Pk	W7GWP-1	SON	Oliver, Joe Oliver, Joe	MB7BNI MB7BNI	FL West Palm Beach GA Savannah	MA4BX8-2 X4NLX-1		Felton, Joshua H., Jr. Goodard, Dan	WA4EXI K4NLX	NE Omaha NE Omaha	KOBOY-1 KOBOY-5		Halbert, Doug Halbert, Doug	ROBOY
Al Show Low Greens Pk	M7GNP-6	#SON	Oliver, Joe	NO 78WI	GA Savannah	K4NLX-2		Goddard, Dan	KANLX	NE South Sloux City	NFON-1		Nickolaus, Mike	NFON
CA Bakersfield CA Berkeley (Grisly Pk)	NGGRR-1 AK7B-1	BFL GPK	Roux, Louis A. Barlow, Chris	WEGRR ANTB	AI Bonolulu	D010J-0 D010J-1		Manalo, Eduardo V.	DUIUJ	NE South Sloux City	NFON-5		Nickolaus, Mike	NFON MIXJ
CA Big Bear	AAGTN-1	TN	Neal, Terrance H.	AASTN	BI Bonolulu BI Bonolulu	DU10J-2		Manalo, Eduardo V. Manalo, Eduardo V.	DUIUJ	NH E. Kingston NH Kingston	M1XJ-1 K1TR-1		New England PR Assn. New England PR Assn.	MIXJ
CA Canoga Park	MA63BV-1 MA63BV-11		Martin, William	KA65BV	BI Bonolulu	KH6GPI-10) HNL	Sprague, Arthur Y.	KE6GP I	NB Kingston	KALOXQ-1		New England PR Asen.	M1XJ M1XJ
CA Canoga Park CA Chatsworth	K61YK-12		Martin, Millian Fortney, James T.	WA6SBV K61YK	EI Maui EI Mt Baleskala, Maui	KE685-9 KE685-1	MAUT	Maui ARC Maui ARC	AB6GJ AB6GJ	NE Kingston NE Kingston	WIDC-0		New England PR Assn. New England PR Assn.	WIXJ
CA Chatsworth	KGIYK-13		Fortney, James T.	REITR	BI Cahu	KEGP1-11		Spraque, A. Y.	KB6GP I	NJ Alpine (NNJ/NYC/LI)	K2LSX-6	ALPINE	Gubernard, John T.	K2LSX
CA Chatsworth CA Del Mar	KGIYK-3 NGNKF-1		Fortney, James T. Antonio, Franklin	KGIYK MGNKF	BI Onhu	KH6GP1-9		Sprague, Arthur Y.	KB6GP I	NJ Alpine (NNJ/WYC/LI)	K2LSX-7 WBSOIF-2	HAMARC	Gubernard, John T.	K2LSX MBSOIF
CA Del Mar	HONKE-2		Antonio, Franklin	NONKE	IA Anes IA Anes	R100-1 R100-2		Fits, David C. Fits, David C.	K100	NJ Cape May NJ Oakland	MA2SNA-2	NN J	Ott, Robert D. Anderson, Robert R.	K2BJG
CA Euroka	KAGNEO-1	EUREKA	Phegley, John W.	KAGHEO	IA Codar Rapids	KOVM-1		Groff, Alvin	KOVM	NJ Oakland	WA2SNA-3	NN J2	Anderson, Robert R.	K2BJG
CA Fresno CA Fresno	N68AV-1 N68FN-2	FRESNO	Post, William R. Lozano, T. J.	NGEAV NGIFN	IA Cedar Rapids IA Cedar Rapids	KOVM-2 KOVM-3		Groff, Alvin Groff, Alvin	KOVM	NJ Palisades Park NJ Palisades Park	W2NV-11 W2NV-6		Mannino, Joseph F. Mannino, Joseph F.	W2NV W2NV
CA Garberville	NGAFT-1	GBV	Reinke, Vernon L.	NGAFT	IA Denison	MBOGGI-1		Crabb, Dennis, M.D.	WB0GG I	NJ Palisades Park	W2HV-7		Mannino, Joseph F.	M2NV
CA Laguna Beach CA Los Angeles	NB6UUT-1 NGAMT-3	LAX	Taylor, Lynn W. Pettus, Michael G.	NB GUUT	IA Des Moines IA Garner	KOIQR-1 MDOEMI-1	DSH	Evans, Robert A.	KOIQR MDOEMI	NJ Palisades Park NJ Palisades Park	N2NV-8 N2NV-9		Mannino, Joseph F. Mannino, Joseph F.	W2NV W2NV
CA Magalia	KG6MS-1	LAA	Corbridge, Robert L.	RG GHS	IA Manson	NBONHW-1		Nall, Dave Swartsendruber, John	NBONKW	NJ Palisades Park	N3CSG-1		Crocker, Royce F.	MICSG
CA Mountain View	MB6FFC-1	INNORM	Westfall, Brian G.	K6OJM	IA Marion	RCOOX-1		Breitwisch, Ron	KCOOK	NJ South	NB2DRD-1		McNally, Thomas O.	MB2DRD
CA Ht. Rasno CA Ht. Vaca	WB9RNH-2 WAGRD8-1	VACA	Russell, John A. Bumphrey, Dennis	NB 9RNN NA 6RDE	IA Marion IA Sious City	KCOOX-2 MBOYOM-1		Breitwisch, Ron Barbes, Loren	KCOOX MBOYON	NJ South NJ South	MB2DRD-2 MB2DRD-3	SN.J3	McNally, Thomas O. McNally, Thomas O.	MB2DRD MB2DRD
CA Ht. Vaca	MAGRD8-11		Bumphrey, Dennis	MAGRDE	IA Storm Lake	MACUSI-1		Matthews, Jerry J.	MAQUEI	NJ South	NB2DRD-4		McNally, Thomas O.	MB2DRD
CA Mt. Wilson (L.A.) CA Pacifica	NB9RNH-3 KA6EYB-1	SSF1	Russell, John A. Wysling, Roy	NB SRNN RAGE YE	ID Boise ID Boise	W78C-0 W78C-1	BOI	Ahmann, Robert Ahmann, Robert	W7SC W7SC	NJ Warren NJ Warren	KA90-1 N48Y-1		Karn, Phillip R. Jr. Karn, Phillip R. Jr.	KA 90
CA Palo Alto	WELOB-7	APALO2	Buttard, Robert J.	MELOR	ID Boise (SW Idaho)	KK7A-1	BOISE	Larson, Jin	KK7A	NJ Wharton	KB2H-1		Winard, Barold	KB 2M
CA Palo Alto	WELOB-8	PALO4	Bussard, Robert J.	WELOB	ID Coeur d'Alene	HE7X-4		Ball, Dennis	KK7X	NH Albuquerque	KC5DD-1 KD5TU-1		Falkowski, Edmond	KC SDD
CA Palo Alto CA Pago Robles	NGLOB-9 NGANT-1	PRB	Buzzard, Robert J. Campbell, Gregory D.	NGLOB NB6ASR	ID Coeur d'Alene ID Pocatello (SE ID)	NX7X-5 N7X5-1	PIB	Hall, Dennis Servel, X. F.	KK7X N7X5	NH Albuquerque NH Deming/Las Cruces	NDSEZC-0		Rogers, Robert B. Taylor, Joann	NDSEZC
CA Paso Robles	NGAMT-11	PRB2	Campbell, Gregory D.	MBGASR	10 Rexburg	KTENE-1	REX	Moss, Ronnie E.	K7ENE	NM Nogal	WB5NQC-1		Jones, Mike	NB 5NOC
CA Red Bluff CA Red Bluff	WEAHT-7 WEAHT-8	ABL PRBL2	Campbell, Gregory D. Campbell, Gregory D.	NB GASE NB GASE	ID Rupert IL Champaign-Urbana	KA7UEN-1 KA9CAP-1	CMI	Short, Barold Berkman, Ronald E.	WATUEW KASCAP	NV Ely NV Ely	WB7WTS-1 WB7WTS-2		Christensen, Joseph R. Christensen, Joseph R.	MB 7MTS
CA Riverside (RACES)	NGKEB-1	SBD	Burton, Mike	N6K1B	IL Chicago	KOVXM-1		Bergstedt, C. R.	K 9VXM	NV Gardnerville	MA6NGU-2		Tweedy, Stan	MA 6NGU
CA Sacramento CA Sacramento	NGAR-1 NGAR-10		Crandall, Keith	REQIF	IL Chicago	KOVXN-2		Bergstedt, C. R.	K 9VXW N 9GBB	NV Gardnerville NV Gardnerville	NA6NGU-3 NA6NGU-4		Tweedy, Stan Tweedy, Stan	MA 6NGU
CA Sacramento	WEAK-4		Crandall, Keith Crandall, Keith	KEQIF	IL Mt. Prospect IL Napierville	N9GBB-1 N9ATH-2		Chesner, James C. Wilk, John R.	NSATH	NV Las Vegas	K7WS-1	LAS	Schenk, Mayne	K7MS
CA San Diego	K6KGS-1		Busas, Robert A.	KENGS	IL Mapierville	19ATH-3		Wilk, John R.	N 9ATH	NV Las Vegas	K7NS-11 K7N5-2		Schenk, Mayne	8,7 MS 8,7 MS
CA San Diego CA San Jose	NGAMT-4 RAGYZS-1	SAN	Pettus, Michael G. Cronk, Scott	ND6E N7FSP	IN Flora IN Fort Wayne	K9LSB-1	FHA	Cosand, James B. Forbing, Jack D.	KD9MB K9LSB	NV Las Vegas NV Las Vegas	K7M5-3		Schenk, Mayne Schenk, Mayne	K7WS
CA San Jose	N7FSP-11		Cronk, Scott	W7F5P	IN Bebron	N9CVV-1		Burton, Ken	N 9CVV	NV Las Vegas	K7N5-4 AK78-14		Schenk, Mayne	K7MS AK7B
CA San Jose CA San Jose	MGAMT-0 MGAMT-10	SFO SFO2	Campbell, Gregory D. Campbell, Gregory D.	ND GASE ND GASE	IN Lafayette IN Martinsville	NB 90PG-1 NA 90GO-1		Filmer, David L., Ph.D. Earnshaw, John W.	NB90PG MA9UGO	NV Reno NV Reno	AK78-4	RENO	Barlow, Chris Barlow, Chris	AK 7B
CA Santa Ana	NGAMT-5	SHA	Pettus, Michael G.	ND62	IN Plynouth	MASINH-1	PLY	Ichner, Mayne	MASINH	NV Silver City	AK78-11		Harlow, Chris	AK7B
CA Santa Barbara	RA6SOX-1	SOX	King, Thomas C. Jr.	KA6SOX	IN Terre Baute	N9UUU-0		Wabash Valley ARA	NSUUU NASVMN	NY Bardonia	K25K-1 N2CJ-1	CLV	Douglas, Robert N. Dutchess Cty. Ofc of CD	K2SK N2CJ
CA Santa Barbara CA Santa Barbara	#6AMT-12 #6AMT-2	SBA2	Bickerdike, Peter L. Bickerdike, Peter L.	NB 6D AO	IN Valparaiso IN Nestfield	MASVNM-1 NSERX-1		Czaja, Edward NA	NA	NY Clove Mt., Unionvale NY E. Long Island	K2AAA-1		Herten, Donald J. S.	K2 AAA
CA Ventura	MAGESH-13		Sulphur Mtn. Aptr. Asen.	NGMA	IN Westfield	M98RX-2		NA	NA	NY Mt. Beacon	MB2KMY-1 MB2KMY-11	ENY	Ht. Beacon ARC	WB 2 KMY
CA Ventura, South Mtn.	WA615N-3 WA615N-6	VNTURA	Sulphur Mtn. Rptr. Assn. Sulphur Mtn. Rptr. Assn.	N GMA	KY Ft. Mitchell KY Independence	KA4BCD-1 K4CO-1		Uckotter, Tim Gouge, Balph	KA4BCD K4CO	NY Mt. Beacon NY Mt. Beacon	WB2 104Y-12		Mt. Beacon ARC Mt. Beacon ARC	MB 2 KHY MB 2 KHY
CO Boulder	REGLT-1		Spinelli, Gene	REGLT	KY Independence	K4CO-6		Gouge, Balph	K4CO	NY New York City	NB2QBP-11		Berson, Mark	N2MB
CO Colorado Springs CO Colorado Springs	KE95-2 MB00CJ-1	COS	Benton, Malcolm E. Berrett, Charles F.	KE95 MBDOCJ	KY Lexington KY Lexington	84AV8-1 84AV8-2	LEX	Shepherd, N. R. Shepherd, N. R.	M4AVI M4AVI	NY New York City NY New York City	MB2QBP-12 MB2QBP-2		Berson, Mark Berson, Mark	N2MB
CO Denver	RQ0J-2	-	Sheffield, Bill	KQ0J	KY Versailles	MB97PG-1	VER	Mitchell, Gary A.	MBSTEG	NY New York City	NB2QBP-3	hat shall	Berson, Mark	N2MB
CO Durango	KDODI-1	-	Orlosky, Kit	KDODI	LA Alexandria	MBSASD-2		Palko, Thomas	NB5ASD KD5SL	NY New York City NY Northern Long Island	WB2QBP-6	NYCVEF	Berson, Mark Geng, Karl B.	NIDL
CO Ft. Collins/Loveland CO Glenwood Springs	NOBJX-1 KOGUI-1	FNL	Selders, Samuel A. Carter, Stephen L.	NOBJX KOGU S	LA Baton Rouge LA Monroe	ND581-1 AE5V-2		McAnelly, Shelton Scott, Benson	AESV	NY Queens (NYC)	MB2QBP-7		Berson, Mark	N2MB
CO Grand Junct ion	MORRE-1	GJT	LeBaron, William J.	MOMTK	LA New Orleans	MB5BSE-0		Rees, J. H.	MB5BEE	NY Schenectady	K2AE-0 K2AE-2		Schenectady ARA Schenectady ARA	K2AE K2AE
CO Kremmling CO Manassa	KQ0J-1 NOFSM-1	KRE	Sheffield, Bill Sigmon, Marcus	ROOJ	LA Fineville LA Sulphur	N5BOF-2 MASVDH-15		Hayes, William I. Nelson, Sam	N SBOF MASVDH	NY Schenectady NY White Plains	MB2111-9		Vydaneny, Faul S.	ND 2VUK
CO Fikes Feak	WOV1-1		Pikes Peak FM Assoc.	NOVI	NA Foxboro	NO 1EMT-1		Fosboro Co. AMC	WB1 ENT	Of Athens	NDBOXK-1 KGAL-1	ATB	White, Jeffrey H.	NDBOXX
CO Bifle CT Collingville	KOGUS-2 MALUOC-7		Carter, Stephen L. Faucher, Dave	KOGUS NA100C	MA Mt. Tom, Bolyoke	#18JH-1 #31W1-10	ABW 12	Hiorek, Jin Clark, Thomas A.	KIMEA WJIWI	OE Cambridge OE Cleveland	MBBCQR-0		Day, Alan Lake Erie ARA	NOAL MOREIS
CT Collineville	MALUQC-8		Faucher, Dave	MA10QC	MD Baltimore	M3 IN1-5	BWI	Clark, Thomas A.	NJINI	OE Dayton	NONN-1		Garcia, Albert B.	NONN
CT Newington	WIAM-5	CENCT	An. Radio Belay League	N1AN	MD College Park	MAJYME-1	UND	Mamakos, Louis A. Clark, Thomas A.	WA3 YMB W3 IWI	OE Dayton	NSNN-8 Kacilt-1	PUT	Garcia, Albert B. Laus, Thomas	NONN KR61LT
CT Newington CT North Central	N1AN-7 N1AN-6	HCCT	Am. Radio Belay League Am. Radio Belay League	W1 AN W1 AN	ND Elk Neck ND Elk Neck	NGINI-11 NB4APR-6	PELK2 ELK	Clark, Thomas A. Bruninga, Bob	WB4APR	OE Elida OE Elida	KB61LT-2		Laus, Thomas	RBGILT
CT Putnam (Eastern)	KAINUJ-1	1000	Lastern Conn. ANA	MALEYN	MD Relateratown	MIGKT-10		McClure, Lester L.	MIGHT	OB Findlay	N8FT-10 N8FT-8		Leube, Frederick L. Laube, Frederick L.	AKSX
CT Putnam (Eastern) CT South Central	KA1HUJ-7 K11KE-1	3007	Eastern Conn. ARA Szczech, Joseph Jr.	MAINYN KIRIE	MD Relaterstown MI Brighton	MAILRL-3		McClure, Lester L. Galipeau, Joseph E., Jr.	M3GXT WALLEL	OB Findlay OB Findlay	#8FT-9		Laube, Frederick L.	AREX
CT South Last	WIOPS 1	SECT	Cos, Boward B.	NIOPS	MI Grand Rapids	KBEFK-1		Bosscher, Tom	MASURE	OH Middletown (SW OH)	WOBLV-2 WOBLV-3	HINO2 HINO3	Dial Radio Club Dial Radio Club	NO BL V
FL Apopka FL Apopka	AB4CO I AB4CO Z		Williamson Gordon Williamson Gordon	AB 4CQ	MI Grand Rapids HB Edina	KBEFR-2 MAGNLP-1	FBL	Bosscher, Tom Hoore, Dave	REGS	OB Middletown (SW OB) OB Middletown (SW OB)	WOBLY-4	MINO4	Dial Radio Club	NISBLV NISBLV
FL Boca Raton			IMM AAC of Boce Baton	BATL	MN Minneapolis	MOTH-1	MSP	Whiting, Rick	NOTN	Of Munroe Falls	NBUCKO-1 NGAFT-2	KLMTA	Young, Michael E. Reinke, Vernon L.	MBBC RO
FL Boca Raton FL Boca Raton			104 Adt of Buca Batun	MATL	MN Minnetonka MN Rochester	NOTN-2 NOMXN-1	RST	Whiting, Rick Dubke, Robert E.	NOTN KOSIR	OR Klamath Falls OR Newport	NTVTN-1	NPT	Milson, Daron	NGAT T NTBUR
FL Casselberry	86+10+1 2		the add of Buca Baton upper 7 8 11	NATL KD45A	HO DI MON	HORQL - 1	ROL	Basilton, Jimmie J.	NOROL	OR Newport	N7VTH-11 N7X1-1		Milson, Daron McMurdo, Douglas S	N/BUR
FL Casselberry FL Clearwater				RD 438	MO Springfield MS Clinton	NEOB 1 ND4DDA 5		Christiano, David J. Jackson ARC Inc.	NEOB ND4DDA	OR Portland OR Portland	M7X1 11		McMurdu Duutian S III	10 P R 1
FL Clearmater				R4 / 1 1	MS Gulfport	MASDVV 2		Fagan, Patrick J.	WASDVV	OR Portland	MA2THP - 7 MA2THP - 8	PDX	Rovner, Alan N Rovner, Alan N	MA2"Mr MA2:Mr
FL Devie FL Devie		: ::	The state of the state	Real B Real W	HS Guifport HS Mendenhail	MASDVV 3 RSHYE-1	MDL	Fagan, Patrick J. Statham, John C	KSHYE	OR Portland			and the second sec	
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A Glenside A Glenside A Barrisburg A Barrisburg A Harrisburg A Harrisburg A Harrisburg A Harrisburg A Philadelphia A Philadelphia A Philadelphia A Phoenixville I cumberland I Providence C Anderson/Greenv'lle C Anderson/Greenv'lle C Anderson/Greenv'lle C Anderson/Greenv'lle C Charleston C Charleston C Charleston C Charleston C Charleston C Florence (East SC) C Goose Creek C Boath Springs D Bath Springs C Boath Springs D Bath Springs D Bath Springs M Johnson City W Johnson City W Johnson City K Johneyrtle Knoxville K Houston K Diver Springs X Boisetta K Disetta K Bouston K Lubbock K Lubbock K Hadland/Odessa	ND5 HTQ-0 K5VHX-1 KA5EJX-1 NA5T8B-1 NA5T8B-2 KE5PL-1 NA5J8H-2 NA5F-1	BBG HES AND AND ABTEX DAS IAR LBB	Teel, Thomas C. Teel, Thomas C. Crompton, Doug Crompton, Doug Crompton, Doug Crompton, Doug Central Fa. Rptr. Assn. Boffmann, Gary Central Fa. Rptr. Assn. Pearce, Jon Pearce, Jon Bealy, S. C. Melacon, W. A., Jr. Helson, B. A., Jr. Helson, B. A., Jr. Schuele, Donald W. O'Heil, Donald M. Schwele, Donald Schwele, Donald Schwele, Donald Schwele, Donald Schwele, Donald Hogram, Zdward R. Spille, Richard F. Thompson, David B. Argo, Sobby E. McKtee, Robert Hale, Jie Caep, David B., Sr.	MAJD3P MAJD3P KJIBN AX3P KJIBN KS2HNF KS2HNF KS2HNF KS2HNF KS2HNF KS2HNF KS2K KAJTZJ KJ KJ KJ KJ KJ KJ KJ KJ KJ KJ KJ KJ KJ	WI Dousman WI Dousman WI Dousman WI Eastern WI Eastern WI Eastern WI La Crosse WI Midleton WI Midleton WI Milwaukee WI Milwaukee WI Milwaukee WI Milwaukee WI Milwaukee WI Tomahawk WV East Central WV Moundsville WV Moundsville WV Moundsville WV Moundsville WV Ravenswood WY Ravenswoo	WASKEC-4 WASKEC-5 WFSR-1 WFSR-2 WFSR-3 WASFIO-1 KD9UU-9 WASSOU-2 WASFIO-1 KD9UU-9 WASTTT-7 WBSTTT-7 WBSTTT-7 WBSTTT-7 WBSTTT-7 WBSTTT-7 WBSTTT-7 WBSTTT-7 WBSTTT-7 WBSTT-1 KAKSKP-3 WBSTT-1 KAKSKP-3 WFXI-1 KAKSKP-3 VFXI-1 KAKSKP-3 VFXI-1 KAKSKP-3 VFXI-1 KAKSKP-3 VFXI-1 KAKSKP-3 VFXI-1 KAKSKP-3 VFXI-1 KAKSKP-3 VFXI-1 KAKSKP-3 VFXI-1 KAKSKP-3 VFXI-1 KAKSKP-3 VFXI-1 KAKSKP-3 VFXI-1 KAKSKP-3 VFXI-1 KAKSKP-3 VFXI-1 KAKSKP-3 VFXI-1 VFXI-	SHE SHE SHE LSE NFR MKE SLG ECNV NCNV
A Barrisburg A Barrisburg A Mt. Bolly Springe A Mt. Bolly Springe A Philadelphia A Philadelphia A Philadelphia A Phonixville I cumberland I providence C Anderson/Greenv'lle C Anderson/Greenv'lle C Anderson/Greenv'lle C Charleston C Charleston C Charleston C Charleston C Charleston C Florence (East 3C) C Florence (East 3C) C Goose Creek C Beath Springe C Beath Spri	WAJ RXC-5 AX3 P-5 WAJ RXC-6 WB 2 HWF-2 WB 2 HWF-2 WA 2 HWF-2	HES AND ABTEX DAS IAB	Central Fa. Rptr. Assn. Boffmann, Gary Central Fa. Rptr. Assn. Fearce, Jon Fearce, Jon Bawes, R. David Sirois, Kenneth A. Bealy, S. C. Melacon, W. A., Jr. Melacon, W. A., Jr. Melacon, W. A., Jr. Nencick, Richard A. Kronick, Richard A. Kronick, Richard A. Kronick, Richard A. G'Meil, Donald W. O'Weil, Donald W. O'K, Vince Marshall, Delrey M. Marshall, Delrey M. Marshall, Delrey M. Marshall, Delrey M. Marshall, Delrey M. Schwenle, Donald Schwenle, Donald Schwenle, Donald Ingraham, Zdward R. Spille, Richard F. Spille, Richard F. Marshall, Robert Bala, Jie Camp. David B. Argo, Sobby E.	KJ 18H AK3P KJ 18H HB2HNF HB2HNF HB2HNF HB2HNF HB2HNF HB2HNF HB2HNF HB2HNF KG1U KA4YEA KA4YEA KA4YEA KA4YEA KA4YEA KA4YEA KA4YE KA4Y	NI Eastern NI Eastern NI Eastern NI La Crosse NI Madison NI Middeton NI Middeton NI Middeton NI Midusukee NI Milusukee NI Milusukee NI Milusukee NI Milusukee NI Tomahawk WV East Central NV Moundsville NV Moundsville NV Bavenswood NF Casper NF Rawins NF Riverton -AUSTRAILA -AUSTRAILA -AUSTRAILA -AUSTRAILA N.S.M. -AUSTRAILA N.S.M. -AUSTRAILA N.S.M. -AUSTRAILA N.S.M. -AUSTRAILA N.S.M.	HF9R-1 HF9R-2 HF9R-3 HA9F10-1 K09UU-9 HA950U-2 HA950U-2 HA950U-2 HA957TT-7 HB57TT-7 HB57TT-7 HB57TT-7 HB57TT-7 HB57TT-7 HB57TT-7 HB57TT-7 HB57TT-7 HB57TT-7 HB57TT-7 HS57TT-7	SHE SHE LSE NFR MKE SLG ECWV NCWV
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C Anderson/Greenv'lle C Anderson/Greenv'lle C Anderson/Greenv'lle C Charleston C Charleston C Charleston C Charleston C Florence (East 3C) C Florence (East 3C) C Goose Creek C Beath Springs C Beath Springs	RA4 TZA-1 RA4 TZA-2 RA4 TZA-2 RD4 JZJ-3 ND4 JZJ-3 ND4 JZJ-3 ND4 JZJ-3 ND4 JZJ-3 ND4 JZJ-3 ND4 JZJ-1 N4U1B-2 R4MJR-3 AMDF-3 AMDF-3 AMDF-3 AMDF-3 AMDF-3 AMDF-3 AMDF-3 AMDF-3 MT43-1 R44JR-3 AMDF-3 MT43-1 NT43-	ABTEX DAS IAB	Kronick, Richard A. Kronick, Richard A. O'Meil, Donald M. O'Meil, Donald M. Ott, Vince Marshall, Delrey M. Marshall, Delrey M. Marshall, Delrey M. Schweele, Donald Schweele, Schweele, Schweele, Donald Schweele, Schweele, Schweel	RA4YEA RA4YEA RA4YEA WD4JEJ WD4JEJ WD4JEJ KA453R KA453R KA453R KA457 KA457 KA457 KA457 AAOF AAOF AAOF AAOF AAOF AAOF AAOF AAO	 HI Hilsaukee HI Hilsaukee HI Tomahawk W East Central W Houndsville W Houth Central W Bavenswood W W Bavenswood W Bave	HB 9777-9 HB 9777-9 HB CL2-1 KAB 3XP-3 HB 87V-1 KAB 3XP-1 HA 8050-2 H7VH3-1 K7NH-5 V721H-6 V721H-7 V722H-7 V72H-7 V722H-7 V72H-7	ECHV NCHV RHL
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C Smath Springs C Smath Springs C Smath Springs D Rapid City D Rapid City D Rapid City H Johnson City H Knoxville H Knoxville H Knoxville H Ningsport H Knoxville H Ningsport K Kouston X Dalsetta X Dalsetta X El Paso X Elvaso K Elvaso K Lubbock K Lubbock K Lubbock K Maland/Odessa	R (HU, TR-1 R (HU, TR-2 R (HU, TR-2 A AD (P-1) A AD (P-2 A AD (P-2 A AD (P-3) M (X (S-1) R (X (S-1) R (X (S-1) R (X (S-1)) R	DAS	Marshall, Delrey H. Marshall, Delrey H. Marshall, Delrey H. Schweile, Donald Schweile, Donald Schweile, Donald Ingraham, Zdward R. Spille, Richard F. Spille, Richard F. Thompson, David 8. Argo, Bobby E. McAtes, Robert Eale, Jie Camp. David 8. Fr.	K4NJR K4NJR AAOF AAOF AAOF K4VE K4VE AAOF K4VE AAOF K4VE AAAES K84JS K84JS K84JS K84JS K84JS K84JK K84JK K84JK K84JK K84JK K84JR K94	WY Casper WY Ravitas WY Riverton -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRIA 	W7KF-1 K7NH-5 VK2IN-6 VK2IN-7 VK2IN-7 VK2RPH-0 VK2RPH-0 VK2RPH-0 VK2RPH-0 OE9ELH-2 OE9ELH-7 OE9ELH-7	
C Seath Springe D Rapid City D Rapid City D Rapid City N Johnson City N Johnson City N Knosville N Knosville N Oliver Springe X Abilen-Khidland X Daisetta X El Paso X El Paso X Elvbock X Lubbock X Lubbock X Lubbock X Lubbock X Lubbock X Lubbock X Maland/Odessa	R 4W JR-3 AAD F-1 AAD F-2 AAD F-2 WX 4S-1 R 4W 8S-1 AAX 8S-1 W2 4J 78-1 W2 4J 78-1 W2 4J 78-1 W5 0 18C-1 W5 0 18C-1 W5 0 18C-1 W5 0 18C-1 W5 0 18C-1 W5 0 18C-1 W5 178 B-1 W5 5 178 B-1 W5 5 178 B-1 W5 5 178 B-1 W5 5 178 B-1	DAS	Marahall, Delray H. Schwenle, Donald Schwenle, Donald Schwenle, Donald Ingraham, Edward R. Spille, Richard F. Spille, Richard F. Thompson, David B. Argo, Bobby E. McAtes, Robert Hale, Jie Camp. David B. Fr.	K4MJR AAOF AAOF WK48 K4VII AA4R5 MB4J3D KB4MK AG5F	WT Riverton -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRALIA -AUSTRIA Bregons -AUSTRIA Bregons	K7NN-5 VK21N-6 VK21N-7 VK21N-7 VK21P-0 VK2PB-0 VK2PF-0 VK2PF-0 VK2PF-0 OE9EL8-2 OE9EL8-2 OE9EL8-7 OE9EL8-7	
D Apid City D Apid City D Apid City D Apid City H Johnson City H Kingsport H Nosville H Rosville H Nosville K Abileeck K Abileeck K 1 Paso K Bouston K Lubbock K Lubbock K Lubbock K Han Angelo	AADF-1 AADF-2 AADF-3 WX45-1 K4VIE-1 AA4K5-1 K94J35-1 K94J35-1 K95K7-3 W55K7-0 K5VK0-1 K35K70-0 K5VK0-1 K35T80-1 WA5T80-1 WA5T80-1	DAS	Schwenle, Donald Ingraham, Zdward R. Smith, Gary E. Spille, Bichard F. Thompson, David B. Argo, Bobby E. McAtee, Robert Hale, Jim Camp. David B., Sr.	AAOF AAOF MK48 K4VII AA4K8 K84J3D K84J8 K8	-AUSTRALIA -AUSTRALIA M.S.M. -AUSTRALIA N.S.M. -AUSTRALIA N.S.M. -AUSTRIA Bregens -AUSTRIA Bregens -AUSTRIA Bregens	VK2 IM-6 VK2 IM-7 VK2 IM-7 VK2 AP 8-0 VK2 AP 8-0 VK2 AP 8-0 OE 98L8-2 OE 98L8-7 OE 98Q 1-2	
D Rapid City D Rapid City N Johnson City N Johnson City H Knogwille N Knogwille N Oliver Springs X Ablien-Khidland X Daisetta X El Paso X Elvaso K Lubbock X Lubbock X Lubbock X Lubbock X Lubbock X Midland/Odessa X San Angelo	AADF-3 WX45-1 K4V18-1 AA4K5-1 WB4J3D-1 KD4KK-1 AG5F-3 W5DKG-1 WD5FTQ-0 K5VFQ-1 KA5EJX-1 WA5TBB-2 KE5PL-1 WA5J3W-2	DAS	Schwenle, Donald Ingraham, Zdward R. Smith, Gary E. Spille, Bichard F. Thompson, David B. Argo, Bobby E. McAtee, Robert Hale, Jim Camp. David B., Sr.	AAOF WX45 X4VII AA4K5 W54J3D K84MX AG5F	-AUSTRALIA -AUSTRALIA M.S.M. -AUSTRALIA N.S.M. -AUSTRALIA N.S.M. -AUSTRIA Bregens -AUSTRIA Bregens -AUSTRIA Bregens	VH2 IM-8 VH2 AP 8-0 VH2 AP 8-0 VH2 AP 8-0 OE 98L8-2 OE 98L8-7 OE 98L 8-7	
N Johnson City N Kingsport N Rnoxville N Noxville N Oliver Springs X Abilen-Khidland X Daisetta X El Paso X Bouston X Lubbock X Lubbock X Lubbock X Lubbock X Lubbock X Midland/Odessa X San Angelo	W745-1 R4V18-1 AA4R5-1 W74J3D-1 R764KR-1 AG5F-3 W5DMG-1 R75BTQ-0 R5VMDL-1 RA5EJX-1 WA5T8B-1 R45F2R-1 WA5J3N-2 WA5F-1	DAS	Ingraham, Edward R. Smith, Gary E. Spille, Bichard F. Thompson, David B. Argo, Bobby E. McAtee, Robert Bale, Jim Comp. David B., Sr.	NX 45 K4VII AA4K5 NB 4J3D KB 4NX AG5F	-AUSTRALIA W.S.M. -AUSTRALIA W.S.M. -AUSTRALIA W.S.M. -AUSTRIA Dregenz -AUSTRIA Bregenz -AUSTRIA Bregenz	VK2 RP H-0 VK2 RP N-0 VK2 RP S-0 OE9BLE-2 OE9BLE-7 OE9KE I-2	
M ANGUILE N Olives Springs X Abilens/Midland X El Paso X Elubbock X Lubbock X Lubbock X Lubbock X Lubbock X Lubbock X Midland/Odessa	AA4 KS - 1 WB4 JSD- 1 RB4WK-1 AG5F-3 W5DNG-1 WD5HTQ-0 K5VPK-1 KA5EJX-1 WA5TBB-2 KE5PL-1 WA5J3W-2 WA5F-1	DAS	Smith, Gary E. Spille, Bichard F. Thompson, David B. Argo, Bobby E. McAtee, Robert Eale, Jim Camp. David B., Sr.	AA4KS NB4JSD KB4HX AG5F	-AUSTRALIA N.S.M. -AUSTRIA Bregenz -AUSTRIA Bregenz -AUSTRIA Bregenz	VK2BP5-0 OE9BLB-2 OE9BLB-7 OE9BLB-7	
M ANGUILE N Olives Springs X Abilens/Midland X El Paso X Elubbock X Lubbock X Lubbock X Lubbock X Lubbock X Lubbock X Midland/Odessa	W784JSD-1 RD4HK-1 AG5F-3 H5DHG-1 R55HTQ-0 R55HTQ-0 R55HTQ-1 RA5EJX-1 WA5T7B-1 WA5T7B-2 KE5PL-1 WA5J3H-2	DAS	Thompson, David B. Argo, Bobby E. McAtee, Robert Hale, Jim Camp. David B., Sr.	NB 4JSD KB 4NK AG5F	-AUSTRIA Bregens -AUSTRIA Bregens -AUSTRIA Bregens	OE9ELE-2 OE9ELE-7 OE9XP1-2	
N Oliver Springs X Abilens/Hidland X Elisetta X El Paso X Eubbock X Lubbock X Lubbock X Midland/Odessa X San Ancelo	AG5F-3 M5DMG-1 M55HTQ-0 K55MQ-1 KA5EJX-1 MA5TBB-1 MA5TBB-2 KE5PL-1 MA5J3M-2 MA5F-1	DAS	Hale, Jim Casp. David B., Sr.	NGSF	-AUSTRIA Bragant	OE9X21-2	
K El Paso , K Ecuston , K Lubbock K Lubbock K Lubbock K Hidland/Odessa K San Aroslo	ND5 HTQ-0 K5VHX-1 KA5EJX-1 NA5T8B-1 NA5T8B-2 KE5PL-1 NA5J8H-2 NA5F-1	DAS	Hale, Jim Camp. David B., Sr.				
K Souston , K Lubbock K Lubbock K Lubbock K Midland/Odessa K San Angelo	MD58TQ-0 K5VM2-1 KA5EJX-1 MA5T8B-1 MA5T8B-2 KE5PL-1 MA5J3M-2 MA5F-1	IAB	Caso, David B., Sr.		-AUSTRIA Bregens	OESXPI-7	
K Lubbock K Lubbock K Lubbock K Nidland/Odessa K San Angelo	KA5EJX-1 NA578B-1 NA578B-2 KE5PL-1 NA5J8N-2 NA5F-1			ND58TQ ND5GAS	-AUSTRIA Rieslern -BELGIUM	OESATI-0 CNIUI-1	
K Nidland/Odessa	MA5788-1 NA5788-2 KE5PL-1 NA5J8N-2 NA5F-1		Bouston Area PAS Buckabay, Rod	KASEJX	-BELGIUM	ON4AMP-2	
K Nidland/Odessa	KE5PL-1 MA5J3H-2 MA5F-1		Reid, Cranston Reid, Cranston	MASTER	-BELGIUM -BELGIUM	CH4AMP-7 CH7EU-2	
I fan Angelo	WA5 J8H-2 WA5F-1	HAT	Reid, Cranston McDaniel, B. John	MASTBB RESPL	-BELGIUM Brussels	ON7BC-0	
West Bouston		SAG	Ellight, Donald H.	NASJEN NAST	-BELGIUM Brussels	ON7RC-2 VE7LAH-1	
Blue Me (Bestevel)	KD70D-1	BOU	Dillard, Johnny K. Anderson, Kelly B.	ND70D	-CAMADA Br. Columbia -CAMADA Br. Columbia	VE7LAM-2	
T Blue Ht. (Eastern) T Castle Dale	KD7YG-1		Mills, Richard Bret	ED 7YG	-CANADA Br. Columbia	VETLAN-3 VETLAN-4	
7 Castle Dale 7 Cedar City 7 Logan 7 Logan 7 Orem 7 Orem	KD7YG-2 MA7GTU-1	CEDAR	Mills, Richard Brot Blanchard, Don	ND TYG	-CAMADA Br. Columbia -CAMADA Manitoba	VEANIS-2	
T Logan	MA 7MAL-1	LOGAN	Blanchard, Don Jacobsen, Jeffry B. Jacobsen, Jeffry B. Buish, B. A.	NA 7MBL	-CANADA Manitoba -CANADA Manitoba	VE4PKT-0 VE4SWR-0	
T Logan	WATHDL-2 KDTYK-1	OREM	Buish. H. A.	NO TYX	-CANADA Nova Scotia	VEIAOE-1	
	KD7YK-12		Buish, H. A.	ND TYK	-CANADA Nova Scotia -CANADA Ontario	VE1CDN-1 VE3CEN-1	ABURG
T Oren T Oren	KD7YK-13 KD7YK-14		Buish, R. A. Buish, R. A.	ND 7YK	-CABADA UNTATIO	VE3GR4-2	ABURG
T Oren	ED7YK-3		Buish, B. A.	ID TYK	CINIDA Ortania	VE3GION-3 VE3LSB-3	
T Oren	ND7YK-4 KD7YK-5		Ruish, H. A. Ruish, H. A.	ND 7YK	-CANADA Ontario -CANADA Ontario -CANADA Ontario	VEJTTT-3	
T Oren T Oren	KD7YK-6		Buish, B. A.	KD 7YK	-CARADA Fr Edward Is.	VEICAA-0	
T Price	KA7LEG-1 KA7LEG-2		Buish, B. A. Buish, E. A. Buish, B. A. Buish, B. A. Buish, B. A. Buish, B. A. Mills, Richard Bret Mills, Richard Bret	ND TYG	-ENGLAND -ENGLAND	GARFG-0 GARFG-1	
T Frice T Salt Lake City	K7EA-1	SLC	Bradford, William Bradford, William	K7EA	-ENGLAND	GBGGI-1 GBGGI-2	
T Salt Lake City	878A-2 80798-2	SNOW	Bradford, William Buish, B. A.	KTEA KDTYK	-ENGLAND -ENGLAND	GORBE-1	ABE1
T Snowbird/SLC T West Central	MA7GTU-2	FRISCO	Blanchard, Don Phillips, Charles O.	NA 7GTU NA ELV	-ENGLAND -ENGLAND	GBBBE-2 GB3AP-1	BBE2
A Alexandria A Alexandria	#4ESV-1 #4ESV-2		Phillips, Charles O.	NAESV	-ENGLAND	GB312-0	
A Alexandria	N4EEV-3		Phillips, Charles O. Phillips, Charles O. Phillips, Charles O.	BAEIV BAEIV	-ENGLAND Cambridge	GB3PX-0 G4RFG-2	
A Alexandria A Arlington	#425V-4 K3AF-0		AFCC & Arnold, E. H. AFCC & Arnold, E. H.	MGAF	-ENGLAND Daventry -ENGLAND Daventry	GARFG-3	
A Ariington	K3AF-1 8408-2	IND	AFCC & Arnold, E. E. Hadron, Inc.	KANN	-ENGLAND Kent -ENGLAND Leeds	G4LEV-0 G0BSE-1	KENT
A Chantilly A Chantilly	K4UM-3	IND	Radron Inc	K4UM	-ENGLAND Sussex	G4VQ1-0	
A Chantilly	K4UM-4 K4UM-5		Badron, Inc. Badron, Inc. Badron, Inc.	K4UN K4UN	-ENGLAND Nare/Berts -INDONESIA Semarang	GETTD-0 YB2AG-0	
A Chantilly A Chantilly	N4JTS-1		Badron, Inc.	K4UN	-ITALY Milan	12KBD-3	
A Chantilly	NAJES-2 MAALME-1	FGAP	Badron, Inc.	K4UN MA4LME	-ITALY Milan -JAPAN Fukushina	12KBD-4 JB70PB-11	
A Chantilly A Fancy Gap (SW) A Front Royal	MA4FRB-3	1.012	Thomas, Malter B., Jr. Malta, V. Michael	KA4FRB	-JAPAN Fukushina	JETYJL-11	
A Front Royal	KC4VR-1	WYTHE		NA 4FRB NC 4VR	-JAPAN Kanagawa -JAPAN Kanagawa	JELYEN-11 JELYEN-12	
A Max Meadows A Gnancock	KJ4AG-1	#1.14E	Pariss, Mike Davis, Austin C. Davis, Austin C. Davis, Austin C.	KJANG		JELYSH-9	
A Onancock	KJ4NG-2 KJ4NG-3		Davis, Austin C.	KJ4NG KJ4NG	-JAPAN Kanggava -JAPAN Kyoto -JAPAN Kyoto -JAPAN Kyoto -JAPAN Kyoto -JAPAN Kyoto -JAPAN Kyoto City	JA3SQL-0 JA3SQL-1	
A Onancock A Richmond	K4ARO-1	RIC	Codie, Arthur Carter	E4ARO	-JAPAN Kyoto	JE3BJN-5	
A Roanoke	MAFEL-1 MAABOCV-1	VAB	Burch, Ben A., III	NAPEL NA4KXV	-JAPAN Kyoto	JE3BJN-6 JE3BJN-7	
A Virginia Beach A Virginia Beach	MA4IOV-2		Burkett, Mallace E. Burkett, Mallace E.	NA4KXV	-JAPAN Magano City	JAO SYV-11	
A Mest Central	M4BLD-1	BRON	Kerby, Robert B.	W4BLD W4WTG	-JAPAN Nagoya	JF2P18-4	
A Williamsburg A Deer Park	#487G-4 #78F8-7		McNutt, George A. Baselett, Steve	N7EF1	-JAPAN Nagoya	JI3YJK-0	
A Deer Park	#78F8-8		Baselett, Steve	N7EFS KATVER	-TAPAN MAGOVA	J13YJK-1 J13YJK-2	
A Everett A Everett	EATVEE-10	IEVT	Lucier, Balph Jr. Lucier, Balph Jr.	KA TVER	-JAPAN Nagoya -JAPAN Okayana -JAPAN Okayana	JE4IRV-0	
A Everett	KATVEL-8	EVT	Lucier, Balph Jr. Lucier, Balph Jr.	KATVEE KATVEE	-JAPAN Okayana -JAPAN Osaka	JH4 SRV-1 JA305A-1	MARD
A Everett A Longview	KATVEE-9 KTEVV-T	1150	Rart, Michael D.	K7 EVV	-JAPAN Osaka	JAJUSA-2	IKOMA
A Longview	K71VV-8	LSO	Bart, Michael D.	N7 SVV	-JAPAN Shisucka	JF2YMO-11 JF2YMO-12	
A Lynnwood A Lynnwood	W7871-3 W7871-4		ALA, Inc. ALA, Inc.	N7ML	-JAPAN Tochigi	JAIYRU-11	
A Lynnwood (demo) A Lynnwood (demo)	ALA-10		ALA, ING.	N7ML	-JAPAN Tochigi -JAPAN Tokyo	JAIYRU-12 JAIYJR-12	
A Lynnwood (demo)	AEA-11 AEA-8		AEA, Inc. AEA, Inc.	#7HL	-JAPAN Shi suoka -JAPAN Shi suoka -JAPAN Tochigi -JAPAN Tochigi -JAPAN Tochigi -JAPAN Tokyo -JAPAN Tokyo	JE1 BYR-10	
A Lynnwood (demo)	AEA-9 NB7CHJ-7		APA Inc.	N7HL MB7CNJ	-JAPAN TOKYO -JAPAN Tokyo	JE1HYR-11 JE1MAE-11	
A Richland A Richland	WB7CHJ-8		Wright, Robert. R. Wright, Robert. R. Cronk, Scott	NO 7CHJ	-JAPAN Tokyo	JEIMAS-12	
A Seattle	N7FSP-1 N7FSP-10	SEATAC SEA220	Cronk, Scott Cronk, Scott	#7F5P #7F5P	-JAPAN TOKYO -JAPAN Tokyo	JE3XCU-4 JE3XCU-5	
A Seattle A Seattle	MN7AME-7	#SEA	NW Amateur PR Assn.	MB7FBC	-JAPAN Tokyo	JJIYYP-11	
A Seattle	88 /D8 - 7	SEA (SEAN	HN Anatour PR Assn. HN Anatour PR Assn.	NB 7FBC NB 7FBC	-JAPAN Tokyo -JAPAN Tokyo	JJ1YYP-12 JR1VMX-11	
A Seattle (Mest) A Seattle (Mest)	RBIDS .	SEAM	HW Amatous PR Asan	MB 7FBC	-JAPAN Tokyo	JRIVMX-12	
A Yakima A Yakima	RIGPJ 0		Wildman, Charles W Bildman, Charles W	R3GP J R3GP J	- NOR MAY	PADENB-1 LASOR-0	
A Tak Las			John ger Bishard M	#788U	- NORMAY NORMAY	LA5 XR - 0	
A Yakima II Cedarburg	# 188. 8		Anterger Bichard H	NO 10 11	NORMAY Duken	LAGDR-0	15

Hawkins, Roy Hawkins, Roy Hawkins, Roy Hartell, Alan Martell, Alan Martell, Alan Hartell, Alan Elaton, A. C. V. Davis, Patrick G. Corstwet, A. J. Knaus, David Bolander, Daniel R. Bolander, Daniel R. Bolander, Daniel R. Bolander, Call Bolander, Call Bolander, Call Raberan, G. Dave Knollinger, Donald E. Rabers, G. Dave Earley, Emsett J., Jr. Caspar ARC Kangas, Milliam H. NA 9KEC MA 9KEC NF 9R NFSR MASFIC ND 9UU NA 9SOU MA SPON NB 9TYT NB 9TTT NOCIF KAUIXI MRSIT KABIXE MARIISO Earley, Emest J., Jr. Carper ARC Rangas, Milliam M. Rangas, Dan Australian Amat. PRA Australi MASUSO M7VN. 171 17104 VK2A VW2AAA VK2AAA VE2BARS VK2AAA VK2AAAB OF SHIR OESALA CE SXPI OL 9XPI OF SATI CHANP CHANP CHANP CHANP ON TRC NE TLAN NETLAN VE 4AMS VEAAFO VEA.TE VELA VE1COM VE3CID VE3G VE 3F.JP VEIAIC Toth, wava s. WacKay, Ron Theodorson, J. Theodorson, J. Geddes, Bob Geddes, Bob Smith, Robert Mitts, Andrew Geddes, Bob Smith, Bobert Witts, Andrew Geddes, Bob Miller, James R. Theodorson, J. Healther, J. Salar, M. A. Healther, M. Salar, M. Nakare, Sumio Wakare, Sinio Makare, Sinio Wakare, Sinio GARFG GARFG GARFG GARFG GARFG GARFG GARFG GARFG GEEBE GEIAP COCCI COCCI GANG GALIV GOBSX GAVQI GETTD YB2AG 121080 12680 JETOPE JATEPE JAIYPE JAIYPE JE38JN JESBJN JE38J JESBJ JR3BJ JA0QJC JF2PSB JE 2PE JE 2P IR JF2P18 JA 4GV JAAGVE JAJUS .13 30 58 JA2QDX TA20DH JAIPY JAIPYE JAILE JE 18YR JE 18YR JE 18AS JEJXCL TRAKCU JIIYYP JJIYYP JRIVNO PAOBNO Hors, Hans T.S.M. Boland, Torfinn Norsk Radio Relae Liga Boland, Torfinn Cedegaard, Knut B. LA75P LA75P LAAYS

-NURWAY Harstad
NORWAY Oslo
- NORWAY Oslo
-NORWAY Oslo
-NORMAY Sandnes
-NORWAY Sandnes
-NORWAY Skien
-NORWAY Skien
-NORMAY Skien
-NORWAY Skien
-NORMAY Skien
-SWITZERLAND
-W. GERMANY
-W. GERMANY (NE)
-W. GERMANY (NE)
-W. GERMANY (NE)
-N. GERHANY (NE)
-N. GERMANY Auerbach
-W. GERMANY Averbach
-N. GERMANY Hamburg
-W. GERMANY Kiel
-W. GERMANY Kiel
-N. GERMANY Kleve
-N. GERMANY Krefeld
-W. GERMANY Lichenau
-W. GERMANY Oberhaus.
-N. GERMANY Oberhaus.
-YUGOSLAVIA
-YUGOSLAVIA
-YUGOSLAVIA
End of NETROM.LST

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LAG

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DDG

DA1 DB0 DB0 DC6 DB0

D85 D80 D80

DBO

YU3

YU3

	Barstadtgruppen NRAL	LAID
		LAALN
		LA4LN
		LA4LN
	Stokkeland, Oystein	LATOI
	Stokkeland, Oystein	LAIQI
	Karlberg, Kjell	LA6OCA
	Karlberg, Kjell	LAGOCA
	Sigg, F.	BB9BFB
HGL	Boymanns, Karl	DJZNB
	Kneisner & Doering	DBOFC
	Engianer & Doering	DBOFC
	Bouser, Kenneth D.	DAINP
	Souser, Kenneth D.	DAINP
		DL3 BCM
		DEILAS
		DBILAS
		DBOKV
		DBSJT
		DL2YAP
		DK4JH
		DK4JM
		YUJAPR
	Radio Club Triglay	TUJAPR
	Radio Club Triglav	YUJAPR
	MGL	segaistad, Toa V. segaistad, Toa V. segaistad, Toa V. stokkeland, Oystein Stokkeland, Oystein Karlberg, Kjell Karlberg, Kjell Karlberg, Kjell Karlberg, Kjell Sigg, F. MGL Boymanns, Karl Kneisner 4 Doering Kneisner 5 Doering Kneisner 6 Doerin

Please send corrections to Mike Busch, W6IXU (CompuServe 76337,727). We particularly need more accurate information on node locations and mnemonic identifiers.

9/1/87

USA-PBBS.09A Revised 1 September 1987 By K1NGC

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The following is a list of Packet Digipeaters and Packet Bulletins Boards reported to be on Packet Radio in the United States. Unly those Digipeaters which are operational 24-hours a day, or those who are known to have purchased a copy of NETRON, and those PBBS's which use UORLI/UNATMBL/UB4APR Mail Forwarding protocol are listed below. A digipeater may be a personnel station or a dedicated TNC that is operational 24hours a day, 365 days a year.

nours u u	ay, oos aayo a goor.	a sea of family	
Call Sign	City	Sta Frequency	Updated
KL7GNG	FAIABANKS	RK 14.1070	870605
KL7GNG	FAIRBANKS	AK 145.0100	870605
KL7GNG	FAIABANKS	AK 145.0900	
KL 7HF I	JUNEAU JUNEAU	AK 14.1090 AK 145.0500	870707 870707
KL7HFI KL7JFU	WASILLA	AK 145.0100	
NIEXO	ANNISTON	AL 145.0500	870811
H4HY	AUBURN	AL 145.0100	861101
HASRAX	BESSEMER BESSEMER	AL 145.0100 AL 145.6700	870605 870605
KASRAX KABET	MADISON	AL 145.0100	870724
HB12KX-1	MADISON	AL 145.0100	861101
HAAP	NONTGONERY	AL 145.0100	870605
HB402N	NONTGONERY OPP	RL 145.0100 RL 145.0100	861101 870605
KB4FSK-2 NISC	BATESUILLE	AL 145.0100 AR 145.0100	870701
KFSTL	EVENING SHADE	AR 145.0100	870701
KSUR	FORT SHITH	AR 145.0100	870716
4058	LITTLE ROCK	AR 7.0930	870701
ND58 ND58	LITTLE ROCK	AR 14.1090 AR 145.0100	870701 870701
4058	LITTLE ROCK	AR 145.0900	870301
KCSJH	LITTLE ROCK	AR 145.0100	870814
NSEDH	CAMP VERDE	AZ 7.0930	870605
NSEDH	CAMP VERDE CAMP VERDE	AZ 14.1070 AZ 145.0100	870605 870605
KE7C2	DENEY	AZ 7.0930	870701
KE7CZ	DEWEY	AZ 14.1070	870701
KE7CZ	DENEY	AZ 145.0100	870701
4878N1	PHEONIX	AZ 144.5500 AZ 145.0100	870701 870701
HB78NI N7GLL	PHEONIX	87 145 0100	870701
WB78NI	PHOENIX	BZ 144.5100	870701
K7BUC	PHOENIX	HZ 7.0910	870701
K7BUC	PHOENIX	AZ 14.1030 AZ 145.0100	870701 870701
K7BUC K00TZ	SCOTTSDALE	AZ 145.0100 AZ 7.0930	870701
KOOTZ	SCOTTSDALE	AZ 144.1100	870701
KOOTZ	SCOTTSDALE	RZ 145.0100	870701
HIFJI	SCOTTSDALE	AZ 145.0100	870701
WIFJI K7PYK	SCOTTSDALE SCOTTSDALE	AZ 145.5100 AZ 7.0930	870701 870701
K7PYK	SCOTTSDALE	AZ 10.1490	870701
K7PYK	SCOTTSDALE	AZ 14.1090	870701
K7PYK	SCOTTSDALE	AZ 145.0100	870605
KR5S KR5S	SEDONA SEDONA	AZ 7.0930 AZ 14.1090	870701 870701
KRSS	SEDONA	AZ 145.0100	870701
KC7CG	TUCSON	AZ 7.0930	870605
KC7CG	TUCSON	AZ 11.1070	870605
KC7CG N7DHE-1	TUCSON	AZ 145.0100 AZ 145.0100	870605 860101
WB7TLS	TUCSON	AZ 145.0100	
NA7HRA	YUNA	RZ 145.0500	870701
NA7HAA	YUNA	AZ 145.0900	870701
KD650 KD650	ALTA LONA ALTA LONA	CA 14.1110 CA 145.3600	870701 870701
W61XU	ARROYO GRANDE	CA 145.0100	870701
HOIXU	ARROYO GRANDE	CA 145.0500	861201
UB6KAJ	BREA	CA 14.1090	870605
UB6KAJ UB6KAJ-1	BREA BREA	CA 145.0100 CA 145.3600	861130 870605
WD68FN	BURBANK	CA 145.0100	861201
H6LUC-1	CAMARILLO	CA 145.0300	870701
N6LUC-1	CAMARILLO	CA 145.3600	870701
N68GH N68GH-9	CARSON CARSON	CA 145.0100 CA 145.0500	870701 861201
N68GH-9	CARSON	CA 145.0500 CA 145.0900	861201
H6864-9	CARSON	CA 146.7450 CA 223.5800	861201
KOIYK	CHATSUORTH	LH 223.3000	870701

WA6RDH	DIXON
HAGRDH	DIXON
NG I YA NG I YA	FELTON
HBGAIE	FRESNO
HB6AIE	ERESHO
N6HAU	FRESHO FRESHO FRESHO
N6HRU	FRESNO
N6HAU BB4BE_1	GILROY
AR4RE-1 AA4RE-1	GILROY
N6CUS-1	HACIENDA HEIGHTS
KE68X	HOLLISTER LAKESIDE
N6CQN NB6CF0-1	LIVERNORE
NA6YHJ-1	LIVERMORE
K6RD	LOS ANGELES
KAGERF	NAPA
HA6HHE-1 HA6HHE-1	NORTH HIGHLANDS
HB7QKP-1	NUEVO
HB70KP-1	NUEVO
HOLOH	PAL ALTO
H611U-1	PALO RLTO
HB6YNH-2 HB6YNH-2 HB6YNH-2	PALOS VEADES PALOS VERDES
HB6YHH-2	PALOS VERDES
HB6YNH-2	PALOS VERDES
WB6YNH-2	PALOS VEADES
HB6YNH-2	PALOS VERDES
HB6KQY HD68FC	PONONA REDDING
HD6BFC	REDDING
NK6K-2	
HK6K-2 HK6K-2	REDONDO BEACH Redondo Beach
N7EQN-1	REDHOOD CITY REDHOOD CITY
H7EQH-1 HD6CMU-1	REDHOOD CITY Richnond
UD6CMU-1	RICHMOND
H6CUS-1	AICHNOND
46CUS-1	RICHMOND
H6CUS-1 KD7XG-1	RICHMOND
N2DHE	SACRAMENTO
N2DHE	SACRAMENTO
NGRUS	SAN BEANARDINO
HAZONI	SAN DIEGO San Francisco
46PH-3 46PH-3	SAN FRANCISCO
HB6ASA	SAN JOSE
HB6ASR	SAN JOSE
NU62	SAN JOSE San Jose
NU62 HORL I	SAN JOSE Santa Cruz
HORLI	SANTA CAUZ
HORLI	SANTA CAUZ
NORL I	SANTA CRUZ
K7PYK	SANTEE
KBGIRS	SCOTTSDALE SOQUEL
KB61RS	SOOUEL
KBGIRS	SOQUEL
KBGIRS	SOQUEL
N4CHU N4CHU	SUMMYVALE
NICHU	SUNNYVALE
N4CHU	SUNNYVALE
AJ6F-1	TORRANCE
	TORRANCE TORREY PINES
K 86 I Q 8 K 86 I Q 8	TORREY PINES TORREY PINES
HIHAB	BOULDER
HIHAB	BOULDER
W1 HAB	BOULDER
WIHAB KE6LT	BOULDER BOULDER
WA821A	BOULDER
NASZIA	BOULDER
WA821A-1	BOULDER
KOTIU NBOBLU	CARBONDALE COLORADO SPRINGS
HBOBLU	COLORADO SPRINGS
KOHOA	COLORADO SPRINGS
KOHOA	COLORADO SPRINGS
KDODI Kroucz-1	DURANGO Grand Junction
WAGERB	LAKEHOOD

	145 0100 030301
CA CA	145.0100 870701 223.5800 870701 145.0900 870701
CA	223.5800 870701 145.0900 870701 141.5000 870701 145.0300 861201
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CA	145.0100 870701 223.5800 870701 145.0300 870701 145.0300 870701 145.0300 870701 145.0300 870701 145.0300 870701 145.0300 870701 145.0300 870701 145.0300 870701 145.0300 870701 145.0300 870807 145.0300 870807 145.0300 870807 145.0300 870701 145.0700 870701 145.0700 861201 145.0700 861201 145.0900 870807 145.0900 870807 145.0900 870807 145.0900 870807 145.0900 861201 145.0900 870807 145.0900 861201 145.0900 870701 145.0900 870701 145.0900 870701 145.0100 870807 145.0100
CA	145.9700 870807
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CA	145.0500 870701
CA	144.7600 870111 144.9900 870701 223.5800 870701 14.1070 870701
CA	14.1070 870701
CA	223.5800 870701 145.0700 870807
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CA	144.9100 870701
CA	223.5800 870701
CA	145.0500 870605
CA	14.1110 870807
CA	145.0900 870807
CA	141.5000 870807
CA	10.1490 870807
CA	145.0900 870807
CA	145.3600 870701
CA	223.5800 870807 14.1090 870701 144.9100 870701 145.0900 870701 223.5800 870601 145.0500 870605 147.7000 870607 144.9300 870807 144.9300 870807 145.0500 870807 145.0900 870807 141.1500 870807 144.9700 870807 145.0900 870807 145.0900 870807 145.5700 870807 145.0100 870701 145.0100 870701 145.0100 870701
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CO	145.0100 870701
CO	14.1110 870701
CO CO CO	145.0100 870701
C0 C0	145.0100 870120 14.1050 860204
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HAGERB	LAKENOOD
NA6ERB NA6ERB	LAKEWOOD
KOVLD	LAKEHOOD LAKEHOOD LOVELAND LOVELAND
KOULD	RIFLE
KOGUZ HDOESY	AIFLE STEALING
NOBRZ-1	THORNTON
NOBRZ-1	THORNTON
KCQQJ	UAL SENBURG
KCOQJ	HALSENBURG HALSENBURG
NIAPI-4	MERIDEN MERIDEN
NIAPI-6	MERIDEN
KE3Z	MIDDLETOWN
H1AH-4	NEWINGTON NEWINGTON NEWINGTON
WIAN-4	NEWINGTON
WA2FTC-1 WA2FTC-1	NEWINGTON
NICUI	RIDGEFIELD
NETH	NEATOGUE
NETH	NEATOGUE
KICE	WEST HARTFORD
KAIZT-I	BIG PINE KEY
KH121-1	BIG PINE KEY
HANUC	BOCA RATON
MANUC	BOCA RATON BOCA RATON
K4GBB	BOCA RATON CEDRA COVE
KIGBB	CEDAR COVE
H1DPH	CLEARNATER
H4DPH	
H4DPH-1	CLEARNATER
N4DPH-1	CLEARNATER
H4DPH-1	CLEARNATER
N4 IPY	FLORAL CITY
KB4F0	FURI LAUDENDALE
KB4F0	FUNI LHOUEHUHLE
NB8LGH NB8LGH	FT PIFACE
UBBLGH	CLEARNATER CLEARNATER CLEARNATER FLORAL CITY Fort Lauderdale Fort Lauderdale FT Pierce FT Pierce FT Pierce
HD4EPK	GAINESUILLE
HBOLGH HD4EPK HD4EPK	GAINESUILLE
AA4TH-1 AA4TH-1	GAINESVILLE GAINESVILLE HOMESTEAD HOMESTEAD JACKSONVILLE MARGATE
HH410-1	RUNESTERU
ND4BIN NA3QFN	MARGATE
H2HX-1	MELBOURNE
KOKBY	niani
KOKBY	niani
NK4K	niani
N4LDG N4LDG	NIANI NIANI
H4HUU	niani
K4TKU	niani
K4TKU	MIANI
K4TKU-1	MIANI
KCSYD	HAPLES
K4025 K4025	OCALA
KHOZS	OCALA
NB4BNC	ORANGE PARK
HB4BNC	ORANGE PARK
K4RHO	ORLANDO
K4AHO	ORLANDO
HB4HYP	ORLANDO
K402N	ORLANDO ORLANDO
KD4EQ-1	PANANA CITY
PO4CO 1	PANANA CITY
KB4CIA KB4CIA KB4CIA	DODT CUODI OTTE
KB4CIA	DODT CHODI OTTE
KB4CIA	PORT CHARLOTTE
UD4KAU	PORT ST. LUCIE
NUNKHU	SARASOTA
N4HAP N4HAP	SARASOTA
HAUND	SARASOTA
H4MHP	SABASOTA
u+nup	SARASOTA
N4HND	SHALIMAR
HD48RF	STUART
KANTA Kanta	STUART
KANTA	STUART STUART
HIBEL	TANPA
1104NKZ	VENICE
WOAL HE	WEST PALT BEACH
KA4NOF-I	WEST PALM BEACH

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UNUUNA	ATLANTA	GA	145.0100 870701	KD9QB NOBLESUILLE
URAUNU	ATLANTA ATLANTA	GA GA	145.0300 870701 146.7300 870701	KD9LP PERU KD9LP PERU
K4TOL	CARTERSVILLE	GA	145.0900 870701	KB9JD TERRE HAUTE
UQ4B	CHICKANUGA	GA	145.0100 870701	WA9UXP VALPARAISO
UQ4B U4KAU	CHICKANUGA COHUTTA	GA GA	145.0900 870701 145.0100 870605	UA9UXP VALPARA I SO U92RX UESTFIELD
HIKAU	COHUTTA	GA	145.0900 870701	H92RX HESTFIELD
H4C1	CONVERS	GA GA	14.1050 860413 145.0100 860413	NOFFN CLAY CENTER
NACI Kaadux	CONVERS	GA	145.0100 861101	NXOR DOWNS
KF4JF	HAHIAA	GA	14.1030 870419	NHON HAYS
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K4ICT	MACON	GA	145.0100 870605	N5DKQ-1 WICHITA
KD4NC-1 K 4x0	MARIETTA	GA GA	145.0100 861101 14.1090 870605	KD9PU ELSNERE KD9PU ELSNERE
K I 4X0	MARIETTA	GA	145.0100 870605	KIAUH FLORENCE
K I 4 XO K I 4 XO	MARIETTA MARIETTA	GA GA	145.0300 870605 146.1300 870605	KI1UN FLORENCE KF1NB LEXINGTON
HBAZNH	NOULTRIE	GA	145.0100 860206	KF4NB LEXINGTON
UA4BRO	ROSHELL	GA	145.0100 861101	HA4UNA LOUISVILLE KA4BCO PARK HILLS
KF4JF-1 AH6GJ	TIFTON Kaupo, Maui	GA	14.1070 860413 14.1070 870701	KA4BCD PARK HILLS KA4BCD PARK HILLS
AH6GJ	KAUPO, MAUI	HI	145.0100 870701	HA9TPG VERSAILLES
KH6GP I KH6UY	MANOA, OAHU Mililani, oahu	HI	145.0100 870701 14.1030 870701	HB9TPG VERSAILLES KD5SL BATON ROUGE
KHONY	HILILANI, OAHU	HI	14.1070 870701	KD5SL BATON ROUGE
KHGUY	MILILANI, OAHU Mililani, oahu	HI	14.1090 870605 145.0500 870701	US5X BATON ROUGE UB5RAA BRERUX RIDGE
NROP	RNES	IA	145.0100 860204	WASUDN LAKE CHARLES
K100	ANES	18	145.0100 870701 147.5550 860815	USDDL LAYFAYETTE USDDL LAYFAYETTE
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NAORGU	CEDAR FALLS	IA	145.0100 870701	UB5BZE NEU OALEANS UB5BZE NEU ORLEANS
URORJT UAORJT	CEDAR RAPIDS CEDAR RAPIDS	18	145.0100 870701 145.0500 870701	HSHNB-1 SHREVEPORT
WAOJFS-1	DES MOINES	18	145.0100 870701	WAIRAJ ACTON
HAOJFS-1 NOKNE	DES MOINES Fort Madison	18	147.5550 860815 145.0100 870701	HA1RAJ ACTON Kaijjn Agahan
KNON	INDEPENDENCE	IA	145.0100 870701	KIBOG ATTLEBORO
HOAN	NCCALLSBUAG NCCALLSBUAG	18	14.1090 870701 145.0100 870701	K1BOG ATTLEBORO N1RCA BEDFORD
AIOZ	ROLAND	IA	145.0100 870701	KIOJH BILLERICA
KA7RMA-1 K7JD	BOISE HAYDEN LAKE	10	145.0100 870605 145.0100 870701	N1BGG BOSTON N1BGG BOSTON
K9HH0	GOODFIELD	IL	145.0100 870605	K3NC BOSTON
K9HH0 H09CZ1	GOODFIELD HILLSBORO	11	147.5550 870324 145.0100 870701	HIGOH BROOKLINE HBIDZK-1 DUDLEY
K9KYK	HILLSBORD	11	145.0100 870605	WBIDZK-4 DUDLEY
W8LUN W92TK	LAKE FOREST Mendota	iL	145.0100 870806 145.0700 870701	KINER EAST HANPTON WAINLV-I LANRENCE
UB911N	NAPERVILLE	iĽ	144.9500 870605	WAIWLU-1 LAWRENCE
UB9NJN	NAPERVILLE	IL IL	145.0100 870605 145.0100 870605	KIBC LEXINGTON KIBC LEXINGTON
HD9DOU H3AIA	NORTHLAKE Schaunburg	it	145.0500 870806	HAICUG NANONET
KJ9L	SKOKIE	IL.	145.0500 870806 145.0100 870806	AA1A MARSHFIELD W12HC MATTAPOISETT
KJ9L KD4PS	SKOKIE TRENTON	IL IL	145.0500 870701	WIZHC MATTAPOISETT
H9CD	URBANA	11	10.1490 870701	HIZHC NATTAPOISETT KAINGO NETHUEN
N9CD K9CH	UABANA UABANA	IL	145.0100 870701 145.0100 870701	KAINGO NETHUEN
K9CH	URBANA	IL	145.5550 870701	KAINGO-1 NETHUEN
K9JA K9JA	URBANA URBANA	11	145.0100 870701 145.0900 870701	KA1NGO-1 NETHVEN H10W HORFOLK
NA9DZS	VERNON HILLS	IL.	145.0100 870605	KIUGN WAKEFIELD
LA9IUB	ANDERSON ANDERSON		145.0100 870701 147.5550 870701	HASTAI ACCOKEEK HSUPR ANNAPOLIS
HABYUR	BLOOMINGTON	IN	145.0100 870605	H3UPR ANNAPOLIS
KN9D-1	BLOON INGTON DELPHI	IN	145.0500 870701 145.0100 870701	U32H ANNAPOL I S U84ARP ANNAPOL I S
KN9D-1	DELPHI	IN	145.0500 870605	HB4APR ANNAPOLIS
H4XI H4XI	EVANSUILLE	11	14.1110 870701 145.0100 870701	HB3EFG BALTINORE HA3HQX BALTINORE
KA9LQN	EVANSUILLE	IN	145.0100 870701	K3UPZ BALTINORE
KA9LQN	EVANSUILLE	1 N	145.0500 870701	K3UPZ BALTINORE W3IWI CLARKSVILLE
KBBNH N9BAC	FORT WAYNE	IN	145.0100 870701 145.0100 870701	HJIHI CLARKSVILLE
N9BAC	FOAT WAYNE	IN	145.0500 870701	NJINI CLARKSUILLE
UB7QUG UB7QUG	INDIANAPOLIS	18	14.1070 870605 145.0100 870605	N3CHS CLINTON
HB9CHE	IND I ANAPOL IS	IN	145.0100 870701 145.0300 870701	KA3OGG COLUNBIA Ka3ogg ellicott city
K9JR1	INDIANAPOLIS	18	145.0100 860204	KAJOBK FORT HASHING

IN	145.0300 870701 145.0100 870605
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KY	145.0100 870701 145.0100 870707
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RY	141.9500 870803
KY	141.9500 870803 145.0100 870803
KY	14 1000 870707
KY	145.0100 870707
LA	14.1110 870701 14.100 870701 145.0100 870701 145.0100 861130
LH	145.0100 861130
LA	145.0500 870605
LA	145.0100 870605
LA	145.0100 870701
LA	145.0500 870701
LH	145.0100 870701
L A	145 0300 870701
LA	145.0100 870724
MA	145.0900 870701
MA	221.1100 870701
MA	145.0500 870701
TH NO	145.0500 870701
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MA	145.0100 860102
na	145.0100 870605
MA	145.0500 870605
TH HO	145.0100 870329
ne	145 0100 870605
na	145.0500 870605
ne	145.0900 870701
MA	14.1110 870605
MA	221.1100 870605
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MA	145.0500 870701
MA	145.0100 870701
MA	145.0100 861130 145.0500 870605
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na na	221.1100 870605 14.1070 870701
MA	221.1100 870701
MA	145.0700 870701
MA	221.1100 870701
MA	145.0700 870701
na nD	221.1100 870701 145.0300 870810
HO	145.0900 870420
10 10	221.0100 870420
nD	115.0100 870707 14.1110 870701 145.0100 870701 145.0100 870701 145.0100 870605 145.0100 870605 145.0100 870701 145.0100 870701 145.0100 870701 145.0100 870701 145.0100 870701 145.0100 870701 145.0100 870701 145.0500 870701 145.0500 870701 145.0500 870701 145.0100 860102 145.0100 870605 145.0100 870701 145.0100 870701 145.0700 870701 145.0500 870420 241.100 870420 245.0500 870420 245.0500 870420
nD	10.1490 870420
ND ND	145.0500 870420 145.6600 870701
nD	145.5500 870810
nD	145.0500 870701
MD	14.1030 861021
nD	14.1110 870701
00	145.0100 870810 145.0500 870810
nD	221.0100 870810
nD	145.0300 061021
nD	145.0500 870810
nD	145.0700 870701 145.0300 860925
110 110	145.0300 860925 145.0500 860925

KAJKIH	FORT WASHINGTON	no	145.0300 86
KJAEE	GLEN BURNIE	nD	145.0100 86
KJAEE	GLEN BURNIE	nD	145.0500 86
H2FB	GLENHOOD	nD	145.5900 87
HB3FFU	MIDDLE RIVER	nD	145.5500 87
HB3FFU	HIDDLE RIVER	nD	221.0100 87
HIJTHZ	HOUNT AIRY	nD	14.1050 86
HISTHIZ	HOUNT AIRY HOUNT AIRY	ND	145.0100 86
W3THZ KA3T	MT. AIRY	HD HD	145.0900 87
KAST	MT. AIRY	nD	221.0100 87
HASYOH	PIKESUILLE	nD	145.0500 87
KB3NY	SILVER SPRING	nD	14.1090 86
KB3NY	SILUER SPRING	ND	145.0500 86
H100	SILVER SPRING	no	145.0300 870
H100	SILVER SPRING	hD	221.0100 87
K30ZP	HESTMINSTER	nD	145.0300 87
HA3PXX	UHEATON	nD	145.0500 87
N1 RHH	BANGOR	ME	145.0100 87
HIAHH	BANGOR	ME	145.0300 87
WA10JB-1	BONDOIN	ME	145.0100 87
WAIOJB-3	BONDOIN	ME	145.0300 87
HA10JB-4 HA10JB-6	BOHDO I N Bohdo i N	ME	116.8200 87 28.2750 87
HIAKA-3	CUMBERLAND CENTER	ME	28.2750 87
NIAKA-3	CUMBERLAND CENTER	ME	116.8200 87
KINON	SCARBOROUGH	ΠE	145.0500 87
HA2YUL-4	SOUTH FREEPORT	ΠE	145.0100 87
HA2YUL-4	SOUTH FREEPORT	ME	145.0300 87
AD8Y	ANN ARBOR	11	145.0100 86
HAILAL	BRIGHTON	11	14.1110 87
WAILAL	BRIGHTON	11	145.0100 87
NOBNA	DETROIT	n I	145.0100 87
NOBNA-1	DETROIT	11	220.5200 87
HOBMA-1	DETROIT	ni.	221.0100 87 144.9300 87
K8HLD Nebux	GRAND RAPIDS	ni ni	144.9300 87 144.9300 87
HABURE	GRAND RAPIDS	ni.	144.9300 87
HROURE	GRAND RAPIDS	ni	145.0100 87
KJ8C	HOLLAND	ni	145.0100 87
KJ8C-1	HOLLAND	11	147.5600 87
HBOLE	MARQUETTE	11	145.0100 87
KEODN	MASON	11	145.0100 87
KA8POG	PINCONNING	11	145.0100 87
HBBUKA	SOUTHFIELD TRENTON		145.0100 86
KE8X	WALLED LAKE	11	145.0500 87
HOKOX	WALLED LAKE	ni	220.5200 87
NTOR	WHITE PIGEON	ni	144.9300 87
NTOR	WHITE PIGEON	ni	145.0100 87
HAOCQG	APPLE VALLEY	nH	7.0930 87
HAOCOG	RPPLE URLLEY	пн	14.1110 87
HAOCOG	APPLE VALLEY	HH	145.0500 87
HLTAIT	LITTLE FALLS	NH	145.0100 87
WL7AIT	LITTLE FALLS	HH HH	145.0300 87 145.0100 87
HDOGHK HDOHEB	ROCHESTER Rochester Haseca	IN	145.0100 87
WROCJU	UASECA	MN	145.0100 870
HBOGDB	HOODBURY	INH	145 0100 87
HBOGDB	HOODBURY	11N	145.0500 87
KOPFX	BRIDGETON	NO	
HOGGU	GRAHAN	no	145.0100 87
H80012	INDEPENDENCE	no	145.0300 87
NOGGZ	JOPLIN	no	145.0100 870 145.0300 870 145.0100 870
NBOAEX	KANSAS CITY	no	145.0100 87
HBOJRJ	KANSAS CITY Neuberg	no	145.0500 87
NUCO	PLEASANT HOPE	MO	145.0100 87 145.0100 87
KOCH	SPRINGFIELD	no	14.1070 87
KOCM	SPRINGFIELD	no	145 0100 87
HDOCZI	ST. LOUIS BASTROP	no	145.0500 87
N58SL	BASTROP	ns	145.0100 87
HSOUU	ELLISUILLE	ns	145.0500 87 145.0100 87 145.0100 87
KD5B	GAUTIER	ns	14.1110 80
UASDUU	GULFPORT	ns	7.0930 87
UASDUU	GULFPORT	ns	14.1090 870
HASOUU	GULFPORT Gulfport	IIS IIS	145.0900 870
WASDUU KFSIZ	JACKSON	ns	145.0100 87
NBSSXK	UICKSBURG	ns	145.0100 87
AJSP	HESSON	ns	145.0100 870
HARANH	HEST POINT	ns	7.0930 870
NTATT	BILLINGS	nī	145.0100 870
KAINN	CHARY	NC	145.0100 870
KK4L	CHARLOTTE CHARLOTTE	HC	11 1110 87
KK4L KK4L	CHARLOTTE	NC	145 0100 87

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WA8HGL WD4RMQ-1	FAYETTEUILLE GREENSBORD	HC	145.0100 870701 145.0100 870701	KN5D CORRALES N5ICC LAS CRUCES
K400	GREENVILLE	NC	145.0100 870701	KASZEC-1 LAS CRUCES
KF140-2	LUNBERTON	HC	145.0100 870701	KEOJC LOS ALANOS
KF4NQ-3 KF4NJ	LUMBERTON	NC NC	14.1070 870701	NSSA ROSHELL NSBGC SANTA FE
KF4HJ	NONROE	NC	10.1490 870701 145.0100 870701	NSBGC SANTA FE U7LHO SANTE FE
AA4L	RALEIGH	NC	145.0100 870120	W7LHO SANTE FE
WR4LPD-1	RALEIGH	NC	145.0100 870701	KD7PK LAS VEGAS
WA4LPD-1 WA5SZL-1	RALEIGH	NC	147.5400 870701 145.0100 861101	N2EZG ALPINE N2EZG ALPINE
UBOUHU	DEVILS LAKE	ND	14.1070 870701	NIBCK BALDHINSUILLE
HBOUHH	DEVILS LAKE DEVILS LAKE	ND	145.0100 870701	NIBCK-4 BALDWINSVILLE
WROLAE	GRAFTON GRAFTON	ND	145.0100 870701	K2APL-4 BRIARHOOD
WROLAE WOLHS	NEST FARGO	ND	146.7000 870701 14.1070 870701	K2APL-4 BRIARNOOD Hb2VPH-2 brockport
HOLHS	WEST FARGO	ND	146.7000 870701	N2EPO CHURCHVILLE
AGON	BAYAAD	NE	145.0100 870825	KC2AZ ELNIRA
AGON-5 NAOPXN	BAYAAD HASTINGS	NE	14.1070 870825 145.0100 870803	NA2AZ ELMIRA KC2EQ ELMIRA
HBOKBK	LINCOLN	NE	145.0100 870803	HAZUPY ELMIRA
HBOKBK	LINCOLN	NE	145.0700 870803	H2DUC FAIRPORT
KOTAJ	NCCOOK	HE	145.0100 870605	H2HPM FARMINGUILLE
KOBOY NFON-2	CHANA Sioux City	NE	145.0100 870803 145.0100 870701	H2HPN FARMINGVILLE H2HPN FARMINGVILLE
NFON-2	SIOUX CITY	NE	145.0100 870605	H2HPM FARMINGUILLE
NFON-2	SIOUX CITY	NE	147.5550 870522	W2JUP FARMINGVILLE
WBIDSW	EAST KINGSTON	HH	14.1090 870605	H2JUP-4 FARMINGVILLE
WB1DSW-1 WB1DSW-1	ERST KINGSTON ERST KINGSTON	NH	7.0930 870605	H2JUP-4 FARMINGVILLE H2JUP-4 FARMINGVILLE
HBIDSH-1	EAST KINGSTON	NH	221.1100 870605	W2JUP-4 FARMINGVILLE
KE1G-1	GOFFSTONN	HH	145.0100 860102	H2JUP-4 FARMINGUILLE
NIDRK-1	NARLON SALEN	NH	145.0100 870701 145.0100 870605	H2JUP-4 FARMINGVILLE H2JUP-12 FARMINGVILLE
NIDRK-1	SALEN	HH	145.0700 870605	AI20-4 FREEPORT
HIPH	HINDHAM	NH	221.1100 870701	AI20-12 FREEPORT
KC2TH	ATCO	HJ	14.1090 870701	KC2PH HERKINER
KC2TH KC2TH	ATCO ATCO	HJ	145.0100 060204	N2AUK-1 HOWARD BEACH N1DL HUNTINGTON
KJIHA	BARGAINTOUN	НJ	145.0900 870701	NIDL HUNTINGTON
N2DSY-4	BERGENFIELD	HJ	145.0700 870701	HIDL HUNTINGTON
H2DSY- 1 HA2VKH	BEAGENFIELD CARLSTADT	HJ	111.0000 870701 115.0100 860201	HA2AKN-2 HYDE PARK HA2AKN-2 HYDE PARK
KJGYS	CROFUT	HJ	145.0100 870701	WAZAKN-2 HYDE PARK
K3GYS	CROFUT	HJ	220.0100 870701	WA2RKN-2 HYDE PARK
KF4TT	EAST BRUNSWICK	HJ	145.0100 870701	KD2GB JOHNSON CITY NA2B MASSENA
UB2ENA UB2ENS	EAST WINDSOR EAST WINDSOR	НJ	145.0100 870701 223.4000 870701	NA2B NASSENA
K2ADJ	EDGEWATER	HJ	145.0100 870701	K2RAR-4 MONTAUK
H82DAD	EGG HARBOA	HJ	145.0900 870701	K2AAA-4 NONTAUK K2AAA-4 Nontauk
WB2PAG WA2SNA-1	ENERSON HAWTHORNE	LH LH	145.0100 870701 145.0100 870701	K2AAA-4 NONTAUK
UA2SHA-1	HANTHORNE	HJ	221.0100 870701	HB2ACU NEH BERLIN
KA2BQE-4	INDIAN MILLS	HJ	145.0700 870701	N2NH-4 NEW YORK CITY
KA2BQE- 1 NB2HBZ-1	INDIAN MILLS Kinnelon	HJ	221.0100 870701 145.0500 870605	N2NH-4 NEW YORK CITY W2ICZ NIAGARA FALLS
KY2D-2	LITTLE SILVER	NJ	145.0100 870701	HZICZ NIAGARA FALLS
UB2MNF	MEDFORD	NJ	145.0100 870301	KA2BHB ROCHESTER
UB2MNF	REDFORD	NJ	145.0300 870701	KA28HB ROCHESTER
UB2MHF NH2Z-4	NE DFORD NE P TUNE	HJ	221.0100 870701 145.0500 870605	UA2UNX SARATOGA SPAINO UA2UNX SARATOGA SPAINO
HH22-4	NEPTUNE	NJ	221.0100 870605	KC3BQ SKAHEATELES
K8180-4	PLAINSBORD	HJ	145.0700 870701	KC3BO SKANEATELES
KB180- 4 UB2GUD	PLAINSBORO READINGTON	HJ	221.0100 870701 145.0100 870701	N2AYY-1 SOUTH GLENS FAL N2AYY-5 SOUTH GLENS FAL
HB2GHD	READINGTON	НJ	221.0100 870701	NA2TUE-4 UTICA
HB2COP-2	RED BANK	HJ	145.0300 870701	HA2PVU VALATIE
HB2COP-2	RED BANK	HJ	221.0100 870701 145.0700 870701	NA2PUU VALATIE NA2PUU VALATIE
N2EUH-4 N2EUH-4	TRENTON TRENTON	HJ	145.5700 870701	UB2QJA-4 UHITE PLAINS
WB2AVW	TRENTON	NJ	145.0100 870605	UB20JA-4 WHITE PLAINS
W2UY-1	UNION	HJ	145.0100 870605	WAZEXE-4 WOODSIDE
12UY-1	UN I ON VI NEL AND	HJ	145.0500 870605	WA2EXE-4 WOODSIDE WA8ERO BLANCHESTER
N4JS-4 H4JS-4	VINELAND	NJ	144.9700 870701	KCOTH CINCINNATI
H4JS-4	VINELAND	HJ	145.0900 870701	KCOTH CINCINNATI
NB2RUX	VOORHEES	HJ	145.0100 870605 220.0100 870605	ADBI CIACLEVILLE ADBI CIACLEVILLE
482RUX KA90-1	VOORHEES WARREN	нJ	145.0100 870701	ADBI CIACLEUILLE
WB2UXT-4	WATERFORD MILLS	HJ	145.0700 870701	AD81 CIRCLEVILLE
HB2UXT-4	WATERFORD MILLS	HJ	221.0100 870701	KB8CI CLEVELAND
KD6TH KD6TH-1	WYCKOFF	HJ HJ	221.0100 870424	KB8CI CLEVELAND KB8CI CLEVELAND
WB2RRS	ALBUQUEAQUE	нл	145.0500 870701	HOCOK COLUMBUS
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WBQLS WB9AND	DELAHARE	OH Oh	144
NOET	FINDLAY	OH	145
NUSPAN	FOREST PARK Forest Park	OH Oh	144
NABJXN	FOREST PARK	OH	221
N8FIS NK8T	FREMONT LOVELAND	OH OH	145
NKOT NOVE-1	LOVELAND MANSFIELD	OH OH	145
KAOCDI	MARTIN'S FERRY	OH	145
HBOLVP HBOLVP	POLAND POLAND	OH OH	14
NOGAG	SHAKER HTS.	OH	145
KCØJN HBSAOH-1	WINTERSUILLE FORT GIBSON	OH	145
NBSACH-1 NBSRZX	FORT GIBSON Norman	OK	145
KF5UY	ROFF	OK	145
H54X-1 H54X-1	TULSA TULSA	OK	145
K71FG	PORTLAND	OR	145
K71FG K71FG	PORTLAND	OR OR	14
W7X1	PORTLAND	OR	145
KS7Y-1 HJET	PRAIRIE PEAK ALLENTONN	OR Pr	145
H3ET H3ET KB3L	ALLENTOWN BEAVER FALLS	PA	221
NA3D01	BERNICK	PR	145
WA3DQ I - 1	BLOONSBURG EAST BANGOR	PA PA	145
KB3UD KB3UD	EAST BANGOR	PA	145
KB3UD H2X0	EAST BANGOR GIBSONIA	PA	221
H2X0	GIBSONIA	PA	145
HB3AFL-1 AK3P	GREENSBURG HANELSTOWN	PA	145
AK3P Wb3Eyb	HAMELSTOWN HARRISBURG	PA	145
AK3UP	HAAAISBURG	PA	145
WR6YBT Kb3zw	HARAISBURG HONESDALE	PA PA	145
KB3ZH	HONESDALE	PA	145
KB32W WA3TSW	HONESDALE	PA PA	145
WASTSH NJERE-15	HORSHAM LAPORTE	PA	221
N3ERE-15 K3DSH-5	MALUERN	PR	145
K3DSH-5 KA3ORH	NALVERN PITTSBURG	PA PA	221
KAJORH	PITTSBURG	PA	145
H3UC H3ACL	PITTSBURG RED HILL	PA	145
K3PGB K3PGB	ROSLYN	PA PA	145
NOACL	ROSLYN Royersford	PA	145
N3CHX HA7SSO	ROYERSFORD STATE COLLEGE	PA PA	145
AG3F	TOUANDA	PR	14
AG3F WA3CYO	TÚNANDA Náshington	PA	145 145 145
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K 3AL I K 3AL I	WILKES-BARRE WILKES-BARRE WILKES-BARRE	PA	145
K 3HL I	HILKES-BARRE	PA	221
KE30N H3GHS	YORK	PA	144
HIDKF	CRANSTON CRANSTON	RI RI	145 221
NISH	UABUICK	BI	146
KA4YEA WA4SZK	ANDERSON FLORENCE	SC SC	145
WA4SZK KA4YEA	FLORENCE	SC SC	145
KF4EF	MONCKS CORNER	SC	145
UOPUF UOPUF	RAPID CITY Rapid City	SD SD	14
HD40QC	CLEVELAND	TH	115
HD100C KJ1KR-1	CLEVELAND GERMANTOWN	TH	145
UB760X-1	JACKSON	1 H	145
WX4S	JOHNSON CITY	11	145
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N N	145.0100 870701	
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	14, 1090 870701 145, 0100 870701 145, 0700 870701 145, 0100 870701 14, 1070 870825 145, 0100 870701 145, 0100 870701 145, 0100 861118 145, 0100 870701 145, 0100 870701 145, 0100 870701 145, 0100 870701 15, 0870 870700 15, 0870 870700 15, 0870 870700000000000000000000000000000	
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u+HHY HS 50 ULLE H HS 0100 870701 K+HK ULUEA SPRINGS H HS 0100 870710 K<01 POUELL H HS 0100 870710 KSTM GRISTAN TX 145 0100 870710 KSSTM CLEAR LAKE CITY H 15.0100 870700 MSSUC DALLAS TX 145.0100 870710 MSSUG GRUSE TX 145.0100 870701 MSSUG GRUSE TX 145.0100 870701		NOCHULLE	TH	145.0100 870701
TANJH PIRESUILLE TM 145.0100 870701 KC401 POUELL TM 145.0100 870701 KC401 POUELL TM 145.0100 870701 KG5FM ABILENE TK 145.0100 870701 KR5FM CLEAR AUSTIN TK 145.0100 870702 KR5FM CLEAR LAKE CITY TK 145.0100 870701 MFSJAY-1 EL PASO TK 145.0100 870701 MFSJAY-1 EL PASO TK 145.0100 870701 MFSJAY-1 EL PASO TK 145.0100 870701 MFSJAKO GAUSE TK 145.0100				145.0100 870710
LC+01 POUELL TM 147.6000 870701 KC+01 POUELL TM 147.6000 870701 KC+01 POUELL TM 145.0100 870701 KSTM SUEAT TM 145.0100 870701 KSTM CLEAR TM 145.0100 870701 MS205 BRYAM TX 145.0100 870701 MS3X7-1 EL PASO TX 145.0100 870701 MS3X7-1 EL PASO TX 145.0100 870710 MS3X47-1 EL PASO TX 145.0100 870710 MS3MUG GAUSE TX 145.0100 870710 MS500 GAUSE TX 145.0100 870710 MS500 GAUSE TX 145.0100 870710 MS500 GAUSE TX 145.0100 870701 MS500 GAUSE TX 145.0100 870701 MS500 GAUSE TX 145.0100 870701				145.0100 870710
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AES1 AB1LENE TX 145.0100 670701 UA52QS BAYAM TX 145.0100 670701 UA52QS BAYAM TX 145.0100 670701 UA5SUM-LEL PASO TX 145.0100 670701 UA5JXY-1 EL PASO TX 145.0100 670701 UASIMO GARLAND TX 145.0100 670701 UASIMO GARLAND TX 145.0100 670710 UASIMO GARLAND TX 145.0100 670701 UASIMO TX 145.0100 670701 070701 UBSUL HOUSTON TX 145.0000 670701 UBSLE PARA HITOHIO TX 145.0000 670701 UASIF SAN ANTOHIO TX 145.0000 670701				
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µB5PUC OALAS TX 145.0100 870701 µA5JXY-1 EL PASO TX 145.0100 870701 µA5JXY-1 EL PASO TX 145.0100 870701 µASTUNO GARLAND TX 145.000 870701 µASTUNO GARLAND TX 145.0100 870701 µJSXO GAUSE TX 145.0100 870701 µJSXO GAUSE TX 145.0100 870701 µJSXO GAUSE TX 145.0100 870701 µJSSDL HOUSTON TX 145.0000 870701 µJSSL HOUSTON TX 145.0000 870701 µJSSL PALESTINE TX 145.0000 870721 µJSSL SAN ANTONIO TX 145.0000 870721 µJSSZI SAN ANTONIO TX 145.0000 870721 µJSSZI SAN ANTONIO TX 145.0000 870721 µASQZI SAN ANTONIO TX 145.0000			TX	145.0100 870806
JARSJNY-1 EL PMSU TX 115.0500 670701 JASNUG GARLAND TX 115.01 670710 JUSNU GAUSE TX 17.0930 670701 JUSNU GAUSE TX 17.0930 670701 JUSNU GAUSE TX 145.0100 670701 JUSFP SAN ANTONIO TX 145.0100 670701 KCSFK SAN ANTONIO TX 145.0000 670701 JUSIFP SAN ANTONIO TX 145.0000 670701 JURSQ21 SAN ANTONIO TX 145.0000 <td>HBSPUC</td> <td>DALLAS</td> <td></td> <td>145.0100 870710</td>	HBSPUC	DALLAS		145.0100 870710
µASTNUD GARLAND TX 10.1550 870710 µASTNUD GARLAND TX 15.0100 870701 µJSX0 GAUSE TX 145.0100 870701 µJSS0B HOUSTOM TX 145.0100 870701 µJSS1L HOUSTOM TX 145.0000 870701 µJSFP SAN ANTONIO TX 145.0000 870721 µJSIFP SAN ANTONIO TX 145.0000 870701 µHSQ21 SAN ANTONIO TX 145.0000		EL PASO		145.0100 870701
UNDERSON GAUSE TX 145.000 870701 USNO GAUSE TX 7.0930 870701 USNO GAUSE TX 14.1090 870701 USNO GAUSE TX 145.0100 870701 UBSDBL HOUSTOH TX 145.0100 870701 UBSDL HOUSTOH TX 145.0100 870701 USSL HOUSTOH TX 145.0000 870701 USSL HAUSTOH TX 145.0000 870701 USSL RAICHARDSON TX 145.0700 870724 USSL SAN ANTONIO TX 145.0700 870724 USSIE SAN ANTONIO TX 145.0700 870724 USSIE SAN ANTONIO TX 145.0000 870701 UASO2I SAN ANTONIO TX 145.0000 870701 URSO2I SAN ANTONIO TX 145.0000 870701 URSO2I SAN ANTONIO TX 145.0000				113.0300 070701
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HB5BBU HUUSTON TX 15.0100 B70B06 HB5BBU HOUSTON TX 145.0100 B60204 KF5SE PALESTINE TX 145.0100 B60204 KFSSE PALESTINE TX 145.0100 B70710 KC5FK SAN ANTONIO TX 145.0700 B70771 USIFP SAN ANTONIO TX 145.0700 B70724 MSLL SAN ANTONIO TX 145.0700 B70724 MSSD21 SAN ANTONIO TX 145.0700 B70701 HASQ21 SAN ANTONIO TX 145.0700 B70701 HASQ21 SAN ANTONIO TX 145.0900 B70701 HASQ21 SAN ANTONIO TX 145.0900 B70701 HASQ21 SAN ANTONIO TX 145.0900 B70701 HAFEU SPRING TX 145.0900 B70701 HAFEU SPRING TX 145.0100 B70701 HATONC COAN T H			TX	14.1090 870701
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AF5U RICHARDSON TX 145.0900 670710 KC5FK SAH AHTOHIO TX 145.0900 670710 MSLL SAH AHTOHIO TX 145.0700 670724 MSLL SAH AHTOHIO TX 145.0900 670724 MSLL SAH AHTOHIO TX 7.0930 670701 MAG021 SAH AHTOHIO TX 7.0930 670701 MAS021 SAH AHTOHIO TX 145.0900 670701 MAS021 SAH AHTOHIO TX 145.0900 670701 MAG021 SAH AHTOHIO TX 145.0900 670701 MAGU SPRING TX 145.0900 670701 MAGU SPRING TX 145.0900 670701 MAREUU SPRING UT 145.0100 670701 MATREU SCAR UT 145.0100 670701 MATREU SCAR UT UT 145.0100 670701 MATREU SCAR UT	KF5SE	PALESTINE	TX	145.0100 870701
USIFP SAN ANTONIO TX 145.0700 870724 USIFP SAN ANTONIO TX 145.0700 870721 NSLL SAN ANTONIO TX 145.0100 870701 NASQ2I SAN ANTONIO TX 145.0100 870701 NASQ2 SAN ANTONIO TX 145.0100 870701 NASQ2 LOGRN UT 145.0100 870803 111 NATMAL LOGRN UT 145.0100 870803 111 NATMAL LOGRN UT 145.0100 870802 111 NATMAL LOGRN UT 145.0100 870802 1111	AF5U	RICHARDSON	TX	145.0900 870710
USIFP SHA MATONIO TX 145.0900 870724 MSLL SAH ANTONIO TX 145.0100 870701 MASQ2I SAH ANTONIO TX 145.0900 870701 MAFEUV SPRING TX 145.0900 870701 MAFEUV SPRING TX 145.0100 870701 MARCOL CORR UT 145.0100 870701 MARCOL CORR UT 145.0100 870701 MARK CORR UT 145.0100 870701 MARTX2-2 LOGRH UT 145.0100 870701 MARTX2-2 LOGRH UT 145.0100 870802 MARTX2-2 LOGRH UT 145.0100 870802 MARTX2-2 LOGRH UT 145.0100	KC5FK		TX	149.0900 870701
NSLL SHN HHIUNIU TX 145.0100 B7070 HASQ2I SAN ANTONIO TX 7.0930 B7070 HASQ2I SAN ANTONIO TX 14.1110 B7070 HASQ2I SAN ANTONIO TX 145.0100 B7070 HASQ2I SAN BANDING UT 145.0100 B70701 HATKZ LOGRH UT 145.0100 B70803 B70111 HB7REZ LOGRH UT 145.0100 B70701 HATKZ SAL LAKE CITY UT 145.0100 B70802 KH6C-1 DALE CITY UA 145.0100 B70802	HOIFP	CON ANTONIO	TU	145 0000 870724
JASQ21 SHN ANTONIO TX 7.0930 B7070 JASQ21 SAN ANTONIO TX 14.110 B7070 JASQ21 SAN ANTONIO TX 145.0100 B7070 JASQ21 SAN ANTONIO TX 145.0900 B7070 JAREUN SPAING TX 145.0900 B7070 JAREUN SPAING TX 145.0900 B7070 KAPPTY BLANDING UT 145.0100 B70701 HA70K CEDAR UT 145.0100 B70701 HA70K CEDAR UT 145.0100 B70803 HA70K CEDAR UT 145.0100 B70803 HA70K CEDAR UT 145.0100 B70803 HA70K SALT LAKE UT UT 155.0100 B70802 KA70C DALE CITY UT 145.0100 B70802 K476C DALE CITY UR 145.0100 <td< td=""><td></td><td></td><td>12</td><td></td></td<>			12	
MH3021 SHN HNIUNIU IX IS, IUU BURON MH3021 SHN HNIUNIU IX IS, IUU BURON MH4EUU SPRING IX IS, IOU BURON MH4EUV SPRING IX IS, IOU BURON MATEUV SPRING IX IS, IOU BURON KAPPTY BLANDING UT IS, IOU BURON MATAUX CEDAR CITY UT IS, IOU BURON MATRU LOGRH UT IS, IOU BURON MATRU LOGRH UT IS, IOU BURON MATRU DER UT IS, IOU BURON MATRU DER UT IS, IOU BURON MATRU UT IS, IOU BURON IT MATRU DER UT IS, IOU BURON MATRUZO SALT LAKE CITY UT IS, IOU BURON MATEC2 CHAL CITY UR IS, IOU BURON MATREC2 CHAL CITY UR IS, IOU BURON MATRS LYNCHBURG UR IS, IOU BURON MATS		SAN ANTONIO	TX	7.0930 870701
MH3021 SHN HNIUNIU IX IS, IUU BURON MH3021 SHN HNIUNIU IX IS, IUU BURON MH4EUU SPRING IX IS, IOU BURON MH4EUV SPRING IX IS, IOU BURON MATEUV SPRING IX IS, IOU BURON KAPPTY BLANDING UT IS, IOU BURON MATAUX CEDAR CITY UT IS, IOU BURON MATRU LOGRH UT IS, IOU BURON MATRU LOGRH UT IS, IOU BURON MATRU DER UT IS, IOU BURON MATRU DER UT IS, IOU BURON MATRU UT IS, IOU BURON IT MATRU DER UT IS, IOU BURON MATRUZO SALT LAKE CITY UT IS, IOU BURON MATEC2 CHAL CITY UR IS, IOU BURON MATREC2 CHAL CITY UR IS, IOU BURON MATRS LYNCHBURG UR IS, IOU BURON MATS	UASQZ I		TX	14.1110 870701
HH3U21 Shi Hh1Uh1U TA TS. 19900 BT0001 HAFEUV SPRING TX 14.1070 BT08006 KAPPTY BLANDING UT 14.1070 BT08006 KAPPTY BLANDING UT 145.0100 BT08006 HATNEL LOGRH UT 145.0100 BT0800 HATNEL LOGRH UT 145.0100 BT0800 HATNEL LOGRH UT 145.0100 BT0800 HATNEZ-2 LOGRH UT 145.0100 BT0800 HATZ2-2 LOGRH UT 145.0100 BT0800 HATZ2-2 CHARLOTTESULLE UT 145.0100 BT0802 HATZ2-2 CHARLOTTESULLE UA 145.0100 BT0802 HATZ2-2 CHARLOTTESULLE UA 145.0100 BT0802 HATGC-2 DALE CITY UA 145.0100 BT0802 KHGC-1 DALE CITY UA 145.0100 BT0802 HATS2 LYHCHBURG UA 145.0100 BT0802 HATS2 LYHCHBURG			18	145.0100 870701
KAPPTY BLANDING UT 14.1070 870701 KAPPTY BLANDING UT 145.0100 870701 KAPPTY BLANDING UT 145.0100 870701 MATNEL LOGAN UT 145.0100 870803 MATNEZ-L LOGAN UT 145.0100 870101 MATNEZ-L LOGAN UT 145.0100 870111 MB7EG PROUD UT 145.0100 870111 MB7EG PROUD UT 145.0100 8701120 MATNEZ-L LORAL CITY UT 145.0100 870802 K4NGC DALE CITY UA 145.0100 870802 K4NGC-2 DALE CITY UA 145.0100 870802 <td></td> <td></td> <td>18</td> <td>14 1020 870806</td>			18	14 1020 870806
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KAPPTY BLANDING UT 145.0100 870701 N7NOK CEORA UT 145.0100 870803 MARTMEL LOGRH UT 145.0100 870803 MARTMEL LOGRH UT 145.0100 870803 MARTMEL LOGRH UT 145.0100 870110 MARTMEL LOGRH UT 145.0300 870111 MBTRK SALT LAKE CITY UT 145.0100 870111 MATTE2-2 CHARLOTTESUILLE UA 145.0100 870802 KMGC-1 DALE CITY UR 145.0100 870802 WATTS CHARLOTRESUILLE UA 145.0100 870802 KMGC-1 DALE CITY UR 145.0100 870802 WATON WA 145.0100 870802 KMGC-1 DALE CITY UR 145.0100 870802 WATON WA 145.0100 870802 KMGC-1 DALE CITY UR 145.0100 <			UT	14.1070 870701
HATMBL LOGRH UT 145.0100 8704010 HATM2-2 LOGRH UT 145.0100 870410 KETRU OREN UT 145.0100 870410 HATM2-2 LOGRH UT 145.0300 870111 HBTRK SALT LAKE CITY UT 145.0100 870701 HATF2-2 CHARLOTTESUILLE UA 145.0100 870802 KHGC DALE CITY UA 145.0100 870802 KHGC-2 DALE CITY UA 145.0100 870802 HATOHX HA 145.0100 870802 HATS 147000 870802 HATOHX HA 145.0100 870802 HATS 145.0100 870802 HATS LYHCHBURG UA 145.0100 870802 HATS 1100LEBURG HA 145.0100 870802 HATS LYHCHBURG UA 145.0500 870802 HATS HATS HATS HATS HATS <td></td> <td></td> <td></td> <td>145.0100 870701</td>				145.0100 870701
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KETRU OREIN UT 145.0300 870111 WB7EG PROVO UT 145.0300 870111 WB7TRX SALT LAKE UT 145.0300 870111 WA7TF2-Z CHARLOTTESUILLE UT 145.0100 8706120 WA1TF2-Z CHARLOTTESUILLE UA 145.0100 870802 K4H6C DALE CITY UA 145.0100 870802 K4H6C-2 DALE CITY UA 145.0100 870802 WA40HX HAPDN UA 145.0100 870802 WA40HX HAPDN UA 145.0100 870802 WA40HX HAPDN UA 145.0100 870802 WA41TSC HIDDLEBURG UA 145.0100 870802 WA41TSC HIDDLEBURG UA 145.0100 870802 WA41TSC HIDDLEBURG UA 145.0100 870819 WB40DJ ROANCE UA 145.0500 870802 WA410HG-10 <td></td> <td></td> <td>üt</td> <td>145.0100 870410</td>			üt	145.0100 870410
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µA7020 SRLT LAKE CITY UT 145.0100 870802 WA1FE-2 CHARLOTTESUILLE VA 145.0100 870802 K4HGC DRLE CITY VA 145.0100 870802 K4HGC-1 DRLE CITY VA 145.0100 870802 WA1GC-2 DALE CITY VA 145.0100 870802 WA10HX HARDX VA 145.0100 870802 WA10HX HARDX VA 145.0100 870802 WA10HX HARDX VA 145.0100 870802 WA155 LYNCHBURG VA 145.0500 870802 WA155 TIDDLEBURG VA 145.0500 870802 WA155 NIDDLEBURG VA 145.0500 870802 WA150 NIDDLEBURG VA 145.0500 870802 WA10HG-10 RICHNOND VA 145.0500 870802 WA10HG-10 RICHNOND VA 145.0500 870802 <			UT	145.0300 870111
MATTZ-2 CHARLOTTESULLE UR 145.0100 870802 KHRGC-1 DALE CITY UR 145.0100 870802 KHRGC-1 DALE CITY UR 145.0100 870802 KHRGC-1 DALE CITY UR 145.0100 870802 MB4D FRONT ROVAL UR 145.0100 870802 MARTS LYNCHBURG UR 145.0100 870802 MARTS LYNCHBURG UR 145.0100 870802 MARTS LYNCHBURG UR 145.0500 870802 MARTS LYNCHBURG UR 145.0500 870802 MATTSC-1 INDLEBURG UR 145.0700 870802 KBIND ORKTON UR 145.0100 870802 KBIND ORICHNOND UR 145.0500 870802 MAONG-10 RICHNOND UR 145.0500 870802 MATONG-10 RICHNOND UR 145.0500 870802 MATONG-10 RICHNOND UR <td></td> <td>SHLT LAKE CITY</td> <td>UT</td> <td>145.0100 870701</td>		SHLT LAKE CITY	UT	145.0100 870701
KHGC DHLE CITY UR 145.0700 870802 KHGC-1 DALE CITY UR 125.0700 870802 WB4D FRONT ROYAL UR 125.0700 870802 WB4D FRONT ROYAL UR 145.0100 870802 WA4DHX HANPTA UR 145.0100 870802 WA4NX HANPTA UR 145.0500 870802 WA4NX HIDDLEBURG UR 145.0500 870802 WA415C HIDDLEBURG UR 145.0700 870802 WA415C HIDDLEBURG UR 145.0700 870802 WA415C HICHOND UR 145.0500 870802 WA4112 UIRGIHIA BERCH UR 145.0100 870802 WH42L WTHEU	UA4TE2-2	CHARLOTTESUILLE	UA	145 0100 870802
KHBC-1 DALE CITY UR T3.100 BU002 KHBC-2 DALE CITY UR 145.0100 B70802 UB40 FRONT R0VAL UR 145.0100 B70802 UR40HX HARTS LYNCHBURG UR 145.0100 B70802 UR4NTS LYNCHBURG UR 145.0100 B70802 UR4NTS LYNCHBURG UR 145.0500 B70802 UR4NTSC NIDDLEBURG UR 145.0500 B70802 UR4NTSC NIDDLEBURG UR 145.0100 B70802 KBRIND ORKTON UR 145.0700 B70802 UR40NG-10 RICHNOND UR 145.0500 B70802 UR40NG-10 RICHNOND UR 145.0500 B70802 UR40NG-10 RICHNOND UR 145.0500 B70802 UR40NJ UR 145.0500 B70802 UR40NJ UR 145.0500 B70802 UR40NJ UR 145.0500 B70802 <td>MANCO</td> <td>DALE CITY</td> <td>UA</td> <td>145 0100 870802</td>	MANCO	DALE CITY	UA	145 0100 870802
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H9ZBD	RHINELANDER	HI	7.0930 870701
H9ZBD	RHINELANDER	11	14.1110 870712
4928D	RHINELANDER	11	145.0100 870712
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HD8MIK	KINGHOOD	HU	145.0100 870701
KRISY	TERRA ALTO	μu	145.0100 870605
W7ZAC	CASPER	HY	145.0100 870825
KA3IDH	CHEVENNE	HY	145.0100 870701
HA7TJU	CHEVENNE	HY	145.0100 870825

Please let me know of any corrections, deletions, additions or verifications to this file. Send them to me - K4HGC # K4HGC via one of the Packet Radio PBBS mailboxes. If you publish or maintain a Diglpeater/PBBS listing, please forward a copy of them to me so that they may be added to this list. Insure that the station you are correcting is marked Diglpeater or PBBS. Any call signs listed on this list will be purged if the Update date exceeds 2 years, therefor verification is necessary. The Master list contains over 1000 calls signs, of which 55% are diglpeaters and 45% are PBBS's. Please do not indicate if the station is a user, diglpeater or PBBS.

Don Bennett - K4HGC 15016 Carlsbad Road Woodbridge, Va 22193 (Home) 703-670-4773 (Office) 703-274-9355/56 (AHRAD BBS) 703-734-1307 (ARPARET) dbennetteame-hq (CampuServe)-72310,263 73's

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01 September 1987

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To: All TAPR Members Fr: Lyle Johnson, President Re: PSR

Last September, Packet Status Register (PSR), the TAPR newsletter, merged with Packet Radio Magazine (PRM). This resulted in your receiving up-to-date packet radio information on a monthly basis.

By February of this year, PRM was in serious trouble. Gwyn Reedy, WIBEL, Editor of PRM, lost the valuable assistance of Brad Voss, and was unable to secure additional volunteer help to continue the publication. Feeling the responsibility of continuing the magazine while he searched for help, Gwyn attempted to continue the effort virtually single handedly.

Unfortunately, the combined workload of editing PRM, continuing an active role in TAPR and FADCA, and the growing pains of his company (which he also "inherited" when he and his partner parted ways), proved to be too much. After getting the March and April issues of PRM out, Gwyn realized he was unable to do everything and still do a good job. Thus, reluctantly, he has stepped down from his directorship of TAPR, the Presidency of FADCA and ceased editing PRM. This decision occurred in late July.

Of course, this meant that TAPR had to locate an editor for, and attempt to revive, PSR.

I am happy to report that we have been successful in this effort. Effective immediately, Scott Loftesness, W3VS, TAPR Director and CompuServe's HAMNET Chief Sysop, has agreed to edit PSR for us. Scott is well qualified for this volunteer post, and we are grateful for his willingness to serve the TAPR membership in this way.

Scott desires that PSR be a meaningful publication for packet radio, and this means that he needs technical and operational articles. Please assist us in bringing a quality publication to you by submitting material to him. Material may be sent to the TAPR office at the address indicated on this letterhead, or submitted directly to Scott via CompuServe (upload on the DL7 database), or you may mail information to him at:

Scott Loftesness, W3VS Editor, PSR 16440 Rustling Oak Court, Morgan Hill, CA 95037.

The "July" cover-date issue is being assembled now, so any submissions you make will be for the next issue.

A final note. TAPR dues were raised last year from \$12 to \$15, partly to cover the additional expense of providing *PRM*. Since the dues were set in 1981, this has been the only increase. Providing the office, supporting packet development, and general costs to maintain the organization have resulted in costs greatly in excess of those anticipated 6 years ago. Therefore, the dues structure will remain as it currently is.

Thank you for your patience with us during this time of turmoil, and please join me in welcoming Scott as your new PSR Editor.

Happy Packeting!

Lyle Johnson, WA7GXD President

MEMBERSHIP APPLICATION

Tucson Amateur Packet Radio Corporation PO Box 22888, Tucson, AZ 85734

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Packet Status Register - July 1987

Tucson Amateur Packet Radio Corp. PO Box 22888 Tucson, AZ 85734

Second Class Permit Pending Tucson, AZ



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

The officers of the Tucson Amateur Packet Radio Corporation are:

Lyle Johnson, WA7GXD	President
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